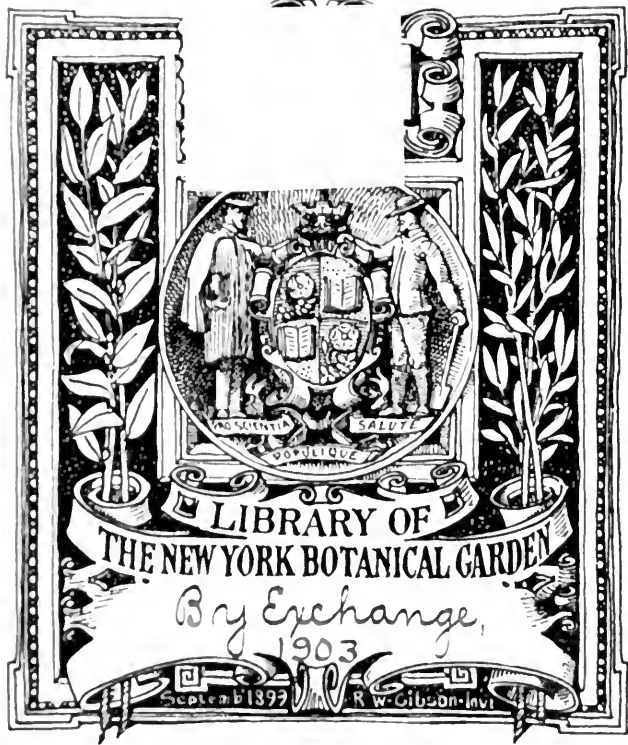


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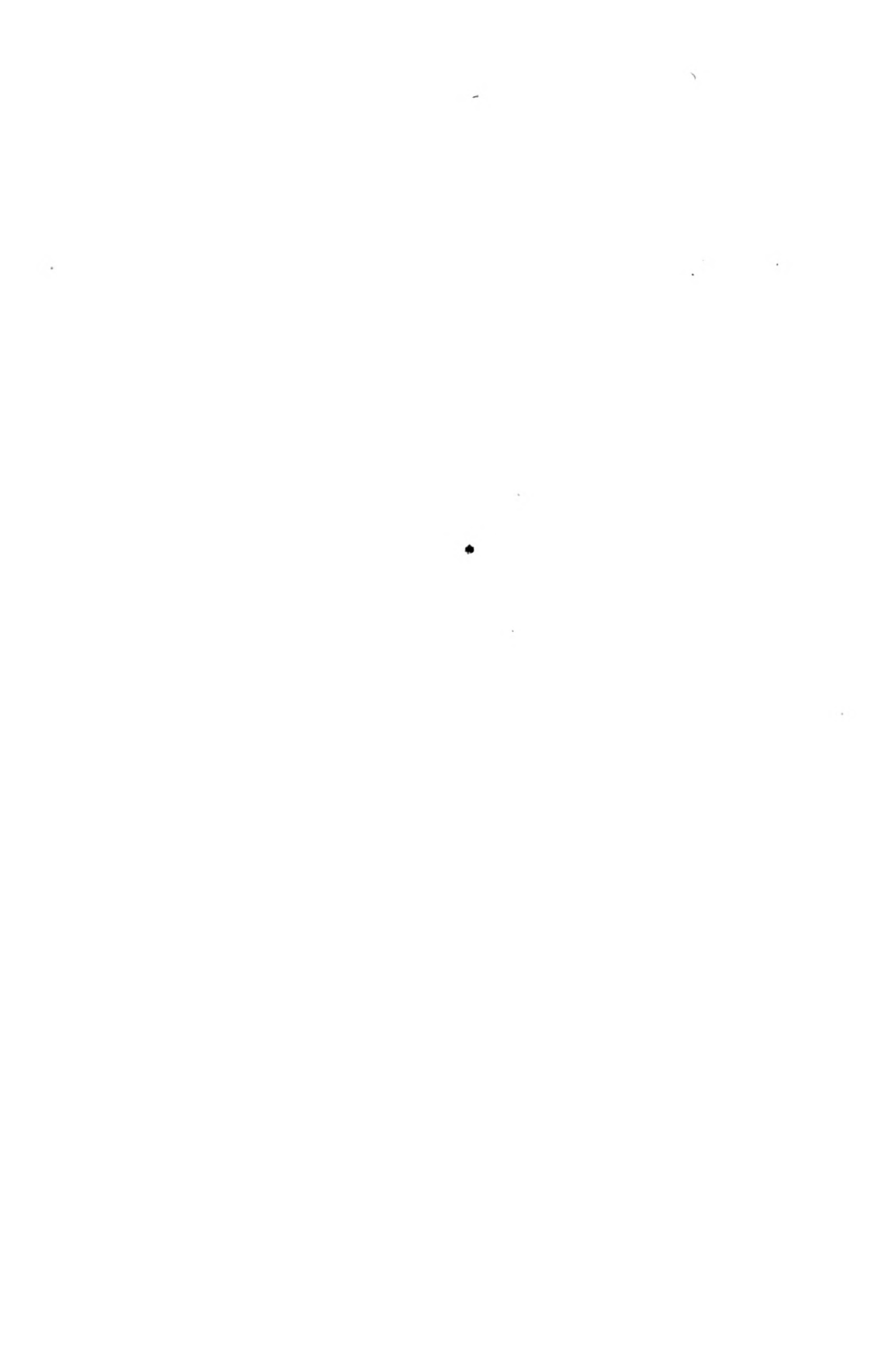


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ARBORICULTURE

VOLUMES 1 AND 2

A Magazine

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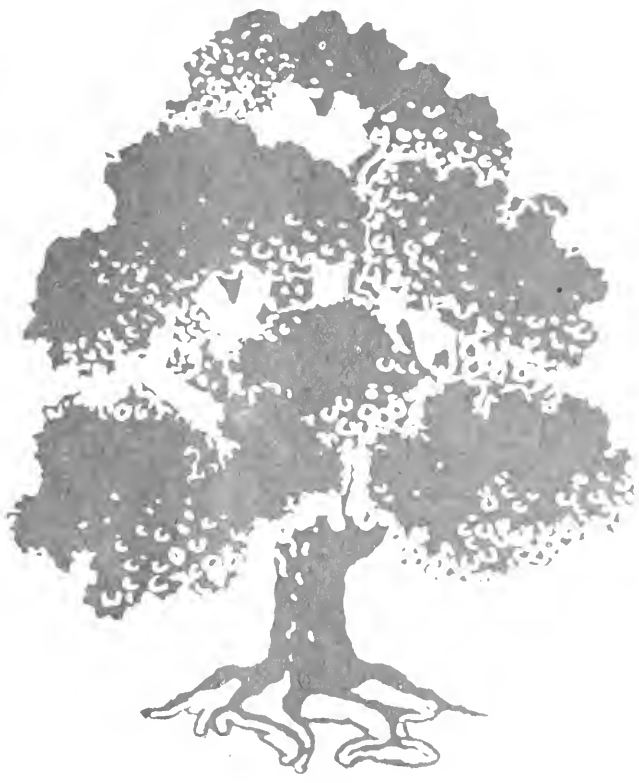
JOHN P. BROWN, Editor and Publisher.

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ARBORICULTURE

VOLUME 1.

NUMBER 1.



A Magazine of the
of Arboriculture

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1902-10

THE INTERNATIONAL SOCIETY OF ARBORICULTURE

OFFICERS

GENERAL WM. J. PALMER, President, Colorado Springs, Colo.
JAMES H. BOWDITCH, Vice-President, Boston, Mass.
JOHN P. BROWN, Secretary-Treasurer, Chicago, Ill.

ARTICLES OF INCORPORATION.

Article I. Name. The name of this corporation shall be The International Society of Arboriculture.

Article II. Purpose. The purpose of the Association is to introduce judicious methods in dealing with forests and woodlands; to advance and advocate a public interest in this subject; to promote the afforestation of unproductive lands; to encourage the planting and care of shade trees in parks, public and private grounds, and along streets and highways; to inspire an interest in our remaining native forests, and groves of ancient trees, and to seek their preservation; to supply information to railway officials in regard to timber culture for railway uses, and incite railway and other corporations to plant trees for economic purposes.

Article III. Membership. Any person may become a member of this society by the payment in advance of an annual due of two dollars. Any person who may contribute ten dollars toward the support of the society shall become a patron. Honorary members may be chosen by the executive committee.

Article IV. Officers. The officers of this Association shall be a president, vice-president and secretary-treasurer, who shall be elected at the annual meeting each year by ballot, and shall serve for one year, and until their successors shall have been elected and shall have accepted office, and when elected shall constitute the executive committee.

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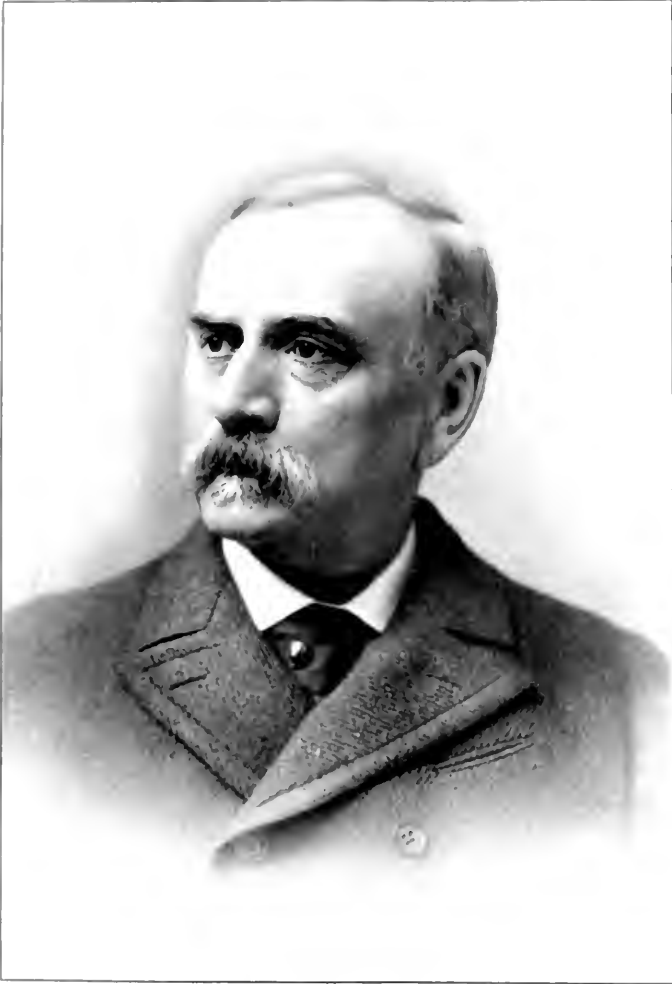
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J. Sterling Morton.

J. Sterling Morton.

J. STERLING MORTON was president of the International Society of Arboriculture, which office he held at the time of his death, on April 25th, 1902. It is proper that his portrait should be placed at the front of this, the first number of our Magazine. Mr. Morton was too well known by his countrymen to need any word of commendation at our hands. The best that can be said of any man may be said of our former president, he was an honest man. Among Americans none has done so much to create a sentiment in favor of forest perpetuation and the planting of trees, as the author of Arbor Day. His motto, "Plant trees," will be retained by this Society. Public men, after their career has closed, are often soon forgotten, their names remain as a faint memory in history. Mr. Morton, the politician, the Secretary of Agriculture, the editor, and as private citizen, will in a few years have faded from our view, but so long as a public school exists children will be taught to observe the beautiful custom of annual tree-planting, and the name of J. Sterling Morton will be revered as the father of Arbor Day.



DOUBLE NARCISSUS.

ARBORICULTURE

A MONTHLY MAGAZINE.



PUBLISHED IN THE INTEREST OF THE
INTERNATIONAL SOCIETY OF ARBORICULTURE.



Volume I.

CHICAGO, SEPTEMBER, 1902.

Number 1.

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Arboriculture

ARBORICULTURE is a science that teaches how great are the influences which forests or trees exert upon a community; not only from the economic uses for which wood is adapted for man's benefit, but in their far-reaching effect upon climate and thus on the welfare and permanence of nations and peoples. Arboriculture is full of interest and is of vast importance to mankind. Forestry, as usually understood, pertains to the management of forests. Arboriculture comprises forestry and also includes every subject relating to the growth of trees and their influences.

ECONOMICALLY

it considers the requirements of agriculture, manufacture, commerce and mining, and teaches the best means for supplying the needs of various pursuits. At what age or size timber should be cut and what should be cut as well as what should be preserved, so as not to destroy the forest, but perpetuate it; the preservation of an ample number of trees for seed bearing in order that nature may reproduce the forest after the demands of commerce and manufacture have caused the removal of marketable trees, are subjects for investigation.

ENTOMOLOGY

so far as it pertains to destructive insects which feed upon forest and shade trees, and practical methods for combating them, as well as

ORNITHOLOGY,

since birds are protectors of the forests. Both these are included in arboriculture, which also comprises the study of those fungus and other diseases common to many forest and cultivated trees.

PROTECTION OF FORESTS FROM FIRES,

how to prevent and how to extinguish them before too great an area shall have been destroyed, construction and maintenance of fire guards along natural base lines carefully prepared and managed so as to prevent the spread of fires which may have been started from any cause, are important subjects included in arboriculture.

IRRIGATION,

which is receiving increased attention as it deserves, is subordinate to arboriculture, for without forests to protect the snowfall, preventing its too rapid melting, as well as to regulate the electric currents which largely govern the movement of clouds and precipitation of moisture, there will be no necessity for irrigation works, since there will be little water requiring reservoirs or ditches.

HISTORY IS REplete WITH ILLUSTRATIONS

oft repeated in which nations have been destroyed and the people dispersed, or greatly reduced in numbers, where after the destruction of the forests such country became so arid and barren as to refuse sup-

port for the population which inhabited it. Arboriculture points out a way by which such disastrous results may not be visited upon our country.

THE PLANTING OF TREES

in forests, for economic reasons, on the streets and roadside for shade and shelter; in parks and private grounds for ornament, species of trees suited to various soils, altitudes, aspects and localities, are subjects pertaining to arboriculture and will be discussed from time to time in this journal.

NURSE TREES.

The influence of apparently unimportant shrubs and plants upon the natural reforestation of a region with more important coniferous or other trees upon the mountains and on the plains, is an important study. As, for instance, the little valued scrub oak which covers many mountain slopes prepares a special soil by collecting and holding its fallen leaves within its cluster of stems. Here the seed of fir, spruce and pine finds lodgment, germinates and is protected from browsing animals until it has outgrown its protectors and becomes the mighty tree so prized by man.

WOOD PRESERVATION.

The chemical preservation of timber, to increase its durability, becomes a highly important subject since our forests are being so rapidly depleted. The most economic and effectual methods of treating timbers to preserve them from decay, and a study of the antiseptic substances which may be thus used will be considered by those who are able to treat this subject intelligently.

It was well known to the earliest nations of history that asphaltum, bitumen, salt, and other material would preserve wood, flesh, cloth, and other substances from decay, while mummies and their wrappings and wooden caskets have lasted through thirty centuries.

By a proper application of this knowledge our forest products may be made more durable and thus avoid the waste of our present methods and permit the young trees to grow into mature timber.

HOW SOIL IS MADE.

The influence of trees and forest upon the soil, how they make soil by penetrating the clays and rocks with their roots, fertilize it

with their annual deposit of leaves, by adding vegetable mold to sand or clay, make it productive. Thus are agriculture and arboriculture brought into close relationship.

RIVER NAVIGATION.

The effects of forests in the mountain regions upon precipitation and retention of snow, and consequently the rapidity with which water flows into the larger streams, and the quantity of water thus borne away, has an important bearing upon the commerce of the larger rivers, deciding their regularity of flow, their flood and low water tide, and thus upon the question of economic transportation, which affects the citizens of other states far remote from the mountain forests.

AFFECTS LEVEE SYSTEM.

It also has a most important influence upon the levee system of the alluvial lands bordering upon the Father of Waters. In this manner Colorado and Louisiana have a community of interest which must be considered from an interstate point of view. And for the best interests of the entire nation arboriculture and arboreal influence should be better understood.

SOME QUESTIONS OF LAW

must be considered; the rights of the state as against those of the individual to prevent the absolute destruction of all forest trees upon large areas. How far the individual owner may go in destroying the birthright of all the people and affecting the conditions of climate is a question which must ere long be decided by the highest legislative and judicial authorities of the land.

THE SOURCE OF ALL IMPORTANT RIVERS

in the United States lies in the mountain regions. Most of them are dependent upon the snowfall and its time of melting to insure a navigable stage throughout the season. While it is true that continuous heavy rains beyond the mountain regions may swell the Mississippi into a flood, or a protracted drouth reduce it to an unnavigable watercourse, yet its regularity of flow and continuous navigable depth is maintained by the mountain snow which, without the protection of the forests upon the headwaters of the streams, melts quickly and flows away in a brief period.

WATER POWER OF STREAMS.

It is the regular flow of water which constitutes its value as a power factor. This also is controlled by the same potent cause, viz., the trees at the source of the streams, as is also the supply of water for immense herds of stock, and household uses.

PERMANENCE OF SPRINGS.

A great majority of springs issuing from the ground all over the valleys have their source of supply high in the mountains, being led by subterranean streams to their point of issuance, and are regulated by the same laws.

UNDERGROUND RIVERS.

Beneath the surface, at varying distances, from six feet in places to 100 feet in others, along the valleys of many streams of the West, there is an underflow, a broad river flowing toward the oceans and gulf, from which a million wells are supplied, and in places the tree roots reach downward to gather necessary moisture, and by capillary attraction it rises to the surface moistening numerous agricultural crops.

The snow upon the Rocky Mountains and other ranges melting, penetrates the rocky strata, percolating through the porous

masses and flowing between the crevices of rocks, through gravel and sand, may require years to reach the points from whence the water is taken, in the Dakotas, Nebraska, Kansas and other distant states, abundant at times, scarce in other years, so that a short supply of snow in the Rockies may not be felt for a decade at some distant point.

ARBORICULTURE

is thus of vast importance as a national question. To solve the problems arising in regard to forest perpetuation a high degree of statesmanship will be required, men who can rise superior to the petty intrigues of partisan politics and in a patriotic spirit look far into the future and recognize the vast requirements of the nation with its increased population half a century hence, see needs of agriculture, of the manufactories which will soon be required to import lumber from the tropics; see the demands of the railways for ties and lumber, requirements of the mines in timbers for their maintenance, and with still greater vision see the disastrous results of the present policy of forest negligence.

This is arboriculture.

LETTER FROM VICE-PRESIDENT
BOWDITCH.

It is not infrequently asked, "Of what special use is the International Society of Arboriculture? Why is it not, for instance, better to join the American Forestry Association?" The answer is a simple one. "Join both if you take a wide interest in the subject and can afford it," but if you wish to give power and working ability to John P. Brown, who really represents the International Society, send your subscription, whatever it may be, to him.

Mr. Brown's name is a common one, and he has the good gift of seeing and handling common things in a masterly way. Practical, businesslike, tireless; one day perhaps in California, next week in New Orleans, and the following week in Boston. Distance seems to lend enchantment to the view, and his far-reaching grasp of the situation is interesting and inspiring.

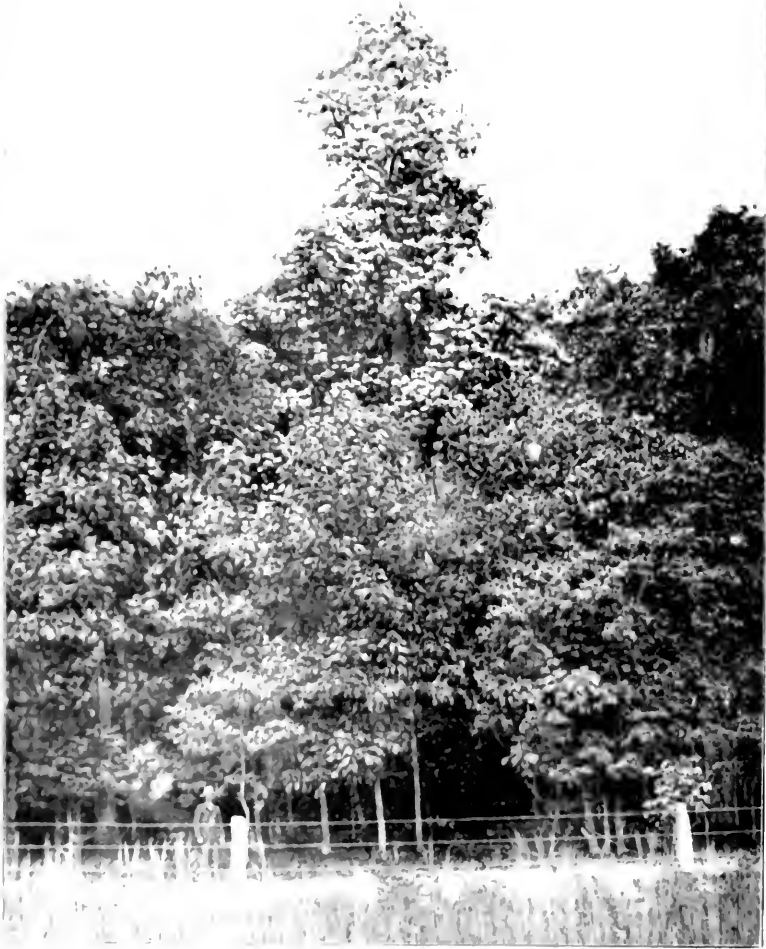
The presidents of the great railway systems employ him as a practical expert to

grow and encourage growth of tie timber; the large mine owners of the West accept his advice on forestry matters, and these two classes of men do not give ear to every enthusiast who presents himself to their notice, unless deep down they see the business end of a plain proposition. Wherever Mr. Brown appears he leaves behind the mark of his individuality; a belief in the man and his work.

We all of us like to consider ourselves good business men, and if we have work to do we try to employ skilled assistants to accomplish it, to the end that we may obtain credit for the same, and most of our best work is done for us by others in this way.

The International Society of Arboriculture is made up almost wholly of men and women who believe that Mr. Brown can and will manage their public and private forestry affairs conscientiously and well, and that the whole country is the gainer by his work.

By giving him your support you incidentally help also other similar organizations.



"THE LAST OF THE MOHICANS."
CATALPA, 6 FEET IN DIAMETER, 101½ FEET HIGH.

The latter are more or less tied to certain territory, certain fixed objects or people, and consequently are not so free to act as the International Society, which can move instantly in whatever direction it chooses, thus completing the opportunity.

The success of all great movements depends largely upon leadership. A good

leader attracts supporters; supporters enable the leader to enlarge his field of operation, and the public listens. If the leader voices the public, the work is done, and done well. Let us give Mr. Brown his chance.

JAMES H. BOWDITCH.

Boston, Mass., Aug. 6, 1902.

The *Catalpa speciosa* as a Railway Timber Tree.

Paper of John P. Brown, read at a meeting of the National Roadmasters and Maintenance Society, Milwaukee, Wis., September 9, 1902.

IT must now be patent to every railway official that within a few years some form of cross-ties other than wood will become a necessity, unless special efforts be made to grow trees suitable for this purpose.

For a third of a century I have studied the problems of railway cross-ties; even at that early day the disappearing forests showed that grave results would follow the wasteful methods of Americans in wood-craft.

In 1876 plans for metallic ties were prepared by my attorneys, but upon a fuller investigation of the subject these were withdrawn, as I had become convinced that the long lines of our railways, the sharp mountain curves, maximum grades, increasing loads and heavier trains, together with their excessive cost, would make metal ties impracticable; and this has been proven to be correct.

The various native woods were next considered, white oak being the standard wood for ties. But white oak must soon become exhausted and a new supply could only be produced in a century. At that time only the choicest timber would be accepted and a critical inspection rejected large numbers which would now be eagerly seized upon.

General William Henry Harrison had, in 1818, called attention to the catalpa tree of the Wabash valley, as being of extreme durability. Mr. James M. Bucklin, a civil engineer, in 1826 had advocated the use of the catalpa for ties.

Several railways in the early part of the past century made use of a limited number

of catalpa ties, but the great abundance of timber prevented any general use of this wood, changes in management contributing to this result, and causing as well the loss of most records of its use.

Mr. Barney, the car builder, of Dayton, Ohio, Dr. Warder, of North Bend, Ohio, and Robert Douglas, of Waukegan, Ill., about 1876 created considerable interest in the catalpa, by various publications. I became convinced that these gentlemen were right and now after a quarter of a century of investigation am assured in regard to *Catalpa speciosa*:

1. It is the most rapidly growing tree in America that possesses economic value.

2. A greater quantity of valuable wood may be produced upon a given area in a specified time than from any other American tree.

3. The wood is the most enduring of all our trees.

4. It succeeds over a greater range of territory than any other valuable tree of this continent.

5. Its habit of growth is upright, with long trunk where it has an opportunity, thus differing from all other forms of catalpa.

6. The chemical constituents of the wood are so resistant of decay as to make expensive artificial wood preservation entirely unnecessary.

7. The roots are strong, vigorous, large and deep, extending far in every direction, holding so firmly in the earth that storms do not blow them over. I never knew a catalpa to be blown over by wind.

8. It is less subject to disease and

attacks of insect enemies than any other tree of my acquaintance. Only one worm, the catalpa sphinx, attacks it, and that is easily controlled by spraying, while the trees are never seriously injured by the sphinx.

9. The wood has the same texture as hatternut, firm enough for tie purposes, and holds a spike well.

10. For inside car finish it is admirably adapted, partakes of high polish, has a handsome grain and is a superb wood for furniture and inside finish.

11. It is easily manipulated with edge tools.

12. Its strength is ample for all requirements in railroad work.

SOME OBJECTIONS TO CATALPA CONSIDERED.

In proceedings of Engineers' M. of Way Association, Chicago, 1900, the engineer of Fort Scott and Memphis Railway mentioned Farlington plantation.

I agree with the gentleman, the money spent has been lost. Twenty-seven hundred trees cannot be grown on one acre of land. Yet that is the number on the 1200 acres, 3,000,000 trees, enough to cover 17,000 acres. Had they been properly thinned fifteen years ago there could now be taken from this tract one million first-class cross-ties, worth to any railway cognizant of their value a million dollars. As it is they are worthless. Every farmer within ten miles or more of the Farlington plantation gives the same verdict, "entirely too thick." Trees must have space in which to expand their roots and secure moisture and sustenance. The farmer who would sow his corn with drill as thickly as wheat, would fail to secure a crop.

Intelligent supervision is as necessary in growing trees as in maintaining a railway. The engineers for the Pennsylvania lines said their experiment had been disappointing. A sad fate of too much lineman. The most fatal disease of street and railway trees is the lineman's butchery. In the history of this experiment something may be learned.

General J. E. Miller, while superintendent of this division of the Pennsylvania roads, planted 200,000 catalpa trees, about 1883, setting them along the right of way. Soon afterwards he was promoted and others had charge of that line. Neglect has been their portion ever since. Unfortunately a large majority were of the Southern or worthless catalpa, yet some were *speciosa*.

If telegraph lines must be on both sides of the track and linemen are supreme in their influence, then it is folly to plant any tree on right of way. A special tract for forest will, in such case, be the better. Yet there are thousands of miles of right of way where they may succeed, and should be utilizing the ground.

The estimate formed of any object depends upon the point of view. If the vision be narrow, then only an imperfect knowledge is obtained, while if the subject be examined broadly, investigating from every source of information, a correct opinion will be formed.

The Pennsylvania engineers have based their estimate upon wrong premises.

Mr. Curtis, in California, had experience with many catalpas from the South. Had he known the Wabash valley catalpa tree and seen those which I observed in the San Joaquin valley and about San Jose, he would not have condemned the best friend of the railway. However, Mr. Curtis was right in that the catalpa needs moisture. In California irrigation would be a prime necessity.

To secure seed of *C. speciosa* from trees sixty to one hundred and more feet high, with few seed pods, is a very costly operation. While to drive along the rows of low branching trees of *C. bignonioides*, haul the pods down with a garden rake into the wagon is an easy matter.

About half a century ago the Iron Mountain Railway Company planted 200 acres in southeastern Missouri, with catalpa trees for cross-ties. It was not known at that time that more than one variety of catalpa existed. When they produced seed a western firm of seedsmen collected a thousand pounds of this seed, which was distributed all over the United States. After waiting many years and realizing no benefit from the plantation, most of the trees were destroyed.

I visited the place in autumn of 1901 to procure seed, and upon investigation found the trees to be *kampferi*, from Japan, and *bignonioides*, from the South, with many hybrids, but not one was *speciosa*, the large forest tree of the Wabash valley.

And so a vast majority of trees spread throughout the United States are worthless scrubs. To this fact one may trace most of the failures urged as objections to this tree.

An avenue of *C. speciosa* trees in Topeka, Kansas, is one of which any city might be

proud. Each tree is tall and symmetrical, without any special pruning, and each has a diameter equal to one inch for each year's growth.

Several large trees at Hutchinson, Kansas, have similar records.

I recently visited, in southern Illinois, the noted big catalpa, "The last of the Mohicans," 101½ feet high, six feet diameter, 150 years old at time of its death. It had ceased to grow many years ago. It was hollow, but its thin shell made 247 very large posts. When it was yet sound it would have made 114 ties or 4,500 feet b. m. of lum-

ber. Note illustration big catalpa halftone. Another tree growing in a swamp I found to be twenty-four inches diameter, thirty-five feet to first limb and sixty-five feet tall. Estimated to be twenty-five years old. It could be sawed into twenty-five ties.

I have found *C. speciosa* growing in Massachusetts, New Hampshire, California, Utah, Michigan, Texas and Florida, and almost every state between, having records of measurements bearing out the rule of one inch diameter growth per annum. Even on bleak Cape Cod, Massachusetts, it was growing thriftily in poor sandy soil.

TO FORM A CATALPA PLANTATION.

If desirable to sow the seed, make rows three and one-half or four feet apart, with broad shallow drills. Use fifty pounds seed per acre, cover very slightly. Hoe carefully until fourth leaves appear, then horse cultivation. It would be far preferable to buy the trees if obtainable.

These should be transplanted in spring; never in autumn, where freezing occurs. Lay off ground eight by eight feet, deep furrows one way, plant at intersection. Each man should set 1,000 trees per day. Cultivate as for corn which may be grown between rows of trees and thus pay expense of cultivation. After eighth year begin taking out alternate trees for posts, continue this as convenient, leaving trees finally sixteen by sixteen feet, one hundred and seventy per acre, 510 trees having been removed for posts. Cultivation should be continued at least once or twice a year, until ground is shaded sufficiently to keep down grass. Very shallow harrowing is best not to injure roots.

With good treatment trees at twelve years will make one tie each. At sixteen years three ties each, or 510 per acre.

At twenty years they will make six ties per tree, 1,020 per acre, while at twenty-five years twelve per tree or 2,040 per acre.

It is evident that trees are of far greater value at twenty-five years than at twelve.

The evidence of many experiments demonstrates that a road tied with catalpa is good for a third of a century.

MINING TIMBERS.

Many railways have also mining interests in which the young growths, removed in

thinnings, will be of value as props, and mines may be supplied with mine ties and props from special plantations at very moderate cost.

The catalpa naturally is found among other forest trees, seldom alone, and may succeed in cut-over tracts with little or no cultivation, overcoming other slower growths.

Complete directions for growing trees from the seed to the mature forest, will be given from time to time, and questions answered as they may occur.

PETROLEUM AN ALLY OF ARBORICULTURE.

It has been the practice in California for the lumber companies to cut the marketable trees of redwood and pine from the mountain slopes, and to leave inferior and smaller trees, which practice would permit natural seeding of the cut-over tracts, and enable nature, in due course of time, to produce a new forest. But the scarcity of coal upon the Pacific Coast has made cordwood the only available fuel.

Cheap Portuguese labor is employed to finish up the trees left by the lumbermen. The fuel for railway engines, manufactories, steamboats, as well as household use, has been principally wood. The result has been to make barren hundreds of square miles which were formerly forest-covered, and which is non-agricultural in character.

In places the soil has been eroded from these mountains since removal of the timber growths, and it is worthless for any purpose whatever.

The introduction of oil for fuel, its adoption by railway companies to replace wood,



CATALPA PLANTATION, 65000 TREES, AT PROVO, UTAH, IRRIGATED,
PLANTED BY RIO GRANDE RAILWAY.

and the general extension of oil-burning appliances by manufactories, for making steam, will save to California much of her forest area.

The Standard Oil Company has thus become one of the greatest benefactors of mankind. It would be impossible for smaller corporations to manage the production, storage, transportation and disposal of oil in a manner which would so revolution-

ize this matter of fuel over so great a territory as this company now is doing. What is said of California is true of Texas and many other portions of America where wood is being replaced by oil for fuel.

It is to be hoped that the great land-owners will appreciate these facts and retain a large portion of the inferior trees for seed bearing, and protect the young growths for future timber supply.

The Quail.

THE quail is not only a most cheerful, beautiful and harmless tenant of our fields and groves, but it is the ideal poultry bird.

Its business in the summer months is to act as scavenger and destroyer of the larvae of the codling moth, Hessian fly, etc. But great as is the use of this bird in this line of work, its value for food should not be overlooked.

One pair of quails will produce two broods in one summer, each brood numbering from fifteen to eighteen birds. Thus at the end of one year, if left free and properly protected, there will be for the second year sixteen pairs of quails. These sixteen pairs will each produce an average of thirty to the pair, or 480 for the second year. I hail with gladness the arboriculture magazine, because it means a restoration of trees to every farm, village and town. These trees in a few years, if properly treated and protected, will bloom in beauty, give shade and verdure, and furnish fuel and lumber, so much needed for the comfort and excellence of our homes.

But, if as soon as one of these little trees began to flourish and send its graceful, slender branches heavenward, some vandal would wound, or peel, or break it, how long would be the time before the planted trees would grace and gladden the earth?

How can the happy, graceful little quail, so full of life and beauty, multiply and replenish the earth according to his capacity, when every time he shows his head some inhumane hunter wounds or kills him? How can he afford the great assistance in the support of the home, that his nature meant

him to render, when guns, dogs, boys and men (?) lie in wait for him in the corners of the grove, in the thickets, and in the meadows?

Let the young trees and the young birds grow together as God meant they should, and they will gladly contribute to man's happiness, to his comfort, and to his support. Let this work of educating the people up to a proper appreciation of their relation to nature, go on with zeal and persistence, because in it is high hope for moral and mental advancement at a more rapid rate than the world has ever known before.

God speed your paper, and God speed the day wherein men shall worship truly in the fields, in the groves, and in the valleys, and on the mountain tops, as well as in the homes and in the cathedrals.

May the time soon come when the murderous shotgun will be heard no more in the land! When men who have a surplus of quail on their farms will catch them in nets and kill them humanely, utilizing them as valuable poultry. Then truly will we realize that the beautiful bird, too long used as a target, has desired to wander contentedly in orchard and field, manufacturing our surplus harmful insect life into delicious human food.

ISAAC W. BROWN.

The Editor of ARBORICULTURE resided in Kansas from 1866 to 1878 and well remembers how abundant were the wild fowls of those beautiful prairies. Quails and prairie chickens were especially numerous.

In 1874 that terrible plague of grasshoppers occurred. These insects came in such numbers that the scintillations of

light from their moving wings gave the appearance of a dense snowstorm. The people had grave forebodings of the destruction which was soon to follow. Field after field of corn and all growing crops were eaten in rapid succession. Trees were stripped of their foliage in a day. Fruit disappeared quickly as the invading armies entered an orchard. Peaches, unripe, were gathered as never before. The flesh being devoured by the insects, the seeds left clinging to the leafless trees were all that remained. Gardens were destroyed and everything edible.

The scourge of the Rocky Mountain locust can never be forgotten by any who witnessed this visitation. Nebraska, Kansas, Iowa, Missouri, and Indian Territory were great sufferers.

The writer had a young nursery, the yearling trees being tender and full of sap. In a few hours these were destroyed, leaves, bark and wood were entirely consumed. All that was left was a bare tract of prairie land, in which were a million holes where the locusts had eaten the roots. All had lost their crops, all were pioneers, many were left in poverty. It was not known how the people could live through the winter.

The life work of the locusts is finished when they have deposited their eggs, which are placed in holes on the roadway, and hard tracts of land, and the insects then die.

During the winter powder and shot were in demand, a general slaughter of birds was in progress, so long as there were any to slay. A thousand carloads of quails and prairie fowls were shipped to Eastern markets.

Sample copies of ARBORICULTURE are being sent to some who have not subscribed. If you receive a copy we shall be pleased to receive your subscription—\$2 per annum. This also constitutes you a member of the society.

Brief articles are desired from every portion of the country. Anything of interest along the lines of arboriculture.

Questions as to management of forests or trees will be answered so far as possible, in the department of inquiries.

Snow and rain and frost came as usual, but the tiny eggs were well protected by their varnish-like cover, and with the warm days of spring began to hatch and the little wingless hoppers emerged by myriads. They ate the tender grass and grew rapidly.

At this stage a pair of quails would require ten thousand such insects with which to feed their family for a single day. In a month a quarter of a million would be devoured, while double this number would scarce suffice for the larger prairie fowls.

Had the birds been spared these locusts would have been eaten by them before they acquired wings, and a greater misfortune which was to befall the prairie region would have been averted; but there was not so much as a barnyard fowl or songbird in many localities, all had been destroyed.

Crops were planted in the spring, seed having been generously contributed, together with food and clothing for the pioneers, by the more fortunate residents of the Eastern states.

The locusts, in time, became full grown, cast away their baby skins, emerging with wings for flight. They also became more voracious, and a second time every vestige of growing crops was swept from the prairies.

What are we doing today with the quails? They are slaughtered each winter as soon as the laws permit. The great packing houses encouraging their destruction by boys and hunters, the birds are shipped to the cities, kept in cold storage and thus prevented from destroying the noxious insects which have become so burdensome to the farmer.

Will we ever learn to know our friends?

Mr. John D. Rockefeller and others, while they have given freely to educational and other benefactions, have exceeded all other of their gifts by supplying the West with a fuel which is destined to perpetuate the mountain forests.

DEAR MR. BROWN: I thank you for ARBORICULTURE. You are engaged in a much-needed work.

Yours very truly,

D. W. FISHER,
President.

Hanover College, Hanover, Ind.

A War Upon Goats.

THE Western press reports from Grand Junction, Colo., mention the killing of six hundred Angora goats valued at \$8,000, by fourteen masked men, presumably cattle herders, and from Oregon it is reported two hundred and eighty sheep were slaughtered by settlers and cattlemen the same day.

While not excusing lawlessness in any form, there must be some good reason for the antipathy which has for many years been shown by Western settlers and cattle owners to the herding of sheep and goats.

Where large herds of sheep are fed the animals destroy the grass and ruin the pastures for all other animals. And where goats are herded in large numbers all forms of vegetation are swept away as by a fire.

In Arizona, New Mexico and Southern Colorado, as well as many other places in the semi-arid countries, there are immense herds of goats which have made the mountain sides so bare of grass that other animals cannot exist, at the same time all the

coarse herbage is devoured by these animals, and every seedling tree destroyed. It is utterly impossible for forests to survive where goats are pastured.

This is simply a repetition of Spain's experience upon her mountains, which resulted in the downfall of that nation, because no forest trees could grow where goats were so numerous. After the forests were destroyed and climatic changes made agriculture so difficult, the nation began its downward career.

The proper way is to punish the men who lawlessly commit these acts of violence, and to enact laws which will confine the herding of sheep and goats to those lands where grass is abundant, and limit the number in each herd so as not to destroy the pasturage—more especially to keep them forever out of the forest regions.

Our cut shows the effects in Southern Colorado, where no shrubs or small trees have been left—everything swept away by these animals, which are kept in large numbers by the Mexican ranchers.

THE ABELE FOR WOOD PULP.

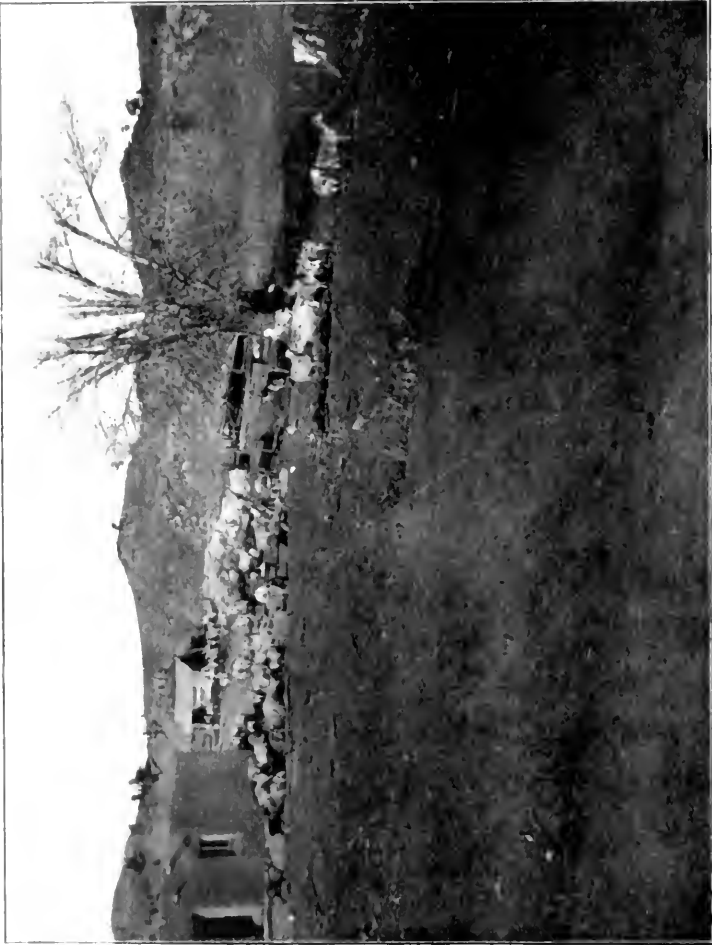
The immense demand for paper and the great quantity of wood used in making pulp to supply this demand calls for the replanting of the denuded acres which have been cleared in this manufacture with some hardy, quickly maturing trees, which will provide a future crop of wood to continue the paper industry.

Such a tree is found in the Abele, or silver poplar, (*Populus alba*), an importation from the countries of Europe, but now become wild in America. This tree is found in every great city; almost the only shade tree which will stand the soot and smoke of the cities, survive the continual digging for street, gas and water improvements, and the almost exclusion from air and water by asphalt and other pavements. The suckering of the abele is a great nuisance on lawns and in grounds not paved, but this habit is not objectionable in a forest.

Frequently there are neglected spots where this tree has surrounded itself with several thousand sprouts which are suitable for forest planting, or they may be grown from cuttings of the branches or of the

roots. Like others of the *Populus* family, the silver-leaved poplar is of quite rapid growth, under favorable conditions. It succeeds in all soils and in every conceivable location, although preferring a fairly rich soil. It will grow upon the mountain slopes of the Eastern States, increasing from three-fourths to one inch in diameter per annum, thus making wood very rapidly. In Europe the tree is used for making box boards and other coarse lumber. The wood is white, and is similar to the cottonwood in texture. It has never been considered of value for lumber in the United States, owing to the former abundance of better timber, but there are very many places where it would serve a good purpose for lumber.

In twenty years there may be grown from fifty to sixty thousand feet b. m. lumber per acre from the abele—estimating 170 trees per acre, twenty inches in diameter and twenty feet length of trunk, which it is capable of attaining. Or considering it for pulp production, there would be 6,500 to 7,000 cubic feet of wood per acre. These facts commend themselves to owners of mountain lands as a profitable investment for capital.



A GOAT RANCH IN NEW MEXICO.

Correspondence and Inquiries.

This department will be open for correspondence and inquiries upon subjects pertaining to Arboriculture in its broadest sense and will be a special feature.

MR. JNO. P. BROWN,

Sec'y International Society of Arboriculture.

DEAR SIR: Yours of July 1st, written at Denver, was duly received. I feel under many obligations to you for writing me so fully on the subject of cross-ties and tree-planting. Those who manage our railroad are studying the timber question as they never have before. With the enormous consumption of timber by steam and street car lines, and the wanton destruction of forest trees by fire and many other unnecessary causes—frequently avoidable—we all must realize that the available timber suitable for cross-ties cannot last many years. We know of no form of construction in this country which will enable the railroad companies to do away with cross-ties, and I fully agree with you, that no metal or composition tie has yet been invented which suits all the conditions in this country so well as wood. Some of the men who have given the subject a great deal of thought, seem to think that wood will be the cross-tie material for a great many years, and this will be made possible by the treatment and economical use of inferior timber.

The idea of growing and taking care of timber in this country does not seem to receive any serious consideration by a large majority of the railroad men. They are too busy to think of waiting for tie timber to grow. Many of the statements you make about growing catalpa trees are new to me, but they have set me to thinking a good deal on the subject, and one gentleman to whom I talked, remarked, "I believe there are places in the San Joaquin valley, near the rivers, where catalpa growing would pay as well as many of our deciduous fruits."

The trouble is that good land has increased considerably in value and the American people want to see profitable results so quickly that it is hard to get them interested in timber planting or cultivation. However, the time must soon come when ties will be very expensive; then railroad companies in many

places will utilize their wide rights-of-way by growing their own timber. I am satisfied that the catalpa would grow well on many of the lands in the San Joaquin valley, where there is plenty of water, and when I go up that way I shall look into the matter.

I did not know, until I read your letter, of the great difference in the varieties of catalpa.

We have, I think, a supply of pine tie timber to last the lines on the Pacific Coast a great many years, and I suppose by treating the timber and using tie plates, we can use wooden ties for many years. The same is probably true of the Southern states, but with the enormous consumption of tie timber by the American steam and electric lines, and the recent demand for our tie timber in other countries, it seems as if it will be impossible to adopt any preserving methods or grow timber fast enough to supply the entire demand for ties a great many years.

On account of the scarcity of redwood ties and their poor lasting qualities, recently our company—the Santa Fe—has been treating a great many sawed mountain pine ties. It is rather soon to say just how they will last, but so far, where we have a good roadbed, they are quite satisfactory. The New Mexico pole tie treated at Las Vegas, is very satisfactory, but this Arizona sawed timber is very different and will not last so long. Ten years ago the redwood ties would last very much better in the ground than the redwood ties we now get. The inspection was more rigid and we got more butt timber. Recently the redwood lumber is in such great demand not only at home but in the islands, Mexico and Central America, that only the poorest timber is cut for ties. I am of the opinion that the redwood grown within a few miles of the coast lasts better in the ground than the redwood grown in the interior. The redwood is now getting scarce within a few miles of the coast.

If you should come to Los Angeles at any

time I shall be glad to have you call on me. Again thanking you for writing me so fully, I am,

Yours truly,

J. E. McNEIL.

Roadmaster So. California R. R.
Los Angeles, Cal., Aug. 11th, 1902.

To MR. JOHN P. BROWN:

Within the past month I have written to all the people to whom your society sent seeds of the catalpa tree, and have replies from most of them.

Seventeen different trials were made in as many parts of our colony and only one reported a failure. Two had trees eaten by slugs, and all the rest are fairly successful. The Dominion Forestry Department have decided to plant the catalpa pretty heavily this spring. They have 1,000 two-year-old trees. I have also a letter from a government biologist and he wishes a few pounds of seed. I shall want a quantity more.

Yours truly,

R. H. McCALLUM.

Devonport, Auckland, New Zealand, July 18, 1902.

This letter shows how far-reaching the influence of our Society has been.

FROM A RAILWAY SUPERINTENDENT IN NEW YORK.

"I have heard of the catalpa tree, and it strikes me that if it will endure the climate of Pennsylvania and progress in its mountainous soil we could make good use of it indeed. I shall be very glad if you will furnish me some information concerning its usefulness, its character, the soil it is adapted to, the durability of the timber and the merits generally of the tree."

The majority of these questions are fully answered in Bulletin No. 1: The Catalpa. The tree is growing very satisfactorily in Pennsylvania, standing the climate perfectly well, but as elsewhere in elevated regions or northern latitudes, but one variety of the catalpa, and that *speciosa*, is hardy. While better results may be expected in alluvial soils, rich lands, and under good culture, yet it compares favorably with other trees. In mountain lands, rough and difficult to cultivate, any tree will be of slow growth.

The requirements of the mines in Pennsylvania for timbers, will always be such as to make a demand for small sized, durable and strong trees. There is no good reason why the catalpa will not supply this demand in an economical manner—certainly in much less time than oak, pine, chestnut or other native trees.

Where railway and mining companies own large tracts of land, from which the timber has been removed, I do not know of any better use to which it can be placed, than to plant the catalpa tree, with a principal object of obtaining mine timbers.

MANAGEMENT OF CATALPA TREES.

EDITOR ARBORICULTURE: My catalpa trees, planted last year, do not seem to be straight enough. Kindly advise me how to treat them.

We have cultivated our trees, planting corn between the rows, both this year and last, and by comparison with others which have not been taken such good care of and which were planted at the same time ours were, we find that our trees have made much more satisfactory growth than those.

H. C. R.

Fort Wayne, Ind., July 31.

Any time after the leaves fall in autumn cut the trees off near the ground. In the spring several shoots will start to grow from the stump; rub off all but one for each tree, the force in the roots will push this one shoot upwards rapidly and it will be straight.

The cut shows a tree which was five inches diameter when cut down and the resulting growth of six months reached a diameter of three inches and height of sixteen feet. Each leaf was two feet across. The tree stood on the grounds of J. L. Ebner, Vincennes, Ind.

Governor Furnas, of Nebraska, writes: "Mr. Brown, I can beat your catalpa tree, I have one eighteen feet."



Six months old catalpa.

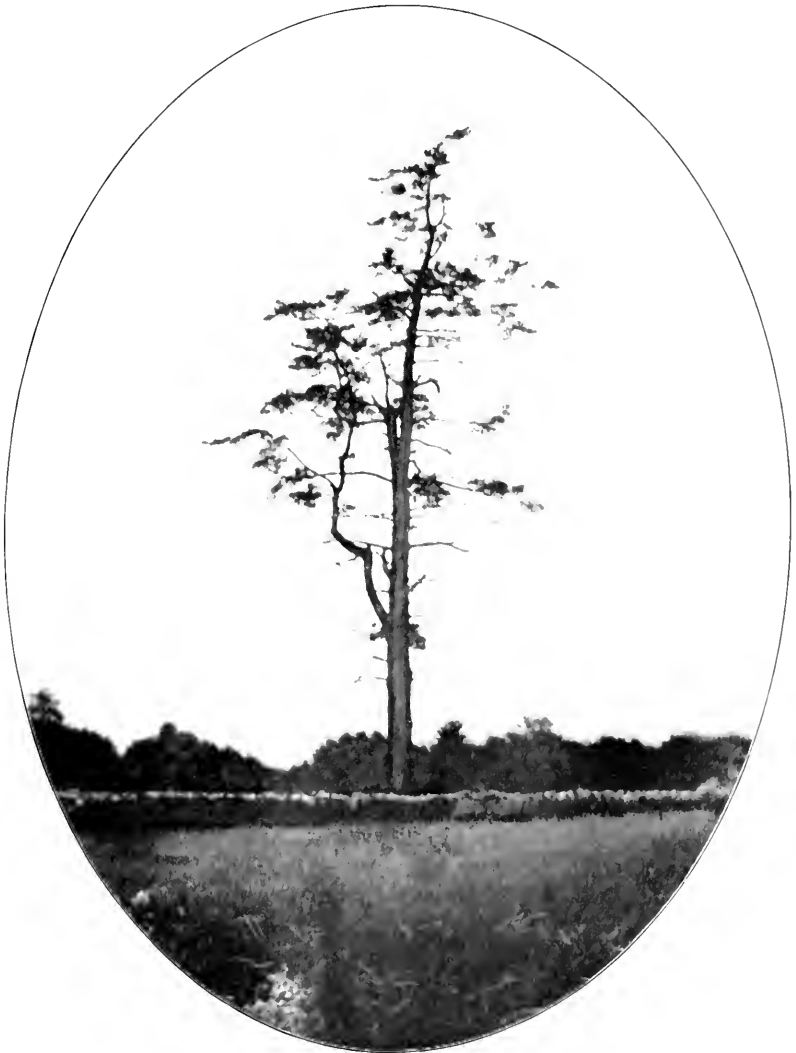
The Celebrated Batchelder Pine

A FEW miles from Reading, Mass., there stood until 1890, an immense white pine tree which was noted for its beauty and symmetry as well as its enormous size. The tree was cut to prevent its falling when it might do harm. As it lay upon the ground its actual size could readily be measured.

With the venerable Jacob W. Manning, whose guest I was, I visited the locality July 26, 1891. The log was 112 feet long. At the ground it measured eight feet in diameter. At ten feet from the ground it

was forty-seven inches diameter. At thirty feet it was forty-five inches, while at fifty feet it was thirty-seven inches. The contents in board measure was six thousand, seven hundred and fifty feet.

By counting the annual circles of growth it proved to be 133 years. The average annual increase in lumber 50.7 feet. Its value at forty dollars per thousand, \$270; an acre, with thirty such trees, \$8,100; annual increase per acre, \$60.90. Who says pine will not pay as a farm crop in New England?



THE CELEBRATED BATCHELDER PINE.

Book Reviews.

Doubleday, Page & Co., 31 Union Square, New York, in *The World's Work*, announce *Nature's Portraits*.

A portfolio of the most wonderful portraits ever made. All being from wild life, fishes in the water, wild animals in the woods and wild fowls in their native habitat. ARBORICULTURE recommends its readers to send for particulars.

Also *American Food and Game Fishes*, by David Starr Jourdan and Barton W. Everman.

In this volume of 600 pages there are ten plates in color, sixty-four full-page life photographs and 208 text cuts. A remarkably valuable and handsome work.

This firm publish that magnificent magazine, *Country Life in America*, which should be found in every home.

The World's Work contains full-page portraits of Attorney General Knox, Vassili Vereschagin, the famous Russian painter, Prime Minister Balfour, two contrasting pictures, the Old and the New Northwest. Secretary of Kansas State Board of Agriculture, F. D. Coburn, at his desk, is a true likeness of this foremost agriculturist of the West, who has a brilliant future in store.

So many valuable articles, ably written, timely and handsomely illustrated make this magazine desirable for every reader who desires to become acquainted with the live workers and work of the world.

D. Appleton & Company have *Familiar Trees and their Leaves*, by F. Schuyler Mathews.

It was formerly considered necessary to be a thorough botanist and to examine the flowers in detail to determine the character of trees and plants. A majority of forest trees have inconspicuous flowers, and remain but a short period in blossom, which would make this method of identification very difficult. Every woodsman recognizes the trees of his acquaintance by their peculiarities of leaf, fruit and bark, although he may not be able to describe the differences in such pleasing language as Mr. Mathews is able to command. With this book before him any school-child may recognize all the common trees of the forest. It should be in every schoolroom.

D. Appleton & Co. have just published *Practical Forestry*, by John Gifford, of Cornell University.

This is a work of considerable value to students. The principles of forestry are well explained and show a familiarity with the theories of the subject as well as thorough investigation in its preparation. It is well written, the illustrations are fine. Price \$1.32 by mail. It is commended to all students of woodcraft.

The American Book Company publish a very interesting book, *Birds of the United States*, by Prof. A. C. Apgar, of New Jersey.

Birds are of so great value to the farmers of this country, and to arboriculture, this study should be given prominence, especially in country schools, and the attractive character of Professor Apgar's books, the numerous beautiful bird pictures, and simple, easy system of identification of birds given in this work, should make bird study one of the gladsome features of school life.

Ten Common Trees is a primary school book, by Susan Stokes, of Salt Lake City. The American Book Company, publishers.

This must greatly interest children at home or in school. Considering that the authoress resides in an arid region where irrigation must be practiced to make trees grow, we can see why she should be so interested in the trees which are so common in moist climates. The picturesque and peculiar appearance of Salt Lake City is largely due to the many avenues of tall Lombardy poplar trees. All of the ten trees mentioned in this book are growing in Salt Lake City, and many others as well.

A. W. Mumford, Chicago, has just issued *Among Green Trees*, by Julia E. Rogers. Octavo. About 350 pages. Price, \$3.00.

This valuable contribution to the popular literature of forestry is illustrated with twenty-five full-page photogravures of typical forest trees, fifty halftones and over one hundred drawings. This is one of the most practical books ever published. It is complete in itself, containing no technical terms that are not defined. It will not have to be used with some other publication to make the text intelligible.

NARCISSUS OR DAFFODIL.

The narcissus in its different forms is one of the most interesting of spring flowers. It is a flower of antiquity, romance and poetry, and its fragrance makes a special appeal to the senses.

The great variety of peculiar and graceful forms which the narcissus assumes in its numerous species and varieties is particularly agreeable and fascinating. The well known daffodil and the jonquil belong to this family of plants. With the exception of the polyanthus varieties, the bulbs are hardy in all parts of the country, and should be planted in autumn in the garden border at the same time and in the same manner as hyacinths and tulips; and their culture, including also the jonquils, cannot be too strongly advised; every garden should contain them and have a plentiful supply. The double varieties are less desirable for cutting, but they make a great show in the garden in early spring, and for this purpose they are admirable. The polyanthus varieties are particularly desirable for window and greenhouse culture, planting three or four in a five or six-inch pot.

All species of narcissus love plenty of moisture. In pot culture this habit can be observed by keeping the plants freely supplied with water, and when grown among pebbles in bowls of water they are secured from drought.

The engraving on page 4, of double narcissus is from the autumn catalogue of the well known seedsmen, James Vick's Sons, Rochester, N. Y. A copy of this catalogue, which contains illustrations and descriptions of narcissuses, hyacinths, tulips, roses, house plants, etc., will be mailed free to anyone who will send name and address.

Sample copies of ARBORICULTURE are being sent to a few who are not subscribers. If you have an interest in the subject please send us your subscription, or at least indi-

cate your wish to receive the magazine. Subscription price \$2.00 per annum. Address Editor ARBORICULTURE, Ludington Building, Chicago, Ill.

EDITOR'S NOTICE.

When it was first announced that this society would print a magazine in order to be in closer touch with its members, it was supposed that one thousand copies would be ample; but subscriptions have poured in so that four thousand copies will be required. The seedling forest trees at our disposal will be distributed so far as they will go, to subscribers who desire them and will pay for the packing and express charges—about fifty cents per package.

ANNOUNCEMENT.

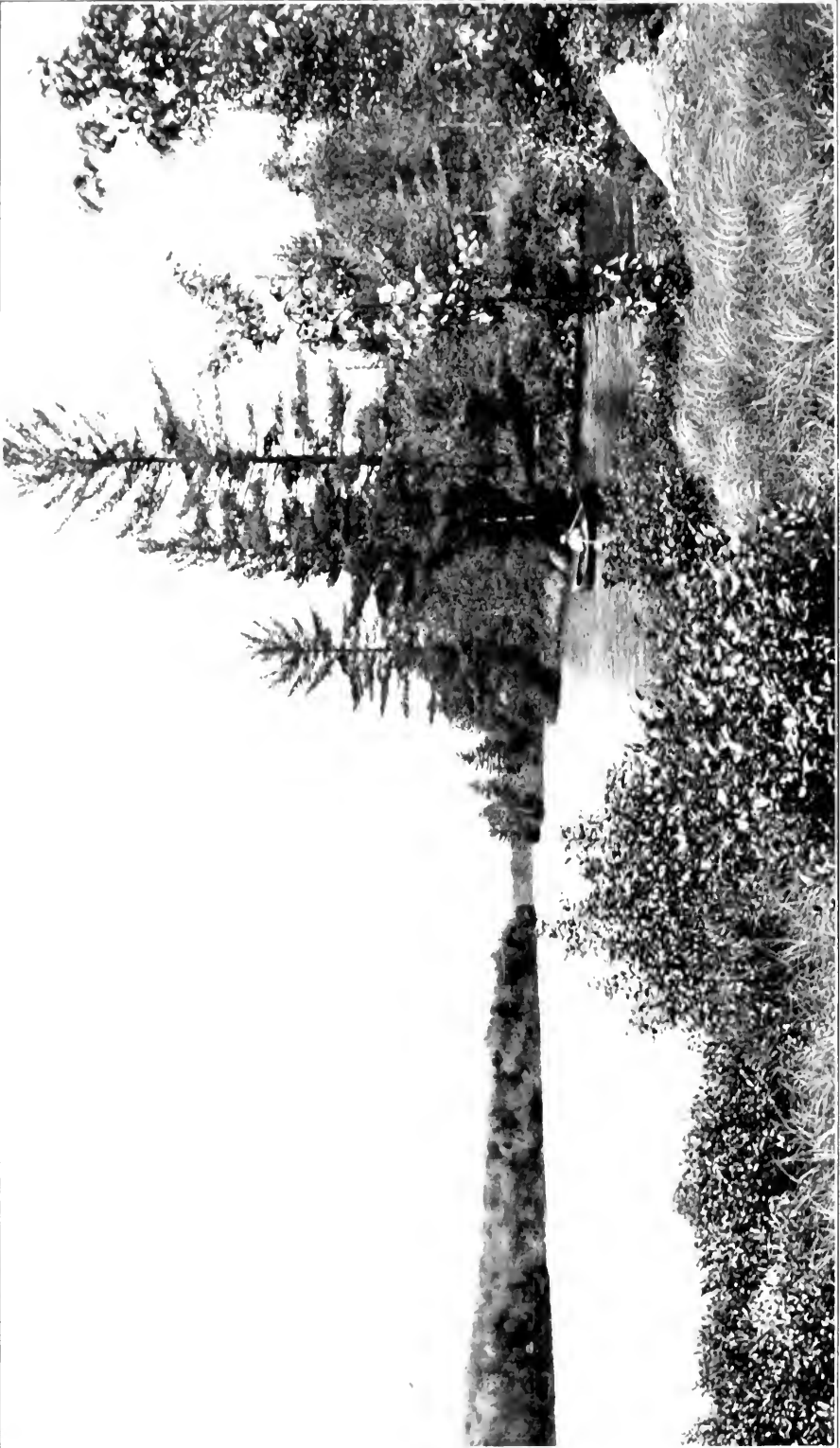
The October number of ARBORICULTURE will be principally devoted to discussions of trees for street planting, in towns and cities; Can trees be grown in cities having paved streets; What kinds to plant in Chicago, New York, New Orleans, and other cities great and small, and reasons for many failures.

Correspondence for ARBORICULTURE or with the Editor should be sent to 1334 Michigan Avenue, Chicago, Ill., and not to Connersville, Ind.

I offer for sale my residence in Connersville, Ind., about three acres in city limits; many fruit and ornamental trees, shade, flowers, etc.; brick house, eight rooms, splendid home, free from incumbrance. Price \$5,250, or exchange for Chicago suburban property. Connersville is a manufacturing town, 8,500 people; no idle men—employment for all—furniture, carriage, foundry, machine shops; houses in demand for rent.

JOHN P. BROWN,
1334 Michigan Avenue, Chicago,
or Connersville, Ind.





A QUIET LAKE IN THE ADIRONDACK MOUNTAINS. ON THE NEW YORK CENTRAL.



HACKBERRY (*Celtis occidentalis*).

Published by permission of Prof. John M. Coulter, of the Department of Botany, University of Chicago, being one of a large number of halftones engraved for him by

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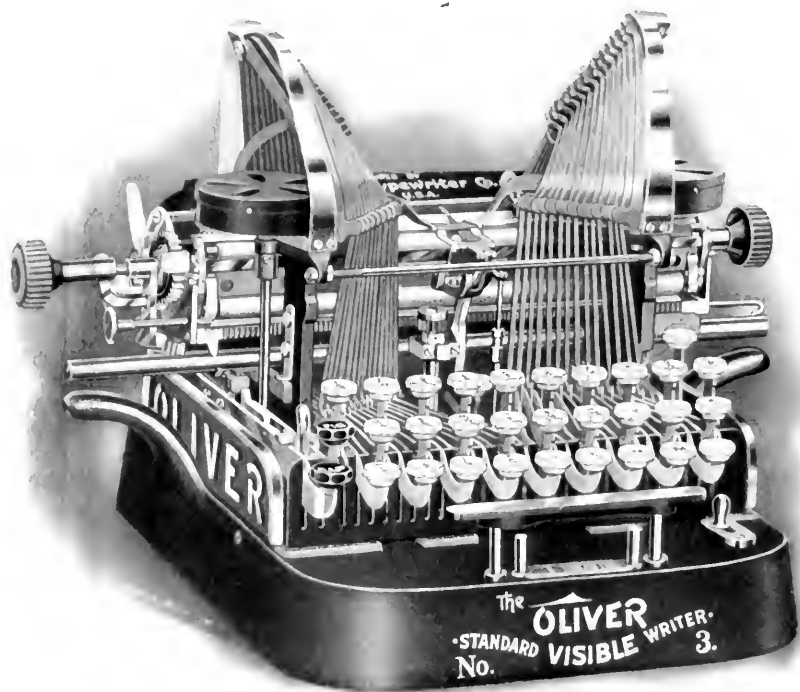
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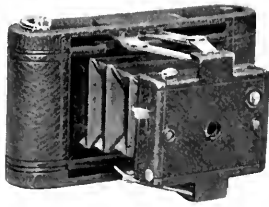
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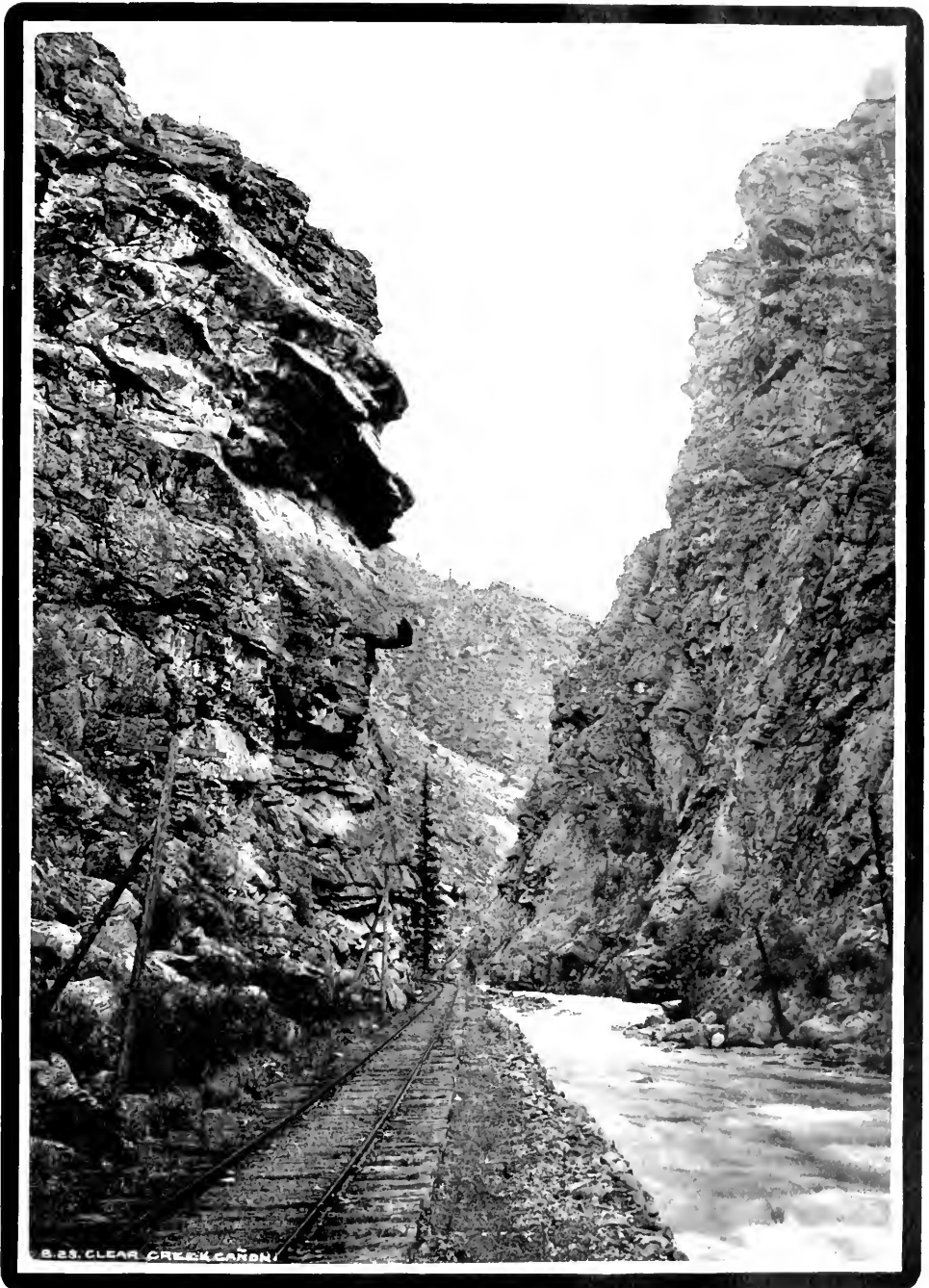
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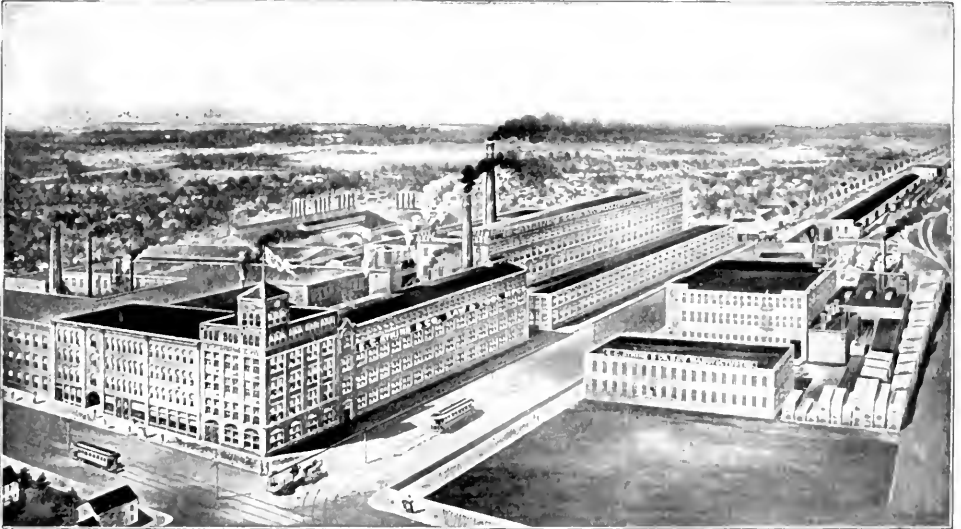
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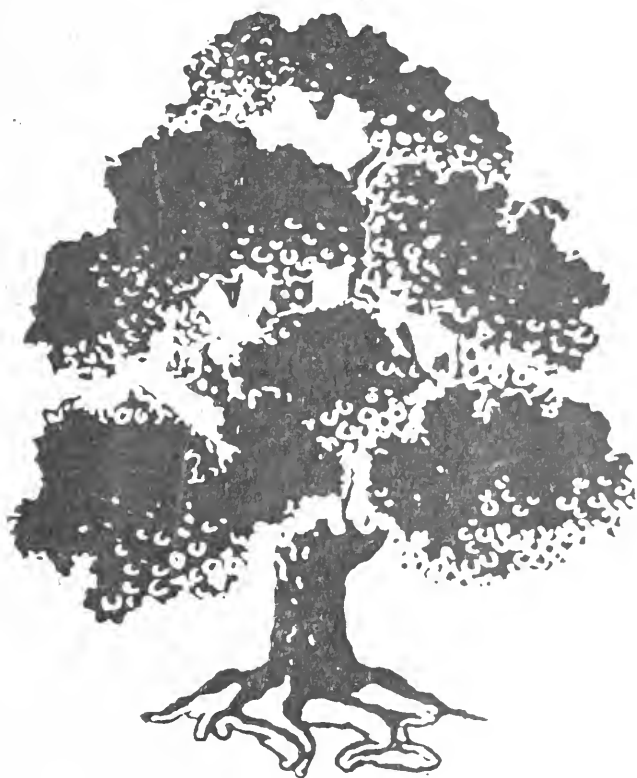
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ARBORICULTURE

VOLUME 1.

NUMBER 2.



A Magazine of the International Society
of Arboriculture: Chicago, October, 1902

THE INTERNATIONAL SOCIETY OF ARBORICULTURE

OFFICERS

GENERAL WM. J. PALMER, President, Colorado Springs, Colo.
JAMES H. BOWDITCH, Vice-President, Boston, Mass.
JOHN P. BROWN, Secretary-Treasurer,
1334 Michigan Ave., Chicago, Ill.

ARTICLES OF INCORPORATION.

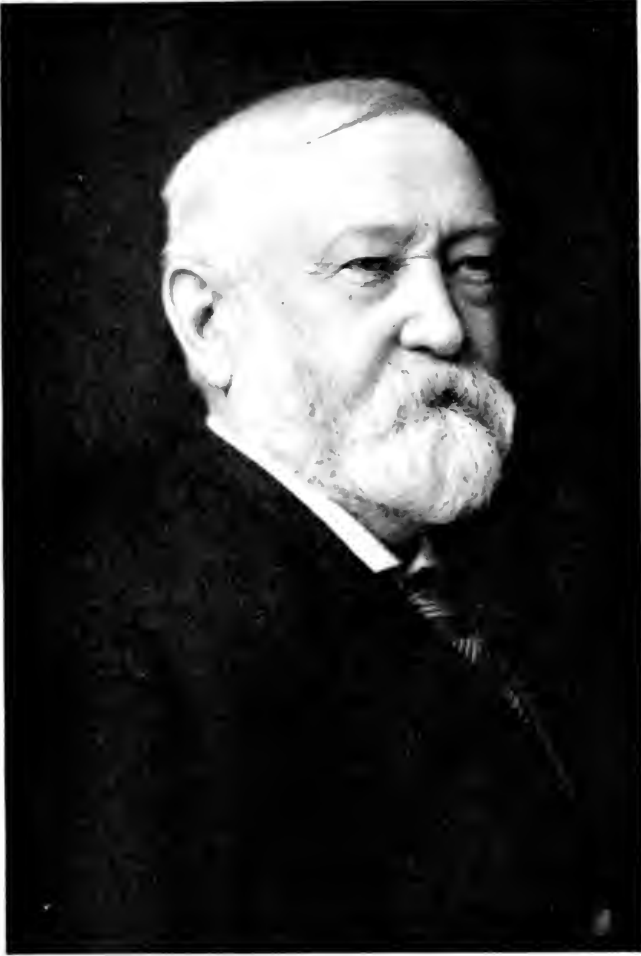
Article I.—Name. The name of this corporation shall be The International Society of Arboriculture.

Article II.—Purpose. The purpose of the Association is to introduce judicious methods in dealing with forests and woodlands; to advance and advocate a public interest in this subject; to promote the afforestation of unproductive lands; to encourage the planting and care of shade trees in parks, public and private grounds, and along streets and highways; to inspire an interest in our remaining native forests, and groves of ancient trees, and to seek their preservation; to supply information to railway officials in regard to timber culture for railway uses, and incite railway and other corporations to plant trees for economic purposes.

Article III.—Membership. Any person may become a member of this Society by the payment in advance of an annual due of two dollars, and on payment of this annual due shall be entitled to receive, regularly, one copy of ARBORICULTURE, the official organ of the society. Any person who may contribute ten dollars toward the support of the society shall become a patron. Honorary members may be chosen by the executive committee.

Article IV.—Officers. The officers of this Association shall be a president, vice-president and secretary-treasurer, who shall be elected at the annual meeting each year by ballot, and shall serve for one year, or until their successors shall have been elected and shall have accepted office, and when elected shall constitute the executive committee.

Article VII.—Executive Committee. The Executive Committee shall have entire control and management of the affairs of the Society.



Benjamin Harrison.

Benjamin Harrison,

Twenty-third President of the United States.

WE are privileged to present our readers with an excellent portrait of General Harrison, who was a firm advocate of arboriculture. It was through the substantial aid, words of encouragement, and constant friendship of Senator Harrison a quarter of a century ago, that the Editor of ARBORICULTURE was enabled to pursue the study of American forests and lay the foundation of the work in which he is now engaged.

As President of the United States Mr. Harrison was foremost in advocacy of forest perpetuation. Several large reservations of forest lands were selected by him and withdrawn from public sale. Upon the organization of this Society the Ex-President was first to join it and give us encouragement in our work.



TYPE OF AMERICAN ELM.

ARBORICULTURE

A MONTHLY MAGAZINE.



PUBLISHED IN THE INTEREST OF THE
INTERNATIONAL SOCIETY OF ARBORICULTURE.



Subscription, \$2.00 per annum.

JOHN P. BROWN, Editor, 1334 Michigan Avenue.

Volume I.

CHICAGO, OCTOBER, 1902.

Number 2.

Trees For City Streets.

SUCCESSFUL tree growth depends upon certain conditions of soil, moisture, temperature and atmospheric purity, and withal a vigorous constitution in the tree.

A bed of gravel does not supply the soil requirements, nor yet a loam saturated with gas escaping from leaky mains or sewers; tropic heat gives energy for a long growing season, while arctic cold confines the growth to a brief period; smoke, dust and poisonous gases are obnoxious to all forms of vegetation.

The strenuous life of shade trees in our great cities is not conducive to a free and natural development which is characteristic of a quiet wildwood.

Certain trees have a vigorous constitution which enables them to withstand harsh treatment. They are tenacious of life and persist in living under all sorts of conditions; their leaves are proof against foul gases, smoke and dust; their roots have such digestive power that life is maintained although an asphalt roadway, impervious to air or water, may cover the entire root system. Such trees may not have the finer qualities of foliage or the beauty of flower possessed by other trees which are not so capable of withstanding hard conditions, but they are trees, and some of them may be found in every city. The list of such trees

is a short one, but valuable, nevertheless, as from this short list some of our cities must be supplied.

THE ABELE,

(*Populus alba*) or silver-leaved poplar. The leaves, white or silvery beneath, gives the tree a bright appearance as the wind whorls the trembling leaves. It becomes a large tree eighty to one hundred feet high and affords a good shade. Its suckering habit makes it extremely objectionable upon or near a lawn, and owing to most abele trees having been taken from such suckers with imperfect roots they do not maintain an upright position, but are crooked or leaning. It is persistent and grows in every conceivable location, so where every good tree has failed there is yet a chance to have a shade by planting the abele.

THE AILANTHUS

is also a hardy, vigorous growing tree for similar locations. The tree has a tropical appearance and forms a dense shade. While the staminate trees are in flower they have a very objectionable odor, and should not be tolerated if any better trees can be induced to grow. The roots extend for great distances and send up innumerable suckers. With all the objections to the ailanthus we find it in every city where most other trees have perished. The wood is hard, takes a

fine polish, and if there were a supply in the market would command a high price. As a forest tree it will at some time be profitable—its rapid growth commending it.

HONEY LOCUST.

(*Gleditsia triacanthus*), comes as near being a perfect tree for city streets as our collections afford. No tree possesses a more handsome foliage, it grows to large size, makes a fine shade and has no very objectionable features. The root system is remarkably vigorous and finds ample support in places where most trees would fail.

If a tree is wanted for a lawn or in locations favorable to tree growth, the honey locust will be found acceptable and responsive to good treatment. The thorns upon the trunk and branches make it difficult for the small boy to climb, but perhaps that may not be a serious objection.

Some of the handsome avenue trees of Washington City are planted with the honey locust, which has too long been neglected as a shade tree.

THE AMERICAN ELM.

Probably no tree in America has received so much attention and is so greatly admired for a shade tree as the elm. In grace, beauty, and character of shade it has no superior, while its broad distribution over nearly every portion of America is a mark of its adaptability to many and varied conditions of climate.

In recent years, however, the elm has been attacked by many enemies, thousands have died from insect depredations, and it is no longer safe to depend exclusively upon the elm for all localities.

In nature the elm family is found in rich soils, along watercourses, or in moist locations where its roots may at all times receive an abundance of moisture.

If elm trees are found upon dry hillsides, this is because of clearing away the surrounding forests. Excessive drainage and erosion of rich surface soil have changed the natural environments of such trees and they show unmistakable decrepitude.



No. 2



TYPICAL ELM TREES.

No. 3.

The elm is a gross feeder, and its demands for fertile soil and abundant moisture must be supplied, otherwise it is folly to plant this tree; yet so long as it maintains a thrifty growth it is able to withstand the attacks of insects and disease.

There are many varieties of the elm family, but two are prominent—*Ulmus campestris*, the English elm, which was largely planted in New England during the Revolutionary period, many grand specimens of which still remain in excellent condition. The historic trees upon Boston Common are largely English elm.

Throughout the West and South the native American elm has been almost exclusively used.

This is doing finely in Colorado and Utah under irrigation. At Denver and in Salt Lake City, and other points in the West, wherever water is supplied the elm is eminently successful.

We present three views of typical elm trees. No. 1 is a natural growth where allowed to spread its branches and form a round, broad head. This tree is eighty feet high, while its branches spread over 7,500 square feet of surface. Yet this is by no means an unusually large tree.

No. 2 is another type, but which shows the effect of clearing away the surrounding forest, which had eliminated the lower branches.

No. 3 shows more distinctly this effect, the broad spreading head having overtopped all its fellows, and now it stands alone with bare trunk.

If a handsome form, good shade and long lived permanent tree is desired, sufficient room must be given while trees are young and vigorous. Too many trees are planted on a given space and little care given to each. For permanent trees forty feet apart is none too far, although a temporary tree may be planted half way between the others, but these intermediate trees must be removed before they injure the more valuable ones. It requires nerve to cut out a tree, but it is often necessary, as has occurred on Commonwealth avenue, Boston, where the trees were injuring each other.

THE MAGNIFICENT HARD MAPLES.

In nomenclature we adhere to *Linnaeus*. There are two principal forms of the maple, *Acer rubrum*, scarlet maple, and *Acer dasycarpum*, silver maple, both growing in

swamps. And the hard maples which are found upon higher and drier locations. *Acer saccharinum*, sugar maple, *Acer pseudoplatanus*, sycamore maple, *Acer platanoides*, Norway maple, with several variations or sub-varieties of each. Besides there are others of which we have not now time to speak.

Throughout the Northern and Eastern states the sugar maple surpasses all other trees in nearly all those qualities which constitute a perfect tree.

While the forests remained the sugar camp was a noted resort, as upon these trees was the dependence for sugar and syrup by the pioneers of America.

In the dense woods the true beauty of this tree was imperfectly observed. The coloring of the foliage after being touched by autumn frosts is superb. The mountain landscapes throughout New England and the Alleghanies are grand when the maple assumes its gorgeous hues.

It is a remarkably clean tree, few insects are found upon it, and it is very free from disease.

An erroneous impression prevails that it is slow of growth, but this all depends upon the soil in which it is planted and the care it afterwards receives. If these be favorable the tree responds quickly to the kindness bestowed.

The silver or soft maple will grow more quickly, but it requires constant pruning to preserve a proper form. The branches are inclined to grow at great length, and as the wood is brittle a strong wind or adhering snow breaks them down, usually injuring them permanently. Not so the hard maples, which require little or no pruning and are strong, wiry and stand the storms well.

The hard maples grow in a clay or compact soil and with less moisture than do the soft forms or swamp maples. The roots are vigorous, large, and penetrate deep into the subsoil.

In suburban districts about our cities there is no tree that will give equal satisfaction. By far the handsomest avenues of New England and New York are composed of the sugar maple.

By all means purchase trees from responsible nurseries, and secure such as have been often transplanted and have good, well-balanced roots. The top may be formed after planting, but ample roots are a necessity. For intermediate trees I would rec-

commend the scarlet maple, which is of rapid growth and forms a good round head without much pruning.

THE OAKS.

For forest planting there are a number of oaks which are not suitable for street or shade trees, principally on account of slower development, but the red oak (*Quercus rubra*) is of very rapid growth, and desirable for permanent street planting. Scarlet oak (*Quercus coccinea*) is one of the handsomest of the oak family. Willow oak (*Quercus phellos*) is also a quick growing, beautiful tree, the leaves being willow-shaped. Pin oak (*Quercus palustris*) is well known as an ornamental tree. The oaks are neglected in street planting from an erroneous idea that they are of very slow growth. True, they do not mature as quickly as a willow, but still they should be used far more extensively than they have been.

Some time ago I was surveying a timber tract in Kentucky, on high mountain land. Coming to a corner the deed called for a red oak five inches in diameter, witnessed by four other trees. In eighteen years this tree had grown from five inches to be one of twenty inches diameter. Few so-called quick-growing trees would have done better.

The tendency among planters is to disregard our most desirable American trees and seek only the one quality of rapid maturity. Remember that permanence is of greater importance than haste in arboriculture.

THE HORSE CHESTNUT,

(*Aesculus hippocastanum*.) of Asiatic origin, is a favorite tree in Pennsylvania, eastward through New England. It has never been successful in the drier atmosphere of the West. The several buckeyes of the Western States are of the same family, but are not used for ornament or street planting.

The destruction caused by the gypsy moth at Buffalo and Rochester, N. Y., and in New England cities, will doubtless disgust tree planters with the horse chestnut. The leaves are skeletonized and the masses of white eggs deposited upon the trees show that the depredations will not be lessened in the future.

What havoc has been caused by one scientific fool who imported this pest!

TREES OF NEW ORLEANS.

The prolonged season of summer temperature, which occurs in southern cities, may be better endured if abundant shade be provided. Southern cities have broad verandas surrounding their houses, but as a rule are careless as to the character of the shade trees.

Audubon Park contains a broad avenue of most magnificent live-oak trees, there are also many in City Park, while upon some of the principal residence streets are fine specimens of live oak, magnolia and other trees which the North would be very proud to possess.

The very narrow streets in the old French portion of the city, have scant room for trees. Yet the broad avenues such as St. Charles, Canal, Tulane and others, should be lined with trees.

The electric car-lines and telephone companies, as usual, dominate the city and destroy the trees. Handsome young trees were planted on both sides the double track of street car lines, in the center of these avenues, but they can never produce shade or become an ornament. The trolley poles, electric light and telephone poles, at varying height, keep the trees from extending upwards, while the nearness to the passing cars prevents side extension of branches, hence it is impossible for them ever to develop.

If the wires and tracks are to be in the center of the streets, then a system of planting should be adopted on each side as exists in some portions of the city.

Nowhere in the world does vegetation make a more rapid growth, or can such fine trees be grown, as in this rich alluvial delta land on which New Orleans is located.

It is simply a question, who owns the city, the electric companies or the citizens? If the latter, more trees should be planted and properly cared for.



THE SOUTHERN CYPRESS.

Taxodium distichum.

Because a tree does grow in the water is not evidence that it prefers that situation. The cypress, which is held in such esteem for lumber, and which supplies many thousands of cross-ties for our railways, is indigentous to the swampy regions of the Gulf

States, yet it thrives in a majority of the Northern States and upon varying soils and all possible situations.

It is one of our most picturesque coniferous trees, although not an evergreen.

That it does not stand in three feet depth of water from choice is proven by the peculiar knees which project from the roots above the water to get breathing room to aerate the sap.

While not a hardwood, yet it is highly regarded for railway cross-ties. The use of cypress in greenhouse construction, where durable under conditions of heat and moisture, is well known.

The negroes of the Gulf States have long time practiced the construction of fences of cypress, placing the rived boards upright in trenches, so durable is the wood. Cisterns and tanks are made of cypress preferably, Southern cisterns being tanks of wood, elevated above ground. Some streets have been paved with cypress blocks set on end, which have lasted a score of years. Quite probably the trees have been disseminated by the wind blowing the very light seeds, and flowing water conveying them upon overflowed tracts. Nurserymen have no difficulty in growing the trees from seed.

The seed cannot germinate in water, and only in times of a prolonged drought, when the water has been drained from the swamps, and remains so for a long period, can the seed grow, which will probably explain why this tree is not increasing. In this tropic weather, on rich alluvial lands, the trees grow very rapidly and are soon large enough to keep their heads above water of the swamps. A few decades hence the cypress will become extinct as a swamp tree, but as its value for ornament becomes better known it may be more extensively grown for sale. There are many thousands of acres of Southern swampy lands which are of little value, and which would become immensely valuable, if planted with cypress. Yet it is by no means necessary that wet land should be selected.

While young and vigorous the cypress has a dense foliage, is of handsome conical shape, branches extending to the ground. It is symmetrical with a regular taper from ground to apex.

In the dense forest the lower branches are eliminated, and in old age it becomes "bald," or stag headed, the topmost branches

no longer able to tower upward, extend outward, spreading its arms over the trees of the surrounding forest.

RAILWAY TREES.

Every railroad company in the United States should utilize the unused parts of its right-of-way for arboriculture. Every railroad in the United States could thus raise in twenty years catalpa ties enough to almost supply itself.

Station agents and section foremen could cultivate and protect the young trees along each line for three years. After that time the trees will take care of themselves. The cost of raising their own ties would not be one-half the cost of ties they must purchase from others. If Charles E. Perkins, Harriman, the Goulds and the Vanderbilts will start the arboreal utilization of the waste rights-of-way owned in the United States by railroad companies they will have earned the gratitude of the public and much money for themselves.—*The Conservative, Nebraska City.*

CHRISTMAS TREES.

We commend to our readers the following words by J. Sterling Morton. In our next issue we shall have more to say upon the subject :

Thoughtful persons are again saddened to see their fellow-citizens in the grasp of their annual lunacy which leads them to encourage, by purchase, the cutting down of symmetrical young conifers for Christmas trees. Every city railroad yard in the country now presents the sorrowful spectacle of cars loaded to their capacity with these pitiful babies of the forest, massacred in commemoration of the Prince of Peace. Recently a big ship sank off the coast of Maine, which was loaded with nothing else. The cargo consisted of hundreds of thousands of Christmas trees; they were Jonahs to that vessel.

For the fleeting pleasure of the children of today, we destroy the trees that the men and women of a few years later will need for building human homes. And in doing this wanton wickedness, with total disregard for those who follow us in the little march from birth to death, we violate every good thing which Christ taught.

Tree Planting in Cities.

NO city of America possesses such avenues of fine shade trees as are seen in Washington City, indeed it is doubtful if any country can excel in this regard.

Several lessons may be learned by studying the methods employed by the authorities at Washington. For half a century all the trees within the city, in parks and on streets, have been under the control of a non-partisan Park Commission, composed of three able and conscientious men, recognized throughout the world as foremost in arboriculture.

The late William Saunders, superintendent of grounds, Department of Agriculture, was principal in directing this work.

Political changes have brought new men in control of the government, but this commission never changed until death removed one or more of its members.

It is impossible to have economic administration of park officers where ward politics dominates the board. Every city of the Union, where the appointment of superintendent and employees is made to pay political debts, becomes extravagant and expensive in their management, or thoroughly inefficient, or both. A system was early adopted and followed, by which each street or avenue was planted with one variety of tree, which gives a symmetry and character to the city, which can never be obtained where each lot owner plants what he may choose and at such distance as he wishes. In planting, good trees were selected, with ample roots.

As the soil was often inferior, stony and in places filled with rubbish, large holes were excavated, the trash hauled away, and good loam brought in. Each tree was given proper space for perfect development. This is impossible where trees are planted ten to sixteen feet apart, as is often the case.

The oaks, elms, lindens, maples, oriental plane, honey locust, ginkgo and trees of highest character have been planted, as they have been found to give the best results. These trees are permanent and will be as enduring as the city itself.

Long years ago the worthless Carolina cottonwood was discarded when it was

found to be so objectionable. Many of our western cities are planting this Carolina poplar cottonwood, to the exclusion of every good tree, and ere long the blunder will become apparent, and at a late day they will begin anew with small trees and be a long time without shade.

Men educated by long experience and sure of their employment without the necessity of ward political work, keep the avenues properly pruned and intelligently cared for.

The trees of the city are held in higher estimation than architectural display or the importance of frequent changes in street grades and excavations. Ignorant city engineers are not permitted to destroy valuable trees by unnecessary damage to the roots as in the thousand towns and cities of the West.

Broad open parkings are frequent in Washington, thus giving to tree-roots some space where water and air may find entrance. While visitors admire the fine public buildings, everyone will admit that chiefest of Washington's attractions is the beautiful avenues of trees which makes it one magnificent park.

The city of Washington, says the *Providence Journal*, "has set a good example to American municipalities in the matter of tree-planting. Within its limits there are now no less than 80,000 shade trees, and it is unnecessary to dwell on the added beauty they lend to the place. Paris has an even greater number, and it is said that \$60,000 is expended annually by the latter city in the care of them and the setting out of new ones. Every street of a certain width is entitled to a row of trees on either side, every street of a certain greater width to a double row. The criticism has been made that the Paris method results in too great uniformity, but, as Charles Mulford Robinson, author of a new book, entitled the *Improvement of Towns and Cities*, says, it will always be a question of taste between formalism and naturalism. The cities of Italy sometimes go further than Paris in the direction of formalism, trimming their trees to fantastic shapes. For us probably the best system is a happy medium between

monotonous symmetry and the haphazard arrangement so much in vogue on this side of the Atlantic.

Viewed merely from the esthetic standpoint, there is every reason why our American cities should give greater attention to tree-planting. Here in Providence there are many miles of dreary streets that would be "vastly" improved, as Jane Austen might say, if they were bordered with shade trees.

In the year 1900 no less than 4,000 trees were planted in New York City, under the auspices of the Tree-planting Society of that town. Some complaint has arisen over the deadly effect of escaping gas upon the roots, but very few trees, comparatively, have perished from this cause. Providence is behind many American cities in the planting of shade trees. Next fall a thousand might easily be set out here without filling a quarter of all the blank spaces along our residential streets."



STREET TREES.

A street which has its sidewalks lined with trees is always an attractive feature in any town of whatever size. Even where the vegetation is irregularly planted, and even more irregularly cared for, it becomes in time an asset of considerable, although somewhat indefinable, value. It is fortunately becoming a rule nowadays to have the street trees planted systematically with the provision made for their proper care and maintenance. Where this has not been done in the past, it is better even now to step in and do the best with what remains than to let what is pass into ruin.

There are two conditions that are detrimental to street trees. The one, as already indicated, being systematic neglect and inattention and the other an unreasonable striving for immediate effect accompanied by an unintelligent treatment in after years. It is the common experience of all who have to deal with street avenues and public ways that, when the time comes, as come it will, for the axe to be brought in and the sacrifice of fully fifty per cent of the trees is a necessity there will be an uprising of ignorant enthusiasts, well meaning but over meddlesome—who cry aloud in behalf of the maintenance of things which the skilled arboriculturist knows should be removed.

In Boston, perhaps, more than in any other of our large cities this condition is brought to the surface more distinctly, simply because it is an older city and the time has come when these conditions have to be faced.—*American Gardening*.

FORESTS AND WATER SUPPLY.

When Colorado was first settled, and for at least a decade thereafter, the forests contained their native supply of timber; the mountain snows remained under their protecting shade until late in July; the streams ran at a flood during the most of the irrigating season and maintained a large volume of water until late in the summer. But gradually the mountain sides have been denuded of their forests. Timber for mining and railroad uses, lumber for commercial purposes, devastating fires, have resulted in the destruction of our forests. If this waste goes on the industries of agriculture and horticulture will be irreparably injured. There is no more important duty in connection with irrigation than the conservation of the forests; that means the conservation of water for storage.

Had it not been for the rains of June and July Colorado crops, save in a few favored sections, would have been practically a total failure this year. It is true that last winter's snowfall was light, but there were few forest areas to protect what did fall. This fact must be so thoroughly impressed on the public mind that hereafter the matter of forest protection will be placed side by side with the extension of irrigation.—*Denver News*.

A GIANT ELM TREE.

Supposed to be the largest east of the Mississippi. The *Gowanda* (N. Y.) *Leader*, says that on the Jason Knapp farm, in the town of Hanover, thirty-four miles from Buffalo, is a giant elm, measuring forty-two feet circumference at the ground, and thirty-three feet girth at three feet higher. Its lowest limb was estimated to be sixty feet from the ground, the head towering above all surrounding trees. It was contemplated to exhibit this tree at the World's Fair, but on account of the expense the project was, very fortunately, abandoned.

Removal of Large Trees.

IT is certainly commendable that when business men have accumulated wealth and have become advanced in years, they should anxiously desire the most beautiful objects of art and nature with which to surround their homes, and the possession of large, stately trees, is one object above all others to be secured.

This shows an estimation of nature's greatest works, for none of her efforts has ever surpassed her forests. But there are some things which man can never accomplish, and which nature has never attempted, among these the production of a forest in a day.

To understand how a tree has grown from the tiny seed, advancing step by step in the extension of its roots and branches, what preserves its life and makes it a thing of beauty, are necessary to be known in order to succeed in transplanting trees. We shall attempt to show some essential facts which must govern tree removals.

There are certain trees which emit roots readily from cuttings, these may be transplanted with comparative safety, even when quite large, although the greater portion of the roots may have been severed. Of such are the willows and cottonwoods.

Cottonwood telegraph poles have grown into fine large trees in the West, although rootless to begin with. Others, again, as the elm, and swamp maples, have many fibrous roots close by the trunk of the tree. These trees may occasionally be saved when they are five or six inches diameter, providing a large ball of earth is secured with the roots. Yet it is not advisable to attempt it. But there are other trees, and among them those of greatest value, which under no circumstances grow from cuttings, and having long, woody roots without many fine fibers, except at the extremities, they cannot be successfully moved, except while quite small. The oaks, hickory, sugar-maple and walnut belong to this class.

In the natural forest or open ground, trees extend their roots farther and farther from the tree each year, and after a score or more years have passed, the fine fibrous feeding roots are twenty or more feet from the trunk.

A good rule may be that the extremities of the roots are half as far from the tree as its height. If sixty feet high the roots extend thirty feet in every direction.

In the earlier periods of its growth the soil has been exhausted of its particular elements of food, and the roots near the tree have become woody, hard and without numerous fibers.

Every particle of nourishment received by a tree must be in solution with water and be absorbed by the millions of microscopic root fibers, conveyed through the larger roots to the trunk, and upward through the cells of the wood, to the foliage.

These large roots are incapable of absorbing nourishment, but new fibers must be formed before the tree can receive food, and the facility with which a tree can provide these millions of delicate rootlets and push them out where food and moisture may be obtained, will determine how soon it may recover from the loss of its root system, and begin to advance in growth.

Because a tree retains its leaves and has some appearance of life is no evidence that the tree will live and become thrifty.

There is stored up in the trunk of a tree a quantity of sap. As the buds expand and leaves evaporate moisture, this is supplied by the tree giving up its life blood, the sap, and this may continue a year or two, but it is gradually exhausted of its vitality, unable to overcome the attacks of insects and disease, and finally dies.



MR. ANDREW CARNEGIE'S EXPERIMENT.

At the corner of Ninety-second Street and Fifth Avenue, New York City, Mr. Carnegie is building a palatial mansion and has brought from the farms many miles away, some score or more of fully grown forest trees.

A few are cottonwood, which are alive. Some are elm, twelve inches diameter, which may possibly survive. The others are sugar maple, from twelve to sixteen inches diameter and sixty feet high. All the branches

have been retained. The holes dug to receive the roots were seven feet diameter; main feeding roots, of course, were sacrificed, the remaining stumps of large roots hewn off three feet from the tree.

All the skill which money could command has been exerted in trying to preserve these trees. Several which died the first year have been removed, some are now dead, while not one has a healthy appearance, and will succumb within a brief period.

It is not safe to remove any tree exceed-

ing six inches diameter. A small tree, two inches caliper, with good roots, will thrive and return a good shade for the care bestowed upon it, long before a very large tree can recover from the loss of its root system.

It is better to take a moderate tree and bestow upon it an extraordinary care and attention, being patient for results, than to try to accomplish an impossibility. All of us have not the bank account of Mr. Carnegie. Let us be content to follow nature.

California's Wonderful Trees.

THE exceptional range of climate existing in California, enables that state to produce the most wonderful trees in existence. It is not necessary to seek the giant sequoias of the higher Sierras, nor yet their cousins, the redwood of the coast regions, to find wondrous specimens of tree growth, for they are everywhere present.

The enormous eucalyptus trees from Australia, of which 150 varieties are being cultivated in California, and the graceful pepper tree are principally used for shade. Yet all the palms, the citrus, and other tropical trees are growing alongside those from cold and temperate regions. Wherever water may be obtained for irrigation, almost every variety of tree may be produced.

The phenomenal success of the experiments at Golden Gate Park, San Francisco, shows what may be accomplished under great difficulties. Quarter of a century ago this was a barren waste of sand, shifting with each ocean breeze. From the bay to seal rocks there was not a tree, scarcely a shrub, soil there was none, simply oceans of sand.

John McLaren has made upon this foundation one of the finest parks in America. A magnificent water system, with an abundant supply, has been created, and trees are now growing brought from every continent of the globe, every isle of the sea, tropic, semi-tropic and temperate regions, furnishing specimens which are luxuriating on this once forbidding situation.

Michigan City, Indiana; Provincetown, Massachusetts; the coast regions of Florida,

in fact thousands of locations in the United States which have similar tracts of shifting sands, may learn from this successful experiment how to improve their own waste places.

San Francisco had only one thing in her favor, the climate. Other places have many favorable conditions, among which abundant rainfall is not the least.

Catalpa speciosa is perfectly at home in California, making a fine shade tree and will prove of great value as an economic tree to replace the magnificent forests which are being so rapidly depleted by selfish money grasping concerns in the Golden State.

TREE 154 FEET IN CIRCUMFERENCE.

"What is undoubtedly the largest known tree in the world has been discovered two and a half miles from the Sanger Lumber Company's mill at Converse Basin, far up in the Sierras, in California. The discovery was made by a party of hunters. But little credence was given to the report, as every one thought the description of this colossus of the forest was exaggerated. But it has since been visited by persons who have verified the finders' statement. The tree was measured six feet from the ground, and it took a line 154 feet and eight inches long to encircle it, making it about fifty-one feet in diameter. This tree is a few rods from the company's boundary line and is on the government reserve, hence will stand to interest sightseers."—*Exchange*.

ARBORICULTURE has investigated this matter. The tree exists, but is 100 feet girth instead of 154, a fairly good sapling of eighty centuries' growth.

Tree Culture Briefs.

OPINION OF A RAILWAY PRESIDENT.

Mr. Marvin Hughitt, President of the Chicago & Northwestern Railway, said to the Editor of *ARBORICULTURE*:

The forests are being rapidly wasted and all owing to our system of government. We need a strong central power. In Europe a tree cannot be removed without another being planted in its stead.

Our national government has not the authority to compel the proper management of forests, while the States are dominated by those who think their interests are adverse to a forest system.

Timber owners are in a hurry to realize all they can immediately and cut bushes and all small growths. Instead of this they should cut matured trees and leave young growths for future use.

I have seen poles of cedar, pine and hemlock, four and five inches through, cut for rafting, which should have been left to grow into lumber.

Our lumbermen are too wasteful, and should be educated to realize the value of forests as an investment.

The artesian well has been the salvation of the semi-arid portion of South Dakota, the supply of water drawn from them being ample to supplement the deficiency in rainfall. Thus far there is no sign of failure, in spite of the heavy drafts made upon the subterranean rivers. The same reports come from localities in the regions farther west, where there is little rainfall. There is sometimes a tendency to drought during some seasons of the year in this and adjoining States, and artesian wells might possibly be made useful in Indiana. It would be a great thing to be able to get a supply of water from the depths of the earth when the clouds deny it. *The Indianapolis Daily Journal*.

Seven hundred miles from the James River Valley, of South Dakota, the Missouri river passes over a ledge of porous sandstone, and loses a large portion of its volume, which enters the earth and follows this stratum, emerging in the Dakotas. The water rises 200 feet above the surface, so great is the force, the head being high in the base of the Rocky mountains. While it is

not likely that this stratum extends into Indiana, yet subterranean rivers having their source elsewhere may supply this State with abundant water for irrigation.

The property owner of Chicago, who gives his views in the *Tribune*, voices the sentiment of thousands of helpless citizens whose property is mutilated by orders of some cheap and inefficient official. The time will come when linemen will be required to obtain written permission from the owner. Speed the day!

TREE-PLANTING USELESS.

Chicago, Jan. 28. — [Editor of the *Tribune*.]

In Saturday's issue your editorial favored the planting of trees in yards and along the walks, claiming it would adorn and enhance in value property thus improved. But why do it? I have given time, care, and money for nearly twenty years for trees along the sidewalk, and when they are in good growth the telephone, telegraph, or some other private user of public streets goes to the City Hall and gets a permit to cut the heads and branches off the trees. You have no redress, and the trees look worse than if no trees were there. Why should people beautify the streets to be destroyed whenever a cheap official chooses to help a private corporationsave money at the property-owner's expense?

PROPERTY-OWNER.

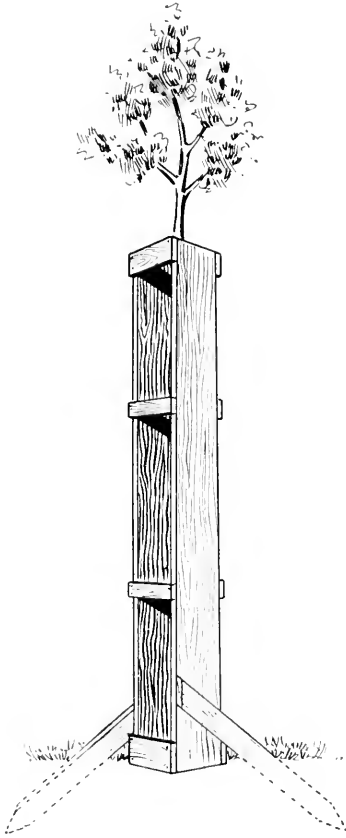
THEY WANT TO SAVE THE TREES.

Sunday the residents living on Euclid road obtained an injunction from Judge Phillips, against the County Commissioners to restrain them from cutting down the shade trees along the road where the county is making improvements. A motion to make the order permanent was to have been argued before Judge Phillips Tuesday morning, but on consent of the Commissioners the case was passed until Friday. The restraining order will remain in effect until that time. *Cleveland Leader*.

Time was when the finest avenue of trees in any city of the world was Euclid Avenue, Cleveland. Elliott's influence had caused those trees to be planted, and their fame spread to every city of Europe.

Cheap officials destroyed every one of those trees, and the street now is as bare

as possible to make it. The display of architectural adornment can never compensate for natural beauty of trees. It is to be hoped the courts will compel respect for the personal property of residents and stop the spoliation by politicians in power.



TREE PROTECTORS.

Where so much carelessness exists as in American cities, newly planted trees should be carefully protected by boxing. There are many forms, some expensive, others quite the reverse; but by some means guard the young trees from the biting horses of the grocer's delivery wagons, the butcher's outfit, or the careless doctor's rig, or any other horse, fastened or not secured, which is liable to reach the bark of your tree. After it has been ruined it is useless to express your feelings else a life-long enemy may be made from some former friend. You have lost your tree, and it may require years to secure another as good, yet

it might have been saved by proper precaution on your part in making a box.

What is worth doing, should be well done, and the job is not completed when you plant a tree until you give it fair protection.

Our cut suggests a very simple and easily constructed tree box. The materials required are, two boards, 1 x 10 inches, seven feet long; six strips 1 x 4 inches, twelve inches long; four stakes, hardwood, 2 x 4 inches, four feet long, sharpened for driving, and a few nails. The stakes, for anchors, should be driven diagonally and nailed to the box with heavy nails.

These terrible fires in the forests of the Northwest must be stopped. National as well as state interests demand it. Destructive as the recent fires have been, they are only one of frequent instances of enormous destruction of valuable forests throughout the mountain region of our western country. The effect of forests on rainfall, on the conservation of water for irrigation and the welfare of the whole western half of the United States, is such that this problem is no longer a western one alone. It is a national proposition, for anything that seriously interferes with the best development of our Western States reacts also against the East and South. There must be co-operation on the part of local, county, state and national authorities to prevent the repetition of these disastrous conflagrations. A century will not fully restore the injury done by the great forest fires in the Northwest during the present month.

The Governor of Indiana has issued a proclamation designating October 24, 1902, as Arbor Day, and the superintendent of public instruction has prepared an excellent manual for the schools of Indiana, suggesting a programme for the occasion.

It is pleasant to note the interest shown by many of our Western States in this direction. It is to the public schools we must look for greatest advance in arboriculture, where children are taught the value of trees and the necessity for planting them. Remember Arbor Day, whether it be in autumn or spring.

Some Good Trees For Colorado Springs

Colorado Springs Telegraph, July 20, 1902.

THE following very interesting paper was read at the recent meeting of the El Paso Horticultural Society by Mr. John P. Brown.

The address is especially interesting because it is localized and treats of the especial needs of this particular region. The subject of trees is one on which the people can scarcely receive too much information.

The pioneers of the plains country, all that vast region west of the Missouri river, would have had a far more difficult time had it not been for the abundance of the cottonwood and box elder which bordered every stream. These were the primitive trees of all this region and are entitled to credit as such.

The downy seed, floating in the air, was wafted by the breezes to every nook and corner of all this western world. Had every seed of the cottonwood produced a tree, these mountains and plains would now be a dense forest wilderness, instead of a treeless desert. But all this prodigality of nature in seed production has been wasted, except where the running streams of water moistened the earth and gave vitality to the seed. Both these trees demand large quantities of water and will not succeed without it. In the cities the cottonwood sinks its roots into the sewers, clogging them at times, in search of water.

I recently saw a large, fine cistern, in Kansas, which had been ruined by the roots of a giant cottonwood which had penetrated the walls and opened crevices in the cement so that it would no longer hold water.

It was natural that the pioneer settlers of the West, finding the cottonwood abundant, should take it for granted that nature did not intend other trees for this semi-arid region, and thus confine their tree planting to these two trees; and so we find in Colorado Springs a vast majority of trees on your streets are of these species of trees, and but few of the finer fibered and better trees have been planted.

But there are many serious objections to the cottonwood.

1. The flying seeds have at times caused death to the persons who inhaled them and the cottony seed is a general nuisance during the period of its falling.

2. There is no tree known to arboriculture which possesses so many enemies, insect and fungoid, as the few members of the *Populus* family included in Balm of Gilead, large leaf cottonwood, narrow leaf cottonwood, aspen and the so-called Carolina poplar, which is only a cottonwood although sold at high prices under a false name.

Americans are always in a hurry. People want trees already grown and are not content to wait. They want trees which grow with greatest rapidity. Well, this is all right if not carried to the exclusion of these slower growing but finer foliage and more durable sorts.

THE MAPLES.

Almost the only maple used in your street planting and home grounds is the silver maple (*Acer dasycarpum*). This, too, is a pioneer tree, probably the most rapid growing of the maple family. Properly pruned when young, and kept trimmed in at all times, it may be formed into a round head, but it requires constant pruning. The branches are brittle, very long, easily broken in wind, or with an accumulation of snow. It is a good tree to plant alternately with other somewhat slower growing trees, but is very unsatisfactory where exclusively used.

Scarlet maple (*Acer rubrum*) is better; has a round head, is a quick grower, and is very handsome, as it colors its foliage in autumn.

Sugar or rock maple (*Acer saccharinum*) is one of the very best street trees in America and succeeds in Colorado. It is very free from insects. Its growth is slightly slower than the two first mentioned varieties, but its foliage is superb. It requires little or no pruning, and less water than the two swamp maples first mentioned. Its home is on rolling and mountainous lands; has a tap root which goes deep after moisture and food.

That the Vermont maple syrup is sometimes made from this tree is no discredit to the tree.

Norway maple (*Acer platanoides*) is an excellent, hardy tree, not a slow grower if well cared for.

Of course if a posthole is dug and a rootless tree is crammed into the hole, the hard maple will not survive, while the silver maple may; but give the hard maple fair treatment, a large hole well filled with rich soil and a moderate quantity of water, and they will grow nearly as fast as other trees and last ten times as long.

There are several sub-forms of the Norway which are admired for their color or some peculiarity, all of which are good and may be grown here.

ELM.

From what I can discover after close observation the American elm and the English elm are both successful here. The elm requires plenty of water, and you are giving them enough. In the Eastern states, the elms are dying; borers, leaf rollers and other insects are doing much injury to them, but so far as I can judge, the greatest cause is a short supply of water. You may not be seriously troubled with elm insects, but do not plant all elms, ere you some day lose them.

GINKGO.

This tree was imported from Japan some forty or fifty years ago and is among the finest avenue trees of Washington City.

It is growing finely in Colorado and every other state in the Union. The leaves are unique, bright green foliage, fan-shaped, narrow at the stem end. Its fruit, a delicious nut, with paper shell, enclosed in a disagreeable fruit pulp, the size of a plum.

Under good culture its growth is by no means slow. It is suited to the lawn better than as a street tree.

RUSSIAN OLIVE

is a fine arid region tree; very satisfactory and numerous at Denver and some at Colorado Springs. Its silvery foliage gives variety to surrounding trees.

TULIP TREE.

(*Liriodendron tulipifera*) is the grand forest tree of Indiana and elsewhere, called yellow poplar. It is a clean, rapid growing, hand-

some street tree, or for the lawn. A few are growing in Denver, and I have no doubt it will be perfectly satisfactory here. Rather difficult to transplant, like the Magnolia family; and should be removed only in spring. Small trees are more successful than larger ones.

LINDEN OR BASSWOOD.

grows well in Colorado and makes a good, dense shade, having a round head and being a handsome tree.

When trees of this smooth-like bark are trimmed up with long trunks, the sun scalds the bark, when borers get a hold and destroy the trees. If trees must be pruned high, as for street planting, the trunk should be wrapped or a box provided which will shade the trunk from the sun. The European linden is far superior to our American variety.

THE SYCAMORE OR PLANE TREE.

The Oriental plane is far superior to our common sycamore. It is hardy at Denver, and doubtless will be so found at Colorado Springs. An avenue of Oriental plane is a very beautiful object.

By the way, if some agreement could be had by property owners by which each street should be planted with one special tree placed at distance of, say, thirty feet between the temporary cottonwood, soft maple, etc., the final result would be most satisfactory in enhancing the attractiveness of this tourist city.

MULBERRY.

There are several varieties of mulberry which thrive here; they have handsome foliage, the fruit is acceptable to your birds and occasionally to the children; but they should never be set as street trees, since the falling fruit becomes disagreeable to passers by. Plant them on the lawn, rather in the rear, if only for poultry and birds.

Russian mulberry makes a nice hedge if kept pruned and is a forest tree of small growth.

BIRCH.

All the birches seem to thrive here, but as a lawn tree the cut-leaved weeping birch is the finest. Common white or paper birch is very fine.

Do not forget that the *Catalpa speciosa* is one of the most successful trees in Denver

and your own city. And while planting trees, if you neglect the oaks, you will regret it.

The red oak (*Quercus rubrum*) is a rapid growing tree.

The pin oak (*Quercus palustris*) is probably the finest shade and street tree of the oak family. There should be avenues of oak which seem to be satisfactory in Colorado if not at too high an altitude.

BLACK WALNUT.

is growing finely at Denver, and I believe it will grow well here. Walnuts are difficult to transplant after the first year on account of the tap root being injured on removal.

CHESTNUT.

grows well in many parts of the State. Only a few have been tried, but it is worthy of experiment.

To this list could be added many more which have proven hardy and which should be given a fair trial.

I have no sympathy with those who say that because nature did not plant certain trees in a particular locality, they will not grow there. This is proven false every year when trees from Europe, Asia and every isle of the sea are safely removed to the most remote portions of the globe, becoming as much at home as in their own native soil.

Plant trees. Plant a variety of trees. Plant very many trees and make your city one of the handsomest places on God's footstool.

The San Francisco *Chronicle* analyses the bird question as follows :

It is beginning to be evident to the most obtuse, that the balance of power in nature cannot be safely disturbed. If we kill the birds the insects will multiply. The women are the great offenders. They seem willing to practice the cruelty of savages if thereby they can get birds for their bonnets. Sumptuary laws have never been popular in America, but we may yet have to enact that any woman caught with a bird on her bonnet shall go to jail.

IN FLORIDA.

The moist climate, warm temperature and kindly sands of Florida are conducive to tree growth. The live oak seldom fails to

grow when taken from the forest and planted upon the street or lawn. Where the orange and lemon thrive, as in Florida, there are very many trees which may be grown as readily.

The *Catalpa speciosa* makes a grand tree in this State. Many thousands have been planted for forest and shade about Deland, Jacksonville and elsewhere.

The destruction of the yellow pine forests by turpentine operators have made it imperative that other trees be planted as a protection to the citrus orchards and for shade.

The eucalyptus or blue gum of Australia, may be grown in Florida and surrounding States and should not be neglected. I have records of growth of the eucalyptus in California that are marvelous. In another issue ARBORICULTURE will give some of these measurements.

The California Nursery Company, Niles, Cal., can supply small trees of eucalyptus; probably other nurseries may. They are not as plentiful as they should be. ARBORICULTURE has many friends in Florida, they will not be forgotten. Each number of our paper will have some contribution for their benefit.

LIRIODENDRON TULIPIFERA.

Tulip tree, yellow poplar, as it is called in the lumber markets, is a grand tree for street planting. The shade of green in the foliage is refreshing, the flowers are prominent and handsome. Except that the trees are somewhat difficult to transplant, and require extra precaution in removal, there are no objections to the tulip tree for country or suburban locations. In nature it is found upon the mountains and drier locations, but in rich soil. It is free from insects, always clean and in every way desirable for shade. As a rule all the magnolia family should be planted in spring; for some reason autumn planting is not usually successful.

LINDEN, BASSWOOD.

Tilia Americana, and *Tilia Europaea*, are both excellent street trees, the foliage is dense, the head usually being sound and compact, forming a perfect shade. The bark is smooth, and if large trees are re-

moved, with but little foliage to protect the bark, it sometimes becomes scalded in the sun, and borers gain access.

The trunk of newly planted trees should always have a shade on the south side. The tree box will afford this protection.

TWENTY-FIVE THOUSAND ACRES.

Every twenty-four hours the railroads, manufacturers and home builders of the United States demand twenty-five thousand acres of timber land. That is, there is a daily consumption of all the wood the trees in twenty-five thousand acres supply.

J. STERLING MORTON.

The removal of shade trees from a street without any notice of the public necessity therefor to the owner of the fee, and without giving him any opportunity to transplant them or remove them himself, is held, in *Stretch vs. Cassopolis* (Mich. 51, L. R. A. 345,) to be an invasion of his rights, for which he is entitled to damages.

Sample copies of ARBORICULTURE are sent to many public libraries and to individuals. Unless an interest is shown by the recipients, and request for continuance, these will cease. We do not intend to make any charge for sample copies nor send ARBORICULTURE to anyone who does not desire it.

The Editor of ARBORICULTURE desires to express the thanks of the society to the numerous friends who have written them congratulations, and the press which has said so many good things of our paper. To reproduce these press notices would require more than our "fourteen pages of reading matter," and we must forbear this pleasure.

EXTRAVAGANT PRAISE.

Our esteemed contemporary from the tropical banana fields of Minnesota, the *Pioneer Press*, says:

The rapid multiplication of such periodicals as *Forestry and Irrigation*, *The Home Florist*, *Mechan's Monthly*, etc., shows the rude popular interest in the horticultural and arboricultural "colts." The latest candidate for popular favor in this line is ARBORICULTURE, a monthly, the publication of which has just begun under the auspices of the International Society of ARBORICULTURE. It was thought that a first edition of 1,000 copies would suffice to meet the demands of subscribers, but it was found necessary to print 4,000. "So far as it goes," the new magazine is very good. It has a fine portrait of J. Sterling Morton as a frontispiece and several other good illustrations, but only fourteen pages of reading matter. The price is \$2.00 per annum. Plainly the publishers will have to give more for the money or the undertaking will prove a failure.

We are glad to learn that the "Rude Popular Interest" appreciates concentration. Fourteen pages of substantial literature may prove of greater benefit to the world than a forty-page Sunday issue of the great daily of Saint Paul.





WILLIAMSON'S SAPSUCKER, (*Sphyrapicus thyroideus*.)

(Figure on left, male; on right, female.)

Correspondence and Inquiries.

This department will be open for correspondence and inquiries upon subjects pertaining to Arboriculture in its broadest sense and will be a special feature. Address, Editor Arboriculture, 1639 Michigan Avenue.

EDITOR ARBORICULTURE: Six years ago I secured a quantity of catalpa seed and planted in my garden. Next year I placed them along fences to grow into fence posts, but they grew crooked and branched near the ground. Some I cut off and the sprouts grew up straight fourteen feet and attained a diameter of two inches by fall. Now, after four years growth, they are five inches diameter, twenty-four feet high. Those planted by the fence now are low, snarly and unsightly. I fear I have the Southern catalpa. How am I to tell? Please give the information in October ARBORICULTURE.

W. D. S.

Zionsville, Ind., September 29.

If the trees were in bloom they would be easily distinguished. *Speciosa*, the large forest catalpa, has much larger flowers than any other variety, are nearly pure white, and bloom two weeks before the Southern catalpa. The pods of *speciosa* are few in number,

usually one or two, seldom three in a cluster. They are long, often eighteen inches, heavy, thick pods. *Bignonioides* has shorter pods, thinner shell, and more in a cluster. The oriental sorts and their hybrids have from a dozen to twenty in a cluster, about the size of a lead pencil. The seed of *speciosa* has a broad square pencil of filaments or hairs at each end, those of other varieties being pointed. The bark of the Wabash tree is thick, heavy, furrowed like the ash; that of the Southern tree is thin, flaky, or scaly, resembling the spruce tree.

All catalpa trees are improved by cutting them off in winter, when not frozen, and confining the growth to one shoot. This having the force or vitality of the whole root system, pushes up straight and rapidly. Of course the true *speciosa* has a more upright tendency because of its greater vitality, and very naturally makes an upright growth. The catalpa family hybridizes readily, and it is impossible to determine, without critical examination, just what W. D. S. has; probably a mixture of hybrids.

Book Reviews.

BIRDS OF THE ROCKIES.

In June, 1900, this Society made an examination of the pine forests of the Black Hills, S. D., and reported to the Government the conditions of the trees destroyed by the bark beetles.

We recommended the sale of all affected timber, requiring that the bark be removed and burned to destroy the insects. Our estimate of the loss, at that time, was 100,000 acres and 100,000,000 feet of timber destroyed. Commenting on the scarcity of woodpeckers, we urged the importation of these birds.

In July, of the present year, the Society issued a Special Rocky Mountain Bulletin, on the Destructive Bark Beetles of the *Pinus ponderosa*, in which we renewed our appeal for speedy action by the Government in dealing with these insect pests.

The Entomological Division, Department of Agriculture, has just issued Bulletin No. 32, upon the subject, by Professor A. D. Hopkins, of West Virginia. Both our contentions have been confirmed by Professor Hopkins, who reports a remarkable scarcity of woodpeckers and birds capable of reaching the insects within the inner bark. The yellow or bull pines of

the west have very thick, heavy bark which only the long-billed birds, such as sapsuckers, can reach.

We still have a few copies of our Rocky Mountain Bulletin to spare.

Through the courtesy of Messrs. A. C. McClurg & Company, Chicago, we are permitted to use the half-tone of Williamson's Sapsuckers, "chiseling grubs out of the bark of the pine trees," taken from *Birds of the Rockies*, just published by them. In this remarkably handsome work Rev. Leander S. Keyser makes many mentions of the woodpeckers in Colorado, confirming our statement as to their scarcity. However, their presence, even in small numbers, is plain evidence that they would be abundant even in these high altitudes, if men and boys could know their value and protect them.

Dr. Keyser vividly describes the rugged regions about Pikes and Grays peaks, and in an enjoyable manner writes of the birds found in each locality.

A novel amuses the reader and enables time to pass quickly, but such books as this gives an equal enjoyment and leaves the mind stored with much useful information. Dr. Keyser writes so that a child can understand, yet full of interest for mature readers.



CAMP LIFE ON COLD BROOK, SARANAC LAKE, IN THE ADIRONDACK MOUNTAINS. ON THE NEW YORK CENTRAL.



HONEY LOCUST (*Acacia triacanthos.*)

This is the second of a series of half-tones printed here by permission of Prof. John M. Coulter, of the Department of Botany, University of Chicago, for whom they were engraved by us.

We call special attention to the exquisite delicacy and perfection of the shadings and markings in this specimen.

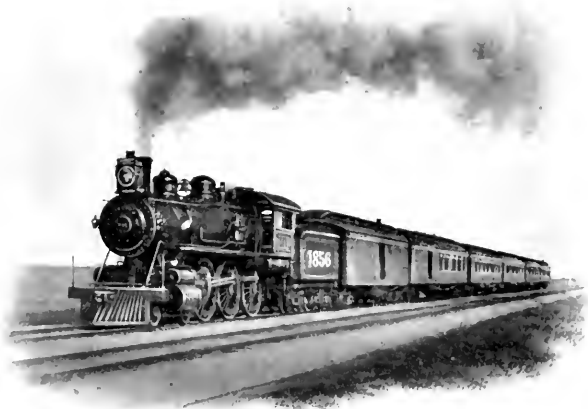
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is the name of a company formed fourteen years ago at Boston, the original founders being Hon. Robert Luce, a member of the Massachusetts legislature, and his brother Linn, both at the time being active newspaper men of Boston. Their original modest beginning grew into such proportions that in ten years they incorporated under the laws of Massachusetts, and established important branches in New York, Cincinnati and Denver, with connections in Chicago, so that today while not a "Trust" the company has such widespread connections that it can be *trusted* by the business and professional public to take adequate care of any interest placed in its hands.

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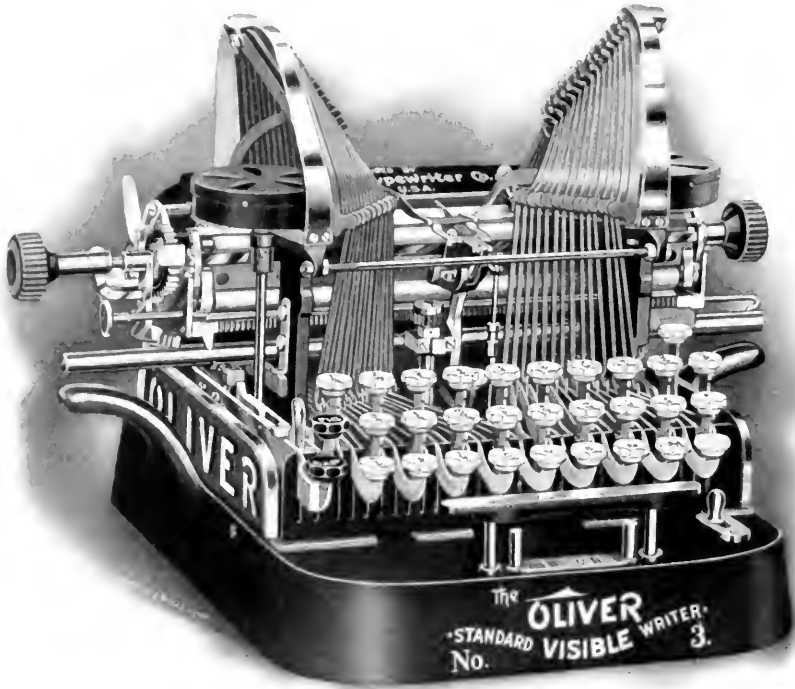
Here are some more interesting facts: Rock Island runs tourist sleepers daily, Chicago to Los Angeles and San Francisco via El Paso. They leave Chicago 8:32 A. M., and make quicker time to Southern California than similar cars over any other line. Tourist cars for San Francisco and Los Angeles via Colorado and Utah leave Chicago 10:00 P. M., Tuesdays and Thursdays. Portland car leaves Chicago 10:00 P. M. Tuesdays.



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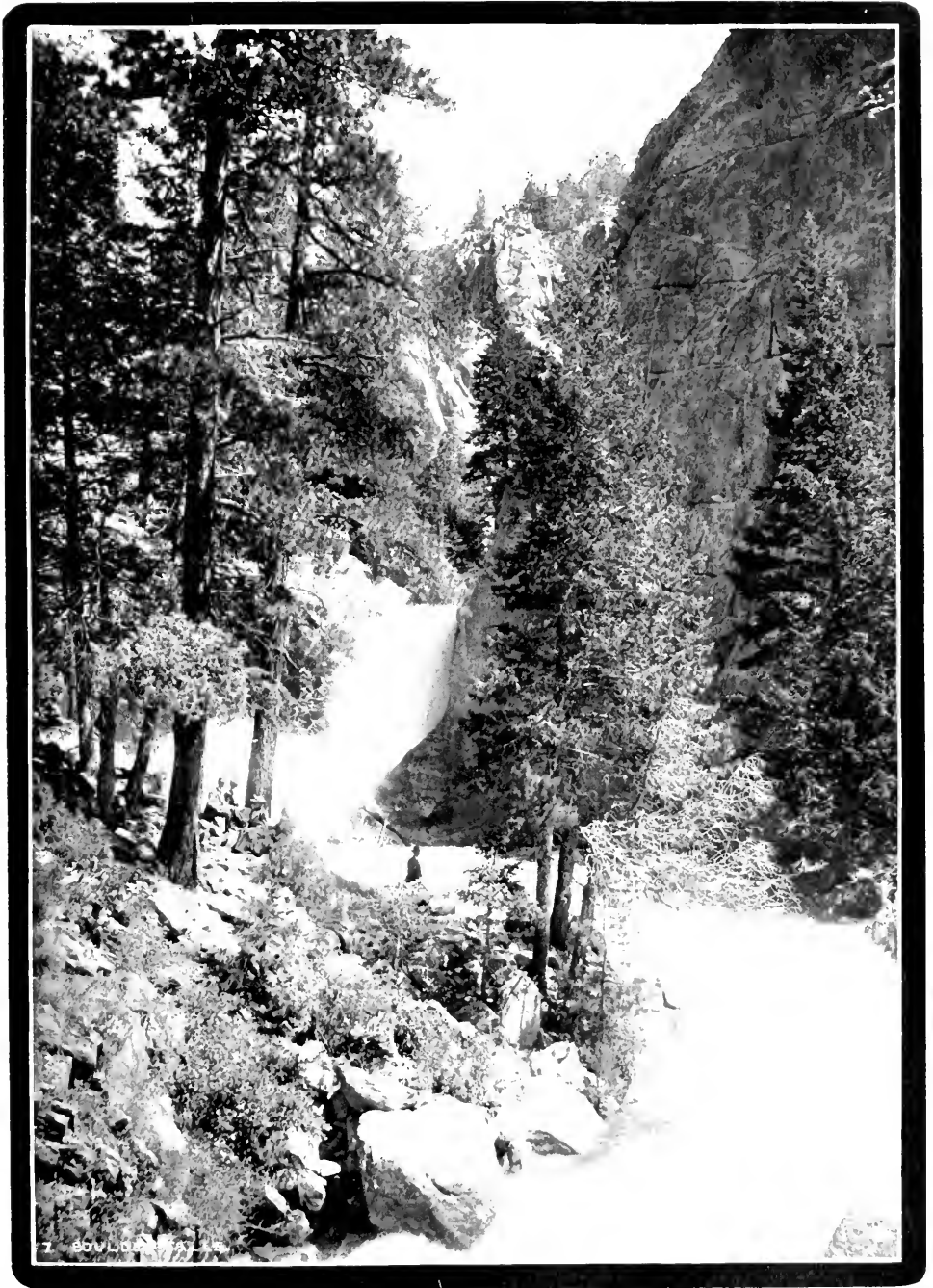
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We can tell you about a lot of hotels and boarding houses in California where you can live nicely for from \$7 to \$15 per week. Don't those figures rather surprise you? Is there really any reason why you should not spend a while in California, the land of sunshine, where the flowers bloom, and the fruit ripens, and the trees and grass are green, while elsewhere people are suffering from the cold? Surely it's worth investigating—it won't cost anything to do that. Write today and ask me to send you a copy of our beautifully illustrated 72-page book about California; no charge; and with it I will send a folder which explains about our Personally Conducted Tourist Parties, and also a circular telling all about the prices of tickets. The saving in doctors' bills likely will pay for your California trip.

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ARBORICULTURE

VOLUME 1.

NUMBER 3.



A Magazine of the International Society
of Arboriculture: Chicago, November, 1902

THE INTERNATIONAL SOCIETY OF ARBORICULTURE

OFFICERS

GENERAL WM. J. PALMER, President, Colorado Springs, Colo.

JAMES H. BOWDITCH, Vice-President, Boston, Mass.

JOHN P. BROWN, Secretary-Treasurer,
1639 Michigan Ave., Chicago, Ill.

ARTICLES OF INCORPORATION.

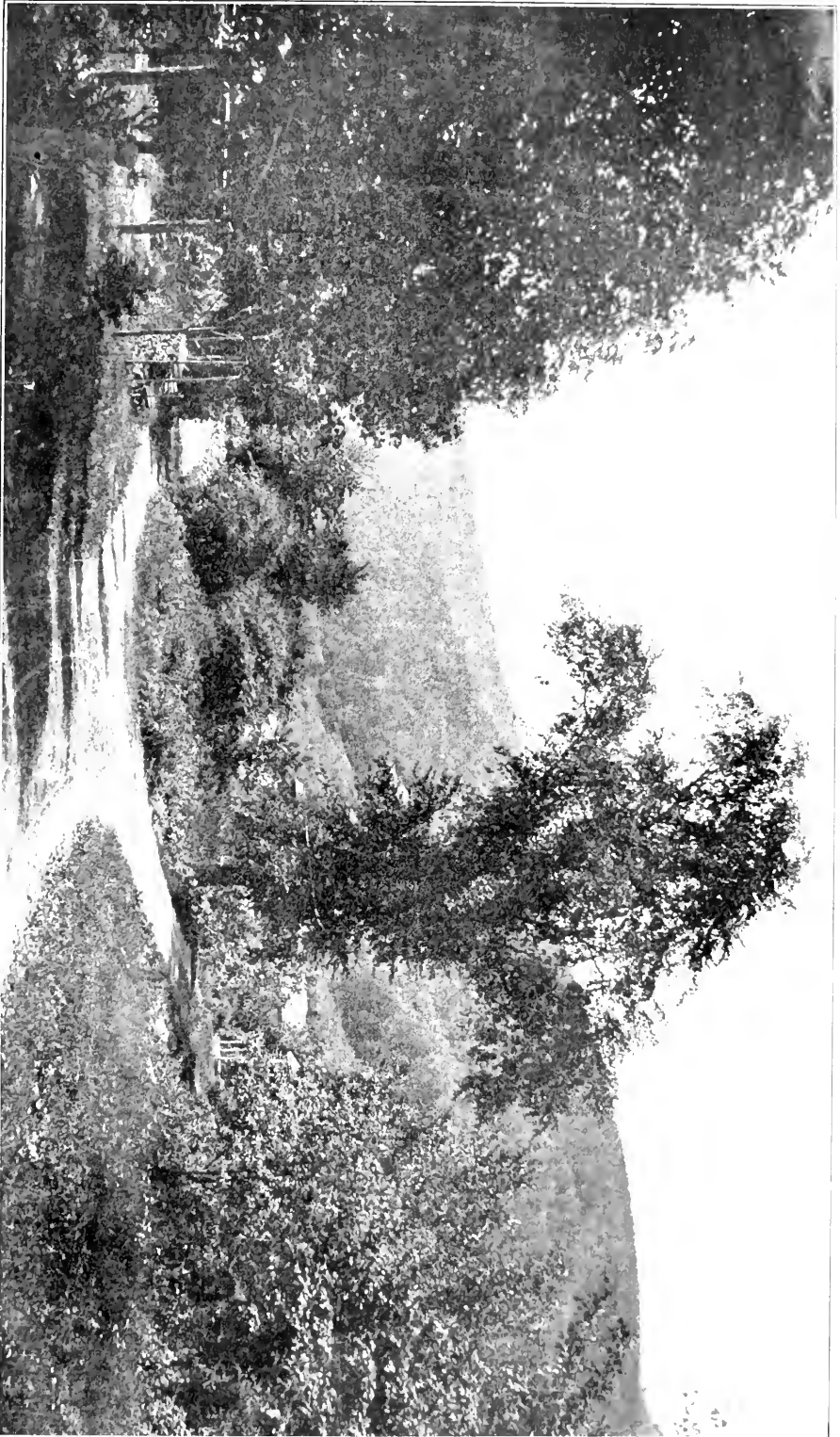
Article I.—Name. The name of this corporation shall be The International Society of Arboriculture.

Article II.—Purpose. The purpose of the Association is to introduce judicious methods in dealing with forests and woodlands; to advance and advocate a public interest in this subject; to promote the afforestation of unproductive lands; to encourage the planting and care of shade trees in parks, public and private grounds, and along streets and highways; to inspire an interest in our remaining native forests, and groves of ancient trees, and to seek their preservation; to supply information to railway officials in regard to timber culture for railway uses, and incite railway and other corporations to plant trees for economic purposes.

Article III.—Membership. Any person may become a member of this Society by the payment in advance of an annual due of two dollars, and on payment of this annual due shall be entitled to receive, regularly, one copy of ARBORICULTURE, the official organ of the society. Any person who may contribute ten dollars toward the support of the society shall become a patron. Honorary members may be chosen by the executive committee.

Article IV.—Officers. The officers of this Association shall be a president, vice-president and secretary-treasurer, who shall be elected at the annual meeting each year by ballot, and shall serve for one year, or until their successors shall have been elected and shall have accepted office, and when elected shall constitute the executive committee.

Article VII.—Executive Committee. The Executive Committee shall have entire control and management of the affairs of the Society.



In the Catskill Mountains—On the New York Central.



THE GINKGO TREE.

ARBORICULTURE

A MONTHLY MAGAZINE.



PUBLISHED IN THE INTEREST OF THE
INTERNATIONAL SOCIETY OF ARBORICULTURE.



Subscription, \$2.00 per annum.

JOHN P. BROWN, Editor, 1639 Michigan Avenue.

Volume 1.

CHICAGO, NOVEMBER, 1902.

Number 3.

Appeal to American Farmers.

PROVIDE AN INCOME FOR THE FUTURE.

To the Farmers of America.

YEAR in and year out, American farmers plow the land, sow the seed, reap, and send to market the various grain, hay or produce, each season demanding seed, labor and expense, repeated as the years roll on, from youth to old age. A few become rich by reason of advancing values in lands, not many make more than a living during a lifetime of toil.

American youth tires of this continuous drudgery and drift to the great cities, in hopes that by successful speculations they may gain wealth without the expenditure of such labor.

Combinations of capital control the price of your productions. Unions among the elements of labor decide the cost of your help. In every branch of industry and all forms of business are alliances to limit the income of the agricultural class. The hours of labor in the cities are short—the day of the farmer is double the length of that of his city brother.

Why not produce something in addition to grains and grasses which will relieve you of part of this incessant toil, and which will ever be in demand at remunerative prices?

You who have made homes in the

wilderness of forest, and by slow and tiresome degrees cleared the fields for tillage, are aware of the small value of wood in the mixed forest. Here and there is a good tree, but the majority is of no special value for the lumberman, and only adds to the labor of clearing. This is owing to the methods used by nature in planting the seed, sowing it promiscuously by wind, animals and birds.

If every tree on your land was a walnut, or a hickory, yellow poplar or other valuable species, all of one kind, you would find a ready market for the timber, in the same manner as your orchard; if all are winesaps, pippins or spys, you have no trouble in securing the highest prices for apples, but if no two trees are alike you cannot sell the crops to advantage.

If you plant a forest of quickly maturing timber trees, and all of the same kinds, these do not require planting but once, they demand but little of your time, growing while you sleep, as well as in your waking hours, and they cannot be manipulated by stock speculators on the one hand or labor combinations on the other. The improvidence characteristic of Americans has destroyed the natural forests, and good timber is becoming scarcer each year, and will always

be in demand at rapidly increasing values.

Pine lumber of better grades is almost exhausted, and so with oak and other woods, something must be provided to take their place.

The landowners who are wise will devote a portion of their farms to the growing of fence posts, cross ties and other forms of timber.

We append a table, carefully prepared after a third of a century's observations and measurements, showing the annual rate of growth of our principal trees, and also estimates of growths which may be obtained in a series of years for each acre planted and properly cared for. This data will enable you to determine the probable results in a given number of years.

A majority of trees will have room to develop if planted 16x16 feet or 170 to the acre.

The *Catalpa speciosa* increases one inch in thickness each year if reasonably cared for; thus by the end of twenty-five years the trees become 24 inches in diameter, with a uniform taper to the top.

Such a tree will contain 150 feet B. M. of lumber, 25,000 feet to the acre, and bring, at prices which will prevail twenty-five years hence, \$60 per thousand, or \$1,500 per acre, net, while the cost of planting and caring for them will be inconsiderable.

If such trees are sawed into cross ties they will produce 1,700 ties, and will bring one dollar each on account of durability.

In the vicinity of mining operations, where mine timbers are constantly in demand, the income will begin in eight or ten years, each tree making probably two lengths, or 1,360 timbers per acre, the trees for this purpose being planted 8x8 feet.

One great railway company will plant *Catalpa* timber on a large scale upon their lands, under which lie vast beds of coal. It is now difficult to procure a sufficient number of mine timbers to support the roof of the mines. These trees will, in eight years, make better props and ties than the wood now being used, while transportation from long distances

will be avoided. Six hundred and eighty trees, making 1,360 props and ties for the mines, grow upon each acre in eight years; the wood being so much more durable than what is ordinarily used, will, of course, be of greater value.

If a railway company can do this, what opportunity does it offer to the farmer to supply such wood for the mines?

DEMANDS OF RAILWAYS.

There are in the United States now, 218,000 miles of steam railways and 50,000 miles of electric roads, the mileage increasing daily. It takes 3,000 cross ties and thirty telegraph poles for each mile of track; ties must be renewed once in five to seven years, poles once in ten or twelve years. The telegraph and telephone lines have in use 5,000,000 poles. Thus three thousand millions of cross ties and thirty millions of poles will be required during the twenty-five years before us. In addition to this three hundred and fifty millions of fence posts will be required to fence these roads in.

It will be seen that a vast area of land must be planted and maintained in timber to provide for these three items—cross ties, poles and fence posts.

If rapid growing trees should be planted at once, 170 trees per acre, it would require five million acres to grow enough timber for this purpose.

There is no danger of our planting too much timber, and the farmers who begin now and plant a fair proportion of their lands in such timber as is in constant demand at high prices, will in due time reap their reward, and it will come when they begin to feel like retiring from arduous labor of farm life.

Of course, if the planting is done and no further interest taken it will result in failure just as any other crop would do.

I shall leave to the great lumber manufacturers and dealers the problem of future supply of lumber for the market. Fires, excessive cutting, unwise exports at unremunerative prices, competition which is entirely unnecessary, waste upon every hand; how long can this continue?

There is a great benefit to the land from growing forests, its fertility is renewed, by the annual deposit of leaves and decay of twigs and roots.

Wind carries the leaves to other fields, adding in their fertilization.

The waste in soil erosion is greatly lessened, and often checked entirely.

The injurious effects of hot drying winds is largely overcome by heavy belts of trees, which guide the air currents above the surface.

The influence of the trees upon the climate, rainfall and sudden changes of temperature is recognized by every intelligent person.

A forest of economic trees is better than a life insurance policy, for a great majority of companies fail after receiving premiums for many years.

TABLE OF ANNUAL GROWTHS.

Careful measurements made by the writer in the last thirty years, and observations in nearly all the states in the Union, establish the fact that young and thrifty trees develop very rapidly, many species enlarging their trunk diameter one inch each year up to the twentieth year, after which, owing to the exhaustion of plant food within reach, and interference by roots of adjacent trees, the growth is somewhat diminished.

Average annual increase in girth after planting:

Ash	2.8
Birch	4.4
Buckeye	2.1
Chestnut	2.0
Eatalpa	3.4
Cottonwood	5.0
Elm, American	3.2
Hemlock	1.7
Hickory	2.4
Honey Locust	3.0
Kentucky Coffee	2.6
Larch	3.0
Locust	4.0
Lombardy Poplar	5.5
Linn	3.3
Maple, White	5.8
Maple, Norway	2.0
Maple, Sugar	2.1
Mulberry	4.0
Oak, Red	3.3
Oak, Black	2.3
Oak, Burr	2.5
Oak, Willow	2.5
Pine, White	2.2
Sweet Gum	2.6
Sycamore	3.9
Spruce, Norway	2.4
Tulip Trees	2.7
Weeping Willow	7.0
Wild Cherry	1.8

Erosion.

NOTHING remains stationary in nature. Changes are constantly occurring. Worlds move constantly in their orbits through the heavens. The earth ever continues to tear down the wondrous monuments of past epochs, and to erect new geological formations. One great force of nature upheaves the land at one place, depressing it elsewhere, and in these operations mountain chains are elevated, volcanoes, earthquakes seismic exhibitions are but partial effects of this enormous force. Another element is at work tearing down the mountains, leveling the hills and sweeping down to lower levels the looser portions of the surface, from the mountain plain and valley. This power is erosion.

Alternate freezing and thawing of the water on the higher mountains rend

asunder the granite rocks, and hurl them far down the valleys; torrents of water roll these fragments along the mountain streams, grinding them into powder, which is borne by the currents to the ocean. This same power, flowing water, washes the soil from ten thousand farms, and mingles it with the debris from granite peaks; strewing it about the deltas of all great rivers.

It is this erosion, by flowing waters, that so constantly channels out the farms on rolling lands, and removes the richest portions of fertile fields of every thriftless farmer. The tendency to clear away all forest growths from every steep hillside, to bare the banks of every stream, for the purpose of obtaining a few crops while the land is new and the soil fertile, is destructive of farm lands and a very injurious practice.

Such lands can be cultivated but a few years, when they are abandoned as worn out soils.

The roots of trees hold the soil from washing while in forest, but as the trees are removed the roots decay, and the ground being loosened by the plow, is soon washed into the streams.

While such lands remain covered with trees, the annual deposit of leaves continues to enrich the soil, and, gradually carried to the lower fields renew their fertility, but with removal of these hillside forests the torrents come with unimpeded velocity, to destroy the lower fields as well as those upon the hillside.

The Ohio Valley is but one instance where half a century ago there existed the richest land of the continent, but erosion has left the clay and rocks, with fields unfertile and difficult to till.

Prior to the Civil War period the Ohio and Mississippi rivers were the great channels of commerce between the North and the South. Many thousands of tons of farm produce were annually shipped by flat boats to the sugar and cotton regions of the South. The lands were "new," full of vegetable mould, productive and profitable to cultivate. Erosion has removed the rich soil and deposited it in the Gulf of Mexico. The flatboats are gone, not because the railroads have entered their field of commerce, for no railway could compete with water transportation, especially by the cheap method of flatboating. It is simply that the farms are not so productive as formerly, the soil has been eroded, its fertility gone.

The red clay lands of Alabama, Georgia, Mississippi and the hill region of the South generally, are instances of erosion. The adhesiveness of the clay is lessened by decomposition of the soil, and each rain carries away the binding materials of the clay, and when loosened it is soon washed into deep gullies and becomes unfit for cultivation.

Such lands should be planted with timber. The natural growths of pine, which comes in so generously, should be protected, for these forests will in time overcome the tendency to erode.

The bad lands of Montana and Dakota are other illustrations where the

alkali is dissolved from the soil and carried away by the melting snows; the earth remaining is of a light, porous, sandy character and erodes very rapidly. Here the depressions are from one hundred to several hundred feet deep, broken into ridges and steep gullies; some of these elevations being of a harder character remain in masses of innumerable shapes. Beds of lignite occurring throughout these bad lands, and at times taking fire, have given rise to conjecture that these beds having burned out, the land has sunken, but the simple fact is erosion has done all this work.

California has numerous demonstrations of this power of erosion. Where dense forests existed less than a quarter of a century ago, they having been cleared away, the soil has entirely disappeared and bare granite rocks remain. Forever worthless to man is much of these eroded mountain tracts.

The mountain lands in West Virginia, Pennsylvania, North Carolina, and, in fact, all steep inclines, once cleared of the timber, and plowed, will produce but a few crops, when the fertile loam disappears by erosion, and usually such lands are necessarily abandoned after ten or a dozen crops have been grown.

While there is such an abundance of rich prairie soil and fertile valleys, suitable for cultivation, it is extremely unwise to clear away the forest growths on mountain sides. At best a precarious existence can be eked out by toilsome cultivation of such fields, while as forest they serve the purpose of supplying necessary timber, aid in making the streams permanent, and check severe erosion.

The remedy lies in re-afforestating the steep hillsides, and many fields which are not so steep. In replanting the margins of streams with forest trees and in planting trees wherever the land is inclined to "wash"—so that the roots may catch and retain the vegetation and the soil which is washed from above—cease plowing the steeper lands. Get these tracts in grass and pasture if not willing to plant again in trees. You cannot stop erosion, but you may reduce it greatly by proper care.

Letter from Barton Cruikshank

President of Coggswell Polytechnic Institute, San Francisco, Cal.

Legislation Demanded.

(Special Correspondence of Arboriculture.)

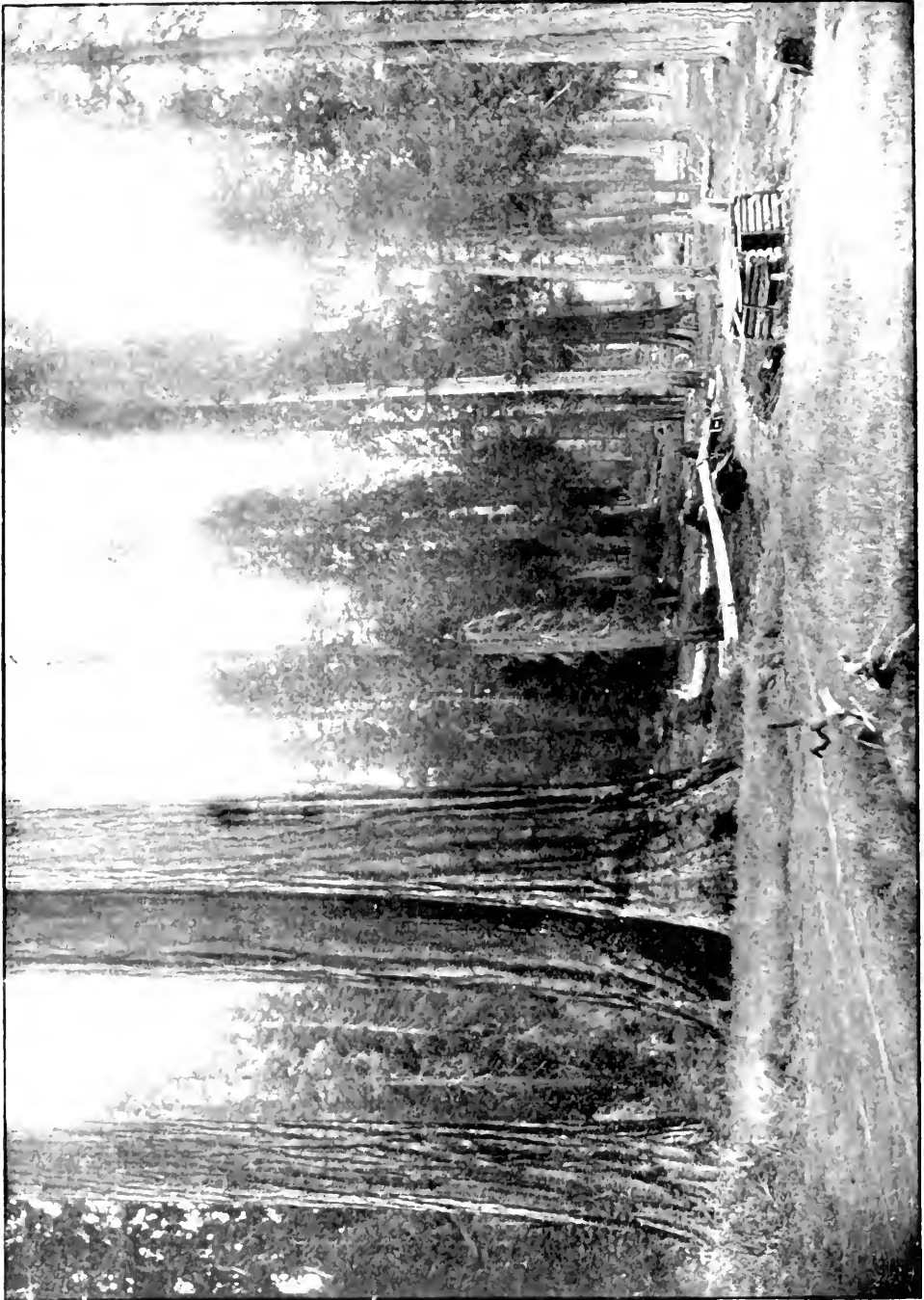
THE old nations of Europe, after having made the same errors this nation is now making, have awakened to the fact that very strict legislation regulating the cutting and planting of trees is absolutely necessary for the preservation of proper climatic conditions and a water supply adequate to their needs.

Why our legislators have done so little can be accounted for probably only in the following way: Our government is one in which the representatives are not as a rule, from families holding large landed estates which have descended from generation to generation, they are many of them, perhaps most of them, men who are in the profession of politics, not for the honor so much as for the making of a livelihood, and their constituents in this new land are one and all working for the "almighty dollar" with no thought whatever for posterity. Such legislation as there has been, has most of it come too late—or so late as to make the accomplishment of its aim a difficult task where it should have been an easy one. Take as an instance the Adirondack Park of New York state. When the first Forest Commission was appointed the plan was all right, but it was not carried out. The commission was probably composed of politicians and not foresters, and no plan was immediately devised for scientific management of the property, for, when done as it can be done, but never is in our ordinary logging camps in this country, matured trees might be removed and thus allow a replacement of a decrepid old stand of timber by a vigorous new crop of better kinds, without in any way affecting the water holding conditions, and with a

decided improvement to the forests as a pleasure park. Such management, too, would materially assure a greater security from fire devastations.

But we have said that most forest legislation comes too late. A belt of land varying from five to fifteen miles in width and running from a little north of Utica almost to the St. Lawrence River along the western border of the Adirondacks, another noticeable strip along the north bank of the Black River after it turns at Carthage, thousands of acres, all of which was once covered with a luxuriant forest growth, is now not only denuded of trees, but is almost totally useless except as it furnishes wild blackberries to the residents of the better favored farm land bordering it. Had proper laws prevented the wholesale slaughter of the young trees which would naturally have reforested this territory, had fire been kept out, this territory, now useless, might be an income producer to the state. And almost if not exactly similar cases are only too common in all the states of the Union. France made the same mistake that we are making—allowed its inhabitants to strip its mountains of forest-cover, and now, having seen its past folly, is having to spend vast sums to rectify its carelessness. From 1860 to 1879 the government spent \$9,500,000 for reclaiming waste lands, and this reclaiming process has been continued since 1879 at about the same annual cost.

And so it must soon be with us if our present methods are not changed. We do not need laws giving authority to buy up timber land for parks so much as laws which shall prevent owners of timbered property from clearing timber from even their own land if it will not



Permission of Water and Forest

BEFORE THE AN

make good farm land. The laws should allow private lumbering, but it should be under state supervision and direction and on principles which would benefit rather than depreciate the market value of the land as timber land, and would increase rather than decrease its water-holding value. The laws should go farther still, and provide that all steep slopes too steep for plowing or even good pasturage, should be reforested as fast as practicable, by state aid, perhaps, for many farmers could not find the money necessary to set out all their steep slopes. This aid could be given in such way as to eventually return to the state from the earnings of the land, which would, through this forestation, be increased in value though at a rate too slow for the average farmer to be able to speculate upon or wait for.

Just as some states authorize an abatement of taxes for tree planting on highways, so a similar policy would induce land owners to replant their waste tracts if state officers would show them how. So long as forest lands are heavily burdened with taxes and no law prevents or other inducements are substituted, the average forest owner will cut the timber in the easiest and quickest way possible, and thus destroy the land and all future profits, for but few look far enough ahead to see the short sightedness of such a policy.

The state should buy the valueless land, not the timber land, if it need buy at all, and reforest it, but its laws should be such as to prevent a denudation of land now forested.

In France a new province has been practically added to the country by planting forests. During Roman times the region known as the Landes, on the shore of the Bay of Biscay, was heavily wooded, but after being stripped of its forest covering, the soil, a very light sand, began to drift inland, burying villages and rendering the whole country uninhabitable, so that the government had to take up the work of tree planting in self-defense. The region is now a famous health resort as well as a well-managed pine forest, paying a liberal interest on the investment made in planting it, and now furnishes lumber for the

industry of the land, to say nothing about the improvement of climatic conditions. Why, then, cannot our states, with seldom so difficult a problem, reclaim their great tracts of waste land and be immeasurably richer by so doing?

California has a few exceptions to the above principles, for her Sequoias are so unique that these mammoth monuments to the wonderful climate and soil of that exceptional state should be preserved at any cost. But, for the vast forests of redwoods, of pine, and of other species on the Pacific coast, the rules just spoken of hold true and *our states and our government should step in now, and regulate the present lumbering methods which are making deserts of our mountains which ought to continue forever to furnish our land with wood supplies, and to send to our valleys the steady flow of rivers and creeks without which they soon become unfruitful and unproductive.*

ARBORICULTURE has fortunately got enough foothold already in this country so that facts are obtainable to answer the question about which so many are ignorant, namely: "Will it pay to plant and cultivate forest trees?" In the plantation of L. W. Yaggy, near Hutchinson, Kansas, the young trees show a net average annual return of \$19.75 per acre for the first ten years of their growth, and further figures go to show that if one could wait for the returns, the average land set out to trees would bring better income per year than if planted with corn or other farm produce.

And now all we need is concerted action by all the states concerning the management of regions of sand, which, if already covered with trees, should be so supervised by proper officials that at least 60 per cent should remain in forest, if not so covered, should be immediately set out to wood lots in that proportion, selecting, of course, the hilly and least easily worked land for the trees.

In Oneida county, N. Y., during one of my many long drives, my horses had been laboring along through a most desolate country, absolutely without trees and practically nothing but dried up sandy pasture land. The road was of so loose a sand as to make trotting almost an im-

possibility for the horses, when suddenly the road entered a wooded strip, and immediately we were on a firm surface. Had the character of the soil changed? No—without the trees it would have been the same. But the road was not all that had been improved. I said this was a wooded strip—it was succeeded by a strip of cultivated land of about the same width, perhaps thirty rods, and then came another strip of woods and another strip of meadow alternating, the whole covering several hundred acres of one of the finest farms in the state in spite of the fact that the soil, if exposed to wind and sun, as on all the neighboring properties, would soon become worthless. The neighboring land owners are too poor to set out trees, they think, and were too grasping in days long past to leave the trees, but should not the state see to it that such failures be not repeated, and also take measures to bring about the same conditions as those upon the noted Miller farm above cited?

In the region of which we are speaking, the land after its long exposure, will not grow a good crop of any regular food for man or beast, but fortunately nature has provided a crop which can grow on just such land, and fortunate too would be the next generation if this land could be thus planted, for spruce is a native to the soil and will grow and thrive where other trees and plants could not live at all, and moreover in New York state, with its vast paper-making industries, spruce is now getting to be so scarce an article as to make its value very great indeed, and a planning for future crops not only a wise policy for the state, but even for individuals. A young man could take out no better class of insurance for independence and comfort for his old age than in setting out to spruce, pine or catalpa, such land, which can be bought by the thousands of acres at the yearly tax sales.

What is true of the land in New York state is true of almost any other. Forestry experiments in Kansas have proven most emphatically that trees are a good and paying crop even where other things will not grow, perhaps I should say, especially where other things do not pay.

BARTON CRICKSHANK.

The half-tones—Before the Ax, and After the Ax—taken from Water and Forest, San Francisco, are true to nature. We have seen many places in California and the West which these pictures would illustrate. ARBORICULTURE does not object to lumbering, on the contrary, is an advocate of manufactures, and of cutting the trees which are ripe and ready to use, but favors a more rational method of clearing whereby the forests may be perpetuated for all time, and made a source of income to the owners of the land, the nation and state. The goose which lays the golden egg should not be sacrificed by the ruinous policy which now prevails in almost every lumber camp.

Canada is far in advance of the United States in her laws for forest perpetuation.

On Crown Lands Licentiatees are forbidden to cut pine trees measuring less than 12 inches in diameter, spruce trees less than 11 inches and other trees less than 9 inches. Some inferior trees, used for wood pulp only, may be cut if 7 inches diameter, measurements made at the stump.

Evanston, Ill., Oct. 14, 1902.

JOHN P. BROWN.

The first number of ARBORICULTURE was exceedingly interesting. I read every article. Such a magazine should do great good.

JOHN N. MILLS.

Woollen's Garden of Birds and Botany,

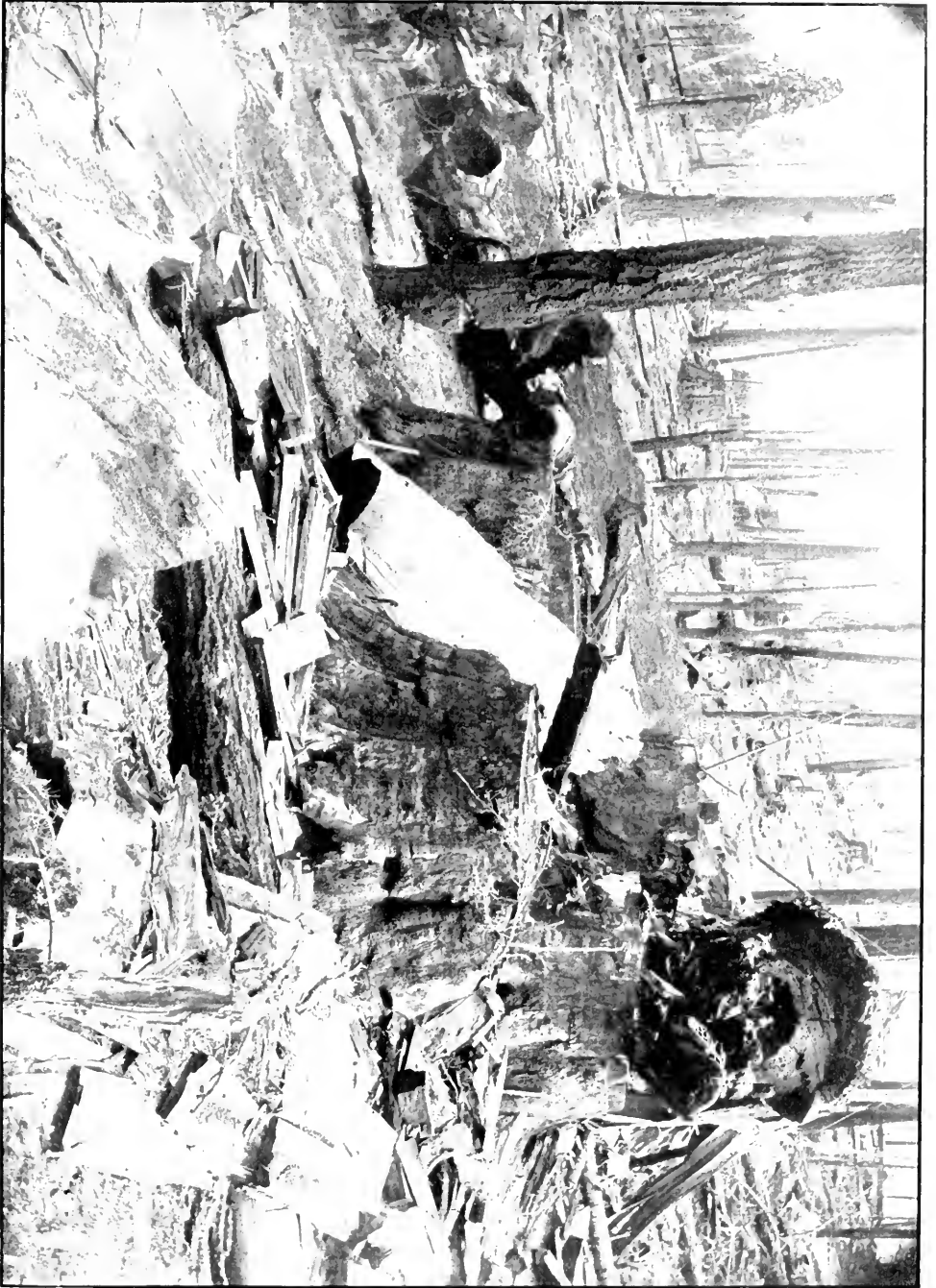
Indianapolis, Ind., Oct. 18, 1902.

MR. JOHN P. BROWN.

My Dear Brown:—I have received the second number of ARBORICULTURE and am greatly pleased with it in every respect. It is a beautiful, interesting and valuable number. If you keep up this pace I cannot understand why your paper will not be a great success. Most assuredly you have my best wishes that it will be so. I am preserving these numbers for binding and for a place in the Library of Woollen's Garden of Birds and Botany.

Very truly,

WILLIAM WATSON WOOLLEN.



Permission of "Water and Forest."

AFTER THE AX.

Christmas Trees a Growing Evil.

THIS is an opportune time for the consideration of the effects of our ill-advised practice of Christmas tree decorations is going to have upon the nation. In a few days the ax will be in use throughout New England, and wherever evergreens are growing, cutting by the million, to be shipped all over the land for the holiday trade.

The fad which has taken such a hold upon Americans, of celebrating the birth of Christ by sacrificing the lives of a million handsome, thrifty young evergreens, should be abandoned. These trees are needed to supply this nation with lumber and timbers, and it is a crime to cause such destruction as occurs every year at Christmas time.

The Vermont Phoenix a year ago said: A large number of small spruces and firs, at least 12,000 to 15,000, cut in Marlboro, have been drawn to the railroad station at Brattleboro this week for shipment to Philadelphia for the Christmas tree trade. The Philadelphia dealer who makes the shipment pays a stated sum for the trees on the stump and hires them cut and drawn. The trees are sawn off close to the ground, and tied in bundles closely bound with stout twine. A car piled high will probably carry 2,000 to 2,500 trees. The men employed in the work say that the farmers get "a dollar a load," which means a dollar for about 200 trees, half a cent apiece, five dollars for a thousand. On a liberal estimate of the cost of cutting, drawing, shipping by rail, and storage and handling in Philadelphia, or any other city, it is apparent that the cost per tree to the dealers can hardly exceed 15 or 20 cents a tree. The Philadelphia dealer said in conversation that he "should not consider himself a salesman" if he could not get five dollars apiece for the larger trees. A fair margin of profit surely between grower and consumer!

The work of cutting these young trees for the city Christmas trade has been go-

ing on in other parts of the state for several years. What this trade means in the way of forest destruction the country over is appalling to consider. These young evergreens are cut in Vermont every year literally by the hundred thousand, and the work is doubtless going on in every other section where firs and spruces grow—unless the farmers in other sections are wiser than those of Vermont. We are cutting off the grown forests at wholesale to make lumber and paper stock, and at the same time are at work at the other end destroying the young growth that would otherwise replace them in part. It is true that in many cases a judicious thinning out of the young trees would be advantageous to those remaining, but when the ax and saw take everything, as is the custom, the loss is irreparable. And what any one farmer or landowner gets in return for this vandalism is hardly enough to pay him for the tools to do the work with! This is sad degeneracy from the thrift and far-sightedness of the farmers who made our hill towns and farms what they used to be.

While we are discussing in a pedagogic way the profit there is in tree-planting and tree-growing as a business proposition, there is need also to discuss this end of the proposition— that of destroying the young growth which nature herself has planted and given a ten or fifteen years' start in life. While Audubon societies and nature classes are showing commendable zeal in trying to save the birds and the flowers, suppose our practical men of affairs begin to consider what this wanton destruction of young trees means.

A few thoughtful men in the cities, who see what the trade involves, have been calling a halt for two or three years past against the unrestricted use of evergreens at Christmas. The crusade may yet have to go hand in hand with that against the wearing of bird plumage in women's hats.

"The *Phœnix* submits this proposition to the *Times*: Can a better use be made of our worn-out, moss-grown and 'abandoned' Vermont pastures (that never ought to have been stripped of their forest growth in the beginning) than to allow them to grow up again to woodland, acquiring, a quarter century hence, a value which they can never gain in any other way?"

There are many good forms of holiday decorations, which may be substituted for trees which have a national value far beyond the pecuniary cost after they have been killed.

Ground pine, a *lycopodium* (*dendroidum*), which is used by florists for holiday decorations—a very beautiful material for wreaths, festoons, etc. It is found in moist woods in New England and westward. This *lycopodium* is a common article of merchandise to be found in every city. It is so abundant that no serious loss occurs by gathering it in large quantities.

The southern bay tree, *Magnolia glauca*, is extremely abundant in the South, where it is an evergreen: the glossy leaves make excellent wreaths and festive decorations. There can be no waste in using this tree, which is of rapid tropical growth in the swamps—south.

The well-known holly, *Ilex*, with crimson berry clusters, if used in moderate quantities, can supply all requirement for Christmas. There are many forms of the *Ilex*, most of which are suitable for Christmastide.

The mistletoe has a special significance for Christmas. It is not used as freely as the holly and ground pine can be, yet helps out the decorations and adds to the joy of the occasion.

This is a true parasite growing upon the oak in California, elm in southern Indiana, and upon some other trees in the far South.

The white berries in clusters give it a bright appearance. These are of a mucilaginous substance, which adhere to the beaks of birds which eat the berries, in efforts to remove the irritation. The birds peck at the bark in which the seeds of the mistletoe are left—to become plants, living upon the sap of the trees

on which it grows. Some southern ladies have cultivated the mistletoe for northern markets.

It will be an easy matter to obtain substitutes for trees if patriotic Americans will cease encouraging this forest destruction.

THE SIROCCOS.

JOHN P. BROWN IN THE *Conservative*.

In Northern Africa are neither mountain ranges nor forests, a tropic sun pours its fierce rays upon the Libyan desert sands and as the wind blows over the desert it accumulates a vast amount of heat. Meeting with no obstructions in its onward flow across the desert and then over the Mediterranean Sea, its hot breath deals destruction to Malta, Sicily and Italy.

Either a range of mountains or a heavy forest would deflect this hot current upwards: mixing with the colder air of the higher strata, the temperature would be reduced and a colder current forced to the surface.

The Mexican sirocco has a clean sweep as it moves northward over Texas, New Mexico and Oklahoma, not a range of mountains nor forest belt to obstruct its passage. It reaches Kansas, Nebraska and other states, accumulating heat all the way, and those who have felt its breath realize its terrible character.

Extensive plantations of forest trees in heavy east and west belts, especially upon the higher ridges of the states along its course, will be an effectual and only relief.

This can only be done by the combined efforts of the national government, each individual state and the farmers and landowners of the entire region, reduction of taxation upon lands so planted in timber-bounties by the national government, seeds and trees to be supplied of suitable character, and practical instruction by the Forestry Bureau. When the landowners are assured that practical forest planting means a profitable return in after years, and that the demand for good timber will always continue, they will be willing to do their part as the states and nation do theirs.

Ginkgo Biloba or Maidenhair Tree.

ALMOST a century ago the United States authorities imported from Japan a large number of that wonderful country's choicest trees, among which was this true gem. A few specimens were planted at the botanical gardens, and an avenue formed of a portion, in the Department of Agriculture grounds. One specimen stands in the public gardens of Boston, while others were distributed throughout the country. These are now large, handsome trees, from which many have been propagated.

The Ginkgo, or Salisburia, as it was frequently called, is undoubtedly the grandest tree which Japan has contributed to America.

The leaves are fan shaped, unique in many respects, being the reverse of almost every tree specimen, appearing like an evergreen, yet falling in autumn. The veins are prominent and are parallel. In color it has a very beautiful shade of green.

The trees grow to a height of seventy-five or eighty feet, and have an upright conical form.

There seems to be no complaint of disease or insect attacks from any portion of America, which is greatly in its favor. The Ginkgo has been planted in every state and is doing well everywhere.

Probably there are more specimens of this interesting tree in Washington city than in any other locality, owing in part to the former difficulty in obtaining seed, yet more to the thorough knowledge of its value by the park authorities of the District of Columbia, and a want of this information among the public generally.

All nurseries of ornamental trees now have them in stock, and they may be readily obtained. While the Ginkgo makes a good avenue tree, it is far better as a park and lawn specimen and should not be trimmed up as would be necessary on a street.

The Orientals in Washington seek the nuts which they consider rare delicacies; these are somewhat like almonds, although more resembling a large plum seed, and have a remarkably thin shell, and are contained in a pulpy fruit of offensive odor, but easily washed from the seed.

All the seeds I have been able to obtain have been too precious for planting and I have not eaten one, hence cannot decide their value as nut-producing trees, yet this may be an important production. When the Ginkgo becomes well known it will be in great demand and is certainly one of the best ornamental deciduous trees grown in any country.

Our frontispiece was supplied by Judge J. M. Snyder, founder of Washington Souvenir-Tree League, which distributes seeds and plants of Washington city and Mt. Vernon, and also extends the following

INVITATION.

Every person, regardless of age, sex, nationality or place of residence, who will, with his or her own hands, plant one or more Souvenir-Tree seeds grown either in Washington, D. C., or at Mt. Vernon on the Potomac, is invited to join the Washington Souvenir-Tree League, an association without secrets, meetings or dues, and devoted to beautifying the homes and idealizing the lives of its members, whether on farm or ranch, in village or city, by each member adopting and affectionately caring for one or more of our beautiful tree-children, offspring of the stately, long-lived trees which adorn the nation's capital and historic Mt. Vernon.

So thine own hands shall plant a noble tree,

Souvenir alike of Washington and thee.

Oil the Ally of Arboriculture.

The recent coal strike has had a terrible effect upon the forests in the more densely peopled regions.

A correspondent says: Old axes have been brought out and sharpened to make cordwood and the forests are being raided for fuel.

We commend the following item from the *St. Louis Republic*:

"Philadelphia, Pa., Oct. 10.—Bricks bid fair to rival coal as a fuel in this city. Thousands are burning bricks soaked in coal oil. This innovation is the invention of a woman.

One large porous brick soaked all night in coal oil will burn for more than two hours, and will furnish sufficient heat to cook a meal. Three or four bricks placed in a heater will warm a house for nearly three hours. The bricks can be used as often as desired.

Persons who have made the experiment are delighted, and many of them say they will continue to burn oil in this way in their cooking ranges, even after the coal strike is ended.

Each brick has attached to it a piece of wire with a loop, so that it may be easily handled.

A very porous soft brick will hold almost a quart of oil.

One brickyard here is making a special porous brick for this purpose."

The cheapness of crude petroleum, the great quantities being brought to the surface in the oil regions of Texas and other states, seem to indicate that oil will in the future be the principal heat producing material both for steam, in commerce and manufactures, and for household use.

We called attention, recently, to the adoption of oil for locomotives by several railways. It is no less of value for warming houses in our cities, and as such we welcome the advent of this ally to save some of our forests.

A field is open for inventors who will provide a method of using this natural fuel so as to avoid the danger—and, as well, the odor, which makes the use of oil so disagreeable in the house.

Natural gas is rapidly becoming exhausted, and manufacturers in the gas regions may well be investigating this subject of petroleum as a substitute.

The frequency of strikes in the coal regions, and the possibility of a repetition of past experiences, should warn citizens not to depend entirely upon coal for fuel.

A California exchange says:

"Oil fuel is being used on some of the Willamette and Columbia River steamers as a substitute for wood. Oil can be had for \$1 per barrel, and a barrel of oil is claimed to be equal to a half cord of wood, the latter costing from \$2.25 to \$2.75 per cord. The cost of installing oil burners is about \$500 per boat of considerable size. The larger boats use coal for fuel; but as coal is also expensive they may change to oil, should the experiments now being made prove economical."

When it is considered how vast a quantity of wood is used for fuel in those regions where coal is scarce, transportation of coal being prohibitive on account of frequent handling from vessels to cars—and distance of rail transportation—it will be better understood how it is that we welcome oil as an ally, since it is so much more easily transported and economical as well. The *Inter Ocean* recently said:

ALL ENGINES WILL BURN OIL.
Southern Pacific Decides to Abandon
Coal on Its Locomotives.

Oil as a fuel has proved such a success on all the lines of the Southern Pacific that general orders have been issued for the conversion of all the engines into oil burners as soon as possible. Coal will be abandoned absolutely. Within a year the Southern Pacific will be on an oil basis solely. The order will affect all the divisions of the company. The local division, generally known as the Western, is in the lead in the number of oil burning engines. The Sacramento division comes next, and the Los Angeles division third. All of the divisions

are using oil for about one-third of the traffic.

The local division now has sixty-three oil-burning engines. There remain eighty-three yet to be converted. It is estimated that within eight months all of the engines will have been converted, and the use of coal on the Western division permanently abandoned. During the month just passed the oil burners on the local division traveled a distance of approximately 200,000 miles. The coal-burning engines passed over 306,752 miles of track. The gain of this year over last is something over 50,000 miles per month, which is a fairly accurate index to the increase in business. It requires on an average 1,000 gallons or about twenty-four barrels of oil for every 100 miles, as compared to five tons of coal. The saving on every hundred miles by using oil ranges from \$16 to \$20. The total saving for the 200,000 miles traveled by oil-burning engines represents from \$36,000 to \$40,000 per month.

The company has expended upward

of \$5,000,000 for oil. The investment is a good one, however, as the saving effected will have paid for the enormous expenditure long before all the engines have been converted into oil burners. On the Western division alone the saving per month, when all the engines have been converted, will approximate \$75,000. When the other coast divisions use oil exclusively the total sum saved will be upward of \$100,000 per month.

The enormous saving arising from the use of oil is sufficient almost at the present time to provide a million in dividends annually. To the saving effected by the use of oil in locomotives must be added the saving arising from the oil-burning passenger and freight boats.

The opinion of those best informed is that it will take ten months and possibly a year for all the locomotives on the Pacific coast to abandon coal. All the engines which go into the repair shops at Sacramento, Los Angeles, or Oakland, come out as oil burners. There are very close to 150 oil burners in use on the three divisions.

Preserving Forests by Fire.

SCIENTISTS say that in order to preserve the forests from fire pine needles shall be allowed to accumulate, that dead brush shall not be burned out, that fallen trees should not be disturbed. The practical mountaineer says: "Burn; and burn often, in order that this accumulation of dead matter shall not become so great as to cause the destruction of the trees when a fire sweeps through the mountains."

There is but one practical way of preserving the forests of the Sierras from being destroyed by fire. The remedy may appear upon its face to be severe, but nevertheless it is the only one, and it is by the use of fire. If the soldiers, under proper instruction, would set fire to the dead matter each year there would be absolutely no danger of the destruction of the forests by fire, for the reason that I have already stated. This was the practice of the Indians in former days,

and until the soldiers came fires were of sufficient frequency to keep the dead matter destroyed, and there were no signs in the mountains of such fires save the occasional scorching of the outer bark of the large trees. Now it is an easy matter to find where recent fires have completely destroyed the forests over large tracts of ground. The remedy which I would suggest, then, is that these accumulations of dead matter be burned by the soldiers or others working under the supervision of persons familiar with such work. The expense attendant upon this would be a trifle compared with the vast loss which will certainly accrue if the present condition of things continues.—*San Francisco Call*.

What folly, what idiocy, Florida has experienced this kind of forest protection for all time—the Indians burned the accumulated vegetation each year—pioneer settlers continued it; not to protect the

forests, but to encourage a fresh growth of grass for their scrub cattle, which, roaming wild, were expected to earn their own livelihood. The result is seen in an open wood far from being a forest, with almost no young trees to replace those which must naturally fall in time from old age.

Sand—without the admixture of vegetable mold—fails to become soil, and vast quantities of artificial fertilizers must be used to produce vegetation. See the difference in the rich, deep soil of the hummock lands, where fire failed to consume the vegetable mold and annual deposit of leaves and grasses in all tracts low enough to retain water.

North and South Carolina, Tennessee and other mountain regions of the South may be cited to show the effect of annual burning by the natives to make fresh pasturage for mountain cattle.

Such statements and arguments by a great city daily are calculated to do irreparable injury, since they encourage the acts of vandalism which are far too prevalent in the land.

A system of forest patrols, with frequent fire guards, roadways and open lines kept free from debris, will forever check the devastating fires.

The forests are worth enough to this nation to justify a liberal expenditure of funds for the maintenance of a thorough patrol throughout all the forest region.

One fire the present season has destroyed more property value than twenty years' expense of fire protection.

All the prairie and plains country, two-thirds the entire area of the United States, has been caused to be treeless solely by fire—from the practice of the aborigines in burning the forest, and later the grass, to drive game.

The loss of so great a forest area has changed climatic conditions, caused an aridity throughout the western plain and mountain regions, which has made millions of acres of the richest soil in the world valueless for want of water. It is causing the expenditure of vast sums for irrigation, which can never benefit this great area, until forest conditions are restored and a great national system of re-forestation adopted by the government.

THE CRATEGUS.

We present as an insert in this number, on page 4, a spray of *Crataegus*, or hawthorn, from Dr. John M. Coulter's collection. While the haw, as it is usually called, is not so much a forest growth as of the open pastures, creek banks and thin woods, where the birds deposit the seeds after eating the berries, or pulp, it nevertheless possesses an interest to arboriculture. The English hawthorn is noted in literature, the hedges of Great Britain being among her principal attractions in rural life.

In every old pasture over large portions of the country are numerous red haws, varying somewhat in size of fruit, yet so similar in appearance as to be generally considered the same, but within recent years a systematic study of these thorns, principally by Professor C. H. Sargent and Mr. John Dunbar of Rochester City Parks, determines a very great number of American *Crataegus*, differing in size and beauty of the flowers, and also in the fruit. The probability is that several choice forms of the *Crataegus* will be propagated, thus adding to our list of available shrubs.

Crataegus Pyracantha is used quite largely about the capitol grounds at Washington city, and is one of our handsomest hedge plants.

These hardy thorns, growing so readily upon all kinds of soils and in every location, will be found valuable as nurses, protecting the more valuable coniferous seedlings until they are enabled to care for themselves, and as such nurses they have a special place in arboriculture, since they aid in establishing forests where none existed before.

We call attention to the able argument of Barton Cruikshank, President of Cogswell Polytechnic College, San Francisco, who is a life member of our society. The opinions of such authorities should have weight. Laws must be enacted to prevent the total destruction of forests by private owners.

The wood pulp mills of Canada have a capacity of 387,000 tons annually. It should be admitted free of duty to save our own forests.

Inquiries and Correspondence.

FROM ROME.

We have a letter desiring to know what American trees will probably succeed at an elevation of 4,000 feet in Italy.

It was a special wish to try *Sequoia sempervirens*, the California redwood, and inquiry was made to ascertain if Catalpa would thrive at that point.

REPLY.

Sequoia sempervirens, or redwood, as it is termed in lumberman's parlance, is indigenous to the low coast range of California, where the fogs from the Pacific Ocean afford sufficient humidity. In no place does the range of this tree exceed the limit of a few miles from the ocean, usually from ten to twenty miles in width, extending along the coast some two hundred miles. The altitude is not great, and the trees do not survive in the more arid portions of California.

It is not at all likely these mammoth trees would thrive either at Rome or higher upon the mountains, especially in a climate less moist than that of California's coast region.

There is a remarkable peculiarity of *Sequoia sempervirens* in its habit of growth. The trees are readily propagated from seed, under proper conditions, yet in nature the usual method of reproduction is from dormant buds at base of the stump. When a tree was blown down, or fell as its period of existence was reached, several shoots pushed upward from the circumference of the stump, and, of course, in a circle. These in time became fully grown, six, ten or a dozen feet in diameter. In after years, as these trees have fallen, each would have a circle of trees surrounding it. Thus, the redwood is found in groups close together. Few seem to have been started from seed.

There are few places in the United States where growers have met with success with this delicate, yet enormous,

tree. In Europe, especially moist England, there are some growing.

The Rocky Mountains have some of the finest conifers of the world. These are perfectly hardy, and are growing in almost every part of the United States, and doubtless will succeed at your villa.

The beautiful Colorado blue spruce, *Picea pungens*, is one of the best. Seedlings from this tree vary greatly in coloring, some have a silvery brightness, others a deep steel blue, while a majority are of plainer green.

Nurserymen graft from the choicest trees and thus have them uniform. Concolor is a very handsome, hardy conifer from Colorado.

Abies Douglassi, Douglass spruce, common to the Rocky Mountains, and *Pinus Ponderosa* will probably succeed. This is a very large tree. *Pinus Montana*, Dwarf Mountain Pine, has a handsome round head, growing from three to four feet high only.

There is little doubt but all of these will succeed in Italy.

In regard to *Catalpa speciosa*, I do not know where to find the limit of its possibilities. Where failure has been reported in the United States it has been found that tender varieties of catalpa have been planted through misunderstanding the different kinds. Only one variety, *speciosa*, possesses any merit as a timber tree. It should be experimented with.

THE EUCALYPTUS.

The *Brockville American* of October 9 has an editorial upon the Blue Gum of Australia, in which the editor makes an error in supposing the Eucalyptus would grow in Indiana.

This is a tropical tree, and will grow only in southern climes.

In our next number we shall have a lengthy article, with illustrations, showing the value of this Australian tree for the South.

Boston, Oct. 20, 1902.

MR. JOHN P. BROWN.

I inclose my check for \$10 to cover life membership in your society. Hope the magazine may have long life.

Regarding catalpa I feel a good deal of interest.

(1) Will catalpa do well in rather moist land, provided same is not too wet to work with a plow?

(2) Will New Hampshire abandoned farm lands require enriching before trees are planted or during first few years of their growth?

(3) How early in the spring can the young trees be planted as far north as I propose? I. S. N.

REPLY.

(1) Yes. The tree is native to a swampy region, growing in what are termed catalpa slashes. However, it grows well on land not wet, as well.

(2) No. The trees will enrichen the land by annual leaf mold, and more by action of roots beneath the surface.

(3) At corn planting time, or as early in spring as frost is out of the ground and it can be worked.

I have found *Catalpa speciosa* to be perfectly hardy at Manchester and Concord, N. H., and at Rockland, Me., and have no doubt as to its success in Middle New Hampshire if not at too high an altitude. While the Green and White Mountains are not as great elevation as points in Colorado and Utah, where the catalpa is perfectly at home, yet altitude combined with higher latitude may prevent its success in the higher elevations. The experiment should be tried in the valleys and lower levels.

MORTON'S ARBORETUM.

Arbor Lodge, the home so long occupied by J. Sterling Morton, together with an ample tract of land surrounding, has been dedicated as an arboretum in honor of the founder of Arbor Lodge.

Mr. Morton's sons have set aside a fund to maintain the arboretum, and create a paradise of trees as their father desired it should be. The states of Ne-

braska and Iowa should take a special pride in this botanical collection, which will be to their inhabitants what Prof. Charles H. Sargent's creation, Arnold's Arboretum, is to all New England.

But while the home of J. Sterling Morton was in Nebraska, he will always be thought of as a national character, and every child will look upon him as a friend, for his love of trees and having been the founder of Arbor Day.

Many states are purposing to send specimen trees from their native forests, to be planted at Arbor Lodge as historic memorial trees.

It is a beautiful custom among the schools to plant on Arbor Day one tree, at least, as a memorial to some person who has performed acts of public importance. The children of many localities have thus memorized the name of Mr. Morton by planting trees on their schoolgrounds in his honor.

This plan of sending trees from all portions of America, to be planted at Morton's Arboretum, should be continued. There will be skilled gardeners in charge of the grounds, and each tree will be labeled and recorded, and, furthermore, well cared for.

We have a very beautiful tribute from Charles S. Mann of Pennsylvania, especially prepared for ARBORICULTURE, but unfortunately its length prevents our using it with our limited space. He says: "Every state in the Union should be represented in the plan, and lend a hand to make this beautiful sentiment a reality. Every state that has made Arbor Day a distinguished date in the calendar of its festivals of commemoration and jubilee will count it an honor to contribute groups or specimens from among their characteristic native trees and shrubs that shall stand as living monuments, ever increasing in stature and in beauty."

The ten thousand white pine trees hard by the home, filled with birds ever singing and joyous, the oak forest and Elm Park, donated to the city by Mr. Morton, the groups of Scotch pines, Rocky Mountain conifers and innumerable trees that were planted by Mr. Morton's hand, make a grand beginning for a national arboretum.

Rocky Mountain Conditions.

Extracts from "Report of Examination of Lands in Colorado," made by John P. Brown during 1902.

The system of cutting timber heretofore pursued seems as follows. A saw-mill having been located, all the mature trees suitable for lumber are cut and converted into boards.

Next those trees of lesser size are made into cross-ties. Then follows the Mexican wood choppers, who clean up the remainder, which are small, immature growths, making them into mine timbers.

Inferior trees, and those remote, are made into charcoal and cordwood.

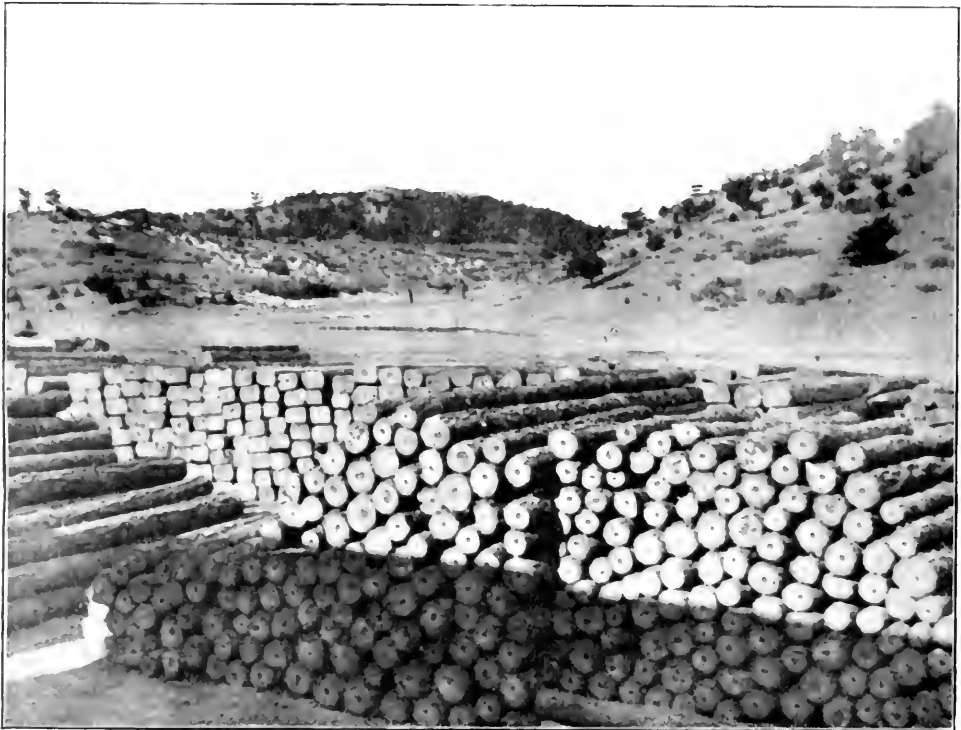
Thus the entire forest growth is des-

troyed, no trees being reserved to re-seed the land, while very few small trees remain for future timber supply. A more rational method would be to reserve a sufficient number of good, healthy seed-bearing trees, which, in time, would insure a succession in forest growths.

It would be wiser to cease cutting very small, immature trees, which have a slight value, permitting them to increase in size for use in future years.

BABY TREES FOR MINE TIMBERS.

Conifers, when mature, contain a large amount of resinous, antiseptic material, which to a large extent counteracts the microbes which cause rot or decay in wood.



DESTRUCTION OF BABY SPRUCE

Immature, sappy trees quickly decay because this resinous material has not been stored in sufficient quantity. This is why mine timbers only last two or three years.

I would urge for the interests of the railways, mines, and for agriculture, an entire cessation of this practice of cutting small trees. It will be fatal to the interests of the state to destroy the forests covering these mountain sides; climatic conditions, snow protection, water supply, depend upon these young growths.

The mines will require timbers, railways will need ties, manufactures will demand lumber—as much twenty years hence as to-day, and provision should be made *now* to supply those future demands.

Two decades hence and forest products, exhausted in the Rocky Mountains, consumed in the middle states, exported from all our seacoasts, will be obtained only from tropical regions, unless we are wise enough to protect young growths.

INCREASE IN WOOD GROWTH.

Rocky Mountain timber grows quite slowly, having a short growing season, and scant supply of moisture. Pine (*Pinus ponderosa*) increases five inches diameter in twenty years, but this annual increase extending around the outside of a constantly increasing body, counts rapidly in bulk, amounting in two decades to 700 per cent gain.

Trees have numerous enemies during the early period of their existence, but as they gain in strength of root and body are able to be self protecting.

Our illustration shows a quantity of these baby spruce piled up by the railway for shipment—not one was over five inches diameter, each five-foot stick representing a tree of that most valuable timber, Douglas spruce.

There was not a tree left in miles circuit, where a few months before there had been fine thickets.

The man who directed this destruction cannot in a lifetime compensate for his criminal and ignorant spoliation.

IMPROVEMENT IN TEXT-BOOKS.

Young people now in the public schools can scarcely appreciate the rapid progress made in school Text Books in recent years, and do not know what a task it was to obtain an education with books available half a century ago.

The numerous handsome engravings which go so far to elucidate every subject, the clear print, good types, better paper and improvement in every department of book manufactory, all aid the pupils in mastering difficult branches of education.

The American Book Company has contributed very largely to this advancement in Text Books, all their books being models of elegance and furnish the highest methods of instruction, with prices which place the best books within the reach of all.

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The trains on the Big 4 Railway are thoroughly equipped, the roadbed is solid and smooth, its cars are palaces on wheels, the officers courteous and obliging. With speedy trains, invariably on time, there is a comfort and satisfaction in travel.

The Editor of ARBORICULTURE would call attention of all friends of the new magazine to the advertisement of Oliver Typewriter on page vi, and at the same time acknowledge the courteous treatment accorded by the gentlemen of that firm. We like the Oliver and commend it to those who contemplate buying a typewriter as being perfect in mechanism and satisfactory in every particular.

Forest Nursery, Connersville, Ind., can supply genuine *Catalpa speciosa* trees and seed in any quantity.

Vincennes, Ind.

EDITOR ARBORICULTURE.

Referring to the item in October number, signed "Property Owner," many of our citizens have experienced the same hardships.

Our streets were beautified by large and spreading trees, hard maple, elm, ash and hackberry.

First came the granetoid (artificial stone) walk and the roots of the trees were cut off and dug out on one side, and to avoid their being blown over by the wind, the trees were heavily topped. As this always occurs in summer, when in full leaf, most of them died.

Then came the telephone, and the taller trees which had escaped the mutilation of roots, were ruthlessly topped and many ruined.

But that was not all, another telephone company secured the privilege of paralleling the first line and other trees had to suffer.

Trees 50 or 60 years old, whose branches entwined clear across the street, making cool and beautiful avenues, have been destroyed.

It appears almost useless to replant. The demands of civilization as now practiced is the deadly foe of trees.

Referring to shade trees, I may add, the sugar maple makes the most beautiful and symmetrical tree in this locality. The gray ash is a clean and pretty tree; also one of the most beautiful trees in Indiana at this season is the sweet gum. It is red and beautiful in foliage.

I took a twenty-mile ride yesterday and found it inspiringly lovely. The dogwood is red as crimson. The gums are gorgeously beautiful. The red, pin and white oak, maple and sassafras are beyond description in beauty.

JAMES P. H. WEIMS.

The editor has often admired the magnificent street trees of the historic old Vincennes.

Our correspondent describes a thousand towns in the West, whose citizens have delegated all authority to a set of incompetent politicians; these, led by a would-be civil engineer, whose prin-

cipal knowledge is how to make a straight line, have created ruin among the street trees. So long as present political methods prevail, and an honorable business man can not be elected as councilman, or alderman, there seems no remedy. The trees are doomed.

Richmond, Ind.

EDITOR ARBORICULTURE.

I take the liberty of addressing you relative to the process of "topping" trees. This seems a barbarism and, of course, entirely destroys the decorative effect, which is the prime consideration in shade trees and parks.

I want an authoritative and scientific opinion on the subject, as I have been protesting long and strenuously in the public prints over the mutilation and demolition of our shade trees here by electric light and telephone companies and the trolleys.

E. G. W.

There are some trees which have the bad habit of growing long branches, reaching upward to great height, and forming undesirable shapes. Among these are soft maple, *acer dasycarpum* and cottonwood, Carolina poplar, *populus monilifera*.

Such trees require severe pruning oft repeated to form a well-shaped head.

I apprehend, however, that E. G. W. refers to the clipping practiced by electric companies, which is invariably done to suit their own purposes and not to benefit the trees. It would seem that here, as elsewhere, the city authorities are dominated by the electric companies and authorize this mutilation.

We have a large number of complaints from every portion of the country, and the situation seems to require a general uprising by all good citizens to protect their own interests.

No tree should ever be pruned when in full leaf. This lowers the tree's vitality, and it is incapable of withstanding disease, insect attacks, nor can it recover this loss.

Telegraph and other lines should be relegated to the alleys, and trolley lines should be prohibited from cutting a tree without permission of the owner of abutting property.



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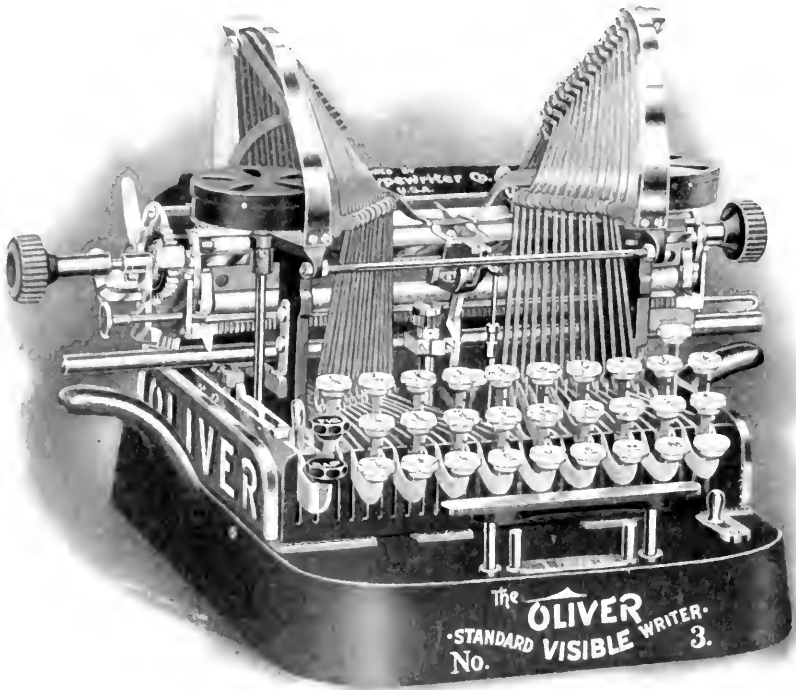
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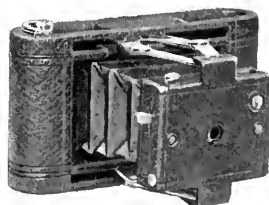
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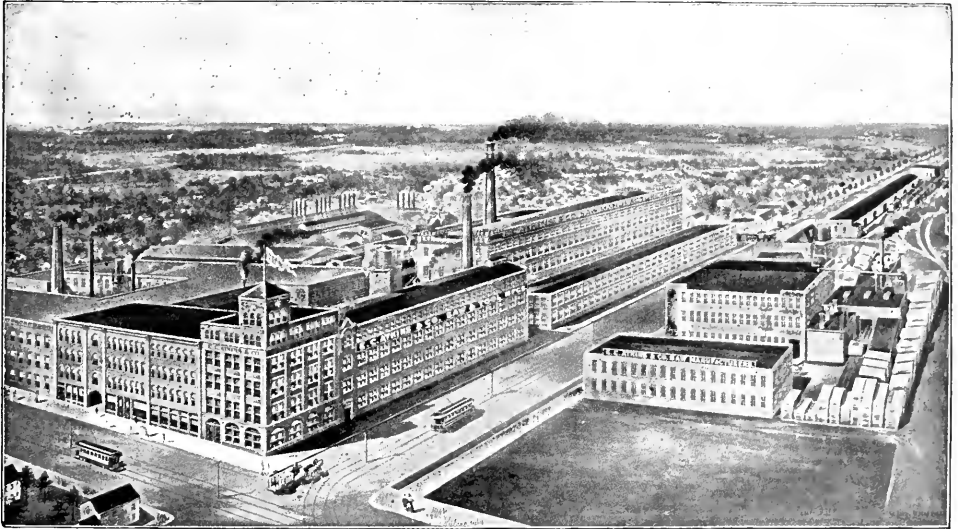
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Passenger Traffic Manager, Rock Island System, Chicago, Ill

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ARBORICULTURE

VOLUME I.

NUMBER 4.



A Magazine of the International Society
of Arboriculture: Chicago, December, 1902

THE INTERNATIONAL SOCIETY OF ARBORICULTURE

OFFICERS

GENERAL WM. J. PALMER, President, Colorado Springs, Colo.
JAMES H. BOWDITCH, Vice-President, Boston, Mass.
JOHN P. BROWN, Secretary-Treasurer,
1639 Michigan Ave., Chicago, Ill.

ARTICLES OF INCORPORATION.

Article I.—Name. The name of this corporation shall be The International Society of Arboriculture.

Article II.—Purpose. The purpose of the Association is to introduce judicious methods in dealing with forests and woodlands; to advance and advocate a public interest in this subject; to promote the afforestation of unproductive lands; to encourage the planting and care of shade trees in parks, public and private grounds, and along streets and highways; to inspire an interest in our remaining native forests, and groves of ancient trees, and to seek their preservation; to supply information to railway officials in regard to timber culture for railway uses, and incite railway and other corporations to plant trees for economic purposes.

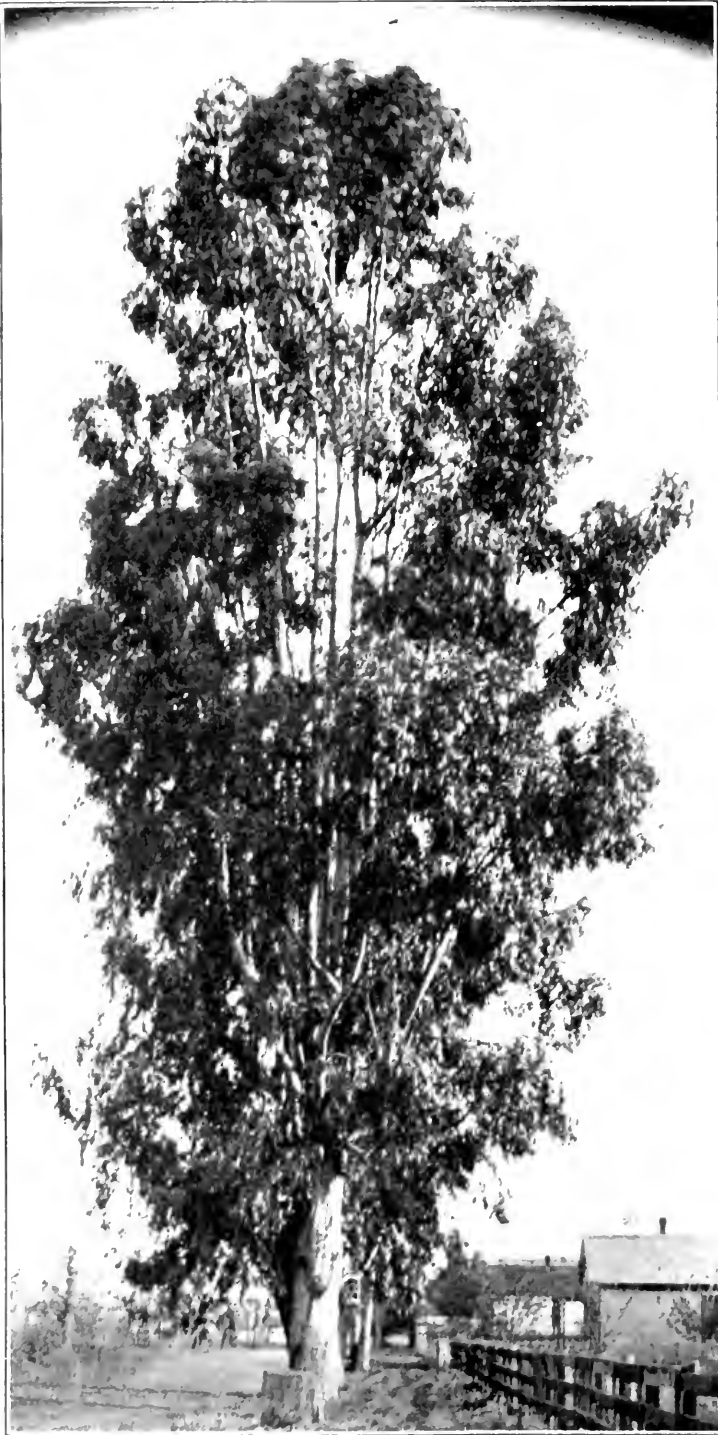
Article III.—Membership. Any person may become a member of this Society by the payment in advance of an annual due of two dollars, and on payment of this annual due shall be entitled to receive, regularly, one copy of ARBORICULTURE, the official organ of the society. Any person who may contribute ten dollars toward the support of the society shall become a patron. Honorary members may be chosen by the executive committee.

Article IV.—Officers. The officers of this Association shall be a president, vice-president and secretary-treasurer, who shall be elected at the annual meeting each year by ballot, and shall serve for one year, or until their successors shall have been elected and shall have accepted office, and when elected shall constitute the executive committee.

Article VII.—Executive Committee. The Executive Committee shall have entire control and management of the affairs of the Society.



THE GRIZZLY GIANT, MARIPOSA GROVE OF SEQUOIAS.
Reached by the Yosemite stage from Raymond on line of the Southern Pacific Railway.



Photographed by Andrew P. Hill, San Jose, Cal.

EUCALYPTUS TREE, SAN JOSE, CALIFORNIA.

ARBORICULTURE

A MONTHLY MAGAZINE.



PUBLISHED IN THE INTEREST OF THE
INTERNATIONAL SOCIETY OF ARBORICULTURE.



Subscription, \$2.00 per annum.

JOHN P. BROWN, Editor, 1639 Michigan Avenue.

Volume 1.

CHICAGO, DECEMBER, 1902.

Number 4.

Improvement of New England Forests.

ADDRESS OF JOHN P. BROWN, AT WORCESTER, MASS., NOV. 19, 1902.

FOREST conditions in much of New England differ from those of any other portion of the country and require a different treatment from what would be prescribed for other locations.

An older settled community than that to westward; the original forests long since removed; fields cultivated for more than a century and abandoned as being no longer profitable, they have grown up with trees having the resemblance of woodlands, yet not fulfilling the requirements of a forest; how can they be improved?

Does any citizen of Massachusetts presume that upon the landing of the pilgrims the groves which met their gaze were such as we see all over the state to-day?

Far from it. A dense forest of stately trees existed and demanded all the energies and strength of those sturdy pioneers to subdue in order that these lands might be prepared for cultivation.

The original forests having been destroyed, subsequent and recent growths were confined to such species as there happened to be seed deposited through the simplest possible agencies.

The Almighty planted the forests, but various agencies are employed to insure

their continuance, and these, to a large extent, have much the appearance of chance.

Man looks upon the forest with an eye to his personal profit, the lumberman to the density of the stand and size of the logs they will make. The dairyman, on the contrary, prefers an open wood where the grass may grow for pasturing his herds. The farmer desires trees upon such lands as he cannot till, to supply his winter's fuel.

And so, while man would have the forest to suit the peculiar wants of each individual, nature has her own plans and endeavors to cover up every bare spot on the earth with some kind of verdure, strewing the seeds in great variety, every forest differing from every other forest.

Upon the coast of the Pacific, in the northern part of California, on a narrow strip, ten to twenty miles wide and 200 miles long, nature planted the redwood, yet not another tree of its kind existed elsewhere upon the globe.

A little lower down the coast on a promontory covering forty acres, she planted a group of Monterey cypress, and if others were planted they are not now in existence.

Far up in the Sierras, eighty centuries ago, she planted the giant Sequoias.

There may have been other Sequoias growing elsewhere, and probably were, but they do not exist to-day.

Near the summit of Pike's Peak, and other high points in the Rockies, are groups of spruce above the line of other timber.

In the Black Hills of South Dakota are forests of *Pinus Ponderosa*, the yellow or bull pine, which tree is not seen to the eastward.

Along every stream from the Mississippi to the summit of the Rocky Mountains are found box elder and cottonwood.

Throughout Indiana were dense woods of yellow poplar, black walnut, beech, catalpa and sugar trees.

In Maine the white pine was placed in vast quantities, while in Massachusetts, although the pine and oak exist, yet a preponderance of the wood is of gray birch, scarlet maple, some of the inferior oaks, alder and in places chestnut.

Notwithstanding the distribution of species of trees by nature, both in the old world and the new, man has asserted the dominion given by God over all herbs, and has transplanted the Sequoias into all portions of the world, and in many instances has succeeded in growing magnificent specimens.

The Monterey cypress has been carried to every portion of California and it grows like weeds.

The white pine is grown by millions in the world's great nurseries.

The chestnut has been transplanted and is now growing in thousands of localities where it was unknown under the unaided guidance of nature. Scientists have dwelt upon the peculiar soils and localities in which certain trees would thrive, drawing their inferences from the special locations in which nature placed them. But every nurseryman and tree grower has demonstrated the falsity of such theory by practically growing almost all kinds of trees in every conceivable location or character of soil. True, there are some instances where a combination of friendly environments are essential, but these are exceptions, not the rule of guidance.

And now, while nature has neglected to direct the aborigines to bring to your

state the oily nut which they planted from New York southward, and westward to the edge of the plains, it is left for "The White Man's Burden" to perform this service, and the duty should be cheerfully performed, and the walnut planted where it has not grown before.

If the white pine must struggle for existence with a preponderance of worthless scrub oaks and birch, then destroy enough of the inferior wood to enable the superior to reach sunlight and gather strength for greater expansion.

Thousands of acres of forest trees have been planted upon the western prairies and plains, where no tree whatever had grown for centuries, yet the dwarf growths on these abandoned farm lands, serving as nurse trees for the protection of the pine and chestnut, and preparing a fertile soil in which worthier trees may flourish, give to New England an advantage which is entirely unknown on the prairies of the West.

I fear the farmers of Massachusetts do not fully appreciate that wonderful collection of the world's trees at Arnold's Arboretum. I would advise a general pilgrimage to that beautiful spot by the farmers and their families, and also that every school should visit it in a body—to learn how many thousands of trees and shrubs that never before were known to New England have been made to thrive on Massachusetts soil.

When you give these same trees forest conditions, instead of park arrangement, where grass must be maintained for appearance sake, and you will succeed still better than you now dream in growing forests for profit on your abandoned farms.

During the summer of 1901 I was requested to examine the lands adjacent to the railway on Cape Cod, with a view to determine what might be done to check the shifting sands which threaten to bury portions of the roadbed.

There is a very large area of this peninsula, which is now absolutely worthless, yet all can be made to become productive of valuable timber trees, and under the protection of these timber belts may be successfully cultivated with cranberries and crops suitable for sandy locations.

The mere planting of beach grass and sowing seeds of pine and oak will not accomplish the reclamation of these sandy wastes, but this process must be supplemented with extensive plantings of quick-growing, hardy trees, set quite thickly. One-year-old rooted trees should be used, and planted 8 by 8 feet.

A moderate quantity of beach grass set at the same time will effect an entire change in this region of shifting sands. Sumac, bay, yucca and similar strong rooted plants of shrubby or herbaceous character will resist the action of the wind, breaking its force at point of contact with the sand, and gradually produce a soil in which important forest trees will thrive.

Able is growing well about the cape, and I found catalpa as perfectly at home as in Indiana. Red oak will quickly mature in this locality if given an opportunity. *Ailanthus* is hardy and a strong grower in the vicinity. The small cost of these plants and the fact that they may be obtained in unlimited quantities make it advisable to do extensive planting, as it will insure to the state a large income in future from an expanse which is now practically valueless.

NATHANIEL MORTON.

One of Massachusetts most valuable citizens has died since my visit last summer. Mr. Morton has demonstrated that the lands of slight estimation, about Plymouth, rolling hills covered with small growths of oak and inferior pine is capable of being converted into magnificent forests of pine if man will but assist nature.

Mr. Morton drove me over his large tract and also showed me the adjoining lands, which are still in a state of nature. The contrast was remarkable.

Critics railed at this man's methods, old fogies wisely shook their heads, penurious persons said he was spending too much money. Yet this noble man left to his native state a most valuable heritage—a monument greater and more enduring than one of the granite. He has set an example which the landowners of your state may follow with profit. He has taught a most important lesson, that while nature may thin out a forest in

time, by the slow process of starving and strangling the weaker trees, while yet the larger and stronger remain always hungry, and thus fail to increase vigorously. Mr. Morton demonstrated that systematic thinning of the forest, and the removal of lower side branches by the ax and saw, is the economical procedure, that time, which is money, may be gained by performing this work instead of waiting for nature to do it by her slow process.

Cutting out the crowding scrub growths sufficiently to enable the pine to obtain a proper share of nourishment, he soon obtained a good stand of valuable trees.

Mr. Morton assured me by his exhibit of expenditures and by the actual increase in wood growth, that under his methods white pine had increased 7 per cent annually. Trees that were sixty years old are 16 inches in diameter and 60 feet high.

By pruning close to the trunk, even cutting into the live wood and bark about the branch to be removed, induces a rapid callous and speedy covering of the wound with new bark.

The life of such man is worth much to the community in which he lived, and the lessons demonstrated at an expense of much money and the devotion of a lifetime should not be allowed to be wasted, but should be of practical value to every landowner of the commonwealth. Our society feels proud that Nathaniel Morton was one of its members. The growth of trees does not so much depend upon the character of soil as upon the moisture available during the growing season, and either a thorough cultivation or a natural mulching with leaves and shade, which prevent a growth of grass. Few trees will thrive in a grass soil.

But trees form a soil, either shallow or deep, depending upon the root system.

By penetrating the subsoil with their tap roots, allowing air, moisture and frost to enter and silently break up the hard crust, one class of trees forms a deep soil. As leaves die and fall away, so roots decay, new ones being formed, and thus the subsoil becomes filled with vegetable mold, creating a soil.

Such trees as have only surface roots form a shallow soil. This latter class

comprises the alder, gray birch, scarlet maple and dwarf oaks, while hickory, walnut, catalpa and the large oaks are deep-rooted forms.

Cultivation in farm crops for a long period of years exhausts the humus or vegetable mold, which is decomposed and absorbed by the growing crops, and such soils become less and less productive. Besides, erosion is constantly removing the best surface soil, especially on rolling lands when loosened by the plow.

Such lands will be improved by a term of years in forest, being renewed in fertility, after which they may again be converted into farm lands. On a recent visit to your state I observed closely the condition of the Berkshire Hills. The trees are scattering and I saw no timber such as we would term a forest. There are no forest conditions, so far as I could ascertain.

Profitable timber growth requires that the land be given up to the trees and that there be enough trees on the ground to properly shade it. Yet the other extreme should be avoided; they should not be so close together as to rob each other and prevent a steady, vigorous development.

New England leads in the manufactures, the dense population requiring such industries as shall give remunerative employment to the greatest number.

These manufactories demand vast quantities of lumber, the box trade alone being one of immense proportions. But the lumbermen are robbing their successors and the community when they manufacture box boards of poles and baby trees which should grow a score of years yet.

There will always be a demand for lumber to keep these thousands of mechanics employed. Your inferior dwarf growths will not supply this demand, but you may grow trees in two decades which will furnish all the lumber needed.

In order to change the old natural inferior growths into new, more vigorous and profitable forest, I would suggest cutting openings, probably four feet wide, at intervals of twenty feet, more or less, destroying every tree in these openings, unless it is a desirable tree to leave.

On these lines may be planted nuts of walnut, hickory, chestnut or red oak, the

latter being the most rapidly maturing of the oaks.

Or one-year trees may be set, of white ash, chestnut, catalpa and similar trees of rapid growth.

Or white pine, nursery grown, of three or four years from the seed.

Two hundred trees, perhaps, per acre. The natural forest conditions already provided with well-established nurse trees for protection of the young timber, gives you great advantage over the western prairies, favorable to forest growth. As these trees become established and require greater room for their roots, more of the nurse trees may be removed as found necessary.

Growing pine from seed is a slow and wasteful process. Probably not more than one seed in ten thousand, in nature, makes a tree, and not much better result can be expected when seed is strewn through the woods. While seedlings, well rooted, may be purchased at western nurseries at \$8 per 1,000, thus costing but \$1.50 per acre.

Catalpa trees are worth about one cent each, ash and many other good trees costing half as much.

There is no adage more true than that "The gods help those who help themselves."

It is very certain that nature will not improve New England forests without the aid of you who occupy the land.

New and better trees, and such as mature quickly, will never be planted here by natural methods.

Manufacturers will cry in vain for lumber unless some special and speedy methods are adopted to provide an ample supply.

Railways, ere long, will transport from long distances millions of cross ties unless the trees are planted here to produce these ties at home.

Farmers will never get rich in selling cordwood cut from the inferior growths which now occupy their waste lands.

Your shoe manufacturers, while primarily using leather may yet have to adopt cowhide packages in which to transport the enormous output of New England shoes, unless the pine can be induced to grow more rapidly or some other tree take its place.

There is a practical way for your society to bring about actual results, which is to procure seeds and plants for distribution, and to use the influence of the press and of individuals to induce the law-making powers to render such material assistance as will make this work possible.

One farmer cannot change New England forest conditions. It must be accomplished by a combined and systematic effort upon the part of all citizens, supported by the authority of the state.

Whatever may be expended wisely in this direction will return to the commonwealth in added wealth for taxation, raw materials for manufacturers and continuous employment for labor.

During the early part of the last century the United States Government directed its representatives in all foreign lands to collect, purchase and forward to this country such seeds and plants as would seem to give promise of success in America, and of which nature had failed to plant on this continent.

And thus in addition to the profuse supply of trees, cereals, forage plants and vegetables which the new world possessed, we added many thousands of plants from every portion of the globe.

The *Gingko* from Japan, *Eucalyptus* from Australia, and a large list of the most valued trees, were transplanted to new soil, a changed climate, and entirely novel conditions.

True, the statesmanship which directed this purchase and dissemination of new and rare seeds has in recent years degenerated and the politician must make his calling and election sure by supplying his constituency with turnip seed, which can be bought for a penny at any country grocery store, but in this you have a

precedent, which Massachusetts well may follow.

Fifty thousand dollars expended in collecting and distributing nuts, seeds and small forest trees would go far toward the reforestation of thousands of acres which are now almost a valueless waste, laying the substantial foundation for a greatly increased income in taxation as these lands become quadrupled in value.

One great nursery in the West offers white pine trees 10 to 12 inches high at eight dollars per thousand.

Other nurseries will supply *Catalpa speciosa* at about the same price.

Walnuts may be bought, if spoken for early in the season, at a dollar per barrel.

All these trees are known to succeed in your state.

It simply means that the commonwealth should be as thrifty as its many worthy citizens who, for an investment, send their capital to the West on long-time investments, insurance, loans, railway, stocks and bonds. They do not expect their returns in a day or a year. In the same manner the state should make some investments which in a quarter of a century will return not with 3 per cent, 4 per cent or 5 per cent, but 100 per cent upon the capital employed.

Where 4,200 square miles of your state, 52 per cent of its area, is in woodland, it is of grave importance what the character of this woodland growth may be, and whether it is worth—for taxation—two dollars per acre or one hundred. It lies with you, gentlemen, to determine which it shall be, for the law-making powers are looking to you for advice and your recommendation will decide the future character and value of Massachusetts forests.

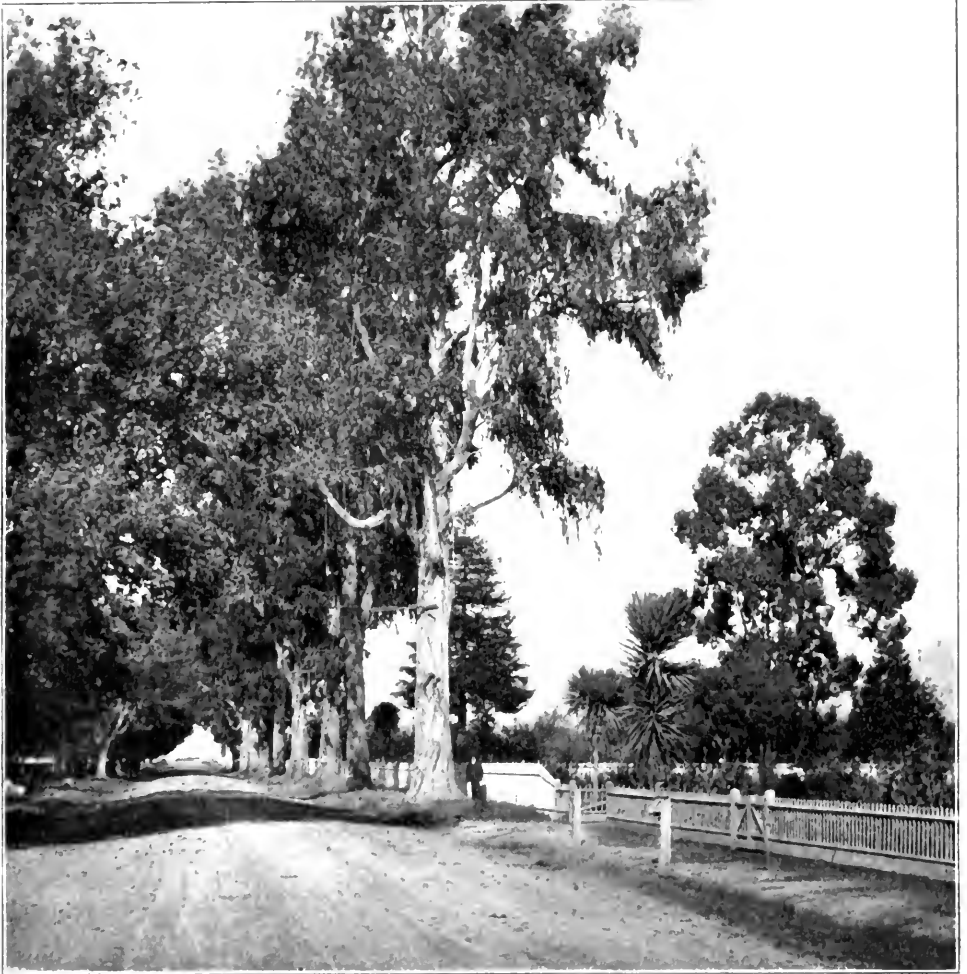
NOTE.

Within a mile of the Worcester Horticultural Hall, where the meeting was held, are many fine black walnut trees, one, of sufficient importance to be noticed in "Transactions of Worcester County Horticultural Society, 1892," page 67, was at that time eight feet eight inches girth two feet from ground, seven feet ten inches girth at five feet from ground, and 75 feet high. It is still standing,

and gives abundant evidence of the success of black walnut in Massachusetts.

I measured one at Mr. Hadwen's place, 20 years from seed, 15 inches diameter four feet from ground.

There are also many catalpa trees in Elm Park and elsewhere, 20 years' growth ranging 17 to 23 inches diameter. One at the home of A. J. Marble, 36 Birch street, 20 years' growth, is 23 inches diameter three feet from ground.



AVENUE OF EUCALYPTUS.

At home of Charles H. Rodgers, Watsonville, Cal. 25 years from seed.

The Eucalyptus.

THE Bureau of Forestry announces a bulletin to be issued shortly on the *Eucalyptus* as cultivated in this country, and in that bulletin the subject will probably be handled from a technical standpoint. It is my purpose in this sketch to speak of the tree from a practical standpoint only, showing some of the uses to which it has been and may be put, how to plant and cultivate the tree, where to plant, etc.

As to uses. The first and most natural service is to be found in the remarkable beauty of the tree growing in arid and treeless sections. In California, along the highways, the tree with its towering foliage lends remarkable relief to an otherwise barren and desolate landscape. Not only as a shade, but also as a relief to the monotony of the view, it is worth while to plant it. But so far the most practical use to which it has been put, aside from its forestry effect on the rainfall, is as a domestic fuel supply. On account of its well-known rapid growth, groves planted twenty-five to forty years have been supplying cooking fuel for years, and while as a fuel it does not rank with the hardwoods, yet considering that it makes a growth in twenty-five years equal to the hardwoods in 300 years, its value may readily be appreciated. I have cut trees that made as many as seven cords of stove wood, and after standing ricked for a few weeks it burned freely, enabling a meal to be prepared in a few minutes, and making the maximum fuel yield in the shortest time from any fuel available in that state. While it ranks as a "soft wood," yet when cut a very short time, the grain being rather fine, it becomes very hard to cut, indicating that for framing material in coarse construction work, the timber may be very useful. In construction of barns and outbuildings there is no reason why this new timber may not become an important and economical factor.

How to plant and grow it. The seeds are planted in shallow furrows, similar to other nursery stock, and should be cultivated for one or two years before

transplanting. In planting the grove, the distance may be made not to exceed ten feet apart, allowing for a ten years' growth, and then if desired cut out alternate trees for use, allowing the remaining double space, which will be ample for the greatest growth attainable. There has not been to my knowledge any experiment made with it as sawed lumber. But there is no reason why it would not be valuable in that way. The great feature of the tree is its adaptability to any sort of soil or environment. It has been equally thrifty in dry, rocky hill land as in swampy corners. And owing to the great penetration of root, it has been found that wet land has become arable owing to the roots breaking up the hardpan, allowing the water to percolate to the sand or gravel substrata, thus acting as a draining system for wet spots. In the matter of climatic range the experiment has not been tried to test this point. Authorities usually give it a range in temperature down to thirty degrees. But as it is very hardy where tested, there is no good reason that I know of why it could not be successfully grown as far north as perhaps Kentucky or Tennessee. Certainly Alabama, and all further southern states east of the Mississippi would do well to plant abandoned farm lands to this promising specimen of imported forestry. Gullied fields now abandoned to bramble and sage grass would soon be reclaimed to fertile lands by a few years' growth of this tree.

There have been many medicinal qualities claimed for the tree, and in California an extensive industry has been established in making *Eucalyptus* oil, used both as a liniment and internal remedy for various ailments. But this feature is a small consideration in advocating the planting of waste land to *Eucalyptus* groves.

It would certainly afford substantial benefit in sections bordering rivers, where the natural forestry has been destroyed in the pursuit of lumber and for clearing land for cultivation. The frequent recurring floods due to the deforestation along the waterways may be entirely



EUCALYPTUS TREE.

At home of Mrs. Rodgers, Watsonville, California, 135 feet high; 17 feet girth; 3 feet from ground; 38 years from seed.

done away with if trees were planted to hold in check by their leaf deposits, the surface water that now finds its way into the flood as soon as it falls. Just what influence such forests have upon the rainfall may not be readily determined. But that it has an important influence seems a well established fact. For many sections in Texas, New Mexico and Arizona, in dry and treeless regions practically abandoned to jack-rabbits and desert growths, useless alike for man or beast, the *Eucalyptus* would find its most useful office. The state and Federal governments should take the matter up in this direction at least, and by establishing extensive forest plants in such places, bestow a great benefit upon future generations.

In the open country, and along public roads, where land is not so scarce or valuable as to render the shade and root encroachment on the adjacent few rods of material moment, and in hilly lots and marshy spots, by all means encourage the planting to this rapidly growing tree.

W. G. BENTON.

Our correspondent, Mr. Benton, gives some interesting facts in regard to the Australian Blue Gum, which gives promise of being a very profitable and valuable timber for the states south of Lat. 35 degrees and 5 degrees farther north in California.

The *Eucalyptus* was brought from Australia and planted in California about 1865 to 1870, and is proven to be well adapted to subtropical regions of America.

During my visit to the Pacific Coast in 1900, I found that little importance was attached to the tree by citizens generally, and began an investigation lasting two months, in which I found many facts to prove that the tree was of vast importance, but its application as an economic wood was confined to a meager few who had learned its value.

At Berkeley, on the grounds of the University of California, is the most extensive plantation that I ever saw in forest form. These trees are upon quite rolling land, not irrigated, and prove what can be accomplished under almost arid conditions. But the largest trees, with most wonderful growth, were on level lands, which were to a greater or less extent supplied with water during the early period of their growth.

There is an avenue of *Eucalyptus globulis*, on both sides of Lincoln avenue, San Jose, at "The Willows," which were planted by the road supervisor in 1872. In twenty-eight years these trees attained a height of 120 to 175 feet.

Twelve exceeded ten feet in girth, five exceeded eight and one-half feet girth, three were twelve and one-half feet girth, five were eleven feet girth. Each would make four logs sixteen feet long.

Mr. James W. Gillespie of San Jose has used much of the wood in wagon works, for which it is admirably adapted, having much the character of hickory, which must be transported across the Continent for use in California.

Mr. Gillespie was filling a very large order from an eastern firm, for telegraph insulator pins, using the inferior portions of the tree in this way. The electric works made tests of the strength of *Eucalyptus*, finding it to be 30 per cent

stronger than White Oak, and 20 per cent stronger than Black Locust.

Mr. Gillespie informed me that one tree was cut in Santa Clara County, which made 1,750 feet of lumber B. M., besides three cords of wood were made from the tops. This lumber was sold at \$1.25 per 1,000 feet. The tree had grown in thirty years. At present the lumber is worth \$50 per 1,000, as it runs, at the mill.

I measured one tree on the grounds of Mr. Leibs in San Jose, which was five and one-half feet diameter and 175 feet high. This tree was thirty years old. Could be cut into 6,000 feet of lumber, worth \$300, 100 trees to the acre bringing \$3,000.

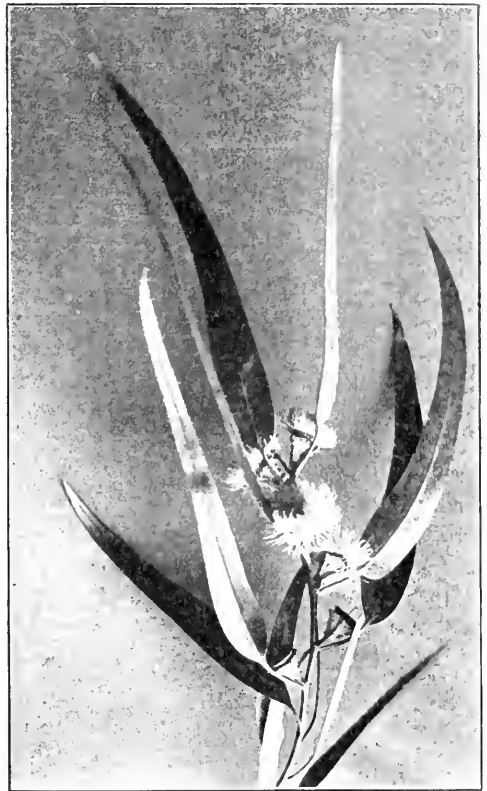
At Watsonville I visited the residence of Mr. Charles S. Rogers, the inside of which is finished with *Eucalyptus*. The finish is exquisite, and worthy of extensive use. The trees from which this lumber was made were planted by the family thirty years ago—one Red Gum, of this same planting, measures 175 feet high, five and one-half feet girth.

The landowners of the Gulf States as well as Arizona and New Mexico should give the Australian Gum tree more attention. The time is rapidly approaching when such timber will be of great value, as the Cypress and Yellow Pine disappear. Its extremely rapid growth and easy culture make it a very desirable economic tree.

As a shade and ornamental tree it has few equals. Since it is not hardly north of Lat. 35 degrees except in California, when it reaches 40 degrees N. Lat., it will not be worth while to attempt growing it except in these locations. However, there are some varieties more hardy than others, and some may be found which will succeed in Tennessee.

Any trees which grow rapidly, as the *Catalpa* and *Eucalyptus*, are gross feeders and require considerable water for best development, but in many portions of the Southwest there are underground streams to which the roots will penetrate and obtain necessary moisture.

Unfortunately as there has been no demand for trees, the nurseries of Amer-



EUCALYPTUS BRANCH, LEAVES AND FLOWERS.

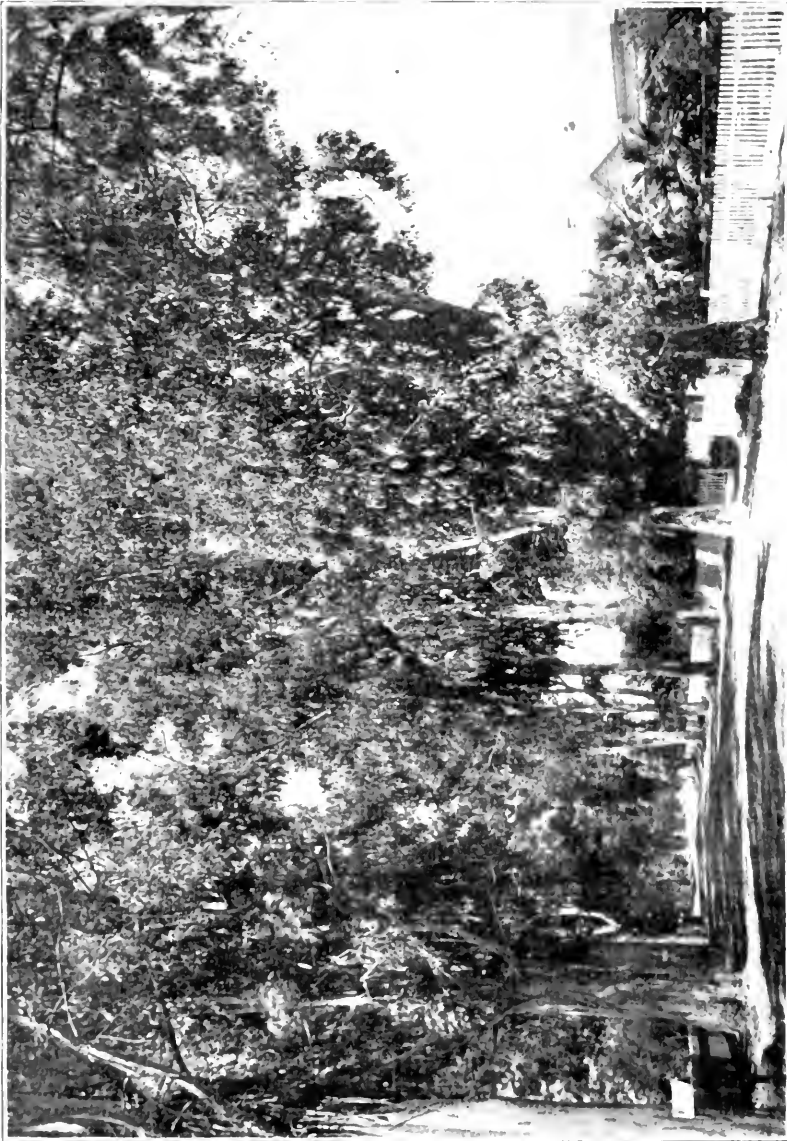


ica are not prepared to supply plants of *Eucalyptus* in large quantities, but this will be remedied if planters take sufficient interest in the trees.

My correspondents in New Zealand, Hawaii and Australia inform me there are more than three hundred varieties of the Gum trees in their native woods. Some varieties have great durability, being used for foundations of mills partly in water, but as a rule the wood is not durable when exposed to alternations of moisture and dryness, and in contact with the earth.

One hundred and fifty varieties have been cultivated in California.

If seed is desired by our readers, ARBORICULTURE will undertake to procure a supply for distribution.



V. P. Hill, Photographer, San Jose, Cal.
GRAND AVENUE OF EUCALYPTUS, SAN JOSE, CAL., 30 YEARS GROWTH

Profitable Character of Catalpa (Speciosa.)

DESCRIPTION: Catalpa (*speciosa*) is readily distinguished from the other species by the following characteristics: First, the tree grows to a much greater height and diameter with a fewer number of branches and seedpods. Second—They come into bloom from ten days to two weeks earlier than other sorts. Third—The pods usually come in twos and threes, are quite large, some of them being fully eighteen inches long, the seed being about one-third larger, with the end hairs not drawn to a point, as in the common sort Catalpa (*Bignonioides*). Fourth—The bark being furrowed and adheres closely to the trunk, similar to the Green Ash or Box Elder. Catalpas with scaly bark belong to the less valuable species. Fifth—Catalpas do not leaf out until quite late; the leaves drop with the first hard frost. When in full leaf the color and size of the foliage produces a tropical effect.

DURABILITY OF THE WOOD.

When in contact with the ground the wood is very durable. Much has been written citing cases where the wood from well matured trees, grown in the Wabash valley, lasting more than fifty years. The wood from young trees will not last so long when in contact with the ground, yet we have data enough to assure us that young catalpa will outlast the best oak. I have used young catalpa posts since the spring of 1894, and they are still in good condition, November 10, 1902. Late summer and early winter is the best time to cut post and pole timber. Catalpa cut in spring or early summer will not make as lasting posts. The wood is valuable for all inside as well as outside work. It is especially beautiful for interior finish of railroad cars, making one of the most artistic pieces of wood-work to be found anywhere. For furniture it cannot be excelled; however, it is a little light in color for some uses. It will be sought after for interior finish on fine buildings, is almost as easily wrought as white pine, and much richer

in grain and color. Young trees can be used for posts, small poles, rake tongue, hayrack, hoe handles, etc. The wood makes a fairly good fire, but cannot be compared with oak or hickory for fire-wood.

SEEDLINGS.—The inferior character of many seeds and seedlings, together with the early practice of planting trees in the permanent plantation 4x4 feet, has caused more trouble to tree growers than everything else combined. The seed of the inferior sorts being much easier to gather, many seedsmen have sold such seed as Catalpa (*speciosa*). In 1885 I planted 100,000 trees, they were bought for the tall, erect growing tree, when to my surprise, fully one-half are the common, scraggy sort. Great care must be taken in gathering the seed. Of late years I only buy my seedlings from a nurseryman who gathers all his own seed. I find it much cheaper than to grow my own seedlings.

GROWTH.

During the last twenty years much has been written about the growth of the Catalpa. I believe for post and pole stock that fairly good prairie soil will give the best results. Because of the more exposed situations, the trees make a tougher piece of timber than if grown on richer ground. The sandy bottom-land of Eastern Kansas and Western Missouri is an ideal place to grow Catalpa for lumber purposes. With proper management the best soil will produce 1,000 feet of lumber per acre for each season's growth; that is, a well-grown Catalpa forest will produce 30,000 feet per acre in thirty years from time of planting. Post stock can be taken out after the tenth and pole stock the fifteenth year. The skeptic will say of all artificial forest grown in the West not one of them has averaged 500 feet per acre for each season's growth. I admit the fact, but we must remember the lessons we have learned and paid for during these twenty years. The Farlington forests in Eastern Kansas, are now on an average of



CATALPA SPECIOSA.

At the home of Geo. W. Tlicher, Topeka, Kansas.

twenty-one years of age, and should be producing four times their present rate of lumber making. They are only at a point where the growth is fine for posts and small telephone poles, while they should be producing large poles and railroad ties. These forests are not situated on the best land, it being at the time of their establishment a high open prairie with no protection from the prevailing south wind during most of the growing season. At the same time we have many thousand of Catalpa trees growing in Kansas that will average one inch in diameter for each season's growth since they were planted as seedlings.

POST AND POLE STOCK.

I believe the development of the middle West during the next twenty-five years will call for millions of posts and small telephone poles for the progressive farmer, who must of necessity be connected with the local telephone company at his county seat. The lasting qualities of the Catalpa make it especially valuable for such purposes. It is one of the easiest trees grown, and I see no good reason why millions of them should not be grown for the above and many other reasons.

Topeka, Kan. GEO. W. TENCHER.

SAFETY IN DOUBLE TRACKS.

The Editor of ARBORICULTURE, in his numerous journeyings by boat and by rail, crossing and recrossing the continent in every direction, more than two hundred thousand miles, has been so far extremely fortunate in not having met with any serious accident in all these years of travel. Yet it was with a special feeling of perfect safety that the recent trip was made from Chicago to New England over the Lake Shore & Michigan Southern and the New York Central railways, where all the tracks are double, and for a large part of the way four tracks.

There is no equivalent which can be considered where safety, speed, comfort and convenience are in our balance of the scale.

It costs a vast sum to build, equip and maintain one line of railway with modern

equipments and construction, but upon a thoroughfare of such importance as to require four parallel tracks over which the numerous trains must pass to accommodate the wonderful freight and passenger traffic between the West and East, the additional expense is far beyond the knowledge of the ordinary layman.

The numerous trains, passenger, mail, freight and express, and the various employes in office, field and shop, would approximate the population of some of the states, yet these are supported, with their families, by this great railway system.

The highest rate of speed attainable may be maintained with safety, since the tracks are always clear, and one need not think of what might happen should someone forget his duty.

For many miles at a stretch the smoothness of the tracks and solidity of the road-bed are so perfect, that but for the puffing of the engine, or passing of other trains on parallel tracks, one would not know that the train is in motion, yet we are covering fifty miles each hour for this entire distance.

To the busy man, whose minutes must all be accounted for, if he succeeds in accomplishing the work projected, speed is of great importance, yet when this is secured with every element of danger removed, as far as human agency can devise, and a trip to the eastern cities and return may be made with no greater fatigue than would be incurred at home, then there is a pleasure in travel which was not realized a few years ago.

The New York Central, Lake Shore and vast net work of railways under this one system are well managed, keep apace with every improvement, and supply the traveler with every convenience and luxury of a well-appointed hotel, while flying a mile a minute through space.

IOWA ARBORICULTURE.

The influence of Professor Thomas H. Macbride in Iowa is seen by the range of subjects discussed, and ability and forcefulness of the speakers selected at the recent meeting of the Iowa Park and Forestry Association at the State House, Des Moines, December 8 and 9.

Evidences of Climatic Changes.

THE United States, with an area of 2,098,700 square miles, exclusive of distant possessions, has 1,720,000 square miles of arid plains and treeless prairie, almost 60 per cent of our territory.

The great interior elevated plateau and mountain region where rain seldom falls, is increasing in aridity with no prospect of improvement under existing circumstances. And yet all this now arid territory was once the home of magnificent forests, with a climate as moist as that which our Atlantic and Gulf states now enjoy.

There are no people of all the world who are more patriotic than Americans, and if we can once realize the vast import of leaving to future generations a land arid, desolate, unproductive, infertile—the life blood wrung out by greedy, avaricious efforts of the present generation; or a country fertile, watered by natural streams, a land capable of maintaining the dense population which will very soon inhabit it—then will patriotism rise to that supreme character which shall demand that proper efforts be made to secure the best results.

I shall endeavor to point out some of the evidences of forest influences in the past and draw inferences from these lessons which may lead us to an appreciation of our responsibilities as a people, that the agricultural condition may be improved. The span of human life is so brief, and the most careful observations so incomplete, during any single generation, they are not convincing when applied to regulations governing the elements. Yet the laws which control and influence cloud movement, evaporation and precipitation by forests are as positive as are those of gravity, or tidal motion, both the latter of which are fully understood. But we have in Holy Writ a history covering many centuries which would be indisputable even were it not corroborated by contemporaneous writers, and this is convincing as to forest influence.

When the angel of the Lord appeared into Moses in a flame of fire out of the midst of a bush, a covenant was made that He would bring the Israelites out of Egypt "unto a land flowing with milk and honey." The promise of the Lord was repeated upon various occasions and after thorough preparation this compact was renewed with Moses in Horeb in these words: "For the Lord thy God bringeth thee into a good land, a land of brooks of water, of fountains and depths that spring out of valleys and hills. A land of wheat, and barley, and vines, and fig trees and pomegranates; a land of oil olive, and honey. A land wherein thou shalt eat bread without scarceness, thou shalt not lack anything in it."—Deut. VIII-7, 8, 9.

From the Caspian Sea, extending westward through Asia Minor, is a range of mountains which branches, one portion, the Taurus, belting the Mediterranean on the north, the other branch, the Lebanon Mountains, parallels the eastern shore of that sea to the Leontes River. Southward this becomes an irregular range extending to the Red Sea.

At the time of Kings David and Solomon these higher mountains were covered with dense forests of mighty trees. The entire country, for a width of one hundred miles, is quite broken, high ridges, deep gulches, with rolling hills sloping toward the Jordan Valley. From the Taurus mountains the Euphrates and Tigris flow southeastwardly to the Persian Gulf, while between these streams and Palestine lies the Arabian Desert. Canaan, as apportioned to the tribes of Israel extended three hundred and fifty miles north and south, Syria, with the Lebanon mountains lying to the northward, a total length of five hundred miles, covered with primeval forest. While the mountain tops were clothed with a forest covering, feeding and enriching the lower valleys, retaining the moisture which fell, and, by their presence attracting the clouds of rain, this region remained fertile, capable of providing food

in abundance for great multitudes of people who occupied it for many centuries; but when the mountains became bared, the rains gradually failed, severe droughts occurred, the soil ceased to be productive and eventually the entire region was depopulated, it became so barren as to be uninhabitable.

THE POPULATION OF CANAAN.

"Behold ye are this day as the stars of heaven for multitude."—Deut. 1-10.

For nine hundred years, prior to the entrance of the Israelites, Canaan had been inhabited by the degenerate sons of Noah, who had become a very numerous people.

"The people are greater and better than we, the cities are great and walled up to heaven."—Deut. 1-28. Num. XIII-28.

When the Israelites took possession they also continued to increase greatly. When David ordered the enumeration of the people Joab found the number to be 1,570,000 that drew the sword.—I Chron. XXI-5.

This is equivalent to a population of more than six million souls. In addition to which the coast provinces, with large maritime cities, Tyre, Sidon, and many others, not included in David's realm, together with the large cities and numerous people in the Lebanon Valley, brought the population of Canaan up to ten millions.

Both from profane and sacred history we are reminded of the vast multitudes who peopled this country, and of the temples and works of art which they constructed. Solomon employed 153,600 laborers for twenty years in erecting his various religious and state buildings. At the same time he maintained a standing army numbering half a million men; forty thousand stalls of horses were provided for his chariots and twelve thousand horsemen. While as compared with David's reign, his was one of peace, yet that was secured by a strong exhibition of power.

Thus "Judah and Israel dwelt safely, every man under his own vine and fig tree."—I Kings IV-25.

David had thoroughly organized the army, and subdued the neighboring nations, but the power of Israel reached its

zenith during Solomon's reign; all nations from Mediterranean to Euphrates acknowledged his sovereignty.

To support a population so dense required an exceptionally fertile soil, intense cultivation with a regular and abundant rainfall. The land, cultivated as in gardens, produced wheat, barley and all manner of fruits; the hillsides were terraced and planted with grapes, pomegranates, olives and figs, horticulture being one of the arts which was thoroughly understood and practiced by the children of Israel.

The abundant agricultural resources of the Kingdom may be better realized as we read that 320,000 bushels of grain were annually sent to pay the Sidonians, who were making lumber for the Israelites, while a million gallons each of wine and oil were also sent for the same purpose, year by year, for twenty years.—Chron. II-10.

A LUMBERING NATION.

"Hew me cedar trees out of Lebanon; for thou knowest that there is not among us any that can skill to hew timber like unto the Sidonians."

The Sidonians occupied the coast from Mt. Carmel northward some hundred and fifty miles, the mountains of Lebanon being within their territory. They were extensively engaged in cutting and hewing timber, building ships and exporting lumber; this was a seafaring people whose trade extended to the farthest coasts of western Africa and southern Europe as well as to the cities of the Mediterranean. They navigated the Nile in trade with the Egyptians. Timber was their chief export, for in the region of these African ports to which they sailed forests were unknown, while the skill of the Sidonians was especially directed to wood-craft.

Fortunately for the Orient the methods of the Sidonians, lumbering solely with the axe, gave some opportunity for forest renewals, and centuries were required to devastate the mountains of Canaan and accomplish their aridity.

When King Solomon found it necessary to procure a navy, it was the Sidonians who constructed it in Ezion-geber, on the Red Sea, and manned it for the

trade with Ophir in the Indian Ocean.—I Kings IX-26.

The Temple was called by Solomon "The house of the forest of Lebanon," because it was chiefly constructed of cedar. Darius, also, in rebuilding the temple, sent to the Sidonians for cedar trees from Lebanon, Ezra III-7. The fame of the Sidonians as timber dealers had thus continued six centuries.

So long as the mountains retained their forest covering, and forest influences prevailed, the clouds were attracted, rains were frequent, and percolating through the soft soil burst out in numerous springs to water the fields below, while the soil remained fertile, producing food in abundance. As a rich agricultural region, the large population well fed, were strong in spirit and fully able to protect themselves from incursions of neighboring tribes. We may readily trace the gradual change which took place in climatic conditions as the forests were removed from the mountain slopes all along the Mediterranean coast as well as the Libanus and Taurus Mountains, resulting in agricultural disturbances, droughts, famines, pestilence and ultimately in total barrenness, from cessation of rainfall; then the dispersion of its people became a necessity. As the lands increased in aridity, the soil refused its harvest. Judah and Israel were diminished in numbers, impaired in spirit and were easily subdued by one after another of the nations which had long desired this historic land.

HISTORIC DROUGHTS.

Ten hundred and twenty-one B. C., there was a famine in the days of David, three years, year after year. 2 Samuel XXI-1.

Nine hundred and ten years B. C., Menander describes a disastrous famine throughout Judea.

More than a year had passed without rain or dew. This was the same drought in which Elijah was fed by the ravens, and when the brook Cherith had become dry, increased the supply of the widow's meal.

Five hundred and eighty-eight years B. C., another famine occurred, and with it pestilence, which greatly reduced the

population and power of the nation, so that when the Babylonians besieged Jerusalem, the stronghold fell, and the people were carried away into captivity.

While the immediate reason for the fall of Jerusalem may have been on account of the wars and dissensions among the Jewish tribes; and while the idolatry of the rulers and populace is given in scripture as the occasion for their punishment, *yet the real cause was the decline of agriculture through the loss of forest influence, impairing the stamina of the inhabitants and resulting in national decadence.*

What is frequently considered miraculous in the Almighty's direction of affairs, is in reality His adoption of natural laws to achieve desired results.

The Persians coming into power B. C. 444, Darius restored Jerusalem, and rebuilt the temple, but the country was overrun by various tribal bands, agricultural pursuits having been abandoned, and the Jews were ever after under foreign dominion.

Josephus mentions that when Pompey pitched his camp at Jericho, he found palm and balsam trees, this fact being of sufficient importance to be made of record, since trees had become so scarce in the land.

Under the procurators, Tiberus Alexander and Cuspius Fadus, A. D. 65 to 75, there was a drought continuing several years, and many people died from starvation. Queen Helena, who sympathized with the Jews, sent into Egypt and brought large quantities of corn for the suffering multitudes in Jerusalem, and also procured a cargo of dried figs from Cyprus.

During the thirteenth year of Herod's reign, B. C. 24 years, very great calamities came upon the country; there were perpetual droughts, and for that reason the ground was barren, and did not bring forth the same quantity of fruits, after which want of food caused pestilential disorders. This drought lasted several years, corn being brought from Egypt to supply their food.

Another famine occurred during the fifth, sixth and seventh years of Claudius, A. D. 54. This drought was foretold by Agabus (Acts XI-28).

RESULT OF THE CLIMATIC CHANGE.

These historic mentions of famines enable us to see the result in the now rapidly changing climate of the country about Palestine, portions of which, however, still remained fruitful during the first century of the Christian Era. Flavius Josephus, A. D. 75, says of Galilee, "For the Galileans are inured to war from their infancy, and have always been very numerous, for their soil is universally rich and fruitful, and full of the plantations of trees of all sorts, inasmuch that it invites the most slothful to take pains in its cultivation by its fruitfulness; accordingly, *it is all cultivated by its inhabitants and no part of it lies idle. Moreover, the cities lie here very thick, and the very many villages there and here are everywhere so full of people, by the richness of their soil, that the very least of them contain about fifteen thousand inhabitants.*"

"But for Perea, the greater part of it is desert and rough; yet hath it a moist soil and produces all kinds of fruits, and its plains are planted with trees of all sorts, while yet the olive tree, the vine and the palm tree are chiefly cultivated there. It is also sufficiently watered with torrents which issue out of the mountains, and with springs that never fail to run, even when the torrents fail them, as they do in dog days."

"Now as to Samaria, it is entirely of the same nature with Judea; for both countries are made up of hills and valleys, and are moist enough for agriculture, and are very fruitful. They have abundance of trees, and are full of autumnal fruit, both that which grows wild, and that which is the effect of cultivation. They are not naturally watered by many rivers; but derive their chief moisture from rain, *of which they have no want.* By reason of the excellent grass they have, their cattle yield more milk than do those in other places; and what is the greatest sign of excellency and of abundance, they each of them are very full of people."

Having this description by contemporary writers during the first century, let us contrast writers of the present day as to what Palestine now is.

Dr. T. DeWitt Talmage says from his visit in 1880: "While Palestine of today is generally uninviting as a land sown with dragons' teeth, choking out like tares, the fruitfulness of the soil, until it presents the hard appearance of a country mildewed, decayed, desolated, yet many evidences remain to attest its former magnificence, if not fertility. Out on the barren hills where rocks pile up in confusion, covered with wild vines, a haunt for the scorpion, lizard and fox, there will be found ruins of stately edifices, monuments graced with the records of mighty events, columns of marble that once gleamed in the corridors of splendid temples, images and statues which centuries ago stood in grand halls, great courts and sparkling throne rooms."

Dean Stanley says: "For miles and miles there is no appearance of present life or habitation, except the occasional goat-herd on the hillside, or gathering of women at the wells. Yet there is hardly a hilltop of the many within sight, which is not covered with the vestiges of some fortress or city of former ages."

The brooks of Palestine are but wadys where once flowed a considerable stream.

The United States has numerous instances where we are approaching the same condition of barrenness that is found in Palestine.

The hills along the Ohio valley, within the memory of thousands of citizens were heavily timbered, affording protection and fertility to numerous lower fields. They were rich with the mold of a thousand years' accumulation, and for a time were extremely fertile; wheat, corn, potatoes, timothy hay and other farm crops were grown upon their rich, fresh soils for many years. How are they now? Rocks of loose limestone thickly cover many of the hillside fields, while others embedded in the hard, stiff clay torment the husbandmen who must plow their surface. Clay forms the land from which all vegetable mold has been eroded by torrents of rain. Strict economy and constant labor are required to eke out a living from these once famous, fertile, wooded hills.

There are similar instances in California where the greed of man, and a want

of intelligent laws upon the subject, have removed the magnificent forests, leaving them bare of vegetation, and the soil soon washed away has left the primitive rocks, upon which never more will anything grow. They are valueless to the Nation, the state or the individual, a barren waste. The great Rocky Mountain region where less than fifty years ago there were splendid forests, now not a hundredth part of the trees remain, criminal carelessness, wanton wastefulness, forest fires without state or National protection, and spoliation, have reduced these forests and threaten their speedy extermination.

How long will America continue to feed the world from her now inexhaustible granaries, after her forests are destroyed and climatic changes such as have devastated the lands of the Orient, shall have completed their work in the Occident?

The world has had distinguished philosophers whose names will be chronicled with high honor so long as history and civilization exist, who adopted theories and evolved hypotheses, based upon the knowledge possessed during their age of the world, which in the light of later discoveries have proven false, and in many cases ridiculous. Notably before the laws of gravitation were known, and while the earth was yet flat, and rested upon impossible animals. Yet they were quite as firm in their belief as some of our present philosophers, who, because they cannot understand, assert that forests have no effect upon climate. Yet forest masses do concentrate moisture already in the atmosphere and cause its precipitation upon the earth.

An illustration of forest influence upon cloud distribution is found in the Danish Island of St. Croix, one of the lesser Antilles, which group of islands form a regular crescent from Puerto Rico southward to Venezuela, and all are wooded except St. Croix, from which the forests have been removed. This island lies twenty miles south of St. Thomas, and without the regular crescent of the group. The clouds follow the trend of the forest-covered islands and rains are frequent but St. Croix suffers severely

from drought, as the clouds are attracted from it—yet in this tropic region the evaporation from the Carribean Sea is very great, fully as much at St. Croix as at St. Thomas, but twenty miles away.

It is also well known to farmers that summer showers so necessary for agricultural prosperity follow the course of timber margined streams.

In the Orient, so long as the forests remained upon the higher elevations, the rain belt extended inland more than one hundred miles, but as the mountains were cleared of their trees, the desert encroached upon the fertile lands, gradually but surely, until all the land became arid.

So the rainless plains of the United States have obtruded their aridity by slow degrees, as extensive forests were destroyed by fires, by ice and by man, until the Pacific has been reached throughout the greater part of California.

The logical conclusion must be that forest covered elevations controlled the distribution of moisture through the atmosphere and abundant rains prevailed; but with the removal of these bodies of timber their influence was lost and aridity was the consequence.

EDITORIAL NOTICE.

With the fourth number of ARBORICULTURE we close the year 1902. With the beginning of the new year we hope to have additional interest and shall endeavor to present the various subjects demanding attention in a candid manner, give the best illustrations obtainable, and earnestly strive to stimulate a greater respect for the forests and for trees in general.

We have promise of several good articles from eminent writers during the year. We have sent out many sample copies to those whom we are assured have an interest in arboriculture, and we hope our friends who have received the magazine will now become permanent subscribers, otherwise their names will be dropped. Payment may be made at any time during the year 1903.

The subscription is \$2 per annum, which should be sent to John P. Brown, No. 1639 Michigan avenue, Chicago, Ill.

Forest Fires and Legislation.

EACH year makes an additional record of disastrous fires throughout the forest regions. The appalling reports read by millions of busy citizens, cause a shudder at the time, but are soon forgotten and the lessons go unheeded.

There never was a forest fire which was caused by spontaneous combustion. There never was a forest fire but which could have been avoided had the residents and campers been reasonably careful.

The annual fires in all forest regions may be prevented if proper efforts are made, suitable legislation enacted and laws enforced by the strong hand of a powerful government.

Carelessness in starting fires should be declared a crime, and as such punished with severity.

It would require a sum far inferior to the annual losses by fires to maintain a system of rangers, under competent fire wardens, and they under an able chief, to suppress all fires before they are beyond control.

It is well known that in the great forest regions of the United States the destruction caused by fires far exceeds the quantity used in the export trade, together with the domestic consumption.

Two hundred and fifty million dollars would not cover the fire losses during the past two decades.

Several causes combined are responsible for this remarkable conditions of affairs.

1. The very general practice of smoking among Americans, and extreme carelessness in disposition of lighted cigars, cigarettes and matches.

2. The indifference which exists among almost all classes as to the results of such fires.

3. The practice of campers of leaving inextinguished campfires through the wrong impression that they cannot communicate with the surrounding inflammable materials. A brisk wind fanning these embers into a blaze and carrying leaves and resinous needles to these em-

bers a fire is quickly started and distant from human habitations becomes uncontrollable.

4. Absence of fire guards and want of proper precautionary measures and lack of any systematic methods for fire control by the national, state and local governments, and by large corporations.

5. Failure on the part of railway companies to devise means for the extinguishment of fires which may have been started by trains.

6. Absence of statutory laws upon the subject of forest fires and the neglect of legislators to grasp the situation and see the importance of providing such laws and means for their enforcement.

7. Encouragement of arson by the United States authorities through unwise rulings of the land department, whereby green, standing timber will not be sold, but burned trees may be purchased at a low price. Fires have been started by evil disposed persons to enable them to secure at a nominal price what timber may not have been consumed.

8. Probably the greatest obstacle in the way of forest protection is our abominable system of state sovereignty, the national government having a very limited jurisdiction, while the various states have neither the ability, will nor financial power to protect the timber within its borders. This, of course, is more applicable to the West and South, where the greater area of forest remains. Great improvement is found where the United States has established a system of patrols on the limited forest reservations.

PRAIRIE FIRES.

In the early settlement of the western prairies much damage was caused by the annual burning of the prairie grass, which was burned to stimulate a fresh growth of grass and enable the herds of cattle to more readily reach it.

These fires were anticipated by the more thrifty settlers and preparations made for their protection. In June, while the grass was green and growing,

three or four furrows were turned, outside the outer fence or field lines. If a roadway was traveled the plowing would be some fifty feet distant from the road, otherwise another line of furrows was plowed, parallel with the first.

After the grass upon the prairies was dead and dry, upon a day when there was little wind, the grass between these furrows was burned. Two persons, each armed with a heavy burlap, followed the blaze along the edges of the furrows, to beat out any flame which might threaten to cross the furrows.

In this way a broad fire line was secured, over which fire would not pass except in an extremely high wind.

Upon the discovery of a fire which could be seen approaching, recourse was had to back firing, using the fire guard as a base of operations.

FOREST FIRE LINES.

This plan, modified to meet varying conditions, may be adopted for forest protection.

In mountainous regions there are usually certain lines which have a less dense growth, if not entirely clear of timber and brush, which may be kept clear for fire protection. Usually the summit of divide is fairly clear of inflammable materials, or may be made so with moderate labor and expense. The topography of the country must guide the wardens in laying out fire lines. Roadways can be utilized, by clearing a space on one side, to form a base for back firing.

While the densest thickets are usually in the rich bottom valleys, yet a stream may generally serve as a fire guard, if the banks upon one side are cleared sufficiently to prevent burning trees which may fall from communicating the fire.

The greater the frequency of these fire lines, the less damage will be done, and more quickly can the flames be checked.

Only natural obstacles, a timely rain, or exhaustion of timber supply, will check a forest fire when thoroughly under way. Owners of timber lands cannot afford to ignore this fire protection, nor can the railways, nor yet the state, for with a thorough system a few men can check the progress of a fire by back firing, otherwise it may continue for a hundred miles.

POLICE PROTECTION

is necessary to guard property in cities. Fire patrols, engines, fire department and ample water supply, are all provided at great cost in every city. How necessary then to take the precaution in forest regions for saving from fires and spoliation the timber which is so necessary to agriculture, commerce and manufactures.

CORPORATIONS.

Each corporation owning large tracts of land should employ at least one man whose sole duty it should be to maintain a suitable fire protection. He should be fairly paid and expected to be on the alert, anticipate fires and be prepared to extinguish them. Every man in the employ of the company should be subject to this man's call in case of urgent necessity.

Such a man, with proper assistance, would open and maintain fire guards, keep leaves and trash cleared away to prevent the spread of flames.

RAILWAY FIRES.

When wood was used for fuel fires were of great frequency, and even now, with the best care, fires occur along every railway line, and the fire losses paid by railways are very great. Yet, in most instances, the negligence of adjoining property owners is chiefly responsible.

The railway interests in every state are powerful enough to secure the passage of good and effectual laws for fire protection, if the effort is made in the right direction.

Property owners should be required to maintain their part of a fire guard along each railway line, failing in this the company should be privileged to enter upon such lands and secure such fire guard.

THE INTERIOR DEPARTMENT.

has provided an excellent patrol system for the forest reservations, and is to be commended for this; but every acre of government land upon which there is timber should be as well protected.

One million dollars expended annually in this direction, employing a thousand rangers, would be money well expended. Not a year passes but the fire losses amount to \$25,000,000 and more, with-

out including the inestimable loss from changes in climatic conditions, and the curtailing of timber supply for the nation, which will continue to exist long after the present generation, which is responsible, has passed away.

The forests can be made self-sustaining, and a source of income to the nation, if the lands be withdrawn from sale, disposing of the timber by measurement and a thorough protection given from fire loss.

To do this it is imperative that the forests all remain in the hands and under control of the Department of the Interior, which should have an ample appropriation by Congress to carry out the very best scheme of arboriculture which can be devised.

Distances are great in the forests and the population sparse. It is extremely difficult to trace the origin of fires, owing to the absence of witnesses, and those who cause, by design or carelessness, these great conflagrations go unpunished.

TELEPHONES ESSENTIAL.

A complete system of telephones, the wires strung on trees, will enable the presence of a fire to be made known and help summoned quickly.

Officers and employes should be constabulary, with power to make arrests and command assistance.

It must be remembered that while a fire is raging and beyond control is no time for planning protection; it should be done now.

The *Philadelphia Public Ledger* gives some startling facts along this line:

"\$30,000,000 GONE IN ONE STATE ALONE.

"Much of the Fault for These Devastating Conflagrations Is Mere Carelessness or Inattention—Public Sense Needs Cultivation.

"Investigation has shown that, in an average year, sixty human lives are lost in forest fires, \$25,000,000 worth of real property is destroyed, 10,274,089 acres of timber land are burned over, and young forest growth, worth, at the lowest estimate, \$75,000,000, is killed. A special canvass of the country by the Department

of Agriculture in 1891 discovered 12,000,000 acres of timber land destroyed.

"The figures are mere estimates, which fall far short of showing in full the damage done. No account at all is taken of the loss to the country due to the impoverishment of the soil by fire, to the ruin of water courses, and the drying up of springs. Even the amount of timber burned is very imperfectly calculated, and the actual quantity destroyed is far in excess of that accounted for. Forest fires in this country have grown so common that only those are reported that are of such magnitude as to threaten large communities. The lumbering industry in remote sections of the country may be ruined and people forced to flee for their lives without a mention of the disaster beyond the places near where it occurred.

"The fires that burnt this year in Washington and Oregon were uncommon only in the number of lives lost. The burning of logging and mining camps and farm buildings, the loss to the country in the destruction of timber and young tree growth, is of yearly occurrence. Every fall, not only in Washington, Oregon, Colorado and Wyoming, but up and down the Pacific coast and all over the Rocky Mountain country, fires burn great holes in the forests and destroy the national wealth. The air of the mountains over hundreds of miles is pungent with the smoke of conflagration, and navigation on Puget Sound has often been impeded by smoke.

"The most disastrous forest fire in the history of this country occurred in October, 1871, simultaneously with the burning of Chicago. It extended all across Northern Michigan and Wisconsin into Minnesota. At least 1,000 persons were burned to death and 15,000 were made homeless. The property loss has never been calculated. The Hinckley fire of 1894, which destroyed Hinckley and five other Minnesota villages, burned to death 418 persons, destroyed \$750,000 worth of farm and town property and about 400 square miles of forest. A fire in Southeast Michigan in 1881 burned the forest on forty-eight townships, destroyed \$2,000,000 worth of other property, burned to death 125 persons and made homeless 5,000. Another Michi-

gan forest fire, which occurred in 1890, made homeless 2,000 persons and destroyed town and farm property worth \$1,250,000. Wisconsin lost by fire in May, 1901, 100 square miles of forest and other property worth \$2,000,000. In 1894, in Wisconsin, thirteen persons lost their lives and 3,000 their homes, and \$2,000,000 worth of town and farm property was destroyed in the Phillips fire.

The enumeration of great forest fires could be extended almost indefinitely. One feature, however, is common to them all, they were small fires before they grew uncontrollable, and with little trouble might have been extinguished. For example, the Hinckley fire smoked as a ground fire for weeks and nobody paid it serious attention. But one day the wind rose and fanned the smoldering embers into flame, the flame caught in the dry underbrush, leaped into the trees and

became a fire of so terrible a volume that no human power could stay it.

The best forest fire laws are probably those of Pennsylvania, which makes an annual expenditure of \$15,000 in support of them. State constables serve as fire wardens in their townships and receive extra pay for their services. Minnesota, brought to a sense of responsibility by disasters, of which the Hinckley fire was the most terrible, has established an efficient forest fire system. Massachusetts has had good legislation in the matter. The New York forest fire laws, though generally limited in their effect to state reserves and parks, have brought good results. West of the Rocky Mountains little is done toward the suppression of forest fires except by the forest rangers on government reserves, who are employed by the Department of the Interior.



A EUCALYPTUS FOREST, CALIFORNIA.

NEW YORK ARBORICULTURE.

The Forest, Fish and Game Commission of the State of New York are making good progress in reafforesting the lands from which the timber has been cut.

Last spring the commission planted 420,000 trees on 700 acres of waste, burned-over land. They have just finished collecting seeds for the continuance of this work. They secured 375 pounds of red spruce seeds at Fulton Chain, from 200 bushels of cones.

The trees were planted near Lake Clear Junction.

They have been preparing the ground for a nursery to be started next spring.

Beginning in a small way, the first year with one million seedlings each of red spruce and white pine, this has been the chief work in the Adirondacks.

A nursery of one million seedlings was started in the Catskills, at Brown's station, last spring. These seedlings will be grown until four years old before planting out upon the burned-over state lands, of which New York State has 65,000 acres in the Adirondacks.

A portion will be distributed to private parties or persons for planting, as the fish are now distributed.

The state owns approximately 1,000,000 acres in the Adirondacks and 300,000 acres in the Catskills.

The trees planted last spring are growing nicely, only 8 per cent having been lost.

This not being a seed year for the white pine, no seed was collected.

DECISION OF INTEREST.

Shade Trees in Front of a Man's Property Belong to Him—Restriction as to Rights.

The Supreme Court of Indiana has decided that shade trees in front of a man's residence, although located on public property, belong to him. The case in which the decision was made was one in which a property owner sued a telephone company for cutting off the limbs of his trees. The decision is of interest to all

property holders and corporations. The law, however, holds that a property owner who has trees growing along the highway must not allow limbs and branches to grow until they interfere with the travel of pedestrians or vehicles. —*Frankfort Crescent*, October 31, 1902.

TREES FOR THE STREETS.

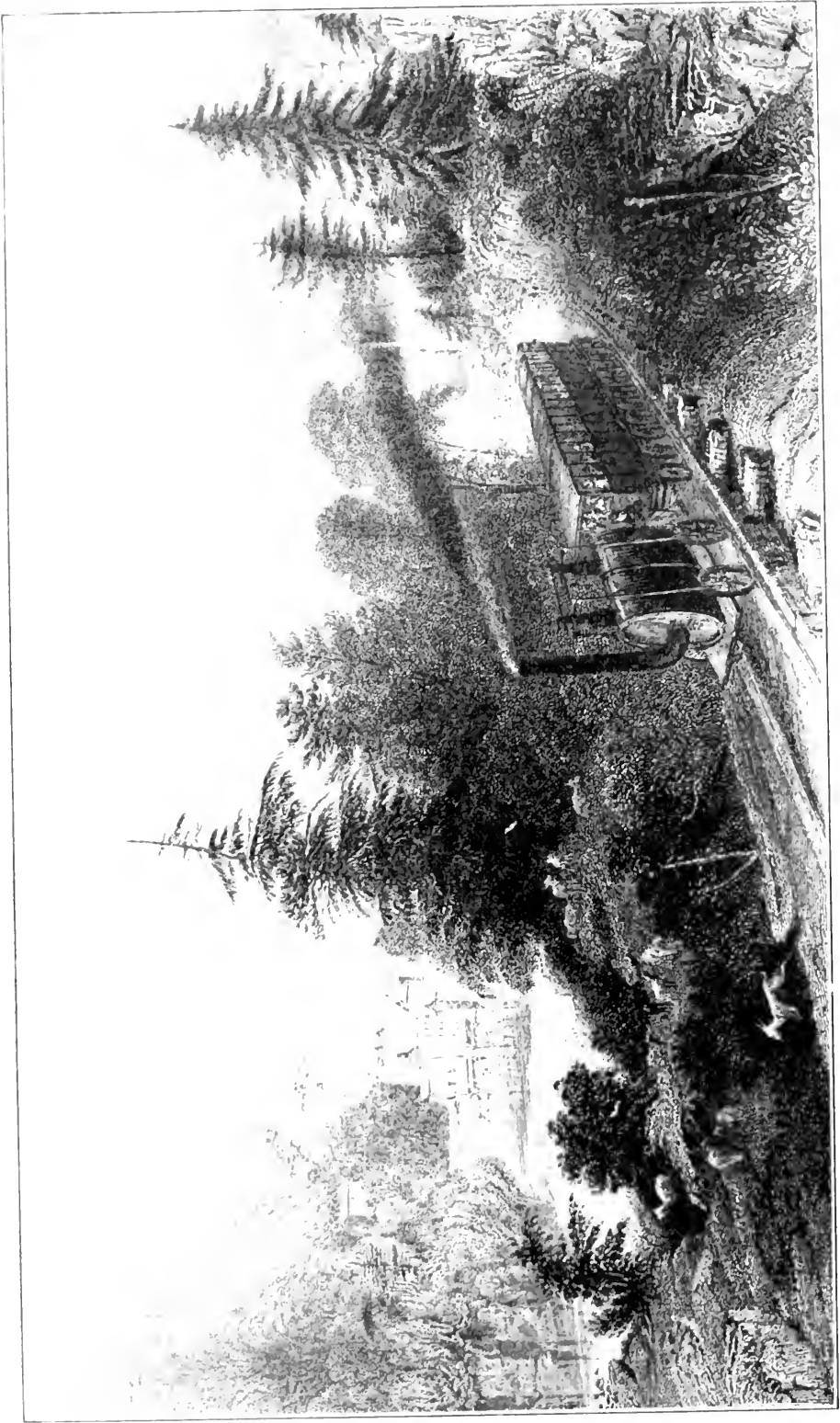
To *The Star*: I notice that the city forester is recommending for planting in the streets only two varieties of trees, the sugar maple and white elm. Now these are doubtless very good trees in their way, but it would be unfortunate to have our city planting confined to only two or three varieties. Why is that rapid-growing tree of beautiful foliage and superb form, the Carolina poplar, neglected? The cottonwood is another tree of quick growth, good shape and nice foliage, and, following, are the beautiful box elder and catalpa. Why are these native trees of unsurpassed value ruled out or neglected? We need something which is hardy, that will grow quick, furnish ample shade and is attractive in its crown or form of top. —A Tree Admirer.—From *Kansas City Star*.

Cottonwood and Carolina poplar are identical—rapidity of growth is their only qualification. Neither should be planted in any location for shade or ornament.

Almost any tree of America will grow well at Kansas City, and there is no excuse for taking the poorest tree on earth when really good trees are so abundant.

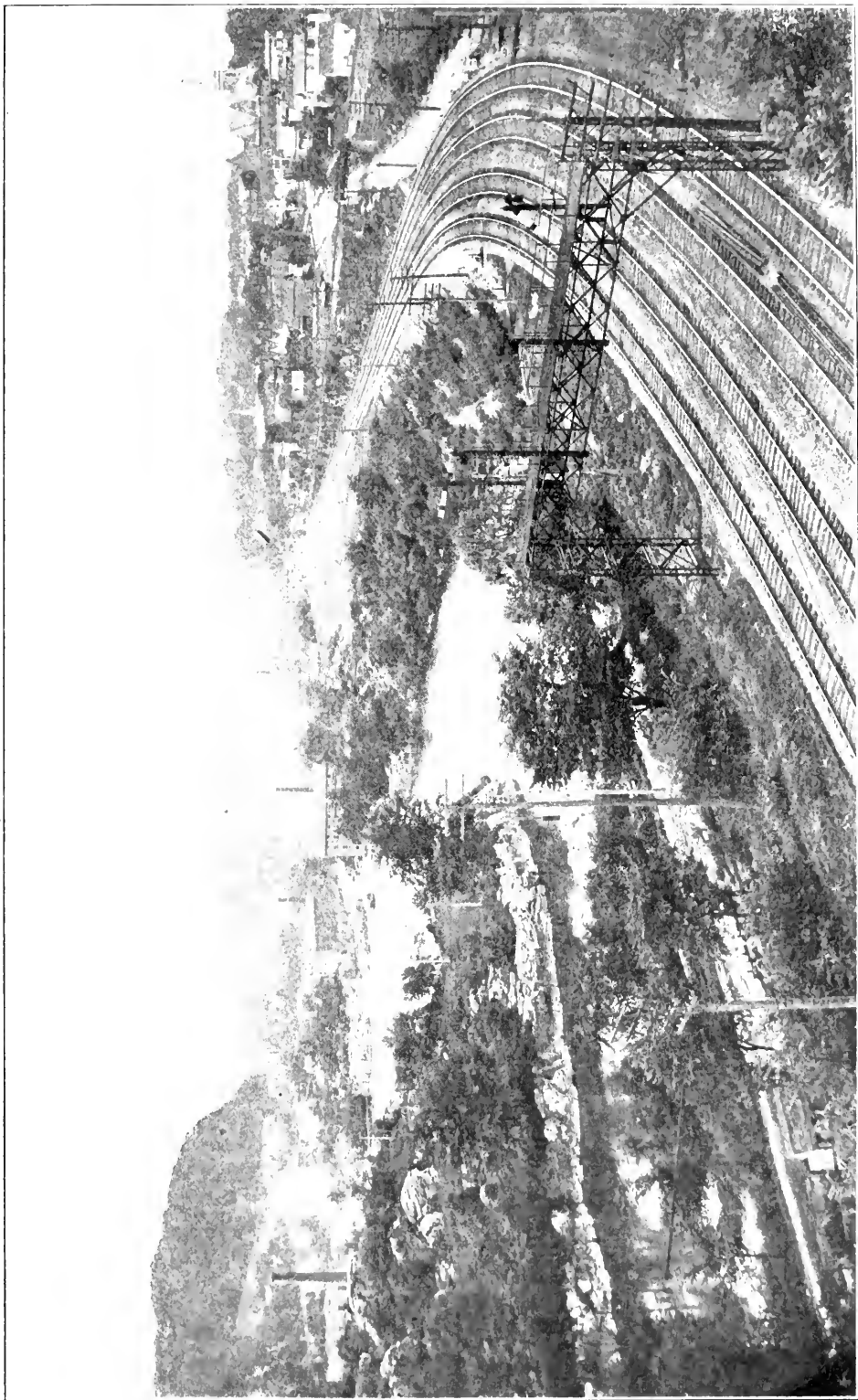
THE CHESTNUT GOING.

The former millions of wild pigeons of Ashtabula County, Ohio, says the *Jefferson Sentinel*, are only known to the "oldest inhabitant," and now the chestnut, the king of all nuts for boys, will soon only be known as a cultivated nut. Parties at Harriman, Tenn., are preparing to locate a mill for grinding chestnut timber into pulp for tanning purposes. It is proposed to consume 100 cords per day. At this rate, and with the destruction the hard-headed borer is doing, chestnuts to eat will soon be a thing of the past.



PRIMITIVE RAPID-TRANSIT EARLY SCENE IN THE MOHAWK VALLEY, NEAR LITTLE FALLS

(Re-printed from a Magazine published in London in 1838.)



A RAILROAD SCENE IN THE MOHAWK VALLEY NEAR LITTLE FALLS, IN 1902.—SHOWING THE FOUR TRACKS OF THE NEW YORK CENTRAL.

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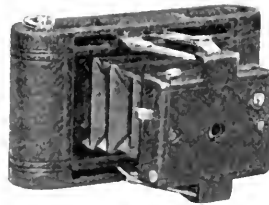
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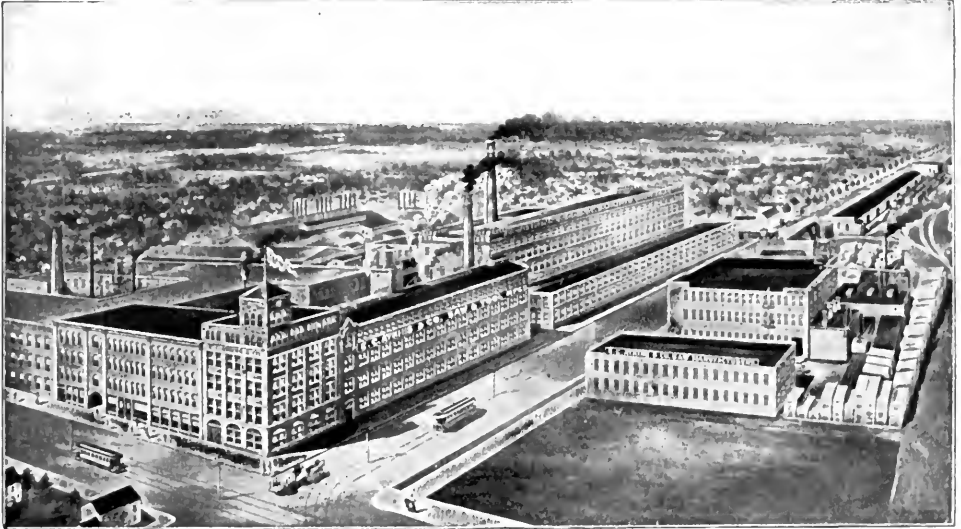
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THE GREAT SOUTHWEST



KANSAS has long been known as a land of tall corn and billowing wheat crops, of blooded cattle and long-fleeced sheep, of fat hogs and fast horses, of rich soil and hustling people. It is not so generally known that it is also taking front rank in manufacturing by reason of cheap coal, natural gas, fuel oil and abundant raw materials. Land is still cheap. The man seeking a new home will do well to carefully inspect the "Sunflower State." In 1901 (a poor year everywhere) Kansas raised 90,333,095 bushels of wheat. In 1899, a big corn year, 225,183,432 bushels of that cereal were produced.

OKLAHOMA was first settled in 1889. In 1900 the population was 398,331. The growth since 1900 has been rapid, particularly in new railroads. Here are found, side by side, wheat, corn and cotton. Wheat is the leader—the 1900 crop was a "record breaker," 30,680,000 bushels. Cotton is the poor man's friend—the 1900 crop was 150,000 bales; its by-products are very profitable. In one county alone a corn crop of 2,800,000 bushels was harvested in one season. There are a million cattle in the Territory and a quarter of a million hogs. The Santa Fe is opening up Eastern Oklahoma.

TEXAS is the largest State in the Union. It can produce almost everything needed. It has sea coast and mountains, forests and plains, soils of every kind, a wealth of fuel, geysers of oil, growing cities and a hospitable climate. Its corn and wheat crop average 40,000,000 bushels annually. Texas gave to the world in 1901 four million bales of cotton. The lumber industry is immense. Rice is a comparatively new crop in Texas, suited to the low lands along the Gulf Coast. Experts pronounce rice a money-maker. The Santa Fe traverses the heart of Texas, with terminals at tide water.

COLORADO is popularly known as a mining State, producing gold, silver, iron and coal. Resultant of these interests have sprung up flourishing cities like Denver, Pueblo and Colorado Springs, with their big smelters and allied manufacturing industries. The principal agricultural section is in the Arkansas Valley, between Pueblo and Holly. Here are grown in profitable abundance sugar beets, melons, vegetables, small fruits and alfalfa. Ample water by irrigation and an immense beet sugar factory have attracted several thousand farmers, with room for ten times as many.

NEW MEXICO lies at an average altitude of one mile. Dry air and almost constant sunshine—the ideal country for outdoor life. It has mines of gold, copper and coal, great cattle and sheep ranches, pine forests and two magnificent irrigated valleys, the Rio Grande and Pecos. There are churches, schools, growing towns, and a refined social life. Small fruits, alfalfa and grain are the principal crops. On the wide plains cattle and sheep are grazed. In the mountains are fine mines. The Pecos Valley and Maxwell Land Grant are just now attracting special attention.

ARIZONA is in the semi-arid region. In average years enough rain falls in the hills to supply sufficient moisture under irrigation. In the Salt River Valley, near Phoenix, oranges are raised side by side with wheat; alfalfa fields nod to lemon groves and vineyards yield abundantly. Thousands of cattle are fed here each winter. Ranch life is very fascinating, healthful, and quite profitable. Around Prescott the mineral development is astonishing. It is estimated that Arizona mines have yielded \$200,000,000 in twenty-five years. Arizona has much to offer the young man who is ambitious.

CALIFORNIA California was once known only as a land of gold. Gold is mined there yet—millions of dollars a year. But other things have crowded it to one side—for example, oil wells, citrus fruits, wheat and cattle. In the San Joaquin Valley of Central California, a district 250 miles long and 50 wide, with room for 250,000 farms of 40 acres each, the small farmer is coming to the front. He raises alfalfa, has a small herd of cows, sells butter and eggs and sets out a vineyard. He arranges an orchard of figs or olives or walnuts, has vegetables to eat and sell, and a bank account at the end of the year. This is not all done at once, but sooner than "back East." Irrigation is the explanation. The mountains on each side are full of living streams. There are excellent local markets.

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ARBORICULTURE

VOLUME II.

NUMBER I.



A Magazine of the International Society
of Arboriculture: Chicago, January, 1903.

THE INTERNATIONAL SOCIETY OF ARBORICULTURE

OFFICERS

GENERAL WM. J. PALMER, President, Colorado Springs, Colo.
JAMES H. BOWDITCH, Vice-President, Boston, Mass.
JOHN P. BROWN, Secretary-Treasurer,
1639 Michigan Ave., Chicago, Ill.

ARTICLES OF INCORPORATION.

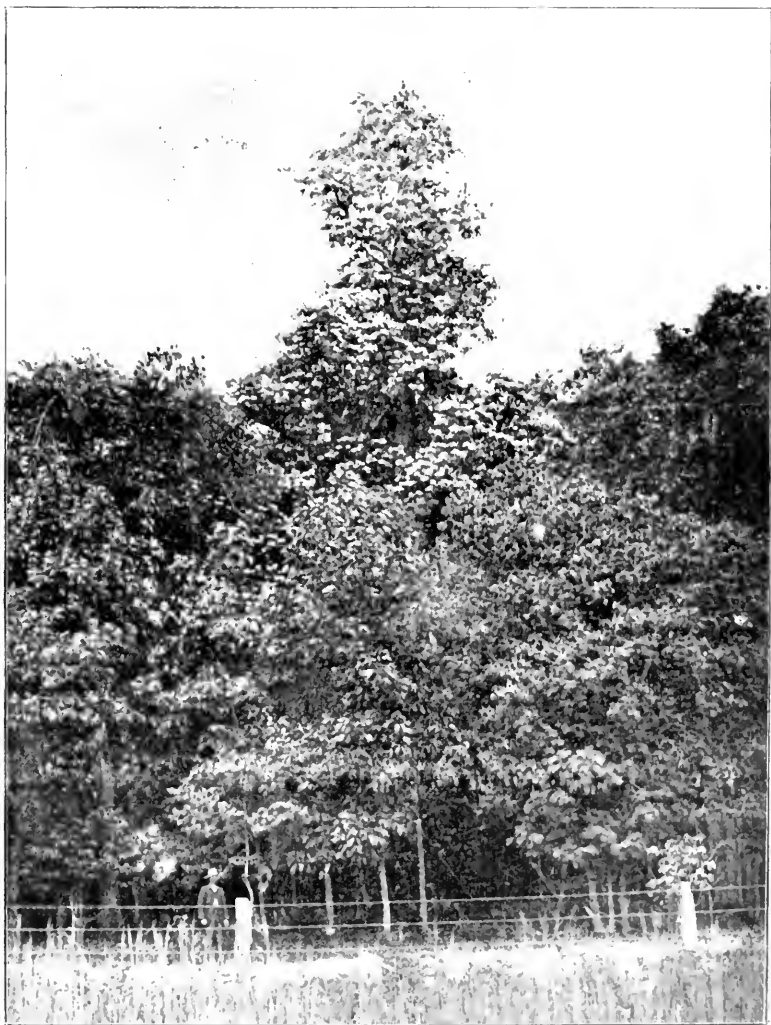
Article I.—Name. The name of this corporation shall be The International Society of Arboriculture.

Article II.—Purpose. The purpose of the Association is to introduce judicious methods in dealing with forests and woodlands; to advance and advocate a public interest in this subject; to promote the afforestation of unproductive lands; to encourage the planting and care of shade trees in parks, public and private grounds, and along streets and highways; to inspire an interest in our remaining native forests, and groves of ancient trees, and to seek their preservation; to supply information to railway officials in regard to timber culture for railway uses, and incite railway and other corporations to plant trees for economic purposes.

Article III.—Membership. Any person may become a member of this Society by the payment in advance of an annual due of two dollars, and on payment of this annual due shall be entitled to receive, regularly, one copy of ARBORICULTURE, the official organ of the society. Any person who may contribute ten dollars toward the support of the society shall become a patron. Honorary members may be chosen by the executive committee.

Article IV.—Officers. The officers of this Association shall be a president, vice-president and secretary-treasurer, who shall be elected at the annual meeting each year by ballot, and shall serve for one year, or until their successors shall have been elected and shall have accepted office, and when elected shall constitute the executive committee.

Article VII.—Executive Committee. The Executive Committee shall have entire control and management of the affairs of the Society.



"THE LAST OF THE MOHICANS."
Six feet diameter, 101½ feet high.



*Portrait by
Wm J Palmer*



A CATALPA FOREST IN THE WABASH VALLEY.

The principal tree in foreground is 35 inches in diameter and 98 feet high.



HUNNEWELL ESTATE, WELLESLEY, MASS.
Avenue of *Catalpa speciosa*, fifteen years old.

ARBORICULTURE

A MONTHLY MAGAZINE.



PUBLISHED IN THE INTEREST OF THE
INTERNATIONAL SOCIETY OF ARBORICULTURE.



Subscription, \$2.00 per annum.

JOHN P. BROWN, Editor, 1639 Michigan Avenue.

Volume II.

CHICAGO, JANUARY, 1903.

Number 1.

The Hardy American Forest Tree.

CATALPA SPECIOSA.

In 1898 the first edition of our booklet, "The Catalpa Speciosa," was printed, the 1,000 copies being soon exhausted. A second edition of 5,000 copies followed, and the demand increasing, a third and fourth editions were issued. Altogether 50,000 copies were sent out, while it has been printed in various daily papers, in whole or in part, so that many thousands of copies have been circulated.

Inquiries for the booklet have been received from Rome, Berlin, London and many portions of Europe and from Australia and New Zealand, besides the demand from America. The last copy has been sent away, and we now reprint in this number of ARBORICULTURE, the sixtieth thousand, adding to the text new matter, several half-tone engravings and all information obtainable in regard to this most valuable, economic tree, making it as complete as possible to this date.

THE CATALPA SPECIOSA.

There is such a close resemblance between the various forms of Catalpa, both those of Asiatic origin and the American trees, that a close study of the variations has not been made until quite recently.

The fact that the two principal forms indigenous to the United States are so similar in many of their characteristics, and the hybrids are so numerous, make

it a difficult matter even for experts to determine precisely where to place them botanically, except when they are in flower.

It is not strange, therefore, that early botanists failed to discover and describe *Catalpa speciosa*.

In 1818, Thomas Nuttall had heard that there were two varieties of catalpa, but he had never seen *speciosa*. The southern form, *Catalpa bignonoides*, has a great range, being found upon hills as well as river bottoms throughout most of our southern states, while *Catalpa speciosa* was confined to a very limited tract along the overflowed lands of the lower Wabash river, apparently distributed solely by the backwaters up the nearby creeks, and down the Ohio and Mississippi rivers, as far as New Madrid, Mo. In Southeastern Missouri the two forms meet, both being found growing together with many hybrids. The beauty of the flowers has alone prevented the extermination of the *Catalpa speciosa*. Its extremely valuable character was known to the earliest settlers of the Northwest Territory and to the Indians before, and as the tree does not easily propagate in nature, and the demand was great for durable timber, the original forests were practically destroyed. Gen. Wm. H. Harrison and a few other enter-

prising pioneers carried the seeds and trees to distant points for ornament and shade. Some of these stocked the home of General Harrison, near Cincinnati, and the surrounding country. From these early plantings others have been distributed through the United States, until specimens of the Catalpa are found in every state, as well as Canada and Mexico. Probably the greatest number of large trees in the United States are about Cincinnati, Ohio; North Bend, Ohio, the home of General Harrison, being but 19 miles distant. This was also the home of Dr. John A. Warder, whose interest in the Catalpa was very great, and who described and named the large growing variety *Catalpa speciosa* in 1853.

The state of Kansas has a larger area of land planted in Catalpa than any other

state, and there are more and larger nurseries producing the trees in that state than elsewhere.

In 1586 the remnants of Sir Walter Raleigh's first colony, on their return to London, took with them three valuable American products—the potato, tobacco and a Catalpa tree. Raleigh gave the tree to Sir Francis Bacon, who planted it in the garden of Gray's Inn, which at that time was the resort of scholars and the nobility of England. The tree is still alive, or was recently, but in a decrepit state. As this tree was from Virginia, now part of North Carolina, it was doubtless bignonoides.

Thus we see what an interest has been manifested in this American tree for more than three hundred years.

To Railway Directors, Stockholders and Officers.

The object of this manual is to present, in a concise form, some of the problems in reference to Railway Cross-ties: What material shall be used? The probable cost, and where shall they be obtained?

Good white oak has become too valuable to justify its use for ties. [Note.—There are 45 feet, b. m., in a medium tie, which for furniture lumber is worth \$1.80, three times the price of cross-ties.] Only the larger limbs, defective portions and small trees are made into ties. The average life may be estimated at seven years.

Tamarack (American larch), white cedar, chestnut, pine and redwood are used near the localities where they grow. The characteristics of each are well known to Engineers of Maintenance of Way.

Each year the price is advancing as the forests decrease in extent, while railways not favorably located experience increased difficulty in obtaining a supply.

METAL TIES

have been devised in countless numbers; some have been used upon European lines with apparent success, but they are costly, from \$2 to \$4 each, reaching about \$9,000 per mile, as against \$1,500 for white oak.

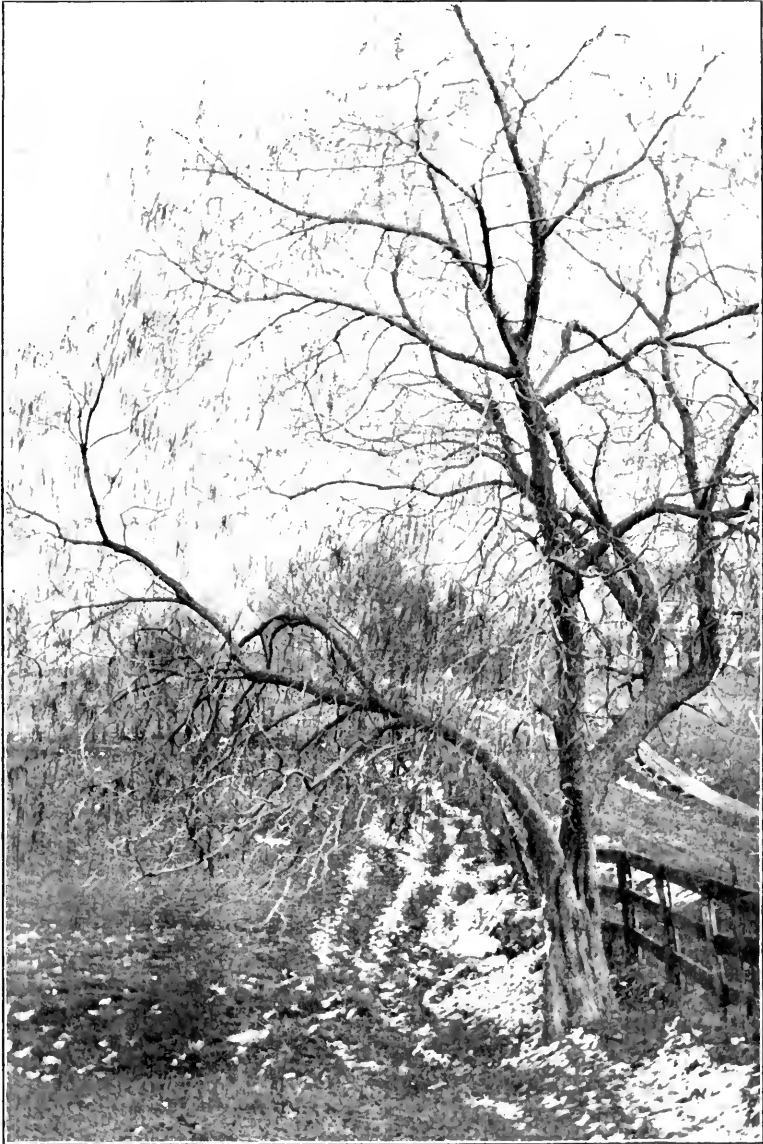
Were all American railways as straight

as those of Europe, with their minimum grades, and as substantially constructed, metal ties would not be objectionable, save for their expense; but none of these conditions exist.

Given a mountain railway with abrupt curves, often reversed, with the outer rail elevated, a heavy freight train with half a mile length, an engine at each end or a double header: What engineer can compute the complex forces exerted against the rails in many directions as successive portions of the train are forcibly thrown from side to side? [Wooden ties are elastic; every spike is held in place by a cushion of wood fibers, every strain and blow being reduced by their elasticity.] How will it be with 100 pound steel rails, rigidly bolted to inflexible metal ties, with these forces pounding continually?

Accidents from broken rails and fastenings must reduce profits materially; and when they occur the slow process of unscrewing nuts, replacing rails, ties and bolts can only result in tedious delays and great expense.

It would seem, therefore, that wood is far preferable to anything else so far devised for cross-ties; but wood is rapidly disappearing and trees must be grown for supplying this need.



CATALPA BIGNONOIDES, CINCINNATI, O.

This is a type found in every locality and from it the popular conception of a Catalpa tree is formed.

THE CATALPA TREE—ITS IMPORTANCE IN
COMMERCE.

Catalpa wood has so many excellent qualities to commend it for railway uses that a third edition of this pamphlet has been prepared.

Catalpa, the name given by the Aborigines. There are at least two varieties indigenous to the United States, and others from Asia.

CATALPA SPECIOSA. Warder. A large tree, 60 to 80 feet high, becoming from 2 to 7 feet in diameter, indigenous to the lower valley of the Wabash river in Indiana and Illinois, seemingly preferring the overflowed alluvial lands. As freshets occurred the seed pods were distributed along the Ohio and Mississippi Rivers, forming limited groves in Tennessee and Missouri. Unlike tree species which have edible nuts or fruits, although its seeds are winged, the distribution of the *Catalpa speciosa* was not aided by birds or animals, being almost entirely scattered down stream by water.

The beauty of the flowers, quick growth of the tree, admirable shade and the extreme durability of the wood, have combined to cause the dissemination of the *Catalpa* to all portions of the United States. It has proven to be hardy south of lat. 44, and also capable of adjusting itself to the soils, location and conditions within the above limit.

In California, Nevada and Utah, and upon the sandy semi-arid plains of the West, it has been grown successfully, and promises even there to be a profitable investment under irrigation.

The flowers are large, two inches in diameter, and two weeks earlier than the variety from the South, which is described elsewhere.

The tree has a naturally upright habit. The bark is deeply furrowed, somewhat like an ash, the ridges extending up and down the trunk. Leaves are heart-shaped, large and never have more than one apex. Seed pods thick, heavy, twelve to fourteen inches long, three-fourths of an inch in diameter. Seed is winged, and while quite different from other *catalpas*, can with difficulty be distinguished when mixed with other varieties.

Bignonoides, common in all Southern

States and cultivated in most states of the North. This tree is of small growth, crooked, and seldom forming a well-shaped tree. Prof. Austin C. Appgar, in *Trees of the Northern United States*, describes the flowers as much spotted with yellow and purple, the lower lobe entire, pod thin, while *speciosa* has flowers two inches long, nearly white, faintly spotted, the lower lobe notched, pod thick.

Unfortunately a large majority of *Catalpa* trees in the United States are of this worthless variety, and it is of greatest importance the large growing tree should be secured.

The habit of this tree is spreading; flowers smaller than *speciosa*; pods thinner and of less diameter; bark is broken into scales, much resembling wild cherry; seed easily gathered by inexperienced persons, which has caused it to be largely disseminated. Many leaves are three pointed. There are many hybrids, all of which are inferior to *speciosa* for forest growing.

HYBRIDS OF CATALPA.

The difference in time of blossoming of the American *Catalpas*, *speciosa* usually blooming two weeks before *bignonoides*, has caused some high authorities to think there could be no hybrids. But there are innumerable mixtures, some partaking more of the habit of one parent than the other—some closely resemble *speciosa*, others follow after *bignonoides*, or *Kempferi*, if the latter has been planted near.

On the old Harrison homestead at North Bend, Ohio, in the spring of 1901, I found one tree of *Kempferi* and many of both *speciosa* and *bignonoides* in bloom on the same day, *speciosa* being at the close of its season, the others at the beginning of their blossoming period. Insects were flying from tree to tree, carrying pollen.

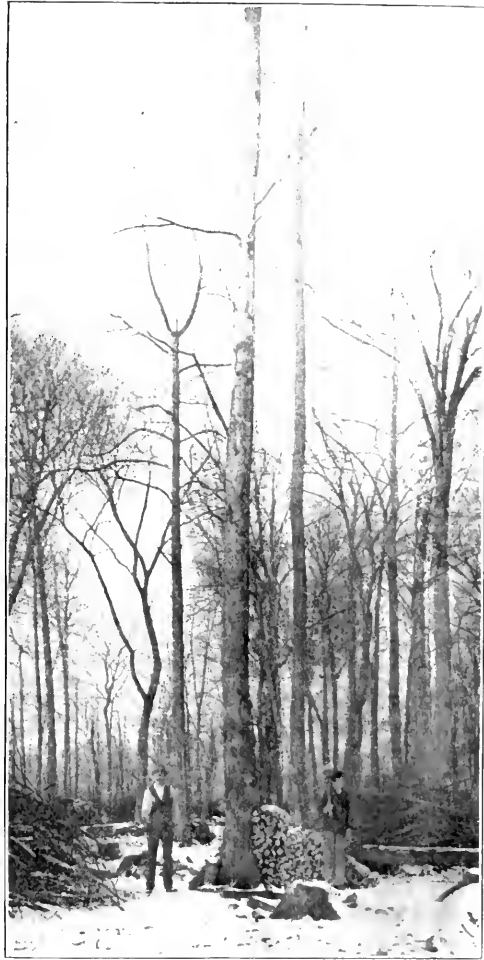
Hundreds of smaller trees nearby, now in bloom, had various characteristics of the three forms.

The rapid disappearance of the American forests, the advancing prices of lumber, with increasing difficulties experienced in a supply for commercial uses, as well as the struggle among competing



A LOUISIANA CATALPA.

Six miles below New Orleans on the Mississippi levee; 30 inches diameter; 90 feet high.



HOW CATALPA SPECIOSA GROWS IN THE NATURAL FOREST.

Edwards County, Ill. The principal tree is 20 inches diameter and 100 feet high.

railways to secure enough cross-ties for the maintenance of a safe track, bring prominently to every consumer of wood the question: *What shall we do for timber in the future?*

It has been the custom to take the oak, a tree which is slow to develop, as a standard by which to measure every forest growth, and thus impatient Americans are discouraged from forest planting. However, in the Catalpa we have a tree combining many of the qualities of oak, besides possessing several features of great value unknown to the quercus family, and, withal, coming quickly to maturity, producing merchantable sawing timber and several cross-ties in from fifteen to twenty years.

The Indian tribes who dwelt in the Valley of the Wabash, or traversed this region, sought such trees as could be easily wrought with their rude implements, and those which were most enduring, from which to fashion their canoes, and the Catalpa was their favorite wood.

Usually those woods which are dense, and slow to mature, have great durability, while the quick growing trees with softer wood, soon perish. The reverse is the case with Catalpa, its chemical constituents being permanent antiseptics preserve the fibers from decay.

The early white settlers in the Valley of the Wabash were instructed as to the valuable qualities of the Catalpa and they made use of it in constructing their houses, boats and stockade forts, which have endured through more than a century.

General William H. Harrison often spoke of the Catalpa and urged its cultivation, since he had known of its many valuable qualities during his residence at Vincennes. He had seen this wood sound and bright more than a century after it had been placed in the stockades, and he used Catalpa for posts in his fence ninety years ago, some of which are still standing.

The writer procured one of these posts for the New Orleans Exposition in 1885; it was sound and good for many years' additional service.

On the line of the Evansville & Terre

Haute Railway I found a large number of Catalpa posts which were set fully half a century ago, and are still in use.

Evidences of the durability of Catalpa wood are numerous and convincing.

The earthquake at New Madrid, Missouri, in 1811, threw down many Catalpa trees and others were killed, but left standing. These were sound and well preserved a few years since—as mentioned by Mr. Barney in his book.

WHY CATALPA IS DURABLE.

Trees have the capability of appropriating from the soil such pigments as will give them color, flavor or other peculiarities. Upon the same soil one tree will take up such materials as will produce a red apple, another green, another yellow. The hickory stores up a valuable dye, etc. The Catalpa takes those antiseptic substances which, in concentrated form, resist the microbes of decay. These are built into the fiber wood, and when once dry are incapable of solution in water. Millions of dollars are expended in chemical treatment of wood to increase its durability. These chemicals, in solution, are forced into the cells of the wood, and for a long period ward off the fungii which cause rot or decay, but, in time, the elements dissolve and wash out these artificial materials, leaving the wood unprotected.

Catalpa is permanently protected because nature has enabled the tree to make these antiseptics a part of the wood itself. Scientists have expended much time in attempting to explain why some Catalpa trees are decayed while still living. It is simply that when the sap is flowing freely, the antiseptic materials are greatly diluted, and, if a limb has died and remains attached to the tree, the dead wood shrinks away from the living wood built around it, admitting water and air, and with them the germs of decay which successfully attack the wood at such time.

A chisel, broad and sharp, upon a long handle, removes branches close to the trunk, smoothly; they soon callous and heal over, thus preventing the decay mentioned.

ANALYSIS OF CATALPA WOOD BY J. N. HURTY, M. D., PH. D., ANALYTICAL CHEMIST.

Indianapolis, April 2, 1909.

Sample furnished by J. P. Brown.

	Per cent.
Moisture	13.97
Ash	0.72
Petroleum ether extract	0.35
This extract was of a light yellow color and very faint fat odor. It was free from glucosides, alkaloids, free organic acids and chlorophyll.	
Ether extract	0.36
The ether extract had a light brown color, resinous appearance and slight aromatic odor. It contained no chlorophyll, alkaloids, glucosides or organic acids. It seemed a resin.	
Alcohol extract	4.06
This extract had a dark brown color, woody odor. It contained a glucoside, no alkaloids, no tannin. Contained resinous matter.	
Water extract	3.67
This extract was of dark brown, almost black color, faint aromatic odor.	
Lignin, cellulose, etc.....	76.87
	100.00

Remarks.—It is probable that the fat and the resinous matters are the preservative in Catalpa wood.
J. N. HURTY.

MANAGEMENT OF CATALPA PLANTATIONS.

TWO ADVERSE THEORIES.

Almost every artificial forest plantation in America has been made upon the old theory that side branches of trees must be eliminated by close planting; that forest conditions must be maintained by the dense shade of many trees. Such is the theory adopted by the United States Forestry Bureau in a recent report.

The majority of such plantings has been at 4x4 feet distant with but comparatively little thinning.

We now have in consideration the Catalpa tree which, when once established, is a remarkably strong, vigorous, growing tree. At 4x4 feet distance, or 16 square feet surface for each tree, the roots will occupy all the ground in two years after planting.

In four years there will be a struggle for existence among the roots and a corresponding decrease in vitality and power to produce an efficient top.

Forest conditions are thus maintained at the expense of wood growth. Every plantation so made has been a failure and always must be.

The theory adopted by ARBORICULTURE is directly opposed to this.

A strong root system must be developed and ample room given the trees,



A DECAYED CATALPA TREE.
Caused by persistent dead branch. See page 126.
"Decay of the Catalpa."

so that the vital part of the tree, and which is never seen, being beneath the ground, shall have room to expand and gather strength for the support of the tree.

In the native forests of Catalpa the trees are tall, straight, with few branches along the trunk.

This is nature's method of reproducing a forest of Catalpa: When a tree is felled, a shoot from the stump, having the force of the entire root system, quickly springs up into a tall, strong branchless stem, in a few years becoming a full-grown tree.

ARBORICULTURE, following after nature's method, recommends the development of a strong root system, regardless of the irregular growth of the top during two or three years, after which the stem is cut off at or near the ground while the tree is dormant.

The upright stem results; all surplus buds that start should be removed, leaving but one, the strongest.

The distance, 16x16 feet, seems to be the most satisfactory for a permanent plantation—170 trees per acre. But in order to occupy the ground, prevent injury by winds and properly shade the ground, four times as many trees are planted, or 8x8 feet, being 680 trees to the acre.

As soon as these have attained a suitable size, in seven to ten years, the temporary trees are removed and used for fence posts, mine timbers and other uses.

The rapidity of growth will depend upon the character of soil, length of season, cultivation given during the first three years, and moisture obtainable.

Shade and forest conditions, so called, secured at the expense of root vitality, will not compensate for loss of vigor and absence of good cultivation during the first three years. After first year cultivation should be very shallow.

Branches of Catalpa are very persistent. They do not fall away when dead, but remain as dead pins. Each annual growth of new wood encloses them until, as the tree becomes mature, these dry sticks lead from the heart of the tree to its circumference. Shrinking away from the surrounding wood a cavity is formed,

into which air and water find their way and carry germs of decay.

The Catalpa must be hand-pruned if one's bank account is to be benefited.

The best instrument for this purpose is a three-inch sharp chisel upon the end of a long pole. An upright thrust, or a slight blow with a mallet, removes the limb close to the tree. This soon becomes calloused over and covered with new wood.

No branch along the trunk should exceed two inches in diameter before removal.

On prairies a thick hedge of Russian mulberry will protect the growing trees from wind and furnish food for birds.

On the grounds of Mr. J. L. Ebner, at Vincennes, Ind., I found a Catalpa speciosa which had grown from the stump of a small tree, probably four inches in diameter. It was sixteen feet in height, and so straight and symmetrical that I employed a photographer to take a picture of it.



SIX MONTHS' GROWTH FROM A CATALPA STUMP.



AN INDIANA CATALPA SPECIOSA.

Showing habit of growth. No necessity for crowding.

A tree grown in the streets of Connersville, Ind., was given the writer. It was made into a desk by the Rowlett Desk Company and polished by the Connersville Furniture Company. This was exhibited in the State House at Indianapolis for two months, being pronounced the handsomest desk in the state.

It is now used in editorial office of ARBORICULTURE.

The tree grew in twenty-five years, becoming twenty-two inches in diameter and having 250 feet b. m. lumber.

The late E. E. Barney, the veteran car builder of Dayton, Ohio, who was one of the best judges of timber in America, took a very great interest in the Catalpa, having published an exhaustive pamphlet, which is now quite rare, giving the results of his investigations, experiments and correspondence, upon the subject.

Many railway officials in early days experimented with Catalpa trees, the testimony of several being quoted in this booklet. Mr. Barney spent several thousand dollars in painstaking research and demonstrated the value of this wood to railway interests.

The late Robert Douglas of Waukegan, Ill., also expended a large sum in similar investigations and was thoroughly imbued with the importance of the Catalpa to commerce.

URGING UPON THE GOVERNMENT AND CORPORATIONS THE PLAN OF EXTENSIVE PLANTATIONS OF CATALPA.

The late Dr. John A. Warder made the subject one of deep study, advocated the growing of this timber and planted many Catalpa trees.

Mr. H. H. Hunnewell, a wealthy gentleman of Wellesley, Mass., planted a square mile of Catalpa timber near Farlington, Kan., Robert Douglas & Son contracting to furnish and plant the trees—2,000 *per acre*—or one and a quarter million trees. The planting began in 1879, Mr. Hunnewell at that time being 65 years of age.

Unfortunately this experiment has been a total failure on account of entire want of attention. After twenty-two years the trees are but little larger than they were when six years old—as Mr. Robert Douglas' report shows, 2,000 trees per acre cannot develop. (See page 209.)

In a state of nature, where time is no object, a thousand years as but a day, a long struggle takes place between the stronger and weaker trees, both robbing the others; eventually a sufficient number succeed by destroying the remainder.

Where dollars are the object and time of great importance, as in an artificial forest, these surplus trees should be destroyed after the object of close planting has been attained, namely, an upright trunk free from side branches to a great

height. Otherwise the moisture and nutriment required by the permanent trees will be divided and none receive enough. From a report made by Mr. Douglas in 1885 many of the trees, six years old, measured 18 inches girth. While from sheer neglect and overcrowding there has been a serious loss in subsequent years.

I have personally measured a large number of Catalpa trees in Kansas, Nebraska, Iowa, Missouri, Illinois, Kentucky, Ohio, District of Columbia, Utah, California and Indiana, taking trees of known age, and they have averaged one inch diameter increase for each year after planting.

The Pennsylvania Railroad Company planted on its line between Richmond and Indianapolis a large number of Catalpa trees, part of which were speciosa and other, bignonoides, or southern form. These were allowed to grow at random in a *blue grass sod*. They have been cut back often to prevent interference with telegraph wires, and a majority are worthless, from neglect. Yet I measured several that were 48 inches girth after 16 years' growth.

If these trees could be cut down, allowing one shoot to grow from the stump, they would in five years produce valuable, straight, thrifty trees of which the company would be proud.

One tree in Minifree Comty, Ky., planted in 1840, has a spread of 80 feet diameter, the trunk being 15 feet circumference.

Mr. L. W. Yaggy is the owner of a large farm near Hutchinson, Kan., on 500 acres of which are growing Catalpa trees; 13,000 posts were cut in 1868 after eight years' growth, selling for \$1,300.00, leaving the remaining trees close enough for perfect development. Mr. Yaggy considers this a very profitable investment.

A writer speaking of the value of Catalpa ties and lumber, says: "Notwithstanding it makes a durable tie, the wood is entirely too valuable for that purpose, as the lumber—40 feet b. m. in a tie, is worth \$2.00 to \$3.00. In fact there is no lumber grown in the United States that is more valuable. It takes a finish equal to San Domingo mahogany."



CATALPA SPECIOSA AT HUTCHINSON, KANSAS
18 years' growth—60 inches girth; 35 feet high. Numerous trees of Kempferi in the distance

Several Catalpa cross-ties were placed in the C. C. C. & St. L., Cairo division, in 1879, one of which was taken out last summer (1899), having been in constant use for twenty years.

Mr. J. W. Cowper, engineer maintenance of way, officially reports of this tie as follows: "This Catalpa tie, taken out of the track three miles north of Harrisburg, was put in in 1879, in mud ballast. The wood is perfectly solid, showing very little signs of decay. * * * With tie plates and good ballast, those ties would, I think, without doubt last fully thirty to thirty-five years."

Mr. Cowper furnished the author with a half of this tie, who had part of it sawed into boards and a frame made and finished to determine its value as a furniture wood.

In appearance it resembles white walnut, *Juglans cinerea*, also similar in texture. It is as easily wrought as white pine; the polish which it receives places the Catalpa upon a plane with walnut, cherry and our finest cabinet woods.

Suel Foster, Muscatine, Iowa, cut a tree of his own planting, at 20 years from the seed; it measured 21 inches across the stump.

STRENGTH OF THE CATALPA.

It has been customary for farmers where this tree abounds to use the young poles for repairing agricultural implements, where strength, combined with lightness and durability, was desirable. Plow beams, single and double trees, handles of various tools have been made, continuing long in use, where oak had been broken.

I saw a three-horse evener in Kansas, made from a four-inch Catalpa pole, which was being used for the third season, serving the purpose admirably. Two eveners of oak had been previously broken in the same service—proving the practical utility of the Catalpa.

The immensity of the demands for timber by railroads may be realized from the following figures:

There are in use to day.....	780,000,000 cross-ties
Annually required for renew-	
als.....	112,000,000 cross-ties
Expended annually for ties.....	\$60,000,000
Number required during the	
next two decades.....	3,000,000,000 cross-ties



A CATALPA BOARD WELL TRAVELED. Having been exhibited to railway officials in all the great cities of America.

Where shall they be obtained? Of what will they be made? What will be their cost? These are pertinent questions but are capable of intelligent solution.

The Catalpa tree will make the ties, in sixteen years growing to a size that will make five cross-ties, which will last for thirty-five years.

Upon almost every railway right-of-way may be growing 640 trees to each mile of track, omitting the inside line of curves, but planting one row of trees upon each side the track, and 40 to 50 feet from center, trees one rod apart.

In sixteen years this will provide 3,000 ties, being enough to relay the mile of track.

Since the Catalpa renews itself from the stump, when cut, and the young shoots grow very rapidly with the well-established roots to support the new growth, the trees would be permanent, and fully supply all requirements for ties, fence posts, telegraph poles and lumber.

By cutting a portion each year the avenue would remain unbroken.

An avenue 1,000 miles long! As many railway lines are of much greater length than this, it would be one of the happiest views which America could possess.

Transportation of ties for long distances now constitutes a large portion of the cost. This may be entirely eliminated by growing them where they are to be used.

One year old trees are always used in forest planting, and these may be had at from \$5.00 to \$10.00 per 1,000 trees.

Directions for planting Catalpa: The utmost care should be observed in obtaining the hardy western Catalpa speciosa. Unless it is specially desirable to start with the seed, by all means purchase one-year plants.

In growing plants the seed should be drilled in nursery rows about 25 or 30 per foot, with rows 4 feet apart, covered very lightly, kept clean from grass and weeds, and transplanted the first year. There are 10,000 seeds to a pound.

Thorough cultivation is essential. In the autumn when the wood has ripened they are taken up, tied in bunches of 100 and heeled in for the winter. In spring,

with the ground well prepared, furrow out deeply rows eight feet apart, and plant trees eight feet in the rows, the intermediate spaces being cultivated in potatoes, corn, or some non-vining vegetable. Neither weeds nor grass should be permitted to grow, a sod of grass will quickly ruin the Catalpa. The trees will thus form tall upright trunks, with few side branches. After the fifth year the shade and falling leaves will protect the tree, without further cultivation; it may be sooner. By the eighth year all trees should be removed except the permanent stand, not closer than 16x16 feet, in order to give room for the roots and each its share of moisture. This will give 170 permanent trees per acre.

The *cost of planting* will vary according to local conditions. The land should be such as would produce a fair crop of corn.

ESTIMATE PER ACRE.

Value of land, say.....	\$20.00
Preparing the land	5.00
680 trees, 8x8 feet.....	5.00
Labor, planting and cultivating...	5.00
Interest and taxes, eight years...	40.00
	—————
	\$75.00

At eight years three-fourths the trees should be removed, leaving permanent trees 16x16 feet or 170 per acre.

Each tree removed will supply two first-class posts worth 10 cents each.

Five hundred and ten trees removed make 1,020 posts, worth \$100, being original cost with total expenses, leaving the plantation fully paid, including twenty years' interest and taxes.

The remaining 170 trees will, by twentieth year, produce 850 cross-ties worth, at 60 cents, \$510, or 250 feet lumber per tree, 42,000 feet b. m., which, at \$20 per 1,000, is \$850.

The value of the land having been greatly improved, and a permanent income assured from the continued growths (as the trees are quickly renewed from the stumps) equal to a capital investment of \$1,000 at 8 per cent interest.

Cost will vary with location and management.



RIO GRANDE WESTERN RAILWAY PLANTATION.
Two years' growth, irrigated. Provo, Utah. Trees 16 to 18 feet high.

EXTRACTS FROM MR. BARNEY'S PAMPHLET,
PUBLISHED 1876.

Communication to the *Railway Age* by James M. Bucklin, C. E., an engineer on the Miami Canal in 1826: "The importance of the Catalpa has for a long time impressed itself so strongly on my mind that I have repeatedly, for the last forty years, urged upon railroad companies the great advantage to be derived by them from the propagation of these trees in large bodies. * * * The Board of Public Works of Illinois in 1835 ordered me to select lands for that purpose on the routes of the various railroads in process of construction, but the system was not carried out.

"The employment of so durable a material would prove as beneficial as the use of steel in point of economy in the maintenance of railroads, and would dispense with the enormous cost of labor in constant replacement of wood.

"In 1828 while Captain Smith, U. S. A., and myself were exploring the obstruction of the Wabash river, we unexpectedly discovered a lofty forest of Catalpa of large size at the mouth of White river, below Vincennes, Ind. In 1866 I found it in large bodies and of enormous height and size, three and four feet in diameter, and fifty feet without a limb, near Poplar Bluff, Mo., on the route of the Iron Mountain Railroad. Throughout that region the peculiar value of the tree is well known for its durability and other qualities. Canoes are made exclusively of Catalpa, they never crack in seasoning, or rot. Henly, the ferryman at Poplar Bluff, had a canoe, perfectly sound, three feet across the gunwales, in use twelve years. The tree has been extirpated from the great demand for posts all over the country."

COMMUNICATION FROM A PROMINENT OFFICIAL OF THE IRON MOUNTAIN RAILROAD—TO THE *Railway Age*—1876.

"The Catalpa tree is well known and appreciated by our officials. It is beyond question the most durable of all species growing in this country, except, perhaps, the cedar. There are miles of fencing built years ago by the company with

Catalpa posts, none other now being used. A limited supply of ties and telegraph poles were secured.

"In 1871 William R. Arthur, Superintendent of the Illinois Central Railroad, stated that the Catalpa would make a tie that would last forever; that it was easily cultivated, was of rapid growth, they would hold a spike as well as oak and would not split.

"The Farmers' and Planters' Encyclopedia says the rapid growth of the Catalpa in almost every situation and the adaptation of its wood to fence posts and other useful purposes, make it deserving the attention of farmers. The wood, though light, is very compact, of fine texture, and susceptible of the most brilliant polish, is fine straw color, producing a fine effect in cabinet work and inside finish of houses.

"A railroad once tied with Catalpa will find its annual expenses for repairs diminished \$200 per mile, a saving that would add ten per cent to the value of the property.

"E. E. BARNEY."

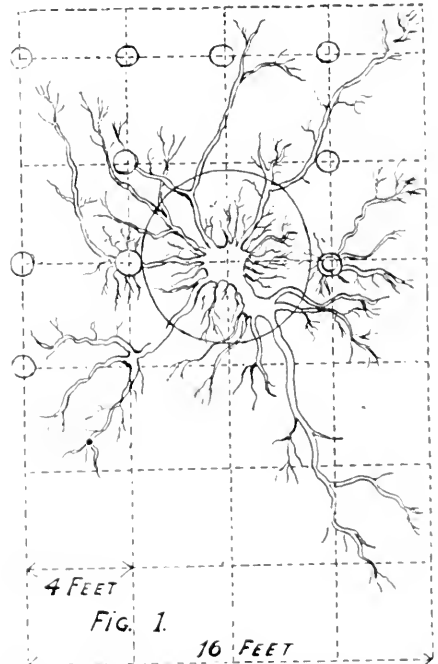


FIG. 1.
ROOT SYSTEM OF A FOUR-YEAR-OLD CATALPA TREE, OCCUPYING ONE HUNDRED SQUARE FEET SURFACE COMPLETELY.

PROF. T. J. BURRILL, OF ILLINOIS INDUSTRIAL UNIVERSITY, SAYS:

"While collecting specimens of the trees of Illinois, for the Centennial, I found some boards sawed from a Catalpa log two feet in diameter that was known to have lain on the ground one hundred years. The wood is still sound and susceptible of a fair polish."

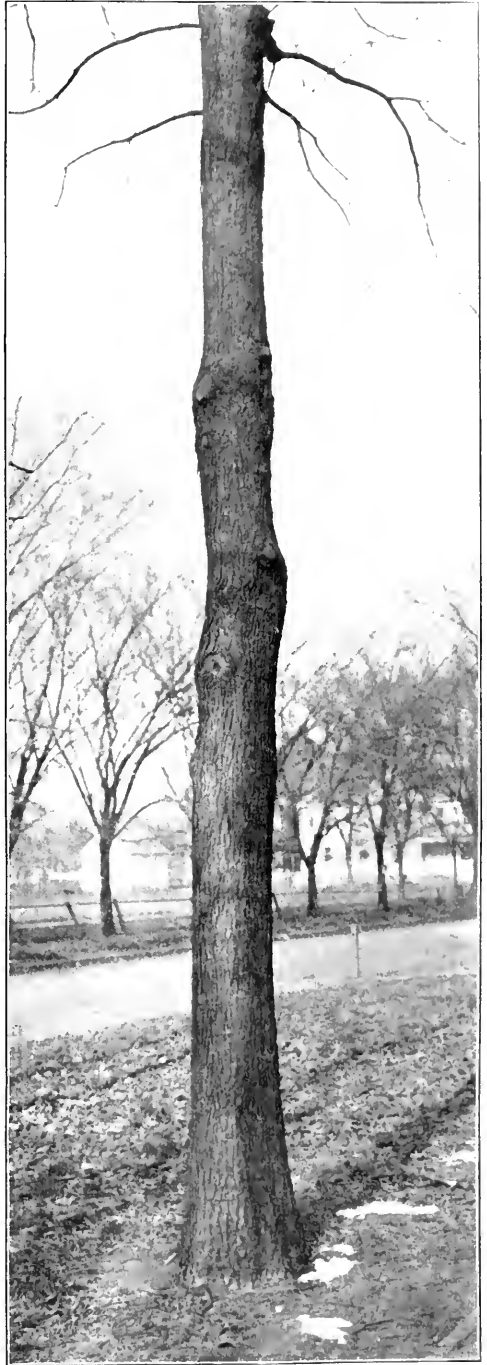
The theory held by eminent authorities of early times, that artificial plantations of forest trees should be as close as 4x4 feet in order to induce upright growth and to eliminate lower branches, has proved a failure everywhere. The Catalpa is so strong a grower, making enormous demands upon its root system which cannot develop and so dwarfs the tree.

Oriental gardeners grow oak trees in tiny flower pots, by a process of starvation. American planters have been equally successful in producing 2,722 tiny fence posts by similar process, in two decades, upon an acre of land.

Nature, in the course of time, will kill off the weaker, and leave a proper amount of space to the remainder, but capital invested in forests demands quicker returns, and a more rational method must be employed in planting if we expect financiers to invest money in growing trees.

In Kansas alone one million dollars has been lost through this erroneous over-crowding of trees. There is not a forest in existence which has become a success where planted 4x4 or even 6x6 feet, unless severely thinned within 8 or 10 years.

The Farlington, Kan., plantation of 1,200 acres, planted in 1879, should at this time be producing cross-ties by the hundred thousands, yet its failure is most complete. No ties will be produced in half a century without radical change in management. In 1885, when six years old, Mr. Douglas reported that these trees were 18 to 21 feet high, 12 to 18 inches circumference. They have not grown as much in the 15 years subsequently; very many are no larger than in 1885. Neither water nor food can be secured to sustain a growth.



CATALPA SPECIOSA AT TOPEKA, KANSAS.

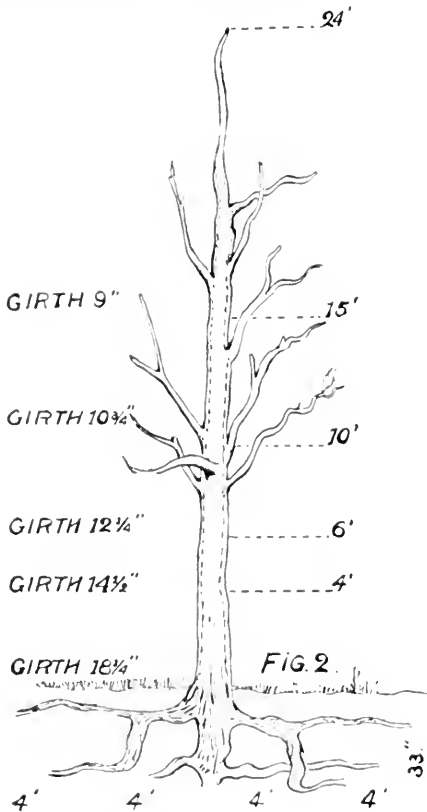
Twenty years from seed, twice transplanted; height, 45 feet; diameter, breast high, 14 inches.

On the contrary, thousands of *Catalpa* trees in Topeka and throughout the United States have attained to great height; and a diameter of one inch for each year of growth, when given ample room.

Eight feet each way is proper distance, and after three years' growth, with strong roots secured, cut off the tree at the ground. A 12-foot straight growth will result the first season and good trunk will be assured. After seven or eight years intermediate trees must be removed for posts, etc., leaving permanent trees not less than 16 feet apart.

The cuts represent a four-year *Catalpa* which I had dug, measuring every root and branch. Soil, heavy clay. One root 12-inch girth extending 15 feet, others 8 to 12 feet. Total length of roots, 1 to 4 inches diameter, was 114½ feet.

When our four-year tree requires 100 square feet of space, filling it with root-lets, what root growth and consequent wood growth can be expected with trees having only 16 feet space?



Good cultivation and the occasional use of the pruning knife are necessary if financial returns are expected from forest planting.

CROSS-TIE RENEWALS.

The cost of railway cross-ties does not end with their purchase nor yet with their transportation. Each year there must be dug out, removed and destroyed by burning, one-sixth of all the ties in every railway; these must be replaced with new ties. This is an enormous expenditure of labor and money which would be greatly reduced by the use of *Catalpa* ties—only one-thirtieth of the ties would require renewal each year; one-sixth of the present expense.

TELEGRAPH POLES.

Railway companies and telegraph lines, as well as telephone companies, will be interested within a few years in any relief from the enormous expense of procuring new poles.

No tree offers the same inducements to planters for such poles as the *Catalpa*. In sixteen years better poles may be grown than are now used by any corporation.

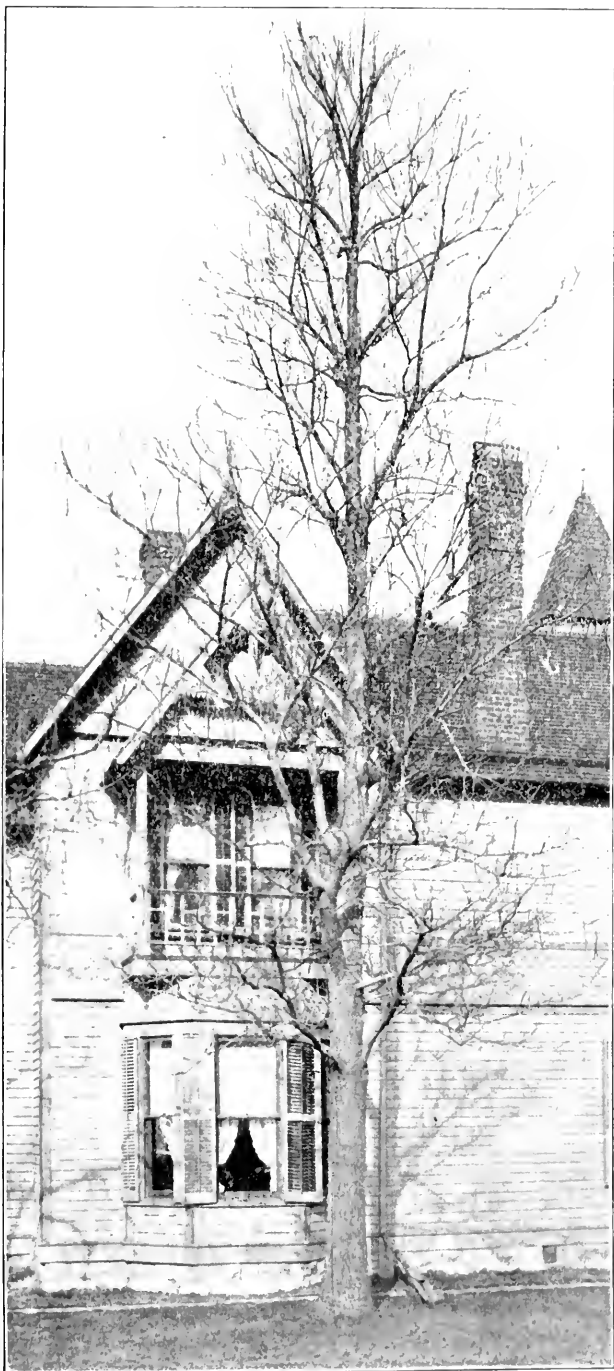
The white cedar, which is now used, has been from eighty to one hundred years struggling for an existence, while red cedar is of still slower growth. The expense of iron poles precludes the use of metal for long lines outside the cities.

MINING TIMBERS.

The enormous quantity of wood used in supporting the roofs of mines in the United States, which must be renewed frequently, demands the attention of mining engineers, investors and statesmen, as to what shall be used in the near future.

Even now, many of the coal and other mines are transporting timbers hundreds of miles. The durability of *Catalpa* wood under similar situations, and its rapid growth, commend it for this purpose. It has ample strength and resists the germs of decay completely.

While metal may be desirable to replace wood in mining operations, yet the cost of metal must be so great as to induce the planting of *Catalpa* timber for this use.



ONE OF TOPEKA'S FINE CATALPA TREES.

Note the upright character. It is now a fine shade tree, but for forest the branches should have been removed. Age 20 years.

Where the Catalpa Grows.

During the Nineteenth Century the Catalpa has been largely distributed. In some instances it has been disseminated by enthusiasts who, having learned the high value of the timber, have planted it in other localities. Others, admiring the flowers, have planted Catalpa trees for ornament. By these experiments we are now enabled to determine the range to which the Catalpa is adapted.

There is no record in history of any tree which, originally confined to so small an area, has an adaptability to so universal a range of soil, climate and locality as *Catalpa speciosa*.

Seed sent to New Zealand by the International Society of Arboriculture has produced many hundreds of trees and attracted the attention of the Dominion Government.

A limited number has been planted in Europe, but throughout America we find the greatest quantities.

Almost invariably where *Catalpa speciosa* has been planted it has proven successful, and as positively where *Catalpa bignonioides* and *Catalpa kempferi* are found they are seriously disappointing. The almost criminal carelessness of seedsmen and nurserymen in selling millions of these inferior varieties as *Catalpa speciosa* is responsible for so large a number of scrub trees everywhere.

About Philadelphia *Catalpa* grows rapidly, although most of the trees which I found were *bignonioides* hybrids.

The earliest plantings were made near Cincinnati, Ohio, at the old Harrison home, and from there numerous seedlings have been distributed. At the home of that enthusiast, Dr. John A. Warder, are many very fine trees of *speciosa*, and also the other forms. It was here I found *bignonioides*, *kempferi* and *speciosa*, all in bloom at the same time, and a large number of hybrid seedlings also in bloom—pollen carried by bees.

In every county of Indiana and Illinois are found more or less trees, their fruit and character showing the stock from whence obtained.

In Southern Michigan the M. C. Ry-

has planted many Catalpas which are doing well.

There have been more Catalpa trees planted in Kansas than other places. The Farlington Plantation is mentioned elsewhere.

At Hutchinson Mr. L. W. Vaggy has 500 acres in Catalpa, which he considers a profitable investment. Many of the Catalpas of Hutchinson are of Oriental and southern types, and their unthrifty condition is plainly apparent. The origin of these trees is traceable to the Iron Mountain plantings in Southeast Missouri. These seeds are being collected and will probably find their way into the markets.

Judge Martin has a very nice grove, which were planted with cuttings, 7x6 feet. These range from 30 to 48 inches girth and 30 feet high in twelve years.

W. H. Underwood has several trees of ten years' growth, which measure from 31 to 45 inches in girth. Messrs. Underwood and Viles have 400 acres prepared, and have purchased 300,000 trees *Catalpa speciosa*, which they will plant this spring.

In Iowa there has been considerable progress in *Catalpa* planting.

In Nebraska there are quite large plantations at Lincoln, Omaha, Nebraska City, Brownsville, Crete and elsewhere, in which the diameter increase, one inch per annum, is maintained.

In Colorado and Utah, under irrigation, the *Catalpa* is remarkably successful where the elevation does not exceed 6,000 feet. As a general rule, in the Rocky Mountain region the broad leaf cottonwood disappears at about 6,000 feet, and the narrow leaf cottonwood takes its place, and where the cottonwood *monilifera* will grow *Catalpa speciosa* succeeds, requiring considerably less water than the cottonwood.

At Denver there are a large number of excellent Catalpas. In Colorado Springs are several very good trees. In the parks at Pueblo and at C. F. & L. Co.'s Hospital are quite large specimens.

There is no place where the prospect is better for growing *Catalpa* than Grand



THE BIG CATALPA AT PROVO, UTAH.

Near Roberts Hotel. Thirty years old, 50 feet high, 64 inches girth. An old diseased Lombardy poplar stands to the right.

Junction, where numerous trees prove their success.

As good results have been attained at Provo, Utah, as in any portion of the United States. Here are many tall, symmetrical trees, some of which are illustrated.

The Rio Grand Western planted 65,000 trees at Provo in the spring of 1900. Unfortunately a large portion were bignonoides. The difference in vigor is seen where, under the same treatment, bignonoides are from 4 to 5 feet high and *speciosa* 12 to 16 feet and 8 inches girth. The good trees will be planted at various points on the D. & R. G. system.

In California I found a number of excellent *Catalpa speciosa*, but a very large number of scrub trees scattered over the state have created an erroneous opinion of the *Catalpa*.

At the asylum at Stockton is a long row of bignonoides, which have been supposed to be *speciosa*.

In the parks at Los Angeles the same thing occurs—not one *speciosa*.

In the lower valleys of New Mexico there are a number of good trees. It will be a profitable undertaking for any who will thus supply mining timbers to this region, where they are very scarce.

In the South, where bignonoides is indigenous, *speciosa* makes a splendid showing. The long growing seasons, abundance of moisture and rich soil cause it to make rapid growth, not infrequently two inches diameter increase per annum.

There are many trees in Florida, Louisiana and Texas.

CATALPA TREES IN MASSACHUSETTS.

The superintendent of Elm Park, Worcester, twenty years ago purchased 1,000 trees, all supposed to be *speciosa*. These were in part planted in the park and quite a number remain. So far as I can learn, all the *Catalpa* trees about Worcester are from this same lot.

Of those in Elm Park I measured three which were 51, 58 and 68 inches in girth, respectively, a number of others appearing to be the same relative size. They are *speciosa*.

Some at Mr. O. B. Hadwin's home are

bignonoides, or hybrids of inferior character; besides, they have been greatly neglected.

AT PROVINCETOWN.

I find several all doing well. There is one *kempferi* in Provincetown. Captain Caleb Rich has a very fine specimen of *Catalpa speciosa*, eight years old, which is 25 inches girth. It is on the sandy lands of which Cape Cod is composed.

Captain Joseph Hatch has a small tree. Mrs. H. N. Rand has one eight years old, 20 inches girth. These are on a high hill exposed to the severe ocean blasts. Contrary to the general impression the large leaves are not injured by the constant winds of the storm-beaten coast.

On the public grounds of Boston are several *Catalpa* trees—*kempferi*, bignonoides and some hybrids. There are throughout the city several good trees of *Catalpa speciosa*.

On the estate of the late Mr. H. H. Humewell at Wellesley is a fine row of *Catalpa* trees, which have made their customary rapid growth. One large bignonoides is fifty years old; all seem to be hardy enough.

At the old witch house, Salem, is a large, crooked bignonoides, while across the way is a true *speciosa* of younger growth, planted on the street. It is an upright, handsome tree.

AT SPRINGFIELD.

In the front yard of a correspondent are three trees growing from a stump of original *Catalpa* planted thirty-five years ago, one being a foot in diameter. They are bowing and crooked, branching six feet from the ground; not much trunk to them. Seed was sent to me, which shows it to be bignonoides. I advised cutting the whole tree down and preserving one shoot from the stump.

While the tree is worthless for beauty or economic use, yet the fact that it has stood thirty-five years shows that even the more tender southern *Catalpa* is hardy in Massachusetts.

The Southern Pacific system in Texas has planted 10,000 *Catalpa* trees in various portions of that state to test the matter under varied conditions which exist in so vast a state as Texas.



A FINE CATALPA AT PROVO, UTAH.
Residence of David John: 10 years old, 38 inches girth, 40 feet high.

IN NEW ENGLAND.

In White's Park at Concord, N. H., are quite a number of fine young trees in perfect health.

At Manchester there are many of quite large size, the true *speciosa*; some are 10 inches in diameter. These were brought from Indiana.

At a point on the Maine Central Railway, in latitude 45, there is a fine specimen of *Catalpa speciosa* some 14 inches in diameter. At Rockland, Me., I found several small trees.

At Arnold's Arboretum, Boston, are quite a number of *Catalpa* trees in a very unfavorable and exposed situation, which are in healthy condition and have made fairly good growth for their situation.

At the home of Mr. Arthur J. Marble, 36 Birch street, Worcester, Mass., is a *Catalpa speciosa* seventeen years old, which is 78 inches girth at the ground, 68 inches girth at three feet height, and 72 inches girth at seven feet from ground. This tree is grown for shade, being 40 feet high, with a spread of branches 35 feet.

GENEVA, NEB.

Measured *Catalpa speciosa* 48 inches girth, 16 inches diameter, 12 years growth, 35 feet in height.

PUEBLO, COLO.

On the grounds of the C. F. & I. Co.'s hospital are several *Catalpa* trees 12 inches and upward diameter; doing well.

Catalpa speciosa trees at Audubon Park, New Orleans, La., planted in 1890, eleven years growth when measured; time of planting certified:

No. 1.—Girth one foot from ground, 92 inches; girth four feet from ground, 66 inches; girth 10 feet from ground, 60 inches.

No. 2.—Girth one foot from ground, 92 inches; girth four feet from ground, 77 inches; girth ten feet from ground, 68 inches.

By Scribner's rule a log 20 inches diameter, 18 feet long, contains 288 feet B. M.; 170 of such trees on an acre would give 48,960 feet of lumber per acre, which, in this case, New Orleans delta lands, has grown in eleven years on an average of 4,451 feet per annum.



UPRIGHT HABIT OF CATALPA SPECIOSA.
On grounds of Mrs. S. S. Jones, Provo, Utah. Pruning is unnecessary.



CATALPA SPECIOSA AT AUDUBON PARK, NEW ORLEANS.

Planted by Prof. Stubbs in 1900. In twelve years it has reached a diameter of 25 inches and a height of 50 feet. This cut also shows the cisterns used in the South.



Stop! Look! Listen!

TO THE RAILWAY MANAGER.

You are a busy man; very much depends upon your judgment in the management of your company's affairs. Details multiply! Correspondence pours in as rapidly as you can clear your table. The piles of letters disposed of to-day are followed by others to-morrow.

If, when you are crossing the tracks of some railway, and are on dangerous ground, you hear the tinkling of an electric bell which gives the warning sound of an approaching train, and see before you the notice, perhaps erected by your orders:

STOP! LOOK! LISTEN!

There is no doubt but you will at once heed the warning of the safety signal and move with caution until you are clear of impending danger.

The stockholders of your company have placed you in this responsible position. You are expected to look to their interests in all that pertains to the management of the road, to secure its safety and eventually return to them the greatest possible income for their investment.

STOP

long enough from the dictation of letters and routine affairs of your office to consider what your road is going to do for cross-ties a very few years hence; of what they will be made; where they will be obtained; what will be their cost; how long will they last, and what will be

the expense to your company for renewals.

LOOK

far ahead, and see the forests disappearing from every portion of the land, and no adequate effort being made to perpetuate the supply of timber for general consumption as well as for your company's use.

See the vast export of all kinds of lumber and timber, and the demands made upon American forests by European and African railways for cross-ties and lumber. Estimate, if you will, the vastness of the requirements for electric lines as well as for steam railways.

LISTEN

to the warning given in time and prepare for the inevitable result which must come within a few years.

ARBORICULTURE will point out practical remedies from time to time, and as every railway official should be informed of the actual condition of the forest supply, and the means for making it perpetual, will continue to encourage the planting of economic trees and a better protection to our native forests. What will you do toward the encouragement of Arboriculture? The magazine comes to you monthly and gives the gentle warning. Will you heed its signals? The train is rapidly approaching—it is nearer than you suppose—which brings the last timbers of American forests.

THE CATALPA FOR LUMBER.

A few individuals, some holding responsible government offices, predict that our lumber supply will last forever. There is a concealed object in these efforts to misrepresent the true situation and retard wholesome legislation favorable to forest perpetuation. But every lumber consumer well knows that the increased price in boards is caused by the rapid reduction of available timber supply, and that at the rate of forest clearing now going on, the years are numbered when it must become exhausted.

White oak trees, suitable for quarter sawing, must exceed 30 inches diameter. Presuming the trees to be already started into growth, it will require 100 years for them to grow into profitable lumber. Red oak will mature in somewhat less time, but it is not so valuable.

White pine in a natural forest requires from 80 to 150 years to produce logs acceptable to lumbermen. Yellow poplar, on rich soil, and under favorable conditions, may attain a milling size in 50 or 75 years.

A cypress tree four feet in diameter has been growing since Columbus landed in America.

The Catalpa, under fairly good conditions, in two decades will make a tree 20 inches in diameter, containing 250 feet lumber B. M. The trunk having but little sap wood is all available for lumber.

It compares with butternut in texture and appearance and is suitable for any purpose for which walnut and butternut are suited. In color it is a handsome shade of brown. The somewhat open grain absorbs the finishers filling, and is capable of being used for imitation of many wods, if desired, yet in its natural state it is equal to any American wood.

In strength it is ample for most purposes. Specific gravity as given by Prof. Charles S. Sargent, 0.4474. A cubic foot weighing 27.88 pounds absolutely dry.

Mr. E. E. Barney, speaking of Catalpa for railway ties, says:

"Its durability is unquestionable; it is very elastic; and, contrary to what most

suppose, it is very tough. I subjected pieces one inch square to a breaking pressure—twelve inches between supports.

Catalpa	broke under a pressure of	703 lbs
Ash	"	800 lbs
Oak	"	709 lbs
Oak	"	577 lbs
Oak	"	1141 lbs

Mean, 809 pounds.

"The Catalpa deflected three times as much as the ash or oak before breaking.

"Five thousand pounds pressure on blocks one inch square by three inches long compressed:

Oak	.....	10-16 inch
Oak	.....	10-16 inch
Oak	.....	8-16 inch
Catalpa	.....	7-16 inch
Catalpa	.....	9-16 inch
Catalpa	.....	7-16 inch
White pine	.....	5-16 inch
Norway pine	.....	6-16 inch
White walnut	.....	5-16 inch
Yellow pine	.....	6-16 inch
Black walnut	.....	10-16 inch
Black walnut	.....	8-16 inch
Ash	.....	14-16 inch
Ash	.....	6-16 inch

"These samples were taken at random, and would indicate that Catalpa will bear the pressure to which it is subjected when used as railroad ties. Two Catalpa railroad ties were placed in the track near our office five years ago, and twelve one year ago. All hold their spikes well and show no signs of mashing more than oak on each side of them, and over both of which heavily loaded trains pass almost hourly. The roadmaster, who has watched them with interest, says he has had no better ties on the line of his road."

Timber lands which have been cut over and which are not of great value, may profitably be planted with Catalpa timber, and thus prolong the lumbering operations indefinitely.

The lumber is suited for inside finish for dwellings and all kinds of furniture, especially the medium grades. As a base for veneering, it has a special value, as it neither warps, swells nor shrinks with changes of weather, while glue clings to it with tenacity.

BRIEF HISTORY OF RAILWAY PLANTING.

The high value of the Catalpa for railway uses was known to the earliest railway engineers; its extreme durability as compared with other woods, for cross ties had been proven fifty years ago. Advanced thinkers among the railway officials recognized at that time the approaching period when Catalpa would be the timber which must be used in future.

The first railway in Indiana, from Madison and Jeffersonville to Indianapolis, was largely tied with red cedar. Many of these ties are still in use as fence posts by farmers along the line. Some Catalpa was also used, but their identity was lost in changes of management, and no trace of them now can be found. These two woods were chosen because of their requiring less frequent renewals. The Iron Mountain Road passing through the Catalpa region in South-eastern Missouri, made use of all the Catalpa obtainable. Two hundred acres near Charleston, Mo., were planted with Catalpa, about 1860. Changes in officials, carelessness of the plantation managers and worse the planting of the worthless kind of trees, combined to make them a failure. It was abandoned, and used as a farm.

When the plantation was made, seed was bought in open market, a large quantity having been Oriental seed, while much was bignonoides.

From this lot of trees a thousand pounds of seed were gathered, quarter of a century ago, and distributed throughout the land. The vast number of crooked, dwarf, and worthless trees of the United States may be traced to this source, and this has given rise to the impression among many, that all Catalpa trees are of this character.

The Farlington plantation made by the K. C., Ft. S. & Gulf Ry. and Mr. H. H. Hunnewell are mentioned on another page.

About 1883 the Pennsylvania Railway planted 200,000 Catalpa trees along its line through Ohio and Indiana. This was done by General J. F. Miller, at that time superintendent of the line, General Miller being promoted, the care of the trees devolved upon others and they have

been mutilated by telegraph linemen—their value destroyed. Yet many of these trees are of size to bear out the general rule, one inch diameter increase per annum.

The Evansville & Terre Haute Ry. about the same time planted a grove at Sullivan, Ind., and one near Decker Station. Also set many trees along right-of-way. An examination of these prove them to be mostly the bignonoides.

This seems strange since *C. speciosa* was abundant in the vicinity, but this is explained by the large quantity of seed produced by low growing bignonoides, and the ease with which it may be collected, while *C. speciosa* produces very few pods, which are high in the tall forest tree and are gathered only by great labor and at much greater cost.

The grove at Sullivan is 4x4 feet distant, not cultivated, and are now, after twenty years, stunted and dwarfed and choked with briars and grass. A few trees planted *at the same time* at the station grounds are fine large trees, ten times larger than those in the grove. They have had ample room, but no cultivation.

During the lifetime of M. A. Torrey, chief engineer Michigan Central, that official took much interest in the Catalpa and several thousand were planted. There was a good growth and proved the hardiness of the trees in Michigan.

About thirty years ago the C., B. & Q. Ry. made several experiments in Western Nebraska. It seems that most of the trees were planted on the right-of-way particularly on the banks near heavy cuts, for the purpose of snow protection. As the trees increased in height the snow was collected at a greater distance than a four-foot fence would do, and the cuts were filled with snow. In this regard, they were, of course, failure, but enough has been demonstrated to prove the value of the Catalpa in Western and Central Nebraska.

Account of the Santa Fe experiment is given on a separate page.

The C., C. & St. L. Ry. in 1898 planted 35,000 Catalpa trees on one of their tracts of land near Brightwood, Ind., three miles from Indianapolis.

These were planted in the Autumn, and from carelessness of the tenants, many were destroyed during the winter by being thrown out of the ground by frost.

In the spring of 1899 others were planted—set 8x8 feet. These have been allowed to grow at will; attempts have been made to cultivate them, but it has been only partially done. The trees will be cut off at the ground during the winter and one shoot allowed to grow. The soil is of heavy black loam, rather wet, except one portion 5 acres of, a hard pan, in which no crop has ever been successfully grown: on this portion the growth has been unsatisfactory, but on the whole the experiment promises excellent results.

The Boston & Maine Railway, in Spring of 1901, planted several thousand trees, in the Merrimac Valley in Massachusetts. These have been very successful so far. They now have about 40,000 trees.

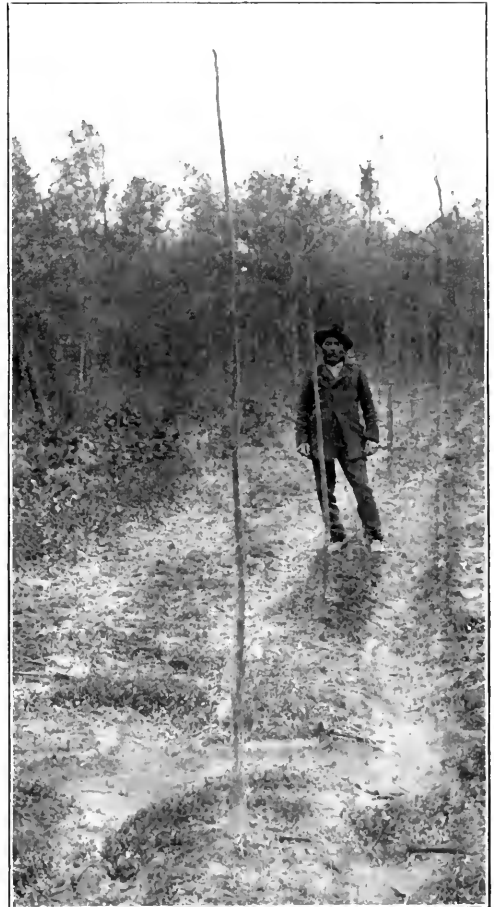
The Boston & Albany road planted at the same time some 20,000 trees, and a quantity of seed, which have grown well. They now have probably 40,000 trees near Westfield, Mass.

The Illinois Central Railway made careful investigations in regard to prospects of obtaining cross-ties by planting Catalpa trees and decided to make some experiments. A tract of 200 acres at Harahan, La., eight miles from New Orleans, was selected and 110,000 trees were planted in spring of 1902. They are now seven to nine feet in height. This location was an old sugar and rice plantation. The trees were planted to correspond with the peculiar method of laying out sugar lands in this low alluvial country. The sugar rows are seven feet apart, on ridges, deep furrows between the rows carry off the water. The trees were planted on alternate ridges, being fourteen feet apart, and seven feet distant between trees.

While the wood growth is very much greater in this warm, moist, rich land than in the North, yet the labor question and want of intelligent workmen, are against the southern plantations. The company has selected 200 acres near Du Quoin, Ill., and purchased 100,000 trees, which will be planted next spring. This

being upon coal land and in a location where there is constantly a demand for mine timbers, as well as a decreasing supply of the wood, it is believed that the trees cut out in thinning the tract will more than pay for the expense attending the experiment.

These trees will be planted 8x8 feet, expecting to thin the plantation in seven or eight years to 16x16 feet.



LEVI BUTLER.

Who has cultivated a patch of garden truck in the Harahan plantation of the Illinois Central Railway.
Tree, one season's growth, 9 feet high.



A GENERAL VIEW OF THE HARAHAN PLANTATION.
One hundred thousand trees. This view shows necessity for pruning in the south.

Theory Based Upon Error.

It seems strange that the Forestry Bureau, which is doing so much creditable work in other lines of arboriculture, should still cling to the same error which wrecked many early planters of Catalpas, that of overcrowding the trees, destroying their vigor and dwarfing beyond recovery.

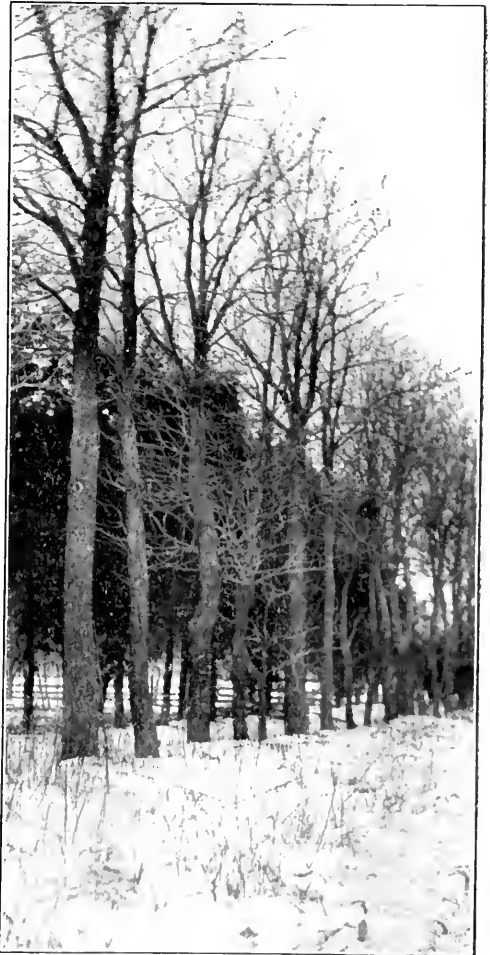
Trees have as extensive a system of roots beneath the soil as of branches and foliage above; they extend as far as the branches and often very much farther. If these are confined to a space two feet from the tree's trunk—as when planted 4x4 feet—the wood growth and visible portion of the tree must be equally constrained. It is remarkable that the Bureau cannot realize this fact, but misleads the public who are depending upon such authority for guidance.

The ancient theory that all forest trees should be planted thickly, that in their efforts to reach the light their growth will be upwards, the lower limbs being eliminated by shade and dense planting, and that gradually, "through a survival of the fittest," the stronger overcome and destroy the weaker, thus securing the space required for their development, is not nature's method in growing *Catalpa speciosa*, as may be learned by an examination of the *Catalpa* slashes along the Wabash and tributary streams. Here each tree has ample space for the extension of root and branch, and they grow upright, straight, with long body, free from branches. Often these trees grew from 100 to 150 feet in height, but there never were 2,700 trees on an acre. Not only are trees stunted and forever dwarfed by such crowding as is urged by the Forestry Bureau, but the vigor of the trees being reduced by starvation they cannot supply energy to force a rapid upright growth, and branches are formed near the ground, and being persistent they remain upon the trees after they have been killed by shading, and become encased by the new wood of the growing trees, thus forming dead knots, extending from heart to circumference. These, in time, shrink from the surrounding wood, leaving a space into which air and

water enter, bearing the germs of decay.

In the forest, when a *Catalpa* is broken down the entire strength of the root system is poured into a new shoot quickly produced from the stump, and in a short time this becomes a large upright tree.

The crooked, gnarled, inferior growths pictured by the government publication are the result of this erroneous theory of overcrowding and starving. *Two thousand seven hundred trees per acre! What folly! Four feet square on which to grow such trees as attain a diameter of seven feet, and height of one hundred and fifty feet.*



ROW OF *CATALPA SPECIOSA*.
Grounds of Charles Merrill, Edwards county, Ill. Trees
10 years old—range from 10 to 16 inches
diameter and 45 feet high.

In the Catalpa Slashes.

On January 15, 1903, I again visited the Catalpa forest in Edwards County, Illinois, a short distance from the Wash-bash River, and took photographs of a large number of native Catalpa trees which are engraved for this number of ARBORICULTURE.

Here are growing maple, ash, walnut, hickory, hackberry and Catalpa, just as nature planted them. The trees are all tall, straight, symmetrical and none exceed the Catalpa in size or straightness of trunk.

These trees have not been crowded, but had ample room for development of roots, trunk and branches. They effectually disprove the theory that 2,700 trees should be planted upon an acre of land to produce straight stems.

If the future planters of Catalpa trees will visit this locality, they will learn a valuable lesson from nature and avoid

severe losses which always accompany unnatural crowding of forests. Here are trees 100 feet in height, 65 feet to first large branches, ranging from 18 to 30 inches diameter, and not one shows any signs of disease.

Within a short distance are several long lines of Catalpas, planted eight and ten years ago, along the roadside, which are now from 8 to 16 inches diameter; some would make fine telegraph poles, others two cross-ties each.

These were set 8 feet apart in one single row.

Near by is a growth from the same seed, set 4x4 feet, which are still worthless—not a tenth as large as some in these rows, where ample space was given.

ARBORICULTURE has secured seed from these native trees for distribution, and hopes to have a tree for exhibition at the World's Fair.

Decay of the Catalpa.

Discarding all scientific explanations a little common sense will show why a tree, the wood of which is so extremely durable, often decays while it is growing. As shown by the chemical analysis of Catalpa wood on page 102, there are antiseptic substances gathered from the soil and built into the tissues of the wood which resist the action of those fungii which cause decay. While the tree is full of sap and these resinous and oleaginous materials are greatly diluted, they have not such resistive powers as when concentrated and have dried or become fixed in the wood, as when so fixed they can only be dissolved with alcohol or other powerful diluent. Water will not dissolve them.

It is a peculiarity of the Catalpa that

the dead branches remain on the tree for many years, each annual growth enclosing them. Gradually these branches admit air and moisture bearing germs of decay which attack the diluted sap, and a rotten heart is the result. A wound made at the time of flowing sap does not heal quickly, while in winter the same wound dries and with next season's growth it becomes covered with new wood.

Posts made from young timber, if cut while full of sap, decay sooner than those cut after cessation of flow.

Well matured wood, thoroughly dried, and even young trees well seasoned are remarkably durable—in other words resist decay.

Catalpa trees in the forest show little symptoms of disease or decay.



A NATURAL FOREST OF CATALPA SPECIOSA.
"In the slashes." Trees 100 feet high. The peer of all the trees.

SUMMARY OF THE CATALPA SITUATION.

From thirty years' study of the *Catalpa speciosa* as an economic tree, making a thorough examination of the various plantations of the United States, investigating conditions under which this tree is growing in almost every state, and thoroughly searching the remaining forests in which the *Catalpa* is indigenous, my conclusions differ very materially in many important particulars from those expressed in the recent publication of the U. S. Forestry Bureau.

(1) First in importance, and a point ignored in the authoritative Government Report, is the absolute necessity of securing good and true seed of *Catalpa speciosa*. Otherwise there can only be dismal failure.

(2) No trees succeed as well on poor soil as on that of good quality, and it is economy to plant on land of fair fertility, if one has a choice of locality.

(3) With the best of soil, under most favorable conditions of climate, and with the choicest trees obtainable, success will not be assured if a starvation diet is forced upon the trees. That is, if more trees are crowded upon a given area than can obtain moisture and nourishment.

(4) Experience has proven that the roots of each *Catalpa speciosa* tree three years of age demands 16 square feet surface space.

At eight years, 64 square feet. At ten years, 100 square feet, and at sixteen years, 250 square feet. With less space the trees will be dwarfed and stunted for want of food and water.

It will require many years for the more vigorous to overcome and destroy the weaker and secure sufficient space for successful vigorous growth.

Failure to appreciate this fact, and overcrowding the trees has caused the loss of millions of dollars to forest planters.

(5) Dense planting will not eliminate side branches. They must be removed by pruning. Systematically performed, before the branches have attained large size, this is an inexpensive operation.

(6) Having once established a strong vigorous root system, the *Catalpa* will rapidly push up a straight stem with few side branches.

(7) The intermixture of Oriental *Catalpa* and bignonoides, with *C. speciosa*, produces numerous hybrids, all of which are inferior to the great forest tree of the Wabash, in proportion to the influence of the parent stock.

(8) There are diseases peculiar to all trees; none are exempt; *Catalpa* has less than most other species of timber and is easily controlled. To prevent disease remove lower branches close to the trunk before they have attained large size.

(9) There are less insect enemies which attack *Catalpa* than any known tree.

(10) In exposed prairie regions a great advantage may be secured to the young trees by planting belts or hedges of thick, low growing timber to break the force of prevailing winds. These should be repeated at intervals if the plantation is extensive. Russian mulberry is the best tree for this purpose.

Although the common peach, planted as a hedge will serve the purpose admirably and die out in due season.

(11) The cost of a plantation is quadrupled where the 4x4 system prevails, or 2,722 trees per acre, over the more reasonable plan of 8x8 feet, or 680 per acre. Upon this increased cost, interest must be considered and a vastly greater capital employed, while there are no compensating advantages, and the final income is greatly reduced from unthrifty trees.

(12) No greater mistake can be made than to plant a forest of mixed varieties of trees for economic purposes. Whatever object is to be subserved, whether fuel, fence posts, mine timbers, cross-ties or lumber, plant for that special purpose, and that only, confining the forest to one species of tree, which promises best results. If imaginary forest conditions are desired, before the *Catalpa* can supply sufficient shade, wild cherry or common peach may be planted and can easily be destroyed when desired. Under no circumstances permit Osage orange, cottonwood or Russian mulberry, which exhaust the ground, drain it of moisture, injure the permanent trees, are difficult to destroy and possess no economic value; the exception being for Russian mulberry as a hedge for wind protection outside the plantation.



CATALPA SPECIOSA 16 YEARS OLD.

In Edwards county, Ill.; 50 inches girth four feet from ground; a good telegraph pole; 9 inches diameter at 25 feet height.

Letter From Vice-President Bowditch.

THE PLANTING OF TREES.

Every warm advocate of tree planting should be a persistent enthusiast, otherwise many a good opportunity is lost through failure to push home conviction.

A hearer may be interested, but unless this interest is aroused to positive action there is no germination. We sow good seed, yet if soil and weather conditions are adverse, failure results. But if the seed is sound it may remain dormant a long time, yet finally produce a bountiful crop.

It is an excellent work to plant trees on your own account, but it is a much more delicate and difficult affair to persuade others to do so. A frequent presentation of new, interesting facts will, however, gradually overcome public indifference, and after that the ball rolls easily on comparatively level ground.

A stereopticon lecture and talk on trees was given last summer in a nearby town; the audience appeared interested, but in no way responsive, and it seemed like an evening wasted. But six months later a listener at that lecture turned up at another meeting held in Boston, and told me privately that his interest had become very much aroused on the whole subject. He is now an enthusiast; yet, had there been no further opportunity for him to ally himself to the movement, very likely his interest would have died within him. This, in other words, is why it is so desirable to keep an established office always open, ready to receive all comers and to promote general forestry work.

Again, just as it takes time to grow a large tree, so does it also take time to plant in the minds of any community a love for trees, and thus usually it is the

man of middle age who is first attracted, and it is the very old men who *do* the most, after all.

It reinspirits the man or woman of sixty, who is already dropping behind in the everyday race, to realize that he or she is still only on the threshold of this knowledge and enjoyment.

Children and grandchildren drift away in distance and in thought, but trees, young and old, that have been and are still being planted by or through us, constantly afford fresh delight and increasing satisfaction. There is no better legacy to leave to posterity and there are no better companions for our declining years than these living children of the forest and roadside that owe their very existence to our endeavor.

But how should we take part in this programme? First organize a *State Forestry Association*. Then persuade your state to pass a *Tree Warden Law* to protect roadside trees.

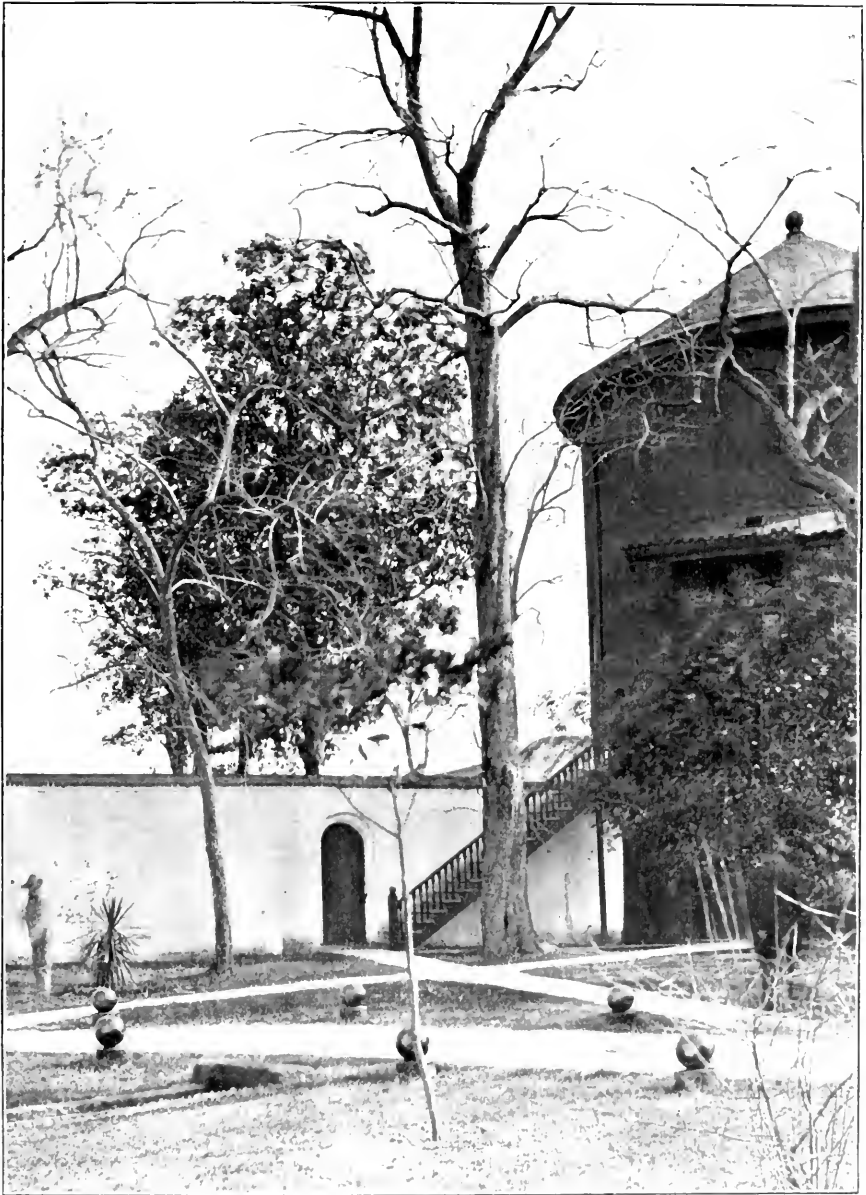
Next, have a *State Forest Warden*, to act as general adviser and promoter.

Finally have a *State Nursery* for free distribution of such native forest tree seedlings as seem best adapted to forest culture.

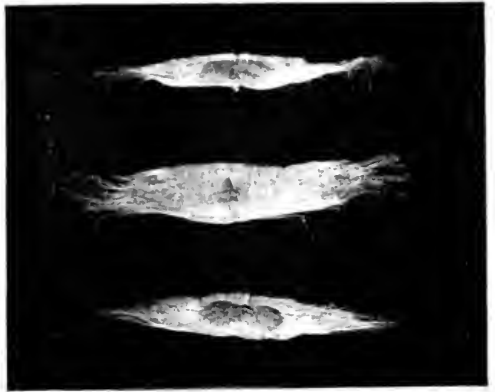
Two or three active, tireless men or women can easily inaugurate such a movement, and if you aim to secure these things you will surely get them, because each year shows an increasing power in this direction, which will in time sweep over the whole country, impelled by the irresistible forces of a wise commercialism and general well being.

JAMES H. BOWDITCH.

Boston, Mass., December, 1902.



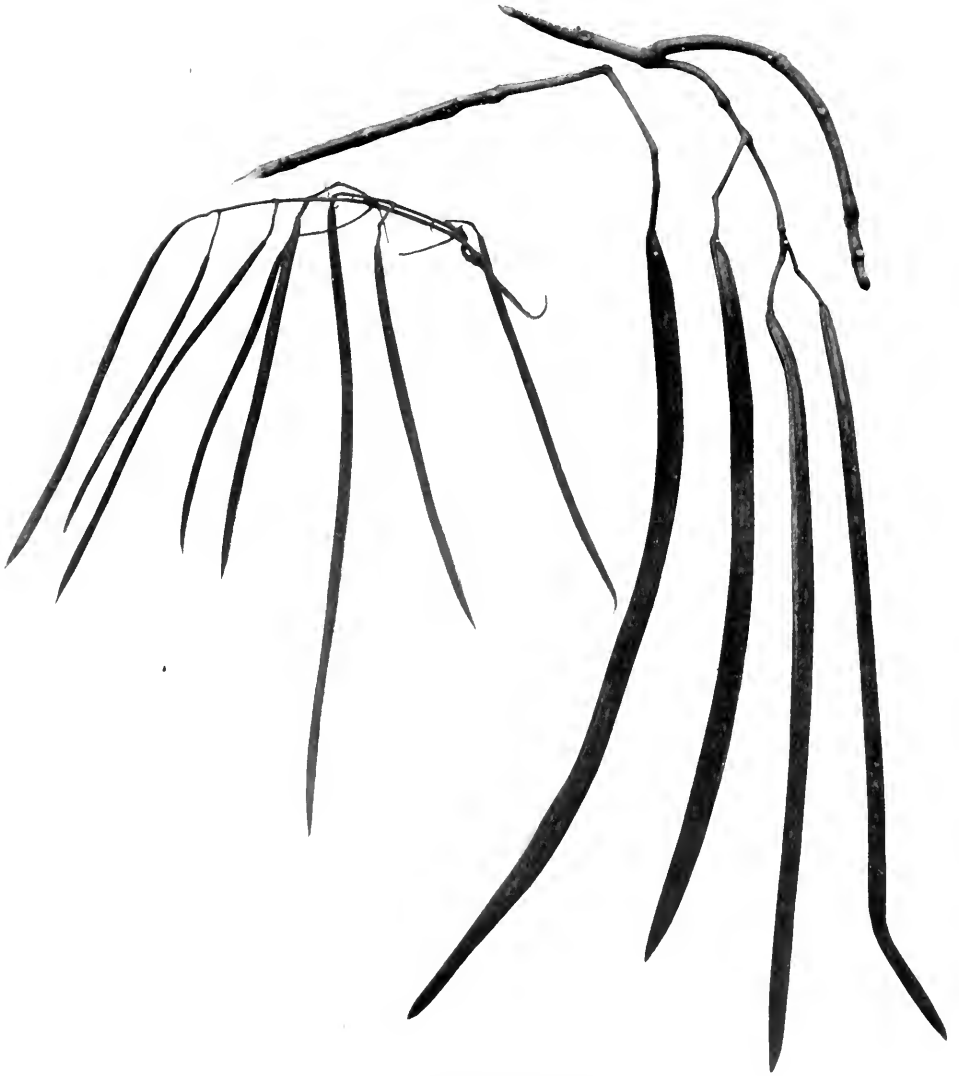
IMMENSE CATALPA TREE AT BARRACKS, NEW ORLEANS.
Fifty years old.



TYPES OF CATALPA SEED.
 Top—Oriental, Center, Speciosa, Bottom—
 Bignonoides.



THE BARK OF CATALPA COMPARED.
 Bignonoides on left; speciosa on right.



SEED PODS OF CATALPA.
Speciosa on the right, bignonioides or hybrids to the left.

California Tule Lands for *Catalpa Speciosa*.

In the valley of California, where the Sacramento, San Joaquin and other rivers approach the bay, and meet tide water, are quite extensive swamps, formed from Tule growths. For half a century these have been the subject of speculation. When protected by dykes or levies these become wonderfully productive, being a mass of decomposing vegetation. Many attempts have been made, and some successfully, to reclaim these lands, but it is quite expensive and when extreme high tides, together with continuous heavy rains, they become flooded, and crops are destroyed. These swamp lands would be admirable location for growing *Catalpa speciosa*.

When once the trees become established and have secured a season's growth, the overflowing would not be detrimental. The growth would be extremely rank, almost continuous, and timber formed with greater rapidity than elsewhere.

In the *Catalpa* slashes of the Wabash, the water frequently overflows to depth of several feet.

Thus the environments of the California swamp lands are similar to those existing where the *Catalpa* is indigenous, while climatic conditions are far more favorable.

Levies for this purpose need not be so substantial as would be required for annual crops, simply enough to keep back the water until the trees have grown one season.

In ten or twelve years, under these conditions, *Catalpa* will make sawing timber, telegraph poles and railway cross-ties to a greater profit than attends any annual crops.

When established, a plantation becomes permanent, producing a succession of crops every ten years, being renewed from the stump when the trees are cut. On the Wabash the farmers dig out the roots when they wish to destroy the trees, so persistent are they in renewals.

Each acre of such lands as are now covered with Tules, should produce 34,000 feet of lumber, worth \$2,000 in a

dozen years, the land improving in value all the while.

Owners of swamp lands who have hesitated at the expense of reclamation, should carefully consider the possibilities of what may be accomplished with this extremely valuable timber.

Wood of such character is not found upon the Pacific Coast, and will always be in demand at remunerative prices.

EDITORIAL NOTICE.

Seed of Eucalyptus and Catalpa.

Our articles upon these two forest trees have brought numerous inquiries for seed and plants.

We have secured from New Zealand a quantity of seed of *Eucalyptus globulis* or Australian Gum tree, for gratuitous distribution among our southern patrons. Others will be supplied at 25 cents per packet—50 cents per ounce.

Seed of *Catalpa speciosa*, gathered under direction of the society, from original forest trees, \$2.00 per pound, 50 cents per packet.

Address ARBORICULTURE,

1639 Michigan Ave., Chicago.

SCHOOL ADVANTAGES TO-DAY.

With the progress of the age, improvement in manufactures, commerce and other affairs, educational facilities have kept pace. The institutions of learning of every degree have advanced wonderfully during the past half century, and in no particular more than text-books.

Those who recall the well-thumbed books of Cobb, Pike and others, used in the schools of fifty years ago, and compare them with the splendid text-books of the present will be willing to give due credit to the American Book Company, which has provided the best of school text-books, with illustrations which were impossible a few years ago.

Such books can only be prepared by the expenditure of much money and the labor of the best authorities. This the American Book Company is doing splendidly.

The publishing year of 1902 is past, and it is too early in the new year to discuss future plans, but our readers may be interested in this résumé of the publications of A. C. McClurg & Co. during 1902, which included some very notable books.

First in importance is "The Conquest," of which the San Francisco Bulletin says, "none of the popular historical novels of the last two or three years can compare with it in value, or will be apt to keep pace with it in popularity." As three large editions have been printed in the two months since publication, this seems a fairly safe prediction. Earlier in the year much attention was attracted by "The Thrall of Leif the Lucky," which is now in its sixth edition.

Mr. Will Payne, in "On Fortune's Road," showed the possibilities of romance in business life. According to the Philadelphia Telegraph "the whole book has the vivid quality of a snapshot photograph, it is so real." The constant demand for romantic fiction was responsible for "The Holland Wolves," a capital story of the Spanish invasion of Holland; "A Captive of the Roman Eagles," dealing with the early struggles between the Latins and the Teutons; "The Point of Honour," rollicking tales of Irish dueling days; and "The Prince Incognito," in which Mrs. E. W. Latimer took up fiction again, after many years devoted to historical works. Modern city life was cleverly handled in "Gertrude Dorrance," and the South found most delightful expression in Samuel Minturn Peck's "Alabama Sketches." New illustrated editions of popular books were represented in "The Bridge of the Gods," with L. Maynard Dixon's remarkable Indian pictures, and Max Miller's "Memories" in a beautiful holiday form with pictures and decorations by Blanche Ostertag.

Although possibly of less interest to the reading public at large the most important contribution to posterity has been the standard library reprint of "The Expedition of Lewis and Clark," of which The Nation says, "We have nothing but praise for this clear and handsome reprint." The appearance of Bishop Spalding's "Socialism and Labor" at the same time that he received his appointment on

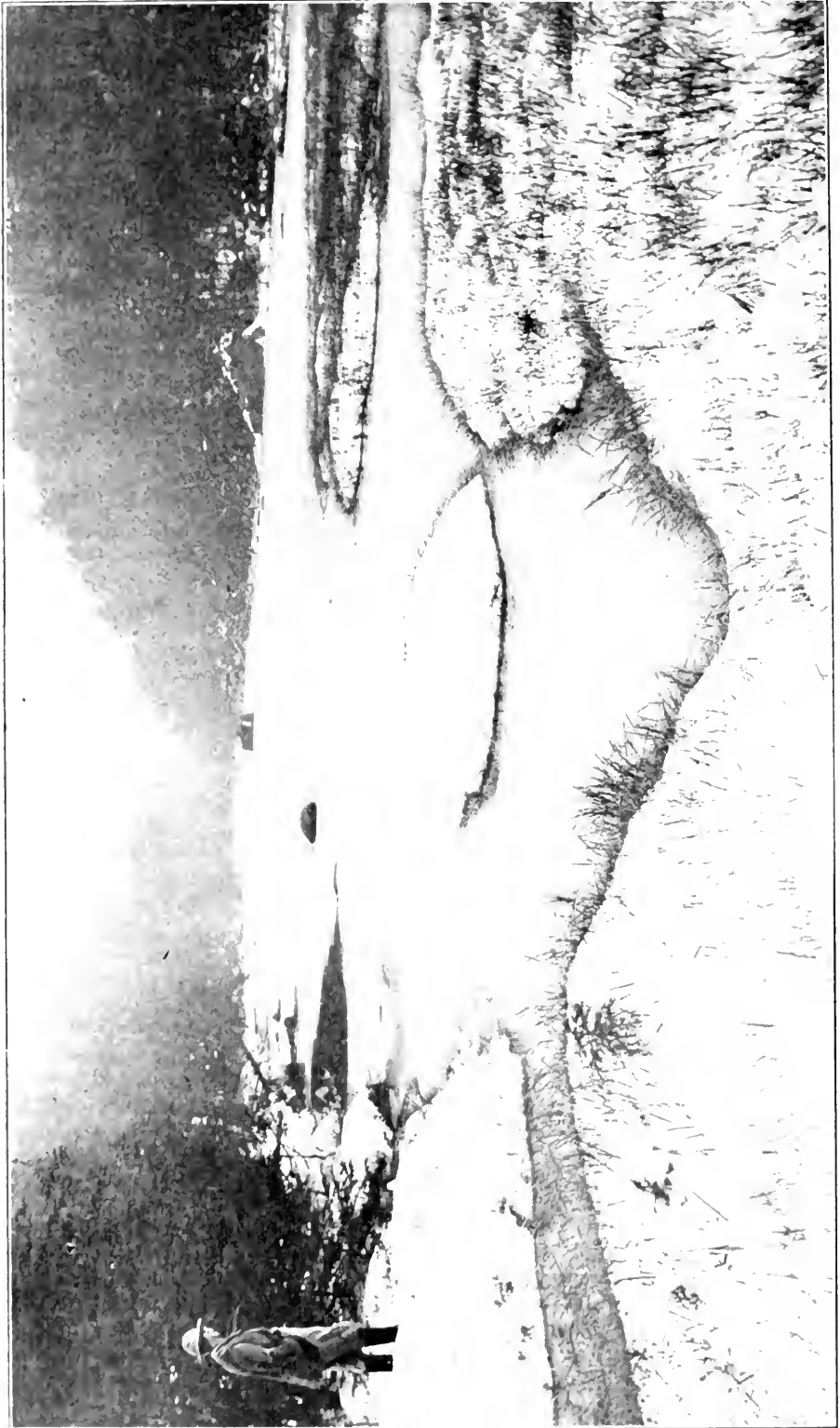
the coal-strike commission was a fortunate coincidence, which gave exceptional timeliness to the book. "Religion, Agnosticism, and Education," also by Bishop Spalding, appeared earlier in the year.

General literature received a notable addition in "Letters to an Enthusiast," a series of hitherto unpublished letters by Mary Cowden-Clarke. Cody's "Selections from the World's Greatest Short Stories," a remarkably useful little book, that has been adopted by twelve large universities. Dr. James Baldwin's ever-popular "Book Lover" was accorded the stimulus of a new edition, beautifully printed at the Merrymount Press.

Literature and education are also considered in William Morton Payne's "Various Views," "Editorial Echoes," and "Little Leaders," three volumes of scholarly essays by this well-known critic. Fine printing was the leading consideration in the publication of the "Helpful Thoughts Series," a successful collection of little books along the lines suggested by the title, including "Right Reading," "Catch Words of Cheer," and "Helpful Thoughts from Marcus Aurelius."

Several delightful contributions to the literature of travel and description were brought out, notably Mr. Horton's "In Argolis," a charming account of a summer in Greece, and "Ocean to Ocean," Lieutenant Walker's capital book about Nicaragua; also new illustrated editions of Sheldon's "Notes on the Nicaragua Canal" and Thwaites's "Down Historic Waterways."

Mr. George P. Upton, well known as the author of a series of handbooks on music, added another volume to the set in "The Standard Light Operas," and also brought out an interesting collection of essays on unfamiliar musical subjects under the title of "Musical Pastels." Nature books were represented by Dr. Keyser's "Birds of the Rockies," a sumptuous volume, illustrated in color and black-and-white, and declared by the Omaha Bee to be "not only beautifully printed, but the best and most thorough publication ever printed treating of the birds in that section of the country." Less pretentious, but no less useful, was Mrs. Wheelock's "Nestlings of Forest and Marsh."



“He makes a solitude, and calls it peace.”
—Byron.

THE SNOWY SOLITUDE OF THE ADIRONDACKS IN MIDWINTER.

On the New York Center.

FOREST NURSERY.

1,000,000 PLANTS, Pure Catalpa Speciosa
and Seed of same collected in forest

WALTER P. BROWN, Manager.

CONNERSVILLE, IND.

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Of the People
Operated
For the People
And Recognized
By the People

As the standard passenger line of the Central States. 2500 miles of railway in

Ohio, Indiana, Illinois, Kentucky
and Michigan

Through Sleepers between

New York } And } Cincinnati
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CINCINNATI, OHIO.



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Every State in the Union covered.
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THE COMPARATIVE GROWTH AND HABIT OF CATALPA, ON THE LEFT, AND BLACK WALNUT, ON THE RIGHT, IS SEEN IN ABOVE CUT. Both the same age and had the same treatment. The walnut has an eight-foot trunk, while the Catalpa has forty. Location, Wabash Valley, Illinois.

**"But where to find that
happiest spot below;
Who can direct, when all
pretend to know?"**

—Goldsmith.

Many are satisfied to live in Northwest Texas, having proved the value of the land in this region as a good Crop Raiser. Not only Cattle, but Wheat, Cotton, Corn, Feed-Stuffs, Cantaloupes, Garden Truck and Good Health flourish here—in a district where Malaria is impossible and very little doing for Jails and Hospitals.

Land, which is being sold at really low figures—though the constantly increasing demand is steadily boosting values—is still abundant; and Farms and Ranches of all sizes, very happily located, are being purchased daily.

We will gladly supply all askers with a copy of a little Book, published by the Northwest Texas Real Estate Association, which contains an interesting series of straightforward statements of what PEOPLE HAVE ACCOMPLISHED along the line of

"THE DENVER ROAD."

Passenger Dept., Fort Worth, Texas.

N. B.—We find our passenger patronage very gratifying. It is necessary to run three trains daily each way as far as Wichita Falls, and two clear through. We continue, the year round, the excellent Class A service that insures the preference of Colorado and California Tourists, Winter and Summer. By the way, we offer now more than half a dozen routes to California, the newest being via Dalhart (also good for Old Mexico); with first-class Eating Cars all the way.

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The Coast Line Route of the Southern Pacific Railway, from San Francisco to Los Angeles, is one of marvelous beauty. For one hundred and fifty miles the road meanders the Pacific Coast, most of the time being in view of the ocean. The long reaches of sandy beach, alternating with broken cliffs, the ever-changing panorama of exquisite beauty. To those who do not often see the surf and rolling waves, but whose homes are within the interior of the continent, these scenes are wonderfully grand. Passing through a continuation of towns, villages and orchards, where in mid-winter the pampas grass is waving, roses blooming, and balmy air, past vine-clad cottages, with trees and shrubs of tropic foliage and flowers, the changing scenes are truly enchanting.

The numerous groves of tall eucalyptus tress, orchards of English walnuts, vineyards and orange groves, offer to the tourist a succession of interesting views of rare beauty.

Just now, after the winter's rains have moistened the soil, a carpet of green covers the entire surface.

Long, gentle slopes in grass, with cattle, make the foreground of one picture, behind which the rugged coast range of mountains, black from the patches of distant trees, rise in irregular masses.

Numerous oil-well derricks, standing close together, remind us of our allies to arboriculture—petroleum for fuel.

It is no longer profitable to clear away every vestige of forest, since these wells supply a better and cheaper fuel.

Only a quarter of a century ago this entire region throughout Southern California was an unproductive desert, solely given up to grazing by native scrub cattle and ponies. To-day, through the efforts of California's great railways, this has become a continuous garden and orchard with happy, prosperous homes. This would have been impossible but for the transportation facilities offered by the railways.

To California through Colorado

Is it worth while to fight through the winter at home, when you can so easily go where the perfect climate will keep you strong and vigorous?

**Burlington
Route**

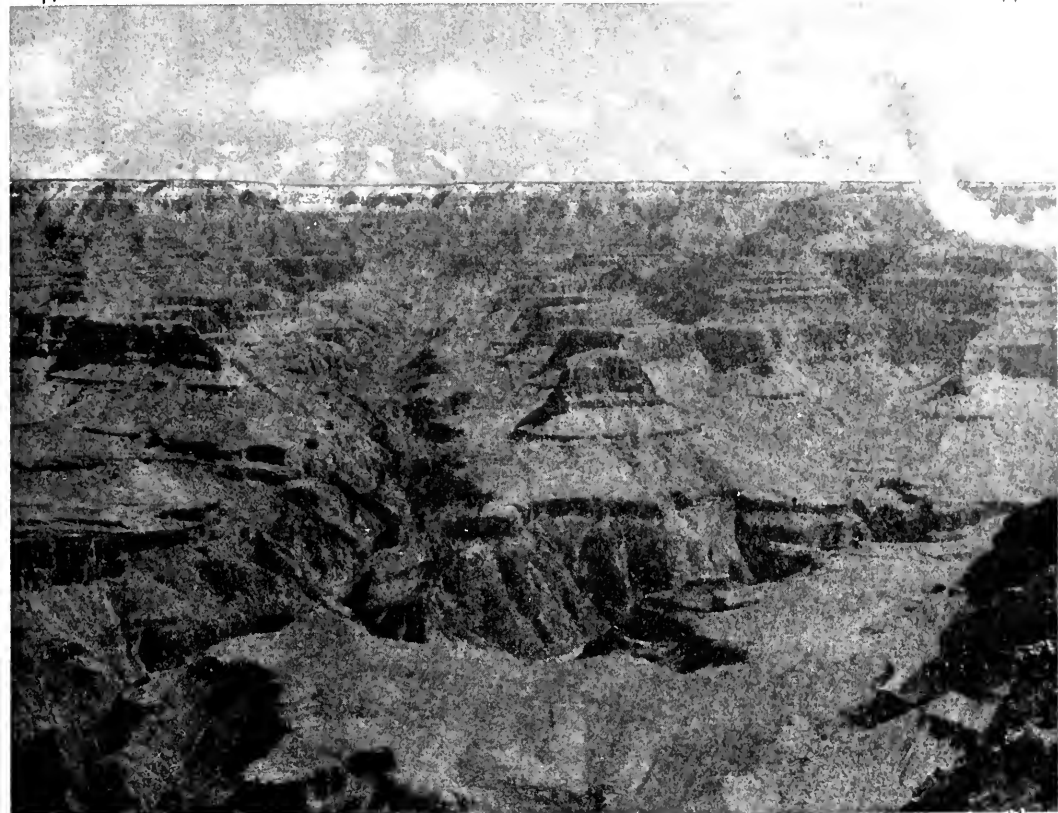
If you can possibly get away, and particularly if you are not in the best of health, why not plan to spend part, if not all, of the coming winter in California, away from the extreme cold and disagreeable weather? Does the idea seem extravagant? Well, there is no reason in the world why you should not make the trip if you have the time, because the expense of going is really very little, and the cost of living in California exceedingly moderate.

We run "Personally Conducted" Tourist Parties from Boston, Chicago and St. Louis every week during the winter. The route is by way of Denver through glorious Colorado by daylight, past some of the grandest scenery in the world, and through Salt Lake City. The most intensely interesting ride in America. The ticket fare is very low indeed. It is made so that people of moderate means can go. Pullman tourist cars are used. A berth in one of them holding two persons comfortably costs only \$6 from Chicago or St. Louis; \$8 from Boston. All the bedding of the very nicest sort entirely free.

We can tell you about a lot of hotels and boarding houses in California where you can live nicely for from \$7 to \$15 per week. Don't those figures rather surprise you? Is there really any reason why you should not spend a while in California, the land of sunshine, where the flowers bloom and the fruit ripens, and the trees and grass are green, while elsewhere people are suffering from the cold? Surely, it's worth investigating—it won't cost anything to do that. Write today and ask me to send you a copy of our beautifully illustrated 72 page book about California; no charge; and with it I will send a folder which explains about our Personally Conducted Tourist Parties, and also a circular telling all about the prices of tickets. The saving in doctors' bills likely will pay for your California trip.

P. S. EUSTIS, Passenger Traffic Manager, C. B. & Q. Ry. Co., CHICAGO

The Grand Canyon of Arizona.



VIEW FROM BRIGHT ANGEL HOTEL.

*Copyright, 1900,
by H. G. Prouty.*

THIS titan of chasms lies in Northern Arizona and is reached by daily trains of the Santa Fe System, connecting at Williams, Arizona, with the Grand Canyon Railway, extending to Bright Angel.

The Canyon proper is 217 miles long, 13 miles wide, and more than a mile deep. The portion most frequented by tourists is known as the "granite gorge," extending from Grand View sixty miles west to Mystic Spring trail. Bright Angel trail is midway, and is the point from which the above panorama is viewed. Here one may look up and down the mighty gorge for miles and miles. The profound depths, the marvelous forms, the brilliant colors by day and the soft witchery by night, the silence of it all—these play upon the emotions in a strenuous way. Stay there a month, and every hour of the day you have a new thrill; stay there a year, and the charm still holds. Whether viewed from the rim, from the precipitous trail, or from the imprisoned river; whether seen at dawn, noon, twilight, or under the serene stars—it is always in truth the "greatest thing in the world."

For 50 cents a magnificent volume about the Grand Canyon may be obtained, properly illustrated, containing articles by noted writers, with lithographed cover in seven colors, or

For 25 cents an illuminated colored photograph will be sent. This shows the Canyon as it actually appears, in all its natural and wonderful colors. Address

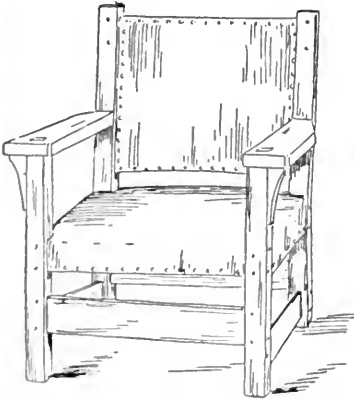
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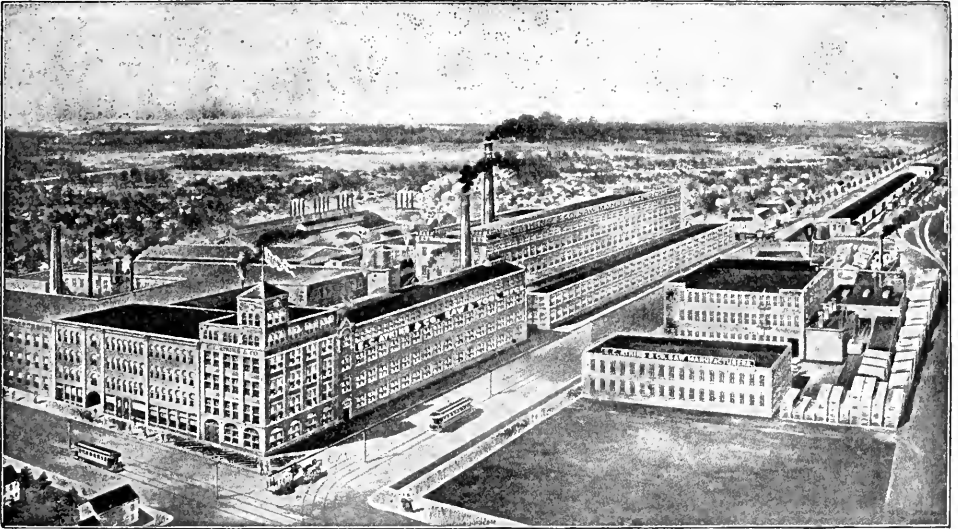
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The rate applies to many other California points than those named above—Santa Barbara, Fresno, Pasadena, Bakersfield, Stockton, Sacramento, San Jose, etc. Corresponding reductions will also be made to points in Idaho, Montana, Washington and Oregon. Rates from points west of Chicago are proportionately low.

Tickets sold at these extraordinarily low rates are good in tourist sleeping cars, which leave Chicago and Kansas City daily; Omaha five times a week; St. Louis once; St. Paul and Minneapolis four times, and Memphis once a week. All these cars run through to California. Choice of routes "Southern" via El Paso, or "Scenic" via Colorado Springs and Salt Lake City.

Further information will be furnished on request, or can be secured by communicating with your local ticket agent.



JOHN SEBASTIAN,
Passenger Traffic Manager

Chicago, January 15, 1917

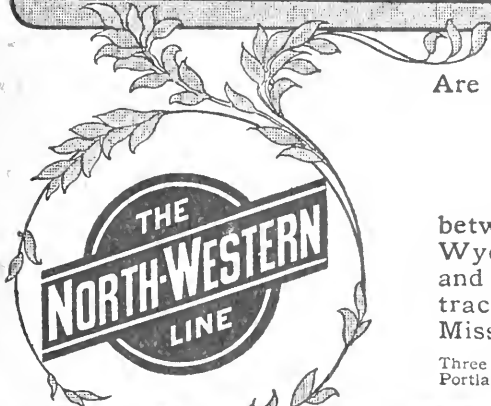
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ARBORICULTURE

VOLUME II.

NUMBER 2



A Magazine of the International Society
of Arboriculture: Chicago, February, 1903.

THE INTERNATIONAL SOCIETY OF ARBORICULTURE

OFFICERS

GENERAL WM. J. PALMER, President, Colorado Springs, Colo.

JAMES H. BOWDITCH, Vice-President, Boston, Mass.

JOHN P. BROWN, Secretary-Treasurer,
1639 Michigan Ave., Chicago, Ill.

ARTICLES OF INCORPORATION.

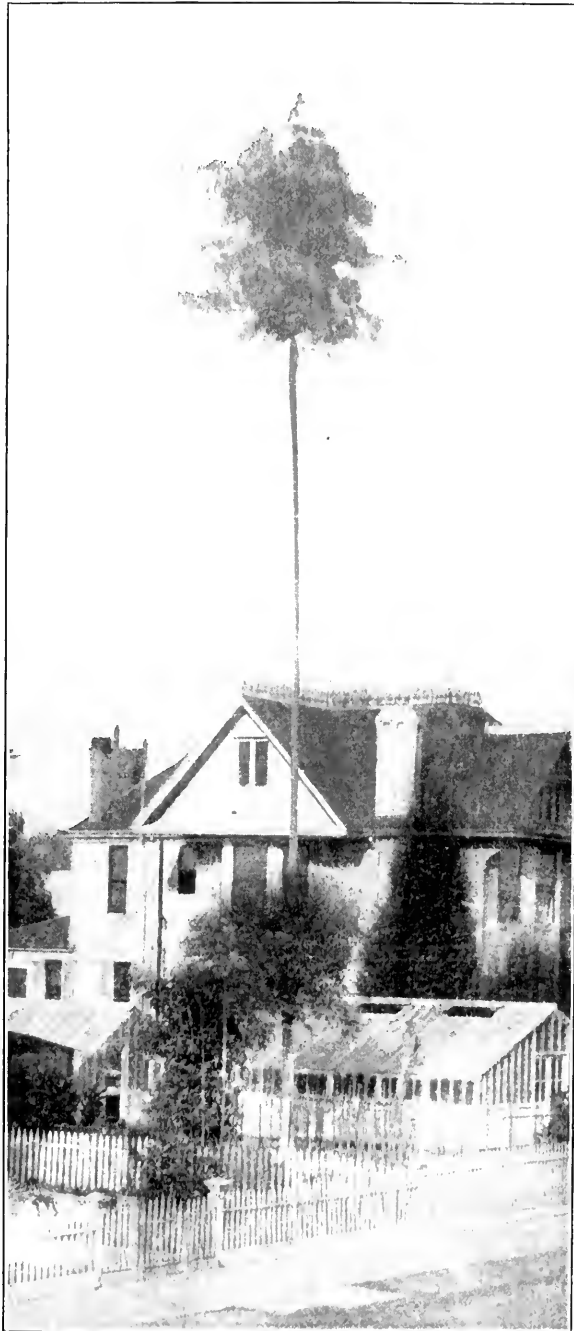
Article I.—Name. The name of this corporation shall be The International Society of Arboriculture.

Article II.—Purpose. The purpose of the Association is to introduce judicious methods in dealing with forests and woodlands; to advance and advocate a public interest in this subject; to promote the afforestation of unproductive lands; to encourage the planting and care of shade trees in parks, public and private grounds, and along streets and highways; to inspire an interest in our remaining native forests, and groves of ancient trees, and to seek their preservation; to supply information to railway officials in regard to timber culture for railway uses, and incite railway and other corporations to plant trees for economic purposes.

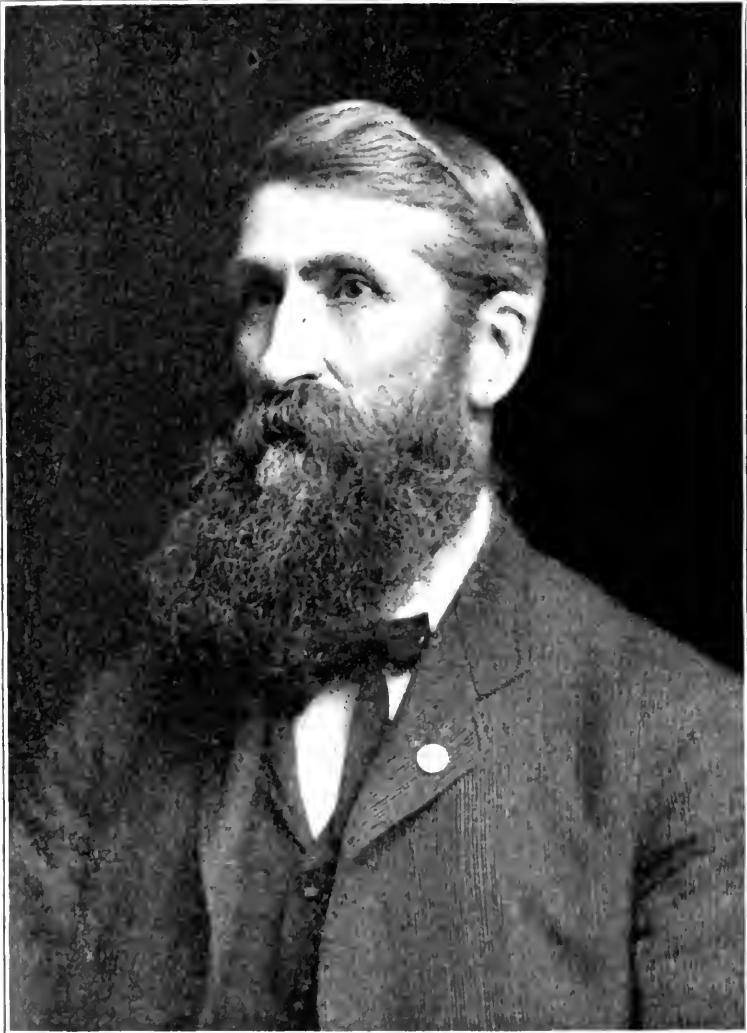
Article III.—Membership. Any person may become a member of this Society by the payment in advance of an annual due of two dollars, and on payment of this annual dues shall be entitled to receive, regularly, one copy of ARBORICULTURE, the official organ of the society. Any person who may contribute ten dollars toward the support of the society shall become a patron. Honorary members may be chosen by the executive committee.

Article IV.—Officers. The officers of this Association shall be a president, vice-president and secretary-treasurer, who shall be elected at the annual meeting each year by ballot, and shall serve for one year, or until their successors shall have been elected and shall have accepted office, and when elected shall constitute the executive committee.

Article VII.—Executive Committee. The Executive Committee shall have entire control and management of the affairs of the Society.



EUCALYPTUS TALL POLE TREE.



Nicholson Photo, Indianapolis.

JOHN P. BROWN, CONNERSVILLE, IND

ARBORICULTURE

A MONTHLY MAGAZINE.



PUBLISHED IN THE INTEREST OF THE
INTERNATIONAL SOCIETY OF ARBORICULTURE.



Subscription, \$2.00 per annum.

JOHN P. BROWN, Editor, 1639 Michigan Avenue.

Volume II.

CHICAGO, FEBRUARY, 1903.

Number 2.

Forest Needs of Indiana.

THE requirements of a community, in forests, depend upon the topography and conditions existing in that province.

No laws or practices can be formed to suit all portions of a country so large and varied as the United States.

If the surface be broken into mountain ranges, in which rise many important rivers, it is all-important that the forests shall be retained upon the higher mountains and more abrupt slopes.

On extensive plains, where semi-arid conditions exist, large bodies of timber become invaluable to induce rainfall, divert the prevailing winds and aid in making such district of greater value for agriculture.

Large tracts of sandy soil too poor for successful cultivation in farm crops, and where grasses do not thrive for pasturage of stock, yet where moisture is not lacking, should at once be reafforested with such trees as will improve the soil conditions, in order that agriculture may at some future time become possible.

Vast areas of low-lying tracts, subject to overflow, and swampy, should be retained in forest until such time as the demand for such alluvial lands will make them of sufficient value to justify the ex-

penditure of large sums in drainage. And in all these locations the forests should be maintained in large, compact bodies.

But where agriculture is the chief pursuit, lands owned in comparatively small tracts and highly cultivated in varied crops, with a dense and increasing population, timber lands should be in smaller tracts and distributed throughout the territory.

In every state the conditions vary and require a different system of arboriculture. Pennsylvania and New York have adopted wise systems of forestry, suited to the conditions prevailing in these states. Here rise some of America's famous rivers, and large sums are expended in purchasing mountain lands, which are being again planted in timber. Massachusetts has splendid laws governing the forests of that commonwealth. It would be extremely unwise to adopt the same policies in Indiana that are suited to the conditions in New York, Pennsylvania, Massachusetts, Colorado or California.

Almost every farm in Indiana has more or less waste land upon some portion of the tract, which it would be the part of wisdom to retain in timber, and would in time become the most profitable part of

such farm. But land owners have been compelled to clear away the forests on all their broken and waste lands and cultivate them to a disadvantage, because of the unwise system of state taxation, which has taxed the forests out of existence. To overcome this evil the forestry law of 1890 was enacted by the legislature.

This law was based upon the theory that so far as an agricultural state was concerned, the forests should be distributed over every portion of the state in small parcels; that the small wood lots should be as nearly free from taxation as the constitution would permit; that every farm owner should be encouraged to preserve a small portion of his broken and inferior lands in timber.

These forest lots are by the Indiana law taxed upon a specific appraisalment of one dollar per acre.

No country upon the globe has a system better adapted to existing conditions than has Indiana. Yet a few county officers have taken it upon themselves to become judges of the law, instead of its executors, and have refused to comply with the law's requirements. The Forestry Board, specially created to aid in the enforcement of this law, have totally ignored it, and refused to prosecute those who have thus ignored the law.

An amendment to this statute, requiring the county attorneys, under direction of the attorney-general, to compel obedience to the law by the auditors would make this act effectual. Hundreds of applications by farmers throughout the state for reservation of forest lands have been turned away by the auditors, who have refused to perform the duties which this law requires of them.

To expend a large sum of the state's money in purchasing lands for forest, and the increase in salaries of the Forestry Board would mean a greatly increased appropriation by each successive legislature to maintain a work which is totally unnecessary in Indiana, and which is already fully provided for by the law of 1890, which carries with it no burden-

some taxation, and builds up no expensive state boards.

Give the old law a further trial with additional precautions for its enforcement and avoid placing additional burdens upon the taxpayers of the state.

FORESTRY LAW OF INDIANA.

AN ACT for the encouragement of Forestry.

SECTION 1. *Be it enacted by the General Assembly of the State of Indiana,* That upon any tract of land in the State of Indiana, there may be selected by the owner, or owners, as a permanent forest reservation, a portion not to exceed one-eighth of the total area of said tract, which shall be appraised for taxation at one dollar per acre.

SEC. 2. If such selection is an original forest, containing not less than 170 trees in each acre, it shall become subject to this act upon filing with the Auditor of the county in which it is situated, a description of such selection as is hereinafter provided.

SEC. 3. If any land owner shall plant not less than 170 trees on each acre of selected forest reservation, and shall cultivate and maintain the same for three years, then it shall become subject to this Act, as herein provided.

SEC. 4. Upon any tract selected as a forest reservation which contains 100 or more original forest trees on each acre, the owner may plant a sufficient number of forest trees which shall make up the required 170 trees per acre, when the same shall become subject to this act, as in Section 3.

SEC. 5. No land owner shall receive the benefit of this Act who shall permit cattle, horses, sheep, hogs or goats to pasture upon such reservation until said trees are 4 inches in diameter.

SEC. 6. Whenever any tree or trees shall be removed or die, the owner in order to avail himself of this act shall plant other trees in place of such trees as may be removed or die, and protect said trees until they are 4 inches in diameter, which shall at all times maintain the full number required by this act.

SEC. 7. Not more than one-fifth of

the full number of trees in any forest reservation shall be removed in any one year, excepting that such trees as may die naturally may be removed, when other trees shall be planted.

SEC. 8. Ash, maple, pine, oak, hickory, basswood, elm, black locust, honey locust, Kentucky coffee tree, chestnut, walnut, butternut, larch, tulip tree, mulberry, osage orange, sassafras and catalpa shall be considered forest trees within the meaning of this act.

SEC. 9. It shall be the duty of the Auditor in every county to keep a record of all forest reservations as the same shall be filed with him, and he shall require the owner or agent to subscribe under oath the extent and description of the land reserved, and that the number of trees is as required by this act, and that he will maintain the same according to the intent of this enactment.

SEC. 10. It shall be the duty of the Assessor to personally examine the various forest reservations when the real estate is appraised, and to note upon his return the conditions of the trees, in order that the intent of this act may be complied with. And if the reservation is properly planted and continuously cared for, he shall appraise the same at one dollar per acre.

A CANADIAN'S OPINION.

Garden and Forest, 1890, Page 602, has an article from M. J. X. Pirrault of Quebec from which we extract a sentence which is as golden in 1903 as it was when spoken in 1860. "The forest-wealth of the United States has been so used and abused that already the richest forests have disappeared. The pine of Michigan, Wisconsin and Minnesota, once considered inexhaustible, exist no longer. They have been exterminated.

"The improvidence of the government, and the insatiate desire to grow rich rapidly, have brought our neighbors' forests into this condition. It seems almost incomprehensible that a nation so intelligent and practical can allow itself to be despoiled of one of the principal sources of national wealth while it was so easy to render it perpetually productive."

ATTICA'S WASTED FORESTS.

"From Professor Charles Burton Gulick's new book on 'Life of the Ancient Greeks.'

"In the midland districts wheat and barley could be raised in small quantities, and the mountain sides were protected from detrition by deep forests. Yet as early as the fourth century B. C. the ruthless and short-sighted stripping of timber began, and in the Middle Ages desolation spread through the carelessness of wandering shepherds, who, like sportsmen and campers of to-day, frequently caused wasting forest fires.

"As early as the fourth century Attica was becoming a waste, because the state and the people failed to realize the importance of preserving the once rich woodlands of Parnes, Pentelicus and Hymettus. The trees were cut down wastefully by lumbermen, who found their profit in the great demand for timber for house and shipbuilding, furniture and fuel. Perhaps most harm was done to the forests by shepherds and goatherds, who deliberately burned down trees in order to gain more pasture land."

"The statements that destruction of forests would work irreparable harm, that unrestricted grazing in the forest reserves would result in their great injury, that it is a proper function of the government to preserve forests, have been met by more or less ridicule on the part of those interested in getting at the timber or otherwise using the lands. Here is competent testimony as to the effect of forest spoliation upon Greece, a record of actual experience, not of speculative reasoning.

"Possibly Greece's glory would not all be in the dim past if her forests had been preserved. Her maritime power might not have vanished, her soil might not have become so lean and stony, her climate would certainly have been modified, the spirit of her people might have been perpetuated by an environment which brought it to so great a degree of refinement and strength. No good results of the destruction of Attica's mountain forests can be cited. The evil effects were many and obvious. May we not learn something from this history?"—Portland Oregonian.



EIGHT EUCALYPTUS TREES, PASADENA, CAL.

The Eucalyptus for the South.

THE vast importance of early maturing trees with which to re-afforest large areas throughout the South which are now being deforested, cannot be overestimated.

Cypress timbers of the southern swamps will not make sawing timber or cross-ties in less than a hundred years.

The white oak of Arkansas and Mississippi, now being rapidly marketed, can not be replaced, even although planted now, before the twenty-first century.

The yellow pine makes quite a showing in two decades, as a young forest, but will not take their places in the saw mill until seventy or more years have passed.

The Chestnut Oak, so prized in mountainous Kentucky and Tennessee, have required fully as long to mature.

In consequence it becomes an important question to know what may be planted to take the place of these woods now going.

In our December number we had several illustrations of this great Australian tree and a brief article calling attention to Eucalyptus.

We are now presenting the subject anew, with photographs taken during our recent trip through California, and wish to show how much more profitable it would be to manage the Eucalyptus differently than California has done.

There is now a great and growing demand for piles, with which to build piers far out into the ocean, to connect the shore with deep water where vessels may discharge their cargoes. Pine from Oregon is principally used, and the great length of some piles make their cost and transportation very great.

While the Eucalyptus (some varieties) is not considered durable for posts, or cross-ties, without treatment, yet the one enemy to ocean piling is the teredo, which soon bores the wood full of holes.

It is said by many who have used the Eucalyptus for this purpose that it resists the attacks of these ocean worms, and now there is a great demand for the Eucalyptus for this purpose.

Unfortunately the universal treatment of this tree on the Pacific Coast, pollarding, has totally ruined them for this use; a few places only have they been left to grow into tall trees with suitable trunks, and usually these have been so closely planted that they are only suited for firewood.

Our picture No. 1 shows a scene in Los Angeles, and the customary mode of cutting off the top of these trees to make them branch lower.

No. 2, on the same street, shows a tree which has resulted from this method of pollarding.

No. 3, another locality in Los Angeles where a cluster of Eucalyptus trees standing about sixteen feet apart, have all made tall, handsome and valuable trees, suited for any purpose of piling or lumber, some of these trees are thirty inches diameter and 150 feet high.

No 4 is a single tree, pruned to a pole, having a few branches with foliage at the top. This simply exhibits what can be done as a curiosity, but is not recommended.

No. 5 is a cluster at Pasadena which were planted in a circle having a diameter of twelve feet. There are eight trees, all of which are of value.

No. 6 is a recent clearing of Eucalyptus near Long Beach, California, now being made into cordwood.

While in California fuel is of great cost, and these trees make very good firewood, yet this far greater value as lumber producers, piles, etc., has been entirely lost sight of in the management of the trees.

The Eucalyptus grows to extreme height, 150 to 175 feet not being unusual, and increases with great rapidity in good soil with a fair supply of water.

The old adage "save at the spigot and lose at the bung hole" is clearly applicable to this method of management.

The Eucalypti about Phoenix, Ariz., show what may be done in this latitude, and the trees should have a place in New Mexico, South Carolina and the Gulf states.



POLLARDING.

One of the best illustrations of the evil results of close planting of rapid growing trees is seen all through California, where the Eucalyptus has been so extensively planted in rows from 4 to 6 feet apart.

The Eucalyptus having many of the characteristics of *Catalpa speciosa*, viz., vigorous growth—upright trunk, gradual taper from ground to apex, strong root system, adaptability to many varied soils and locations.

These trees, so close planted, are tall, slender, dwarfed in wood growth by the constant struggle for life with close neighbors under ground, are from 8 to 12 inches in diameter, while those given sufficient room are from three to four feet thickness in the same length of time.

As a windbreak these trees accomplish their purpose; as fuel producers they serve a good turn, but for economical wood growth their total failure is clearly apparent.

As a comparison, one of these trees in close hedge, 4x6 feet, contains 19½ cubic feet of wood, while one tree at San Jose, but 30 years old, contains 700 cubic

feet of wood, which is capable of being sawed into six thousand feet B. M. of valuable lumber. This is, and always will be, the result of close planting of both Eucalyptus and *Catalpa speciosa*, it being impossible to obtain satisfactory economical wood growth without first securing a corresponding power beneath the soil surface, to supply necessary energy to the trees.

Another demonstration of the loss in timber production is seen where the tall-growing Eucalyptus has been universally cut back at a height of ten or twelve feet, causing numerous branches to form a low head. Such trees are totally worthless for economic uses. Spoiled for piling timbers, ruined for milling purposes, and only valuable for shade.

With *Catalpa speciosa* this occurs where linemen cut back the main shoots. Wherever a branch occurs—low down on the trunk—it decreases the size of the trunk above the branch—in direct ratio to the area of the growing limb. Nature will not remove these—man must do it if profitable wood growth is desired.



RESULT OF POLLARDING.

The Black Walnut.

THIS noble tree was formerly very abundant in the rich timber lands of the middle and western states; its durability and the ease with which it could be cut and split made it a favorite with the pioneers with which to build rail fences, and many old walnut rails are still to be seen on western farms.

With the advent of improved machinery and rapid increase of commercial manufactures, it came rapidly into demand for fine furniture. The beautiful grain of the Walnut, more especially the gnarled and knotty portion near the ground, together with the beautiful polish which it is capable of receiving, placed it beyond all other American native woods for cabinet purposes. As the tree became more scarce from the excessive demand its value arose to a fabulous price. Agents scoured the country paying enormous sums for logs that were but a short time before considered without value. Old stumps were dug up with which to make veneers, while limbs and short, crooked logs were hauled to the mills and utilized as lumber. But the end soon came. Such a continuous demand upon the forests which had been wastefully destroyed for so many years, with no attempt at renewal by planting more trees, could have but one result: the beautiful Black Walnut no longer to be had for commercial purposes was replaced by Oak, Birch and other woods, and is now seldom used as a cabinet wood.

Few trees are more prolific of seeds. The nuts invariably grow when properly planted, but should not be allowed to dry out if intended for seed. Its growth is quite rapid and it would be very profitable to the grower who could wait a few years for his returns.

When trees of this class, spreading in their nature, are grown in the open field,

they form very short trunks, and extend their branches over a large area.

Thus grown their economic value is quite small, but if thickly planted and systematically, the trunk is compelled to grow upright, making a tree with a tall and straight body, which afterwards, when properly thinned, becomes more stocky, producing a much greater quantity of timber per acre.

This statement must not be an excuse for 4x4 planting.

In a natural forest seed bed, with shade and abundant mulching of fallen leaves, the surface soil mellow and in the best condition for the young plant, it makes very rapid growth.

Under cultivation, these conditions should be secured by thoroughly stirring the soil for several years, often enough to keep down all grass.

The nuts should be planted where they are to grow, closely, in rows eight feet apart. By thinning the rows so as to have the trees 8x8 feet, they will not interfere for fifteen years.

While the writer was living on the prairies of Kansas some years ago, it was quite difficult to obtain nuts for planting, but on almost every farm in the older states are trees from which several barrels of nuts could be obtained in the fall after the first heavy frost. Preferably, the outer hull should remain on the nuts if for seed.

The seed should be kept moist by covering with sand, soil or mulching, but should not be kept in a wet place. Freezing aids in bursting the hard shell without injury to the germ.

The long tap root penetrates deeply, and in removal this root is injured so that it does not make so good a tree thereafter, yet one year trees may usually be safely transplanted.

Corn or other farm crops may occupy the space between the rows for several years, thus reducing the cost of cultivation.

There are numerous Walnut trees

which have grown in fence rows on western farms, making large trees in from twelve to twenty years, sufficient for milling purposes except for length of body. A grass sod, however, soon stunts the Walnut, from which it never recovers. Other trees do not thrive well in close proximity to the Walnut, hence the various species should be planted separately.

GREAT WALNUT TREES GROW IN PRAIRIE STATE.

That there is enough walnut timber in Nebraska to warrant the existence of a company for its exclusive handling is something of a surprise to those wont to think of Nebraska as a prairie state.

It is a fact, however, that there is a considerable growth of Walnut trees over the state, some of them of a size and quality that have been found acceptable even in the Liverpool market.

The growth is scattered, the most of it being found near the Blue River, not far from Seward. There the trees grow from twenty to forty-eight inches in diameter, some of the logs cutting one thousand feet of lumber.

The quality is all good and finds a ready market. The Walnut lumber company has just shipped to Liverpool three carloads of logs that have been cut near Seward.

In the early days of Kansas there were numerous Black Walnut trees of immense size growing in the rich bottom lands bordering the Kansas, Marais des Cygnes, and other rivers, undoubtedly planted by the aborigines.

The early settlers built many fences of the solid logs of Oak and Walnut, not taking the trouble to split them into rails. But Walnut had no value at that time and the great prairies now so thickly settled were considered uninhabitable.

It seems that Europe now demands all the Walnut obtainable, while other more abundant woods have the run in American markets.

The land owner who plants Walnuts and takes care of them will have a competency in old age which cannot be assured by any of the life insurance plans yet devised.

THE EVENING GROSBEAK.

(*Coccothraustes Vesper-tina-Cooper*, *Fringilla Vespertina-Nuttal & Audubon*.)

First seen in Illinois by Richard H. Holder at Freeport and at Waukegan in 1871; was seen by Ridgeway at Eureka, Woodford Co., in 1872, and Waukegan in 1873; was not again reported in Illinois till 1882, when Robert Douglass found them in his nursery feeding on the seeds of evergreens and Sugar Maple and on the buds of Ash and Cottonwood.

In the winter of 1897-8 they were found in large numbers at Lake Forest, Lake County, twenty-eight miles from Chicago, on the grounds of H. R. McCullough, feeding on the seeds of the Iron Wood (*Ostrya Virginiana*), and every winter since then they have frequented those grounds. Fearing the supply of Iron Wood seeds would be exhausted before spring Mr. McCullough has placed wheat corn and other grains on the lawn, and the birds have freely fed from them and become so tame that they will allow him to come quite close to them while they feed.

The Rose Breasted Grosbeak (*Zamelodia Ludoviciana*), as is doubtless well known, is a constant summer resident around Chicago, but the Evening Grosbeak, we believe has never been nearer than Lake Forest.

It doubtless has followed the transplanted evergreens from their home in the North. As soon as the buds of the Willow begin to swell this bird starts northward and by April it is gone and is seen no more until the next winter. Its nesting place is in the far north around Hudson Bay and in the northwest along the valley of the Saskatchewan.

Many are the ways by which our forests are planted and preserved from extermination by nature. The Iron Wood is not one of our most valued trees, yet it is a handsome small-sized tree. Its seed is enclosed in a tough innutricious sack resembling the common hop. Few birds feed upon these seeds, yet it is one of the favorite seeds for the Grosbeak.

It is in this way that this hop horn bean, as well as various evergreens of the north and the Sugar Maple, are planted.



ASPEN.

The Aspen.

THIS is essentially a production of high altitudes and Northern latitudes, growing in the higher Rocky mountains, covering many slopes and filling the valleys at the head of every water course.

The seed is produced with the same profusion as that of the cottonwood, which is of the same family, and the young growths are very dense where the location is favorable, often more than a million to each square mile. For this reason the Aspen is usually of quite small size, seldom attaining a diameter of more than six inches in such thickets. As the groves become thinned in time they increase rapidly in size, and where the trees are isolated, they become fine, large trees.

Our cut shows a thicket of Aspens, among which spruce and fir are protected. The one Aspen in foreground is thirty-two inches in diameter, having a long trunk carrying its size to a great height. This is upon the lands of the Colorado Fuel and Iron Company, on the Sangre de Christo Range, Colorado, at the elevation of ten thousand feet.

Nearby are groves estimated to con-

tain 640,000 trees per square mile, ranging from eight to sixteen inches diameter—each of which would make from three to five lengths of mine timbers.

An unwarranted prejudice exists in the mountain region against the Aspen, and it is seldom used except for fuel.

The old adobe houses, some built half a century ago, have flat roofs, covered with Aspen poles, upon which is a foot of earth. The melting snow moistens these poles in winter, while in summer they are thoroughly dry.

Fences are made of the long poles, laid up in the fashion of the rail fences, and in both situations the wood is remarkably enduring.

Where the trees are twelve or more inches in thickness Aspen may be sawed into lumber suited for boxes and all purposes where a white, soft, light wood is required. There are numerous uses for this lumber in the West.

Where so many mine timbers are used as in Colorado, the Aspen should be utilized to preserve the more valuable spruce and fir for future growth. The small coniferous trees now being cut for mine operations, often but five inches at

the stump, should be spared; they will be of much greater value in a few years.

For mine timbers the Aspen should be impregnated with chloride of zinc—a portable treating plant being constructed for the purpose.

Probably not more than fifty spruce timbers are secured from an acre. Long hauls over abrupt mountain roads, with but a few sticks on the wagon, make it quite expensive getting out these small timbers, and being immature they decay in two years. Aspen of a larger size can be treated quite cheaply, the plant being located in the valleys below the thickets, all the haul being down the slope. From one small valley which I examined there can be obtained three millions mine timbers. A hundred millions could be secured on the tract which I was investigating for the Colorado Fuel and Iron Company.

Should the Aspen be adopted for mine timbers it would result in the perpetuation of the coniferous forests of that region, which through the unwise policy of an unworthy employe are now being exterminated, losing forever all hopes of future forests.

The Aspen thickets should be thinned severely, but not entirely cleared away, as there is one provision of the Aspen which is seldom considered. The decay of such a quantity of deciduous leaves each year makes a deep rich mould in which seeds of pine, spruce and fir trees lodge, germinate, and protected by the Aspen, become valuable forests.

Intelligent persons now recognize the importance of these Aspen thickets in holding the snow, preventing too rapid melting, and thus the season of water supply is prolonged for the inhabitants of the lower valleys.

The view on page 159 is of the wonderful Stone Wall, an immense mass of rocks rising perpendicularly out of the mountains to great height and extending many miles. The high snow-capped mountains in the distance are of the Sangre de Christo Range referred to, and upon the summit and slopes of which are millions of acres covered with Aspens. It was on one of these peaks I obtained the photograph of the big Aspen tree.

INJURIOUS EFFECTS OF FIRE.

It has been solely from the action of fires that the great plain and prairie regions are treeless. Evidences are abundant that in former times all the now arid regions of our continent were covered with dense forests, some of monster dimensions. Of this we have more to say elsewhere.

The subject we now have in mind is the destruction of all vegetation by annual burning, throughout the sandy plains of the West, and also in other localities farther south and east.

The Pan Handle of Texas, New Mexico, Western Kansas and Nebraska and Eastern Colorado are instances, while Florida is another illustration.

For ages the grasses and herbaceous growths have been burned off each year, destroying all vegetation which otherwise would become incorporated with the sand and form a true soil of great fertility.

The total productions of every manufacturer of artificial fertilizers spread upon the surface, without admixture of soil, would not produce a growth of vegetation. Sand, without vegetable mould added, makes a very poor farm.

All the sandy plains of the West contain potash, and other mineral constituents in ample quantities to produce immense crops when water is supplied by irrigation.

But these sands, with all their mineral combinations, are subject to frequent loss by burning, during periods of drought, because of the absence of vegetable composition.

This is seen in Florida, a land of sand, that has been burned over by the aborigines, and afterwards by the cattle men, the pine needles destroyed; nothing has been added to the sand to form a soil. But in the thousands of depressions where moisture prevented the burning, rich hummock tracts have resulted, with a deep, rich, black productive loam.

These annual fires are destructive of all young forest growths as well, and prevent the natural spread of forests, besides the great losses each year of matured timber.

This practice of setting fires upon the prairies and plains, as well as within the forests, should be speedily abandoned.

Wood Preservation.

FROM the earliest antiquity there have been methods of chemically treating wood, cloth, and even flesh, to preserve their substances from decay. The Egyptians were better acquainted with this subject than is the world to-day. Their mummies of sacred animals, as well as human beings, are in perfect preservation after three thousand years have passed. The cloths, linen wrappings of the dead, and wooden cases enclosing the mummies are all preserved.

The Natron lakes supplied the antiseptic materials, asphaltum and bitumen; salt and precious spices were also used for this purpose. How well they succeeded is seen by the objects now found in every museum.

Other nations among the ancients practiced this art, and were familiar with the properties of many antiseptics.

In modern times various methods have been practiced for the economical treatment of wood, for ocean piling where the teredo is destructive, and for cross-ties, bridge timbers and other purposes.

In Europe the base of these preservatives is creosote—a product of wood distillation. Owing to the greater cost and value of wood there than in America, this expensive process is considered economical.

In America cheaper materials are sought for, and coal tar products take the place of creosote, but are used under the name of creosoting. They are not so enduring as the real wood creosote, yet are suited for the more expensive works of bridges and piles.

Railway ties are not as yet of such cost as to justify either of the above methods, and resort is had to the chloride of zinc solution.

The wood to be treated is placed in air tight chambers into which live steam is forced—treating and separating the fermenting sap from the wood. Afterward a vacuum is formed and this sap and moisture are drawn out of the cells. The hot solution of zinc chloride is next forced into the vessel and enters the

pores of the wood. Glycerine and other substances are supposed to fix these antiseptic materials in the wood.

SALT.

It has not been generally considered that salt is one of the best antiseptics known—and when once thoroughly impregnated with salt, wood is almost indestructible. This condition is maintained until the salt is dissolved and washed out by continuous moisture. Wood which is placed in Great Salt Lake for a season becomes so impregnated that decay cannot take place, and in this dry, semi-arid region, it would be many years before the salt could be removed.

All these processes add very materially to the enduring character of the timber. Cross-ties of beech would last but three years, and may be prolonged to sixteen years, the cost of treating being insignificant as compared with the cost of renewals.

Artificial treatment of wood, however, is not to be compared with natural preservatives. Substances in solution with water after being dried, may again be dissolved and in time lose their antiseptic power, after which the wood is subject to fungus attack.

The Catalpa gathers antiseptic substances from every soil in which it grows, builds it into the fiber of the wood and these can only be dissolved with alcohol, hence the everlasting character of Catalpa wood under conditions which cause other timbers to decay quickly.

The duration of telegraph poles may be greatly extended by dipping the lower end in a hot solution of asphaltum, allowing the wood to absorb a considerable quantity of the mineral. It is absolutely essential that the wood be well seasoned before applying the solution, otherwise the fermenting sap will cause a more rapid decay since moisture cannot escape. The poles should be coated two feet higher than the surface when the poles are set.



EUCALYPTUS CORDWOOD.

Petrified Forests of America.

WITHIN the arid and semi-arid belt west of the 99 meridian, west longitude, are numerous monuments recording a climatic condition far different from that which now exists. Forests in stone, evidences of a soil and moisture capable of producing growths in vegetation equal to our most favored regions.

These petrified trees are found in large numbers throughout all that portion of the United States in which at present the rainfall is the least and the vegetation most scant.

Duplicates of the Sequoias, equaling them in size. Cedars of mammoth proportion akin to those on the higher mountains of Washington, have been found in the Rocky Mountains where no living trees of like character are now known.

The petrified forests of Arizona are so well known because of the very beautiful ornaments made from the cut sections. Many tons of these trees have been sent to Europe where better facilities for cutting and polishing are had. The material reduced to a coarse powder is also used as emery, and corundum for grinding metals.

I visited the petrified forests of Florissant, Teller County, Colorado, in August, 1900. They are situated two miles from the station of the Colorado Midland Railroad, in a valley a mile or so in diameter which seems at a former period to have been a lake. The petrifications consist entirely of stumps, there were no logs, and are upon the higher slopes surrounding the valley. The character of the wood is well preserved in the stone, the bark, knots and wood are very perfect, showing the trees to have been some form of a Cedar; they much resemble *Thuja gigantea* of Washington. (In 1884 I measured a *Thuja gigantea* near Mount Baker which was 65 feet in circumference and was 265 feet in height.) There has been great numbers of these fossilized stumps but all save one have been carried away by collectors, only scattered clippings remain where they were broken

up for removal. I carefully measured the one remaining stump and counted the annual growths. It was at the time 45 feet 6 inches girth, but much had been broken off and removed; originally it was 18 feet diameter and 9 feet high. Five saws are fastened in the stone where vandals endeavored to saw it into sections for removal. There are $7\frac{1}{2}$ yearly growths to an inch radius, having required 1,620 years to grow. Young trees showed a more rapid increase. Twenty miles southeast of Denver is another Cedar stump the same size as this, while 22 miles south of Denver on the Colorado & Southern Railway is a log of mammoth size. This is on Cherry Creek near the old Santa Fe trail. Rev. M. Hamilton, a collector of fossils, first discovered its character in 1866. It was in three sections broken in falling. It has been mostly removed, blasted with dynamite and carried away. My informant, Mr. W. N. Byers, of Denver, describes it as when he first saw it in 1868, being 90 to 93 feet long and from 20 to 22 feet in diameter, partly imbedded in the earth.

There are many other wood petrifications in Colorado, at Boulder, about Golden and some in Middle Park, which are from 3 to 5 feet in diameter.

Near Sims, Morton County, N. D., on the Northern Pacific Railway, are quite extensive petrifications.

At Fossil Station, Uinta County, Wyoming, on Ham's Fork of Green river, are others. On Yakima river in eastern (arid) Washington and in eastern (arid) Oregon are large numbers.

A party of California prospectors while searching for minerals, reported in 1860 an immense petrified tree in a defile in Northwestern Nevada, not far from the Oregon line. This, according to their report, was larger than the largest Sequoia now living. Numerous other stumps and trees were seen in the same vicinity. This is an extremely arid locality and but seldom visited.

Neither science nor physics as con-

strued by modern philosophy, explain the contrary conditions existing in the Orient to-day with that of B. C. 1,000, or even A. D. 100. No more do they interpret the causes of America's arid belt or its encroachment upon the fertile country.

Meteorology details the thermal changes of the atmosphere and their influences upon air currents, moisture and precipitation, but meteorology does not explain why a country which once produced such massive trees should now be so barren, or why a province that once had abundant rains should be so arid.

Mathematics has no data upon which to predicate a theorem and is thus unable to enlighten us when this change occurred.

Geology makes mention of fossils and petrifications which are found in various parts of the earth, and in different geological periods; it presumes that indefinite ages have elapsed since certain changes occurred, but geology does not explain why these trees once thrived in a region which will produce them no more.

Botany gives the distribution of plants upon the globe, relates with minuteness those plants which exist in an arid climate, yet botany has never attempted to explain why the Sequoia grows upon the highest Sierras and nowhere else in the world, while undoubtedly it did thrive in the Rocky mountains in former times.

There is no rule of science which can satisfactorily account for the change which has taken place in climate since these trees grew. Nor yet how long since the change occurred.

Speculation fails to elucidate the problem and only tells us that the Sierra Nevada Mountains squeeze the moisture out of the passing clouds before they reach the desert. Was it always so? Was this natural law in force when the mighty Cedars and Sequoias were growing in the Rocky Mountains?

In the Orient, so long as the forests remained upon the higher elevations, the rain belt extended inland more than one hundred miles, but as the mountains were cleared of their trees, the desert encroached upon the fertile lands, gradu-

ally but surely, until all the land became arid.

So the rainless plains of the United States have obtruded their aridity by slow degrees, as extensive forests were destroyed by fires, by ice and by man, until the Pacific has been reached throughout the greater part of California.

The logical conclusion must be that forest covered elevations controlled the distribution of moisture through the atmosphere and abundant rains prevailed; but with the removal of these bodies of timber their influence was lost and aridity was the consequence.

When we reflect upon the vast area and density of American forests which existed only a century ago, and the terrible destruction of wooded lands, by forest fires as well as by the ax, and see the extreme carelessness of Americans in setting fires and in permitting them to destroy these forests with no effort toward prevention, by either state or national government and consider that greater destruction of forests have occurred in the Occident during the Nineteenth Century than in the Orient throughout the thirty centuries, preceding.

We well may contemplate upon the future of this land as more rapid climatic changes shall occur from this excessive denudation. It is of great importance that this nation should make earnest efforts to check such wastefulness and commence a thorough system of afforestation throughout the entire country.

The soils of all the semi-arid and arid lands contain every element of fertility, only wanting water to make them as productive as the most favored lands of the earth, and to support the population which America will have but a few decades hence, every effort should be made by state and nation to promote an increased rainfall in localities where moisture is insufficient.

We of the Occident have received from the Creator "a goodly land, a land flowing with milk and honey," and have been most extravagantly wasteful of our heritage. It is full time we were caring for the future of this land, if we possess true patriotism, not that which hubbles

over upon Fourth of July and election days, but the patriotism which seeks the best development and long continuance of this free American Republic. There is a duty for every citizen, a duty for each state and an imperative duty devolving upon the general government.

It should be the patriotic duty of every farmer who has no timber, to plant several acres—one-tenth his acreage is not too much.

The government should withdraw from sale all timber land remaining, selling from time to time a portion of the trees, but never permitting it to be entirely cleared. A systematic fire protection should be maintained, not only on reservations but throughout all timbered regions. All duties should be removed from wood, manufactured or unmanufactured, entering the country from abroad. Especially should this be the case with wood pulp, so large a quantity of which is daily consumed and which is so rapidly denuding American forests. Every encouragement should be given to forest preservation.

Restrictive legislation should be enacted by every timbered state, to prevent the entire denudation of non-agricultural lands.

Bounties and reduction of taxes should be offered by individual states, upon lands planted and maintained in forests.

Prairie states should encourage the planting of heavy and frequent timber belts, running east and west, to overcome the effects of siroccos or hot winds which annually are so destructive throughout the Missouri valley states. In this work Congress should be asked to extend government assistance.

It would be money well expended were the states to distribute seeds of forest trees. Since the failure of that important timber culture act can be wholly attributed to the neglect of the government to provide trees and seeds suitable for growth upon prairie and plain, the only available trees being what the pioneers could find on the river bars, cottonwood and box elder—both totally unsuited to such changed location.

It is full time that the government and states should offer practical encouragement for the planting of trees and per-

petuation of these forests, for the railways to show their confidence by making extensive plantations and for the farmers of the nation to awaken from their indifference and plant trees as a profitable farm crop.

If you love your country prove it by planting trees for its adornment and for the benefit of your fellow men.

HYPODERMICS FOR TREES.

As a result of recent experiments in science, it is claimed that the days of the wooley aphid, the codlin moth and other fruit pests are numbered. The new process of fighting orchard pests is unique. A hole or socket is bored into the trunk of the tree and in the opening is deposited a compound to be taken up by the sap into the branches of the tree.

It is claimed that not only are fruit and tree pests thus destroyed, but that the tree, by its absorption of the injection, is made healthy and thriving.

The compound injected into the tree consists of gunpowder, saltpeter, copperas and sulphur. Pulverized and mixed and applied according to a patented process, the ingredients are said to be readily absorbed by the tree.

Thoroughly diseased apple and peach trees experimented upon were purged of their pests, and the quality of the fruit improved and the trees grew sturdy under the tonic of the insecticide.—Saturday Evening Post.

This is truly refreshing. This old chestnut of forty years ago is now revived under the name of *science*.

When will American farmers and horticulturists cease to be gulled?

Certain minute insects feeding upon the leaves at the extremity of the top, others upon the rootlets at the other extremity, and a borer occupying a millionth part of the tree's trunk, must be poisoned by powerful compounds in solution by the sap. In order to be effective these minerals must be in sufficient quantity to destroy every fiber and cell of the tree, thus killing the tree. But then, as Barnum argued, the people are always on the alert to find someone to humbug them.



EUCALYPTUS GROVE LOS ANGELES.



CATALPA SPECIOSA

On grounds of the late Mr. H. H. Hudnewell,
Wellesley, Mass.

THE WILD BLACK CHERRY.

A BEAUTIFUL AND VALUABLE TREE.

The wild Black Cherry grows in most of our northern states and is also a native of Eastern Nebraska. I have raised it in large quantities the past two years. The summer of 1901 will long be remembered for its terrible heat and limited rainfall. Yet these trees did not mind either heat or drought. Some small seedling made 5 and 6 feet growth, and though beautiful evergreens were burned almost to cinders, and other trees and shrubs were being scorched by the fiery sun, these kept as fresh and green as though they enjoyed it. In growth they surpassed everything else, unless the

Giant White Poplar (*Nivea*.) The summer of 1902 was very wet, and these trees have made a wonderful growth, far surpassing the elm and soft maple. A year ago I planted some Nebraska seed, and some of them made over 3 feet, while some light seedlings are now 8 feet tall. In the spring these trees, when they are grown, will be a snowdrift of lovely white bloom, and in summer be loaded with black fruit which is the delight of the birds. The timber is very valuable for furniture and car finishing. The trees grow to a large size, and are very thrifty and vigorous.

C. S. HARRISON.

York, Neb.

PATRIOTISM AND FORESTS.

Patriotism is defined as the desire to serve one's country—a passion to better the condition of one's country. Patriotism is usually associated with "devotion to the flag," with war and all its horrors. But these are only two of innumerable ways in which one may serve his country. He may strive to make it a country of more abundant and accessible opportunity, a country of better homes, of greater happiness, of fewer graves rather than more. This would be a lofty and most commendable patriotism. But the highest possible type of patriotism is that which strives to make a country a better place of abode for those who are to live in it hereafter, because such patriotism is unselfish, there is no hope of "glory," salary or pension in it. It is the kind of patriotism best calculated to meet the approval of the God of nations.

AUSTRALIAN BLUE GUM.

Eucalyptus Globulus.

The Eucalyptus is a vigorous-growing tree, with long, strong roots. The seed should be sown in shallow boxes, in light, friable soil, covered one-sixteenth inch deep, and kept moist until the young plants appear.

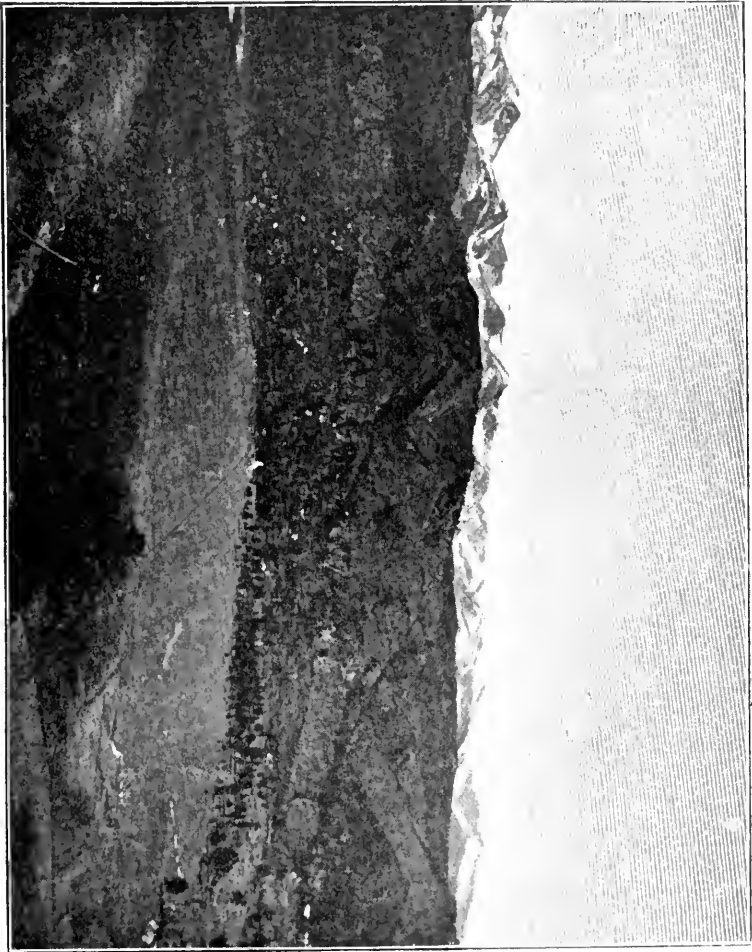
When four or five inches high transplant carefully into other boxes in such manner as to control the roots, or place in permanent location, as desired.

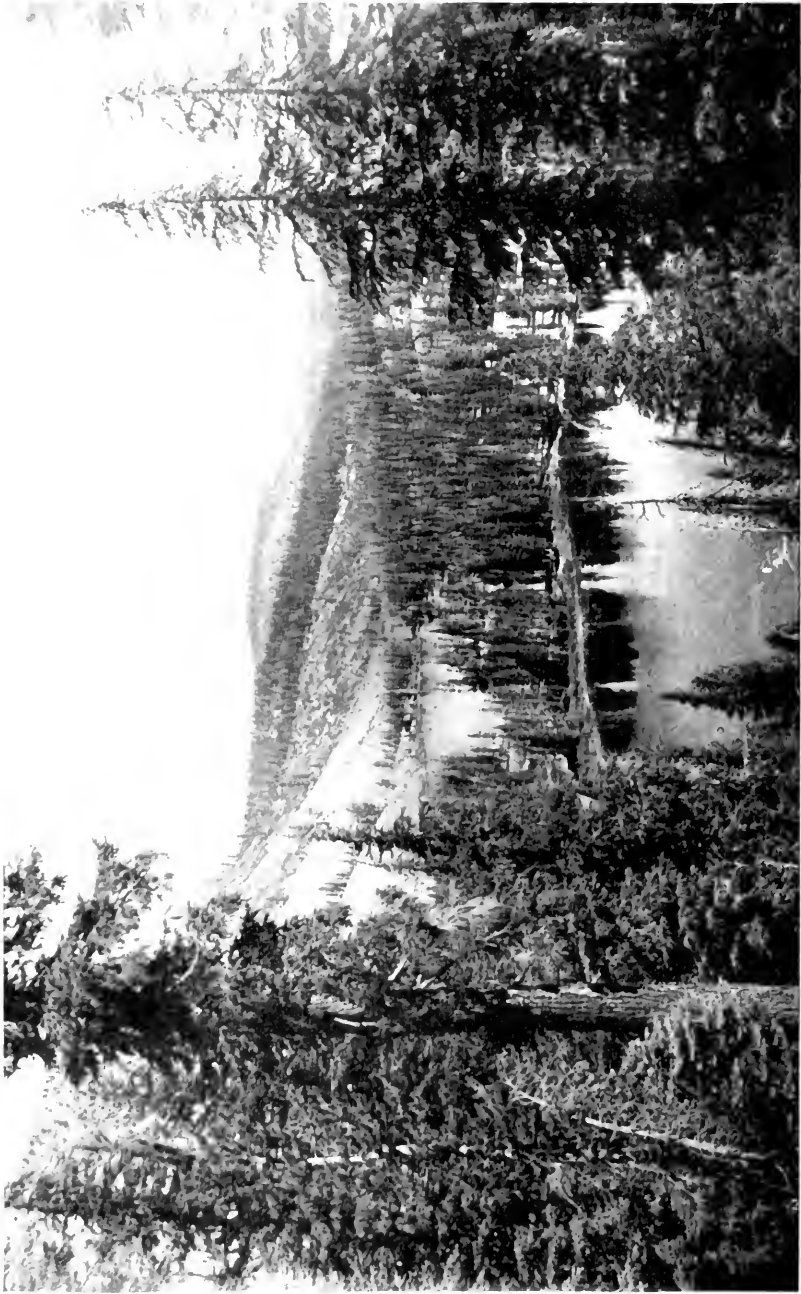
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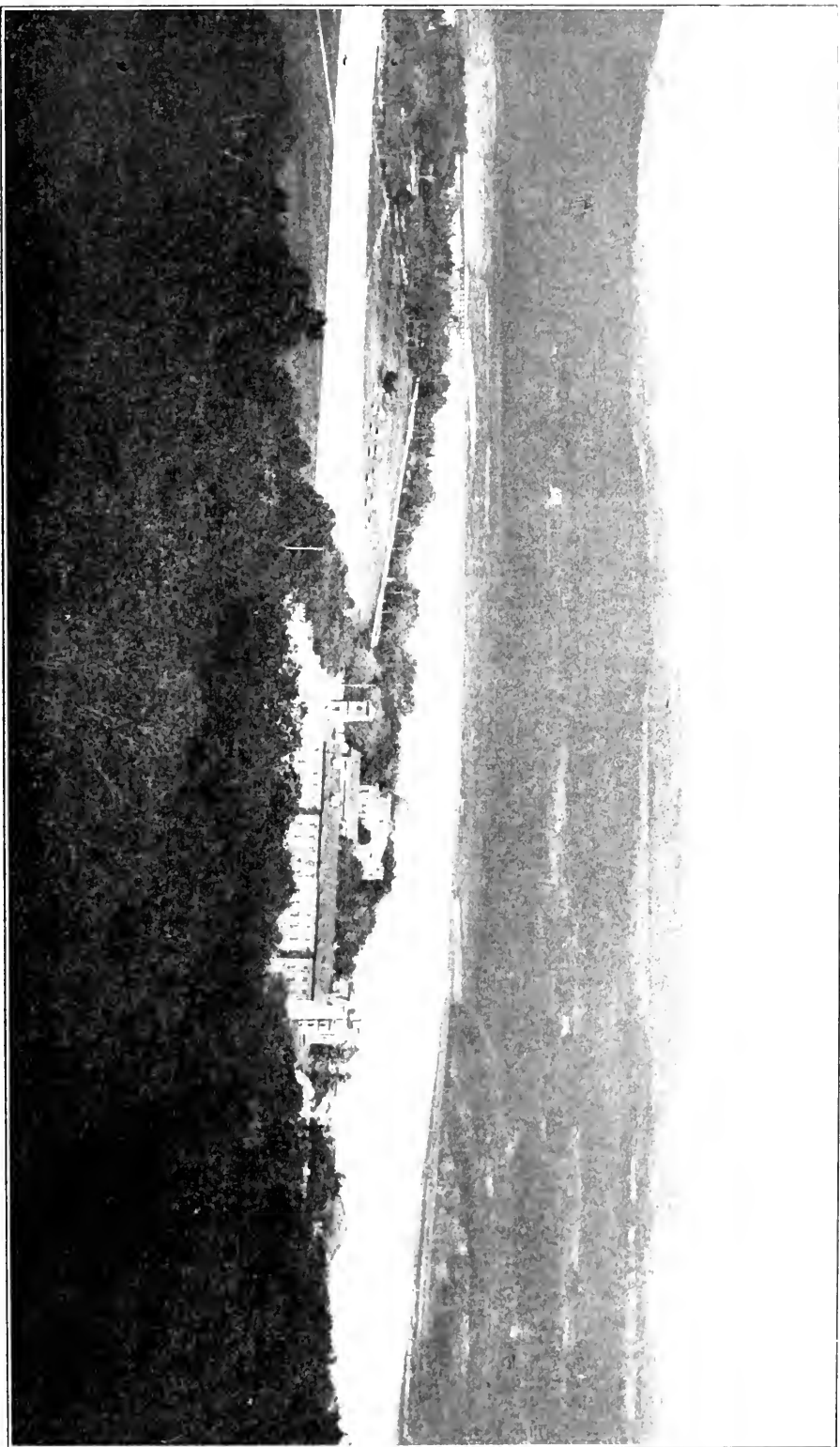
JOHN P. BROWN, - - - - - Editor.

STONE WALL AND SANGRE DE CRISTO RANGE.

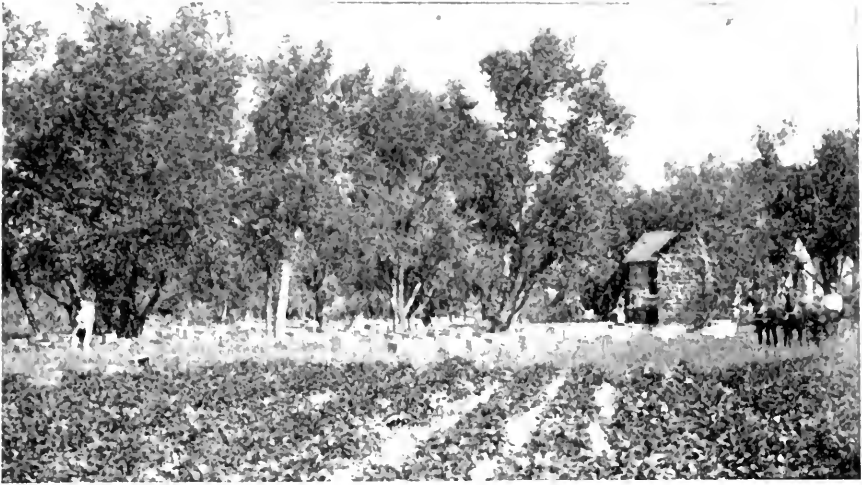




A LAKE IN THE SIERRA NEVADA MOUNTAINS, CALIFORNIA, REACHED BY THE SOUTHERN PACIFIC RAILWAY



WEST POINT—ON THE NEW YORK CENTRAL—BARRACKS AND LIBRARY IN FOREGROUND.
“The arms are fair, when the intent of bearing them is just.”—Shakespeare.



5 Great Irrigated Valleys

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RIO GRANDE VALLEY, NEW MEXICO. Altitude 3,700 to 5,300 ft.; 350 miles long; great sheep raising section; mining in adjacent mountains; adapted to fruit raising and small farms.

SALT RIVER VALLEY, ARIZONA. Early oranges, live stock, vegetables, small fruits, alfalfa, bee culture.

SAN JOAQUIN VALLEY, CALIFORNIA. Wheat raising, live stock, oil wells, alfalfa, raisin and wine grapes, olives, figs, citrus and deciduous fruits, almonds, walnuts; lumbering and mines in mountains.

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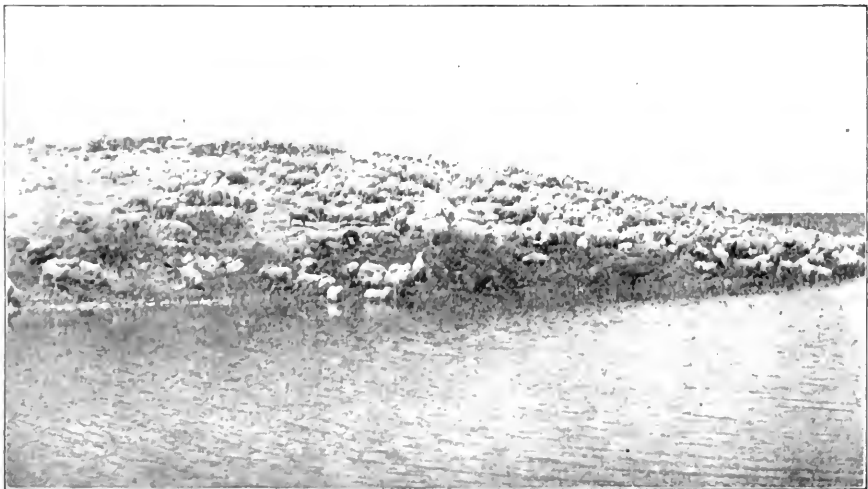
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Great Northern Bldg., CHICAGO

Santa Fe



"But where to find that happiest spot below; Who can direct, when all pretend to know?"

—Goldsmith.

Many are satisfied to live in Northwest Texas, having proved the value of the land in this region as a good Crop Raiser. Not only Cattle, but Wheat, Cotton, Corn, Feed-Stuffs, Cantaloupes, Garden Truck and Good Health flourish here—in a district where Malaria is impossible and very little doing for Jails and Hospitals.

Land, which is being sold at really low figures—though the constantly increasing demand is steadily boosting values—is still abundant; and Farms and Ranches of all sizes, very happily located, are being purchased daily.

We will gladly supply all askers with a copy of a little Book, published by the Northwest Texas Real Estate Association, which contains an interesting series of straightforward statements of what PEOPLE HAVE ACCOMPLISHED along the line of

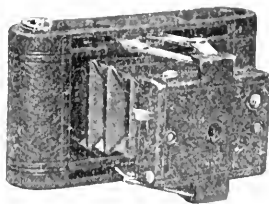
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Passenger Dept., Fort Worth, Texas.

N. B.—We find our passenger patronage very gratifying. It is necessary to run three trains daily each way as far as Wichita Falls, and two clear through. We continue, the year round, the excellent Class A service that insures the preference of Colorado and California Tourists, Winter and Summer. By the way, we offer now more than half a dozen routes to California, the newest being via Dalhart (also good for Old Mexico), with first-class Eating Cars all the way.

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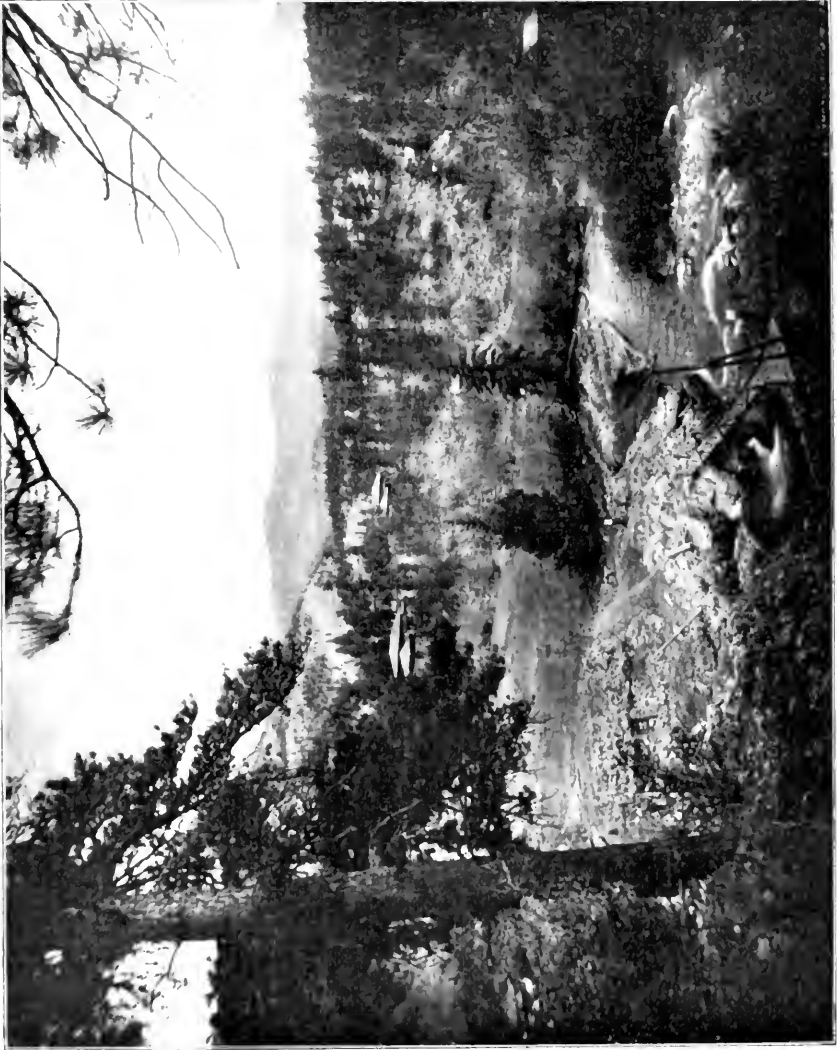
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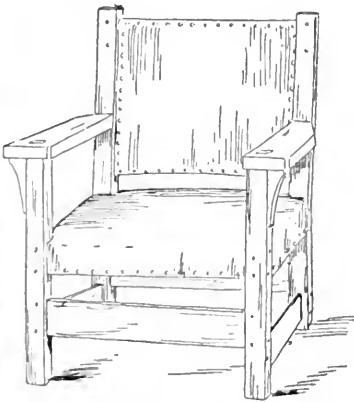
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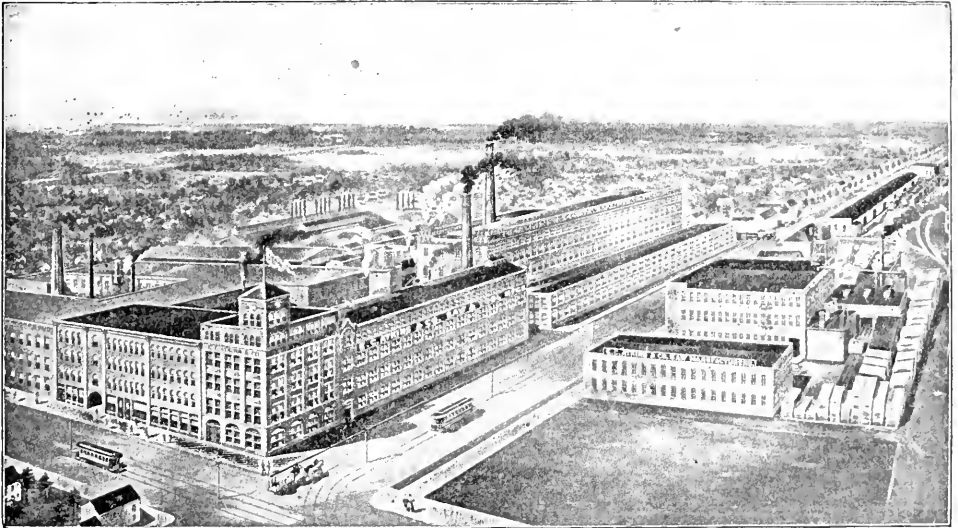
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JOHN SEBASTIAN,
Passenger Traffic Manager.

Chicago, January 15, 1903

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ARBORICULTURE

VOLUME II.

NUMBER 3



A Magazine of the International Society
of Arboriculture: Chicago, March, 1903.

THE INTERNATIONAL SOCIETY OF ARBORICULTURE

OFFICERS

GENERAL WM. J. PALMER, President, Colorado Springs, Colo.
JAMES H. BOWDITCH, Vice-President, Boston, Mass.
JOHN P. BROWN, Secretary-Treasurer,

ARTICLES OF INCORPORATION.

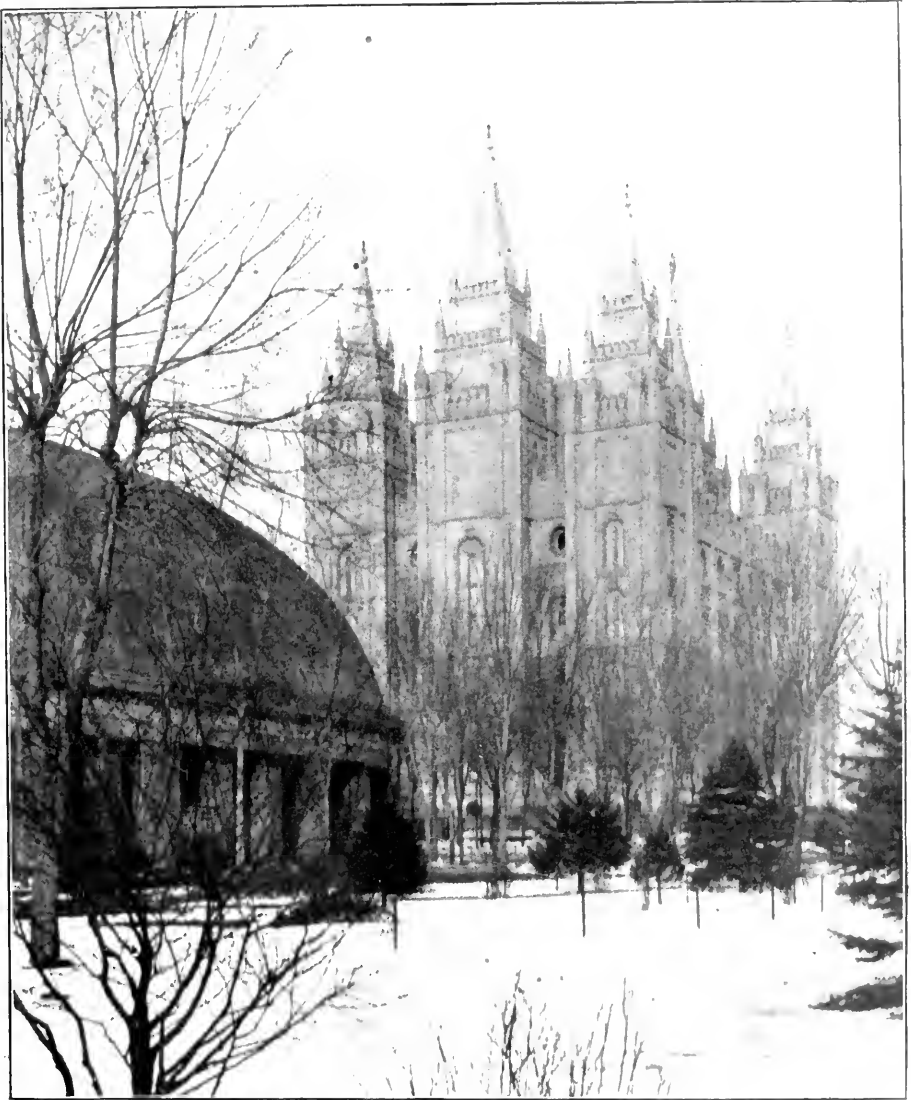
Article I.—Name. The name of this corporation shall be The International Society of Arboriculture.

Article II.—Purpose. The purpose of the Association is to introduce judicious methods in dealing with forests and woodlands; to advance and advocate a public interest in this subject; to promote the afforestation of unproductive lands; to encourage the planting and care of shade trees in parks, public and private grounds, and along streets and highways; to inspire an interest in our remaining native forests, and groves of ancient trees, and to seek their preservation; to supply information to railway officials in regard to timber culture for railway uses, and incite railway and other corporations to plant trees for economic purposes.

Article III.—Membership. Any person may become a member of this Society by the payment in advance of an annual due of two dollars, and on payment of this annual due shall be entitled to receive, regularly, one copy of ARBORICULTURE, the official organ of the society. Any person who may contribute ten dollars toward the support of the society shall become a patron. Honorary members may be chosen by the executive committee.

Article IV.—Officers. The officers of this Association shall be a president, vice-president and secretary-treasurer, who shall be elected at the annual meeting each year by ballot, and shall serve for one year, or until their successors shall have been elected and shall have accepted office, and when elected shall constitute the executive committee.

Article VII.—Executive Committee. The Executive Committee shall have entire control and management of the affairs of the Society.



THE TEMPLE, SALT LAKE CITY.
A City of Many Trees, in an Arid Desert Land.



EX-GOVERNOR WILL CUMBACK, GREENSBURG, IND.

ARBORICULTURE

A MONTHLY MAGAZINE.



PUBLISHED IN THE INTEREST OF THE
INTERNATIONAL SOCIETY OF ARBORICULTURE.



Subscription, \$1.00 per annum.

JOHN P. BROWN, Editor, Connersville, Indiana

Volume II.

CHICAGO, MARCH, 1903.

Number 3.

Disastrous River Floods Effects of Forest Destruction—Remarkable Rise and Fall of the Ohio.

The western rivers are again overflowing their banks, and causing desolation, loss of life and great destruction of property.

So long back as we have any history of the Ohio and Mississippi valleys, there have been floods and they will always occur when melting snows and down-pours of rain unite their volumes and seek an exit to the lowest levels, the ocean.

The first recorded flood in the Ohio river was in February, 1832. An extremely heavy snowfall had occurred in the Cumberland and Allegheny mountains and covered the western part of New York, Pennsylvania, all of Ohio and throughout the Ohio valley. Suddenly the temperature rose and rains occurred simultaneously over a very large area of country drained by this river. As a result, the Ohio rose to the then unprecedented height of 64 feet 3 inches. The next record of extremely high water was in December, 1847, when a similar combination of snowfall and continuous rains with high winter temperature brought the Ohio up to 63 feet 7 inches.

Official records of high and low waters were not begun until 1860, but the editor of ARBORICULTURE has had abundant opportunities during early life as a steamboat official to gather from the earliest

steamboat captains and pilots many unrecorded facts.

The depth of the Ohio at Cincinnati, was, in—

	Feet.	Inches.
February, 1858	55	5
January, 1862	57	4
March, 1865	56	3
March, 1867	55	8
January, 1870	55	3
August, 1875	55	6
February, 1882	58	7
February, 1883	66	4
*February 14, 1884	71	$\frac{3}{4}$
April, 1886	55	9
February, 1887	56	3
March, 1890	59	2
February, 1891	57	4
February, 1893	54	11
February, 1897	61	2

*The highest water ever known.

These being only the stages of 55 feet and over. August, 1875, the usually dry season, and February, 1884, being the highest water ever known at Cincinnati.

When it is considered that the width of the waterway or riverbed of the Ohio river has been increasing with every overflow of the water, by the caving in of farms all along its course, and that today the width between the banks is one-fourth greater than it was in 1832 and 1847, and therefore capable of carrying

a much greater volume of water than in the earlier times, it will be readily recognized that with the rapid denudation of the forest areas and erosion of the fertile soil capable of absorbing large quantities of water, the volume of water flowing away in one brief period is far greater than in times when the forest areas were so much larger.

The writer, as a boy, well recalls the river roads where all the travel between towns and farms along the Ohio passed. These roads were washed into the river and conveyed down the stream year after year with each recurrence of high water, the fences carried away, adjoining farms were swept into the whirling water, acres at a time were thus lost by the land owners along the banks. One house with which the writer was familiar was moved back from the river bank four successive times, each time being taken several hundred feet to a supposedly safe location. It was finally removed half a mile back and the roadway changed to a similar distance.

Meantime there was not, as is sometimes the case, any deposit upon the opposite side of the river, but the breadth of the waterway was increased each year and is now 1,200 feet broader than it was seventy-one years ago, at time of the highest water of early days.

But it is by no means the highest water only which is to be regretted on account of removal of the forest. During the long period of drouth which follows, the springs having been dried up, the streams run low and the period of extreme low water in which navigation is suspended or made very difficult is greatly prolonged.

Prior to 1862 there was no time within the knowledge of steamboatmen of the '40s and '50s when the rivers of the West did not have a good boating stage, usually 12 or 15 feet depth, while in more recent years the water has been so low that teams were crossing the Ohio by fording, the water being but two feet depth, all steamboats and crafts of every kind being idle for months at a time.

Many cities are dependent for water supply on the various streams and during the low water stages the contamina-

tion is far more serious, the impurities being concentrated to such extent as to cause much sickness. Of course, with all sewerage of cities polluting the streams, this becomes a serious matter when the water for a long time remains so low. During the floods of 1883 and 1884 there was great suffering throughout the flooded districts, thousands being destitute who were relieved by charity.

The temperature in February was what it usually is in May. Very unusual rains extended over all the states drained by the Ohio. The waters falling upon portions of fourteen states ran rapidly away and found an exit in the swelling floods of the Ohio.

The Allegheny was full to overflowing, bringing the water from far away Meadville, Oil City and western Pennsylvania, and from western New York almost to the borders of Lake Erie.

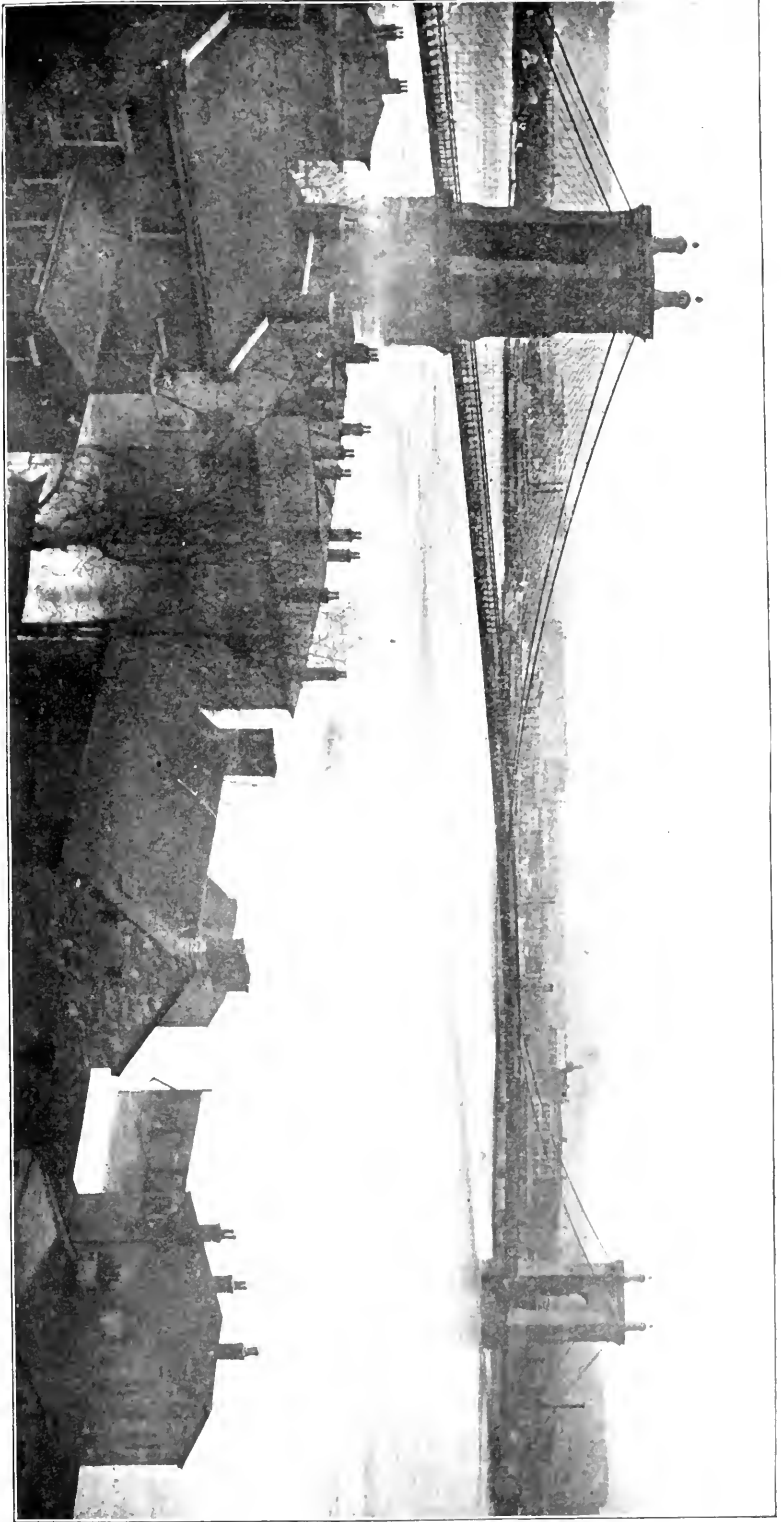
The Youghiogheny brought its tribute from near the Maryland line. Cheat river swelled the Monongahela and that river submerged a portion of Pittsburg. Water falling in Maryland found its way through the Youghiogheny and helped to swell the rising rivers of the West.

The Buckhannon of West Virginia, the Greenbriar and Kanawha emptied their contents into the now overflowing Ohio.

From Kentucky the Big Sandy, Licking and Kentucky rivers aided in the general outpour of waters. The cities along the Muskingum, Hocking, Scioto and the Little and Great Miami were submerged as those streams rose higher and higher over the low lying districts.

At Cincinnati the water kept creeping upward, passed the danger line, and all the lower districts were under water, but it did not stop at the highest mark previously recorded. The railways were covered with many feet of water, trains ceased to enter the various depots, but discharged their passengers in the higher outskirts of the city. The water ascended into the principal streets, filling the first and second stories of hundreds of business houses. Dwellers of the submerged districts who could not remove were fed from skiffs and boats approaching the higher windows. The manufactories ceased to operate, their

STREAMBOAT LANDING AND SUSPENSION BRIDGE, CINCINNATI OHIO. ON FEBRUARY 11, 1884, THE WATER AT THIS POINT WAS 71 FEET 5/8 INCH DEEP.



plants were under water. Farms for hundreds of miles along the river were flooded; houses swept away, stock drowned, and vast quantities of feed and produce were ruined. Bridges were torn from their foundations and borne away on the tide. Streams which are but rivulets had their banks overflowed by the back-waters a score of miles from the big river. Steamboats were barred from navigation, for they could not go under any of the bridges, nor reach shore at many landing places. Business was paralyzed, and yet the water continued to rise.

Lawrenceburg, which had a strong, high levee about the city, and was supposed to be safe, was flooded by the tremendous overflow coming in from the Miami and White Water, as their waters flowed in, overtopping the Ohio.

The several levels of the land along the rivers rise in terraces, fields quarter of a mile wide occupying each terrace. One after the other of these fields were submerged, until cellars upon the third terrace were filled with water. Crops were washed away, and homes had to be vacated.

Rails from fences, lumber from the yards, logs, bridges, barges torn from their moorings and frame houses were constantly floating by, attracting the attention of the wreckers who reap a rich harvest at every rise in the river. From some farmhouse the bank had caved away, carrying with it a brick cemented cistern, and this also floated for miles down the stream until filling with water, it sank.

A few towns along the Ohio are built upon high bluffs, Rising Sun being one of these; the highest floods cannot reach any but a small area in the lower district, but most of the towns and cities are less favorably situated and these suffered severely.

The Cumberland and Tennessee from far separated sources brought their waters, the former from the Cumberland mountains in Tennessee, the latter bringing the drainage even from Virginia, North Carolina, Alabama, Georgia and Mississippi, twice crossing the state of Tennessee, and both rivers pouring their

floods into the Ohio within a few miles of each other.

The Wabash and White rivers covered the land between them, forming a vast sheet of water underneath which lay hundreds of fine farms.

With all the unwelcome pouring of many rivers emptying into the already swollen Mississippi, that river widened its banks and flooded out over Arkansas, *forming a river forty miles wide*. Through the forests and over the fields the steamboats plied on errands of mercy, as a general outpouring of money and provisions from thousands of generous-hearted citizens sent contributions in vast quantities to those in distress, for thousands were homeless, having lost everything by the breaking of the levees and continued rise of the waters.

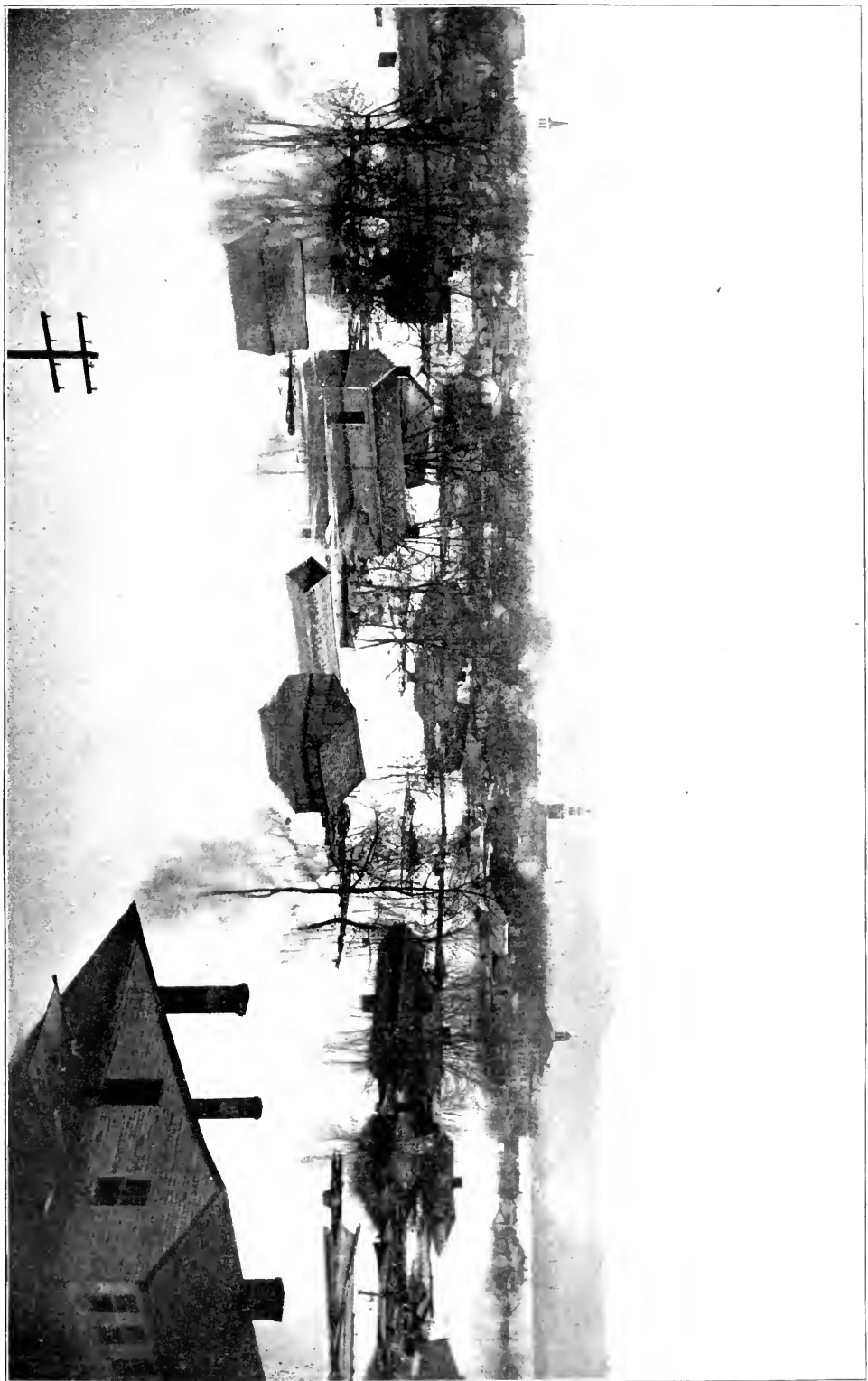
At Memphis the water stood at 37.1 feet, while in 1903 it has reached 40 feet, by far the highest ever known, and immense damage is being done in Arkansas and elsewhere.

At New Orleans, in 1897, there was a stage of 17.9 feet, while at this writing, 1903, it is 19.6 feet, and still rising.

The lower Mississippi Valley, from the junction with the Ohio to the delta, is a low, alluvial plain of varying width, the hills approaching the river in but few places. At Columbus, Ky., Memphis, Tenn., Vicksburg and Natchez, Miss., and Baton Rouge, La., are high lands for a very short distance. Except these the broad low lands have been formed from the sediment eroded from mountain, valley and plain many hundreds of miles away.

Upon each recurring season of high water the river has spread over the low lands, depositing a layer of mud near the banks, thus raising the river and its embankment higher and higher each year, until now, during full tide, the surface is many feet above that of the land.

In order to prevent this annual overflow and enable the planters to occupy the rich lands bordering the river, embankments or levees have been constructed at great expense along both sides of the Mississippi and also along all streams throughout these low lands.



LAWRENCEBURG FLOOD PICTURE. *By permission of Rombach & Grocie.*

There are few rivers flowing into the Mississippi in its lower course, but there are numerous bayous, tortuous in their passage, which convey the water through swamps, finally reaching the Gulf of Mexico.

When the river rises in its highest stage the levees become soft and yielding and frequently a crevasse occurs under the enormous weight of water, submerging thousands of acres.

This relieves the strain from the levees elsewhere and usually lowers the water enough to prevent similar losses farther down the river.

In 1897 there were 15,800 square miles of this alluvial plain beneath the sea of waters: 380,000 people were residents of the flooded area; 39,500 farms were submerged, with 3,800,000 acres of farm land.

Millions of dollars have been expended by the government and the several states of the South, in constructing levees, as in high-water the Mississippi is far higher than the surrounding lands.

Other millions have been used in damming up the outlets to this great river, in order to maintain a navigable stage through the bar at the principal estuary.

Here are two opposing conditions for which money has been lavishly expended, levees to hold the waters in a confined channel, and obstructions at the rivers' outlets which must necessarily prevent a rapid disposition of the flood waters.

When to these overflowing streams of the eastern water-shed there comes from the Rocky mountains the melting snows and from Texas and Colorado the cloud-bursts, which frequently occurs, through the Arkansas, Red and Canadian rivers and from the more northerly Platte, Yellowstone and Missouri, the antagonistic works of man must give way before the terrible influences of Nature.

But why all this waste of water when every drop that falls as rain or snow is needed by the growing population of the states of the West?

REMEDY.

By a systematic re-afforestation of the mountain regions and the planting of trees on the plains at headwaters of

these western rivers, and the construction of extensive storage reservoirs to supply water for irrigation, this country must be vastly improved in agriculture, manufactures benefited by water power, and navigation improved by a regularity of flow in various streams; a recurrence of such disastrous floods in the South would be impossible, as relieved of the surplus water of the western streams, which back up and retard the flow of the great Mississippi, the Ohio would be fully competent to carry away the waters of its drainage area. And with a proper systematic re-afforestation of the Allegheny and eastern mountains, and the broken lands along the various streams, the forces of Nature could be easily overcome and the nation be forever benefited.

Is it not time the statesmen of the South should unite with those of the arid West and formulate some practical scheme for storing these waters as in Egypt and India. And also in a system of afforestation throughout both East and West, in order that these surplus waters may be made to serve our country instead of mastering it.

Untold millions have been appropriated to be spent in a foreign land, for the benefit of Europe and other countries, but of questionable utility for America.

A fraction of this immense sum would be of immense benefit to the United States for all time to come, if properly expended in controlling the waters and regulating their flow, as well as for irrigation of the land.

The illustrations in ARBORICULTURE are mainly photographed by the editor in his travels. The camera used is the Eastman Cartridge Kodak, making a 7x5 picture. This is one of the best cameras made by Eastman and its character may be judged by the views secured by an amateur.

A lifetime is required to become a proficient photographer, but George Eastman has made it possible for even one who knows nothing of photography to secure creditable pictures where the services of an expert are not obtainable. We commend this camera to our friends.

Some Facts About Telegraph Poles.

Between Chicago and Denver, a distance of 1,050 miles, along one line of railway, there are 31,500 telegraph poles. They are set 176 feet apart, or thirty to the mile. As there are considerably more than two hundred thousand miles of steam railway in the United States, increasing in mileage each year, and many roads have double lines of poles to accommodate the great number of wires required to transact the telegraphic business of the country, there are eight million poles in use on railway lines.

When to this is added the poles used by trolley lines and by telegraph and telephone companies we find an aggregate of fifteen millions poles in use. If these should be replaced at once it would require 250,000 flat cars to transport them, eight thousand locomotives would be necessary to haul the trains, which if continuous would reach 1,750 miles.

If the poles were placed end to end they would reach more than three times around the earth at the equator.

A large majority of the poles in use are of White Cedar, *Thuja occidentalis*, which grows in the swamps of northern Michigan, Wisconsin and in Canada. Some are of Oregon Pine, a smaller number are of Red Cedar, *Juniperus Virginiana*, while a limited number are sawed from Washington Cedar, *Thuja gigantea*.

If the trees to replace the poles now in use were growing and forty could be obtained from each acre, it would require 370,000 acres to supply the poles for one renewal.

Were the seed already sown and started into growth, it would be A. D. 2050, when the trees would be of sufficient size to use for first-class telegraph poles.

There are few American forest trees which combine the qualities necessary to make good poles: durability in the ground; great length of trunk; freedom from large side branches which form knots; straight trunk with a regular taper, holding the size to great height.

The northern swamp White Cedar has long been considered the ideal tree for telegraph poles, but so scarce are these becoming that during the past year or two many car loads of Pine from Idaho and Washington have been shipped East to rebuild telegraph lines in both Michigan and Wisconsin, where the Cedar was formerly so abundant.

The long time required for Cedar to grow into a size suitable for this purpose, 100 to 150 years, is discouraging to investors who might wish to plant trees or hold forest property for the world's markets.

The Tennessee and southern Red Cedar is more durable, but is now very scarce, besides it is too valuable for lead pencil timber, and is of very slow growth.

The Juniper found in the dismal swamp also possesses the qualities of a good pole tree, but is quite scarce.

The specifications for telegraph poles demand timbers of unusual length, varying from 24 to 50 feet, having a diameter of 8 to 10 inches at top. They are set in the ground $4\frac{1}{2}$ to 6 feet.

Transportation is a great item of expense on poles. One car at Salt Lake City, from Michigan to Oregon Short Line Railway, contained 66 poles weighing 33,000 pounds, the freight being \$4 per pole.

Upon any good farm land in the middle states, the Catalpa Speciosa may be grown in sixteen years to a size suitable for telegraph poles, and for the largest size in twenty years.

Four or five times as many can be grown on an acre, systematically planted, as are secured in the northern swamps.

They may be grown near the points where they are to be used, and thus avoid excessive transportation, and when once placed in position on the line require to be renewed but twice in a century.

It will cost to produce such poles of Catalpa less than \$1 each, an investment which should attract the attention of business men as safe and profitable.



CHARCOAL PITS AT SUMMIT OF ROCKY MOUNTAINS, ON D. & R. G. RY.

Charcoal Pits.

Along the Colorado Midland Railway there are long stretches of mountain sides on which no growth exists to-day, scarce even a weed, yet a few years ago these mountains were densely covered with Douglas Spruce, Piñon, Cedar and other forest growths. The charcoal kilns lower down the valley, now deserted from exhaustion of supply of wood, stand as gravestones marking the burial place of the magnificent forests of the country.

Tennessee Pass on the Denver & Rio Grande has several of these forest destroyers.

In clearing the mountains of trees suitable for lumber, there are always many left to serve as seed trees, from which, in the course of time a forest may be reproduced. But when the charcoal burner starts to the funeral of a forest he always accomplishes his end in procuring a subject for his funeral pile.

Every tree, stick and branch is destroyed, the mountain being stripped of every vestige of forest growth. No young growths, no trees for seed, but absolutely a desert is made of the region.

With the abundance of coal throughout the entire country, there is no excuse for the charcoal burner. Railway companies which have a long life in expectancy and hope to have business for years to come, are dependent upon the forests adjacent to their lines for ties and lumber not only for their own consumption, but to supply their customers with lumber in future and on which they may have an income from transportation.

Officials must know and believe in climatic effect of forests, and should by all means in their power discourage the deadly work of the charcoal burner and refuse to transport their product.

Memorial to Congress.

We have received the following memorial to Congress from M. C. P. Wiltse, Newport, Neb., which ARBORICULTURE most heartily endorses.

Memorial and joint resolution, requesting that the federal forest reserve be increased; that forest warden be provided; that adequate measures be taken for the checking fires in the forest and that a fund be provided for the maintenance of the federal forest reserve, payment of officers and an establishment of a general forest supervision.

To the Honorable Senate and House of Representatives in Congress assembled:

Whereas, The vast area of natural forest in the United States is gradually decreasing, and thousands of square miles of territory formerly covered by dense forests has been shorn; vast areas are yearly being denuded by forest fires, which have become a menace to industries depending upon lumbering and constantly increasing the price of lumber.

Whereas, It has been the custom of other nations to preserve the natural forest areas and encourage the growth of timber.

Resolved, By the Senate and House of Representatives of the State of Nebraska, that our senators and representatives in Congress are requested to secure the passage of a bill that will provide that all forest areas in the territory of the Government of the United States in which the soil is not valuable for agricultural purposes, which may exist in tracts of more than one square mile, shall be erected into or made part of a forest reserve to be preserved and perpetuated for the lumbering interests of this nation and its citizens; that the surplus products of federal forest reserves be disposed of at market price for lumber, building and fuel by direction of forest wardens.

Resolved, That an appropriation be made by Congress for the payment of the salaries of forest wardens and expenses incident to the establishment of federal forest reserves.

Resolved, That forest wardens be ap-

pointed and provisions be made for the necessary patrol and supervision of forest areas on all tracts of land belonging to the federal government.

Resolved, That the commissioners of the Bureau of Forestry be authorized to request the assistance of state authorities and the United States army for the suppression of forest fires.

Resolved, That Congress increase the forest area by planting tracts of Government land unfit for agricultural purposes to forest trees in sufficient areas to conserve the increasing demand for lumber in the United States.

SPECIAL NOTICE.

The editor of ARBORICULTURE resides at Connersville, Ind., where his office will be hereafter. All mail should be sent to Connersville.

Office of ARBORICULTURE,
The Officers' Publication of
The International Society of Arboriculture.

Chicago, March 1, 1903.

To the Society:—It has been decided to reduce the subscription price of ARBORICULTURE to one dollar per annum—10 cents per copy.

There is a great interest being awakened in forest perpetuation and the planting of trees, through the efforts of this society. We hope to reach a much larger number of readers by this reduction in price, but the high standard of the magazine will be maintained.

We have refused to accept many well-paying advertisements, and under no circumstances will anything of questionable character be admitted to our columns.

It is hoped your interest will continue, and, if you have not yet paid your subscription, that you will remit at once.

If you have any communication to send, we will be glad to receive and print it.

Very respectfully,

JOHN P. BROWN,
Editor and Manager.



PINES PONDEROSA, NEAR PALMER LAKE, GROWN IN ABOUT TWENTY FIVE YEARS.

Pinus Ponderosa.

Among the Clouds in Colorado.

It is not an uncommon experience for mountain climbers to be upon a high peak and look down from a clear sky upon dense clouds from which snow or rain is being precipitated upon the plains or valleys below; the editor has had many such impressions, but on February the 23rd, while examining a large tract of pine timber on the divide not far from Palmer Lake, Colo., quite another experience occurred.

The morning was fairly bright, as at sunrise the range of mountains to the West, as well as Pikes Peak, was in plain view, the snow covered slopes shining resplendent as a ray of sunshine penetrated the partial mist, and the dark, steep canons contrasted with the more regular snowy surfaces. While yet admiring the beautiful scene, Pikes Peak was suddenly enveloped in clouds, and soon the entire range was hidden.

The elevation of this divide is 7,000 feet, no where steep, but with long, gently rolling slopes over which we drove in a buggy through the forests of Pinus Ponderosa. This tree is not a dweller of the highest Rockies, but gradually disappears at from 7,000 to 8,000 feet elevation—Spruce and Aspen appearing at the latter elevations.

Ponderosa is essentially an arid region tree, the melting snows and minimum rain showers providing sufficient moisture, while the sandy or gravelly soil of the plains suits its ponderous roots, enabling them to build up the super-structure which is so well named Bull Pine.

There seems to be no other tree of any consequence which will take root from natural seeding, grow rapidly and develop into valuable timber in a soil so dry and porous as exists throughout the plains regions, under conditions of aridity which prevail west of the 100th meridian and at such an elevation.

Pinus Ponderosa, therefore, possesses a value in reforestation as a grand forest tree which places it beyond the usual popular estimate of timber trees. It is the only solution of the forest problem for the great plains region, South

Dakota, western Nebraska and Kansas, Colorado and westward to California.

Of the millions of seeds produced, by far the greater quantity are devoured by small animals and also forms the food of birds, yet a sufficient quantity falls in good ground and germinates to quickly reproduce a forest where a sufficient number of seed trees remain.

The tract over which I was passing supplied the crossties for the Kansas Pacific railway in 1869, being hauled in ox-carts four hundred miles into Kansas. Again, a few years later, the trees which had become large enough were cut to the Denver & Rio Grande and Colorado & Southern railways. The last cutting was in 1884, when every tree above eight inches in diameter was removed for ties and fuel. The rapidity with which the young timber has grown is marvelous when the environments are considered. Many fine trees are now twelve to sixteen inches in diameter, and stand fairly well upon the ground. Seed has been produced in abundance and groves of young trees of from six inches to six feet in height are numerous where the seed has scattered in more recent years. On this tract care has been used to prevent fires and the young growths are therefore uninjured.

It is interesting to note the rate of increase in this timber in nineteen years. The trees eight inches in diameter were then cut for shingles; those of larger size for ties. Thus the growths which were seven inches are now twelve to sixteen and upwards in diameter, probably an average of six and one-half inches' increase, or one inch in three years, the increased area in the nineteen-year period being 3.7 times that in 1884, while the increase bulk is four times as great.

Towards noon the clouds began to descend, like a great fog, they rolled along. The temperature was reduced, being somewhat below freezing. There was no rain or snow, but upon every tree and on our garments and wraps there was a frosty deposit which clung with tenacity. We had some thirty miles to drive



YOUNG GROWTHS, SELF-SEEDED, IN THE PINERY.

through this cloud; objects at a distance of two hundred yards were entirely hidden, and at one hundred yards the trees could be seen dimly.

The frequency of this humidity at the altitude of 7,000 feet is probably the solution of the vigorous growth of the Pines here, where rainfall is irregular and so slight in quantity.

Early maturing corn, small grains and potatoes give quite excellent results in the parks or little prairies between the groves of Pine, while a high grade of grass and wild hay provides pasturage for many cattle.

About eight cents per acre is received for pasturage during the season, but where much stock grazes and tramps the forests the young growths are severely

injured. It is more than probable that for every dime received by the owner for pasturage, there is a loss of a dollar by reason of damage to young tree growths.

Examination of many dead trees proved them to have been killed by lightning or by former fires, since only one group of half a dozen trees showed the presence of the destructive bark beetles.

By a systematic effort at reafforestation, western Nebraska and Kansas, Wyoming and eastern Colorado could be reclothed with magnificent pines, but this is a matter which demands the assistance of the state and general government, and only a high degree of statesmanship will cause active interest in this direction.



THICKETS OF PINES PROTECTED FROM FIRE.



CHARACTERISTIC TIMBER INCREASE WHERE NATURE HAS A CHANCE TO PERFORM THIS SERVICE.

Forest Nursery Company.

Catalpa Speciosa.

Connersville Ind.

To Our Patrons:

In answer to those who ask the question "How do you grow *Catalpa speciosa*?" we write this letter, and it should be adhered to just so far as the planter sees fit. We write from our own experiences; other people have other experiences in doing the same thing, but in general they are the same.

Preparation of the Soil.—The ground should be broken in the fall so that it will be loose and dry, ready to be prepared for planting early in the spring. This is not necessary in order to grow trees, but it gives them an earlier start, which is very essential, on account of dry weather later in the season.

As soon as practicable after spring opens, pulverize the soil as much as possible without heavy tramping.

Planting the Seed.—When the ground is thoroughly prepared, lay it off in rows four feet apart, if you intend cultivating with horse cultivators, otherwise three feet is enough. This can be done with a garden rake or other light instrument, the main object being to rake a little furrow about an inch deep and several inches wide, into which the seeds can be dropped twenty or more to the foot. If planted on a hillside the rows should be made across the slope, for if the water is permitted to run down the rows it will soon carry away the seeds or even the small trees.

Covering.—The covering in Nature is only a few leaves or a very little soil, but that is in the forest where the rotten leaves hold the moisture. In the open garden or field the cover should be as much like the forest as possible. For this reason we rake over the seeds just enough soil to keep them damp until they germinate and get started to growing.

How to Cultivate.—About two or three weeks after planting, sometimes longer, the little trees begin to come through the ground. The weeds are up already, but if they are pulled the tender little trees break off, so they are left until

they are two or three inches high, when the weeds are pulled from the row and the middles hoed. This latter process should be kept up until the trees are strong enough to stand a few clods hitting them, which shows that they are ready for the cultivator, but never entirely let up on hand weeding until every weed in the nursery is lying in the sun to dry.

It is best to go over them with the cultivator every few weeks during the summer, not only to keep down the weeds but to loosen the ground.

Digging, Etc.—In the fall when the leaves drop off, the trees should be taken up, tied in bunches of 100 and heeled in some loose earth for the winter. If they need another year in the nursery they can be replanted, but if intended for forest planting, one year is sufficient.

The ground in which you intend to plant the yearlings should be plowed in the fall and the trees planted early the next spring.

If there are any further questions along this line we will be glad to do our best in answering them.

With best wishes we are

Yours very truly,

FOREST NURSERY CO.,
WALTER P. BROWN, Manager.

HOTEL DEL CORONADO,
Coronado Beach, California,
E. S. BABCOCK, Manager.

February 25, 1903.

John P. Brown, Esq.

Dear Sir:—I have read with a great deal of interest several numbers of ARBORICULTURE. I was born in Southern Indiana. Had thousands of catalpa trees cut for telephone poles in the Wabash Valley in '80 and '82. I remember the planting of catalpa trees alongside the old Evansville & Terre Haute Railroad, but at that time I did not know there were two varieties.

Am living out in Southern California now, and would like to experiment with the proper kind of tree.

Yours very truly,

E. S. BABCOCK, President.



CANAL AND POPLARS, SUBURBS OF SALT LAKE CITY.

The Lombardy Poplar. The Italian Tree a Favorite in Utah.

Throughout the valley of Utah, along the borders of the Great Salt Lake, the Jourdan river, Utah Lake of fresh water, and everywhere throughout the irrigated portion of the state, is seen the long lines of tall, stately Poplars from Lombardy. They surround the fields of almost every ranch, and line the streets of Salt Lake City. They form, even more than the Temple and Tabernacle, the unique appearance to which the desert city has attained. Provo and other towns have large numbers of Poplars, but not to the

extent to which they have been planted in Salt Lake City.

Nowhere in America is the Lombardy Poplar so generally used, nor does it succeed elsewhere as in Utah. The trees are so easily grown from cuttings and their marvelous growth, where water is supplied in unstinted measure, as along the many ditches which meander each street of the city and irrigate every farm, together with the peculiar effect upon an arid, treeless land, has made them the favorite with all of Utah's population.

The wind breaks formed by these living walls, reaching sixty or eighty feet heavenward, are very valuable to the ranches and aid materially in making the fields more productive. How? Well, in summer, when water grows less in the mountain streams and fields of grain are needing moisture, the current of air is diverted upwards from the field's surface and evaporation is thus reduced to a minimum, leaving the moisture in the ground for the plants.

In winter as the cold winds chilled by traversing snow-covered mountains and plains, the stock upon the ranch and families on the farm are spared the chilling, for these winds are broken in force by the lines of trees.

Deciduous trees, gathering strength from earth and air, accumulate a large quantity of valuable fertilizing materials in their foliage, which, when autumn comes and the leaves fall, they are spread over the fields by winds thus aiding in soil fertility.

To say nothing of the barrenness and dreariness of a land totally treeless, which has been changed by the trees planted by the Mormons to be a land of beauty and productiveness.

The Lombardy Poplar is a tree and as such is worthy of extensive cultivation, although the economic value of its wood is very slight.

It burns quickly and is not a good fuel. The trunk is too small to afford much lumber, which is not durable, and as a timber tree it cannot be considered of importance.

All of us may learn some useful lessons from the Mormon experiment in Utah.

Uniformity is necessary in street planting. Elms, Oaks, Cottonwood, Maples, Box Elders, etc., hit or miss, just as each lot owner fancies to plant, will not make a handsome avenue of shade trees.

On one's private grounds, variety is essential, but each public street should be uniform for best effect.

Our western prairie friends who live on rich farm lands so dismally free from any sort of shade or shelter trees should look to the Mormons, who have set a magnificent example in planting trees which may well be emulated.

INDIANA FORESTS.

Away back in the '50s, during a heated political campaign in which the Whigs and Democrats battled for control of the national government, the editor of *ARBORICULTURE*, then a boy of fifteen, heard the first political stump speech of his life—and to-day the memories of that day are fresh in his memory. The Hon. Will Cumback was the speaker during his candidacy for Congress.

Governor Cumback is well qualified to compare the dense forests of that early day with the few remaining trees of this time. His words of advice are golden and we hope they may be heeded by the farmers of Indiana.

My Dear Brown:—It has been my good fortune to have traveled in nearly all the states and territories of this country. I have been a close observer of the conditions in every place I have visited; and have concluded, all things considered, that Indiana, my native state, is the best of them all. In admiring the beauty of the scenery in our state, we have also the satisfying consciousness of the great fertility of the soil and her other inexhaustible natural resources. I wrote an article some two years ago which went the rounds of the press on "The Woodlands of Indiana;" and I propose herein to repeat substantially what I then said and if you think proper to do so, you may publish this letter for the consideration and action of your readers of *ARBORICULTURE*.

The greater part of this state was once a dense forest. There was only a small portion of prairie land. There is still on the border of almost each farm which was originally in the woods, a skirt of timber which adds a charm to the scenery that the monotonous prairie lands does not possess. Our public highways and our railroads often pass through and alongside of these woods and are seen by the traveling public as they go through this great central state. It is a matter of regret that our farmers, like those of other timber states, give little or no attention to their woodlands. They pay their taxes year by year on this part of their land *and because of their neglect get nothing out of it.* As a consequence

the briars and bushes grow up unmo-
lested in the timber, and rotten logs and
broken limbs and fallen trees, when all
taken together, make a very unsightly
appearance.

The decayed logs and limbs could be
burned, the undergrowth and stunted
timber removed, and the lower and un-
derhanging limbs of the standing trees
cut off, and the sunlight be let in to re-
move the dampness and thus brighten
and make cheerful the gloom and dread
solitude of the forest. A green carpet
of blue grass could take the place of the
dead and decaying leaves. The cattle in
the shade could grow fat and flourish on
the rich grasses of the woods and the
farmer be doubly repaid for all the costs
of the improvement of the woodlands.
This unsightly and unwholesome part
of his possessions would become a beau-
tiful park, and impress the beholder that
the man who held the deed and was the
resident on the premises was not a lazy
sloven, but an enterprising and industri-
ous citizen with an eye to the beautiful
as well as the useful.

And then, again, not only all this
would be accomplished but the labor-
ing man who had done the work in the
woods and beautified the same would
bless the owner who gave him a chance
to earn wages for the support of his wife
and children. It is but true charity to
give the laboring man work and good
wages rather than breaking down his
self-respect by giving him money he does
not earn.

If all the timberlands of our state,
especially those on our public highways,
were thus made beautiful parks as they
easily could be, I know nothing that
would so convince the thousands and mil-
lions of people of other states passing
year after year through our state of the
good taste and thrift of our people. It
would be a standing and effective invita-
tion to the best people of other states to
come and make Indiana their home. It
would add greatly to the value as well as
to the beauty of our land. It is such an
easy and profitable thing to do. There
is a sanitary as well as an esthetic and
financial demand for this improvement.
It is in every sense practical farming.
Let the farmers institute and the press

agitate the question. The movement
once started in real earnest would soon
go on to a finish. Those who refuse to
participate would be under the ban of his
neighbor and would sell out to some
who would.

It required the strength and courage
of two generations to conquer the forests
and remove the stumps, and put in the
tile drains and erect all the buildings of
the farm and procure all the improved
machinery for successful farming. All
that has been accomplished. The rails
that with sturdy blows were made out
of the oaks and the poplars fifty years
ago, from which the old worm fence with
its ugliness enclosed the fields, are pass-
ing out of sight. The beautiful green
hedge or the graceful wire enclosure
have taken the place and surround the
fields now free from stumps and bushes
and swamps. The generations before us
may not have had the time or the money
to clear out the woods. There is but lit-
tle excuse now. Indiana has been a
state for more than three quarters of a
century. The farms are generally paid
for and are otherwise well improved.
It is better for a farmer to improve to
the highest degree the land he has than
to be constantly investing his surplus in
the land adjoining. The *quality* of what
he possesses will give a more desirable
reputation as a farmer than the *quantity*.
Then let the woods be beautified and
made useful, and our state will attract
the attention and the commendation of
all who have a just appreciation of what
is meant by civilized life.

I am very sincerely yours,

WILL CUMBACK,

Greenburg, Ind.

READER:

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Do you realize the necessity for having
forests?

Do you want information on the sub-
jects discussed in ARBORICULTURE?

Have you a patriotic sympathy with
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JOHN P. BROWN,

Connersville, Ind.



MOUNTAIN VIEW.

Forests of the Rocky Mountains.

To know the mid-continental mountain country it is not enough to go hurriedly through the ranges by rail in mid-summer, when flowers are abundant and the emerald hue characterizes every peak and park. One must see the country when ice and snow abound, and the contrasts are most decided.

With from one to many feet depth of snow upon the surface, the Spruce and Aspen thickets of the higher elevations and the Pinon and Cedar on the lower slopes attest the majesty of Nature.

These mountains have been stripped of all larger trees by the ax-man and fire has ravaged the forests on every hand, yet Nature makes extraordinary efforts to cover the bare spots with verdure.

Among the fallen logs and leafless trunks still upright, remnants of former conflagrations, she has scattered the fine seeds of the Aspen on the wings of the wind, as this is almost the only deciduous tree which will grow in the higher mountains, and here among the ruins of a past forest dense thickets of this rapid growing *populus tremuloides* have established themselves, and are fast preparing a soil in which the more valuable conifers will, if they have opportunity, again re-cover these mountain sides.

The steepest slopes and most precipitous mountains, above 8,000 or 9,000 feet

elevation, are being planted by Nature with these most important pioneers of afforestation.

Birds, animals and the wind are doing their part in distributing among these Aspen thickets seeds of Douglas (red) Spruce, Silver Spruce and other trees of greater value and permanence, which, hidden by the fallen leaves, take root, and protected by their deciduous friends grow into timber.

The Aspens when dead and dry are very inflammable, and fire spreads with rapidity, destroying the coniferous forests as well.

The national government has not yet awakened to the necessity and importance of protecting the forests of these mountains from fire and spoliation.

The forest rangers are given far more territory to guard than their insignificant numbers can cover. There should be a hundred times as many men employed as are allowed by the authorities.

Here at the headwaters of the most important rivers of America no adequate efforts are being made to perpetuate the forests, without which irrigation will be forever impossible, navigation irregular and agriculture in the West a precarious occupation, while the mines, upon which so much depends, will be without timbers, except as it is brought from far distant points.

This snow which is filling the valleys and gulches, lying deep in the canons and beneath the Aspen thickets, will soon be melted by the June sun, and flow away to swell the flooded rivers.

One of the most important measures which Congress can consider will be to provide an ample fund and direct the Interior Department to increase the guardians of the forests and forever insure this region against forest conflagration. It is a possible thing to accomplish.

One forest fire in Colorado in 1902, destroyed ten million dollars worth of property. Repeated annually through Washington, Oregon, California, Idaho and Colorado, these fires have reduced the forest area to one-fourth their normal extent. America of the future, with her increased population, will have serious cause to condemn the indifference of the present statesmen, and the inhabitants who have permitted such wasteful, unwise forest policy.

BOTANY ALL THE YEAR ROUND.

BY E. F. ANDREWS.

The American Book Company have issued this very fine botany, which will be appreciated by teachers. Heretofore the interest in children and students has always lagged as the time of flowers passed, but this is unnecessary now, for every month has its peculiar attractions, when the mind of the student may be as greatly interested under Professor Andrews' new work. The illustrations are all fresh and new, and made very plain for youths.

FIRST BOOK OF FORESTRY.

BY FILBERT ROTH.

We are often asked what good book can be recommended as a guide in management of forests.

Messrs. Ginn & Company, Boston, with branch house at 378-388 Wabash avenue, Chicago, have just published this splendid work of Mr. Roth. It is profusely illustrated and deserving of careful study. We will say more of this in the future.

Four years ago if one asked, "Who is John McCutcheon?" the answer would be, the first man to get a complete story on the battle of Manila to his paper." A year later, perhaps it might be, "the man who is sending in such very clever letters from around the world, illustrated by his own drawings." But for the past two years or so his claim on popular approval has rested on his cartoons in the *Chicago Record-Herald*. They have been quite unlike any other newspaper cartoons in their inexhaustible invention, delightful humor, and close appeal to average humanity. Nothing so clever as the "Cartoons that made Prince Henry famous" has appeared in years, and it is interesting to remember that they pleased the Prince so much that he asked for the originals. Perhaps the most popular of Mr. McCutcheon's drawings have been those devoted to "The Boy in Springtime," "Summertime," etc. Their fidelity to nature, their kindly humor, and the delightful spirit in which they are conceived have attracted general attention and brought in many letters from people who like to be reminded of "what they did when they were boys." It will be welcome news that his cartoons are to be preserved in permanent form, as A. C. McClurg & Co. have just announced a collection of one hundred for early publication, under the title "Cartoons by McCutcheon."

THE MAINE.

With the lapse of time a kindlier feeling exists toward the Spanish nation throughout America, and thoughtful people are awakening to the realization that the sinking of our battleship was the result of natural causes.

It seems that the coal bunkers of the vessel were adjacent to the heated boiler room with only a thin partition between, whereas in English vessels there is a circulation of cold water between these important rooms, and the probability is that the explosion was caused by spontaneous combustion of coal dust raised to a high temperature by such close proximity to the furnaces, which we all know to be terribly hot in every sea-going steamer.

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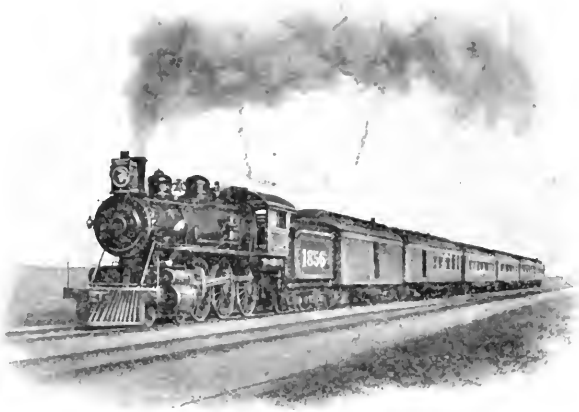
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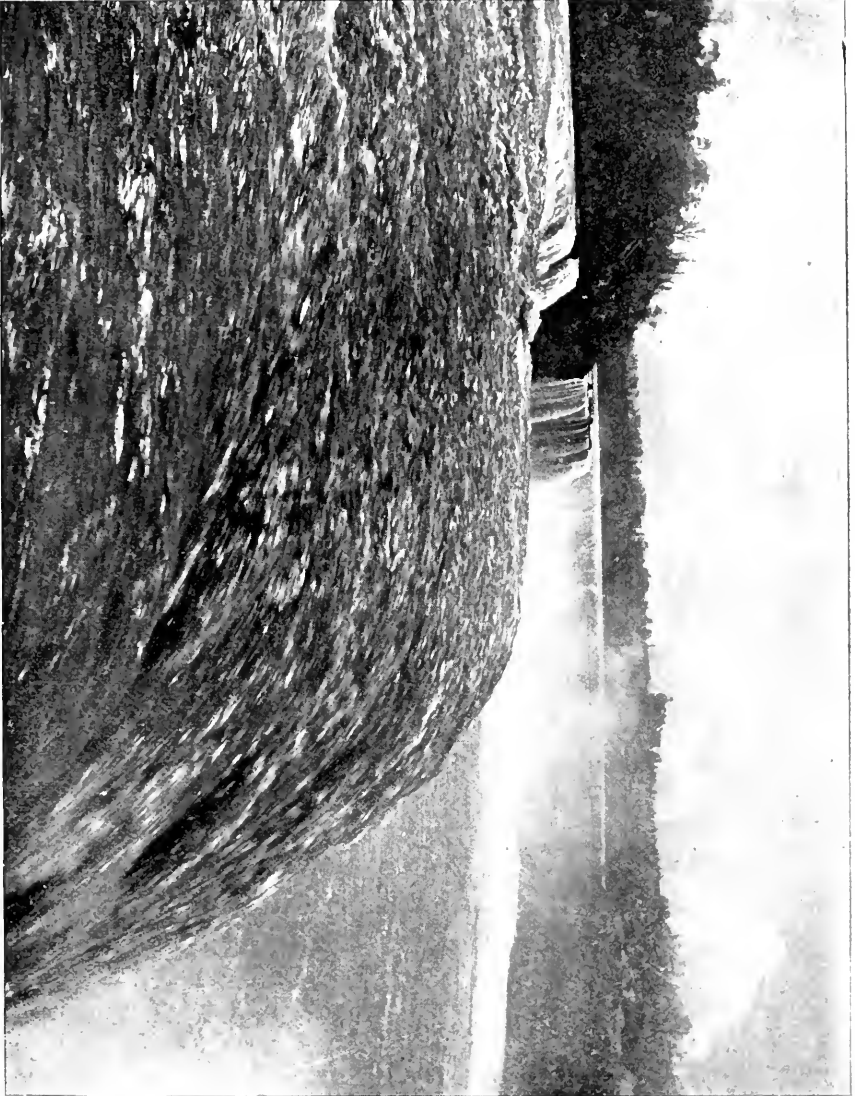
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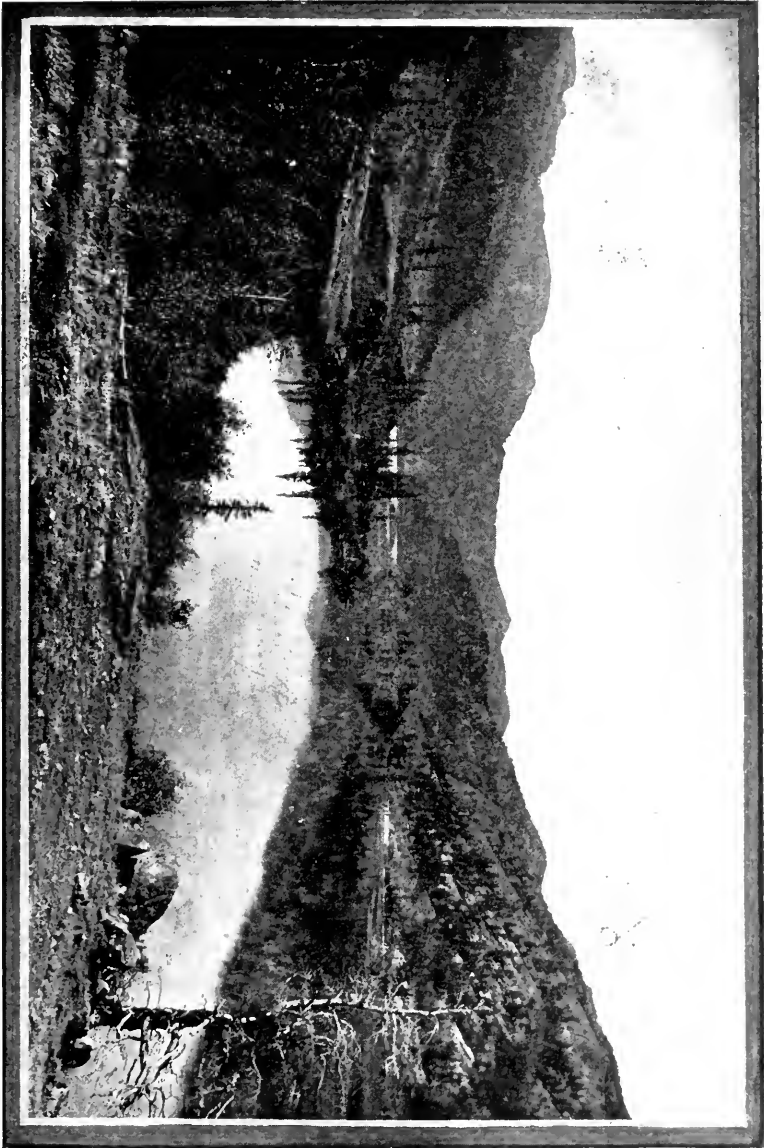
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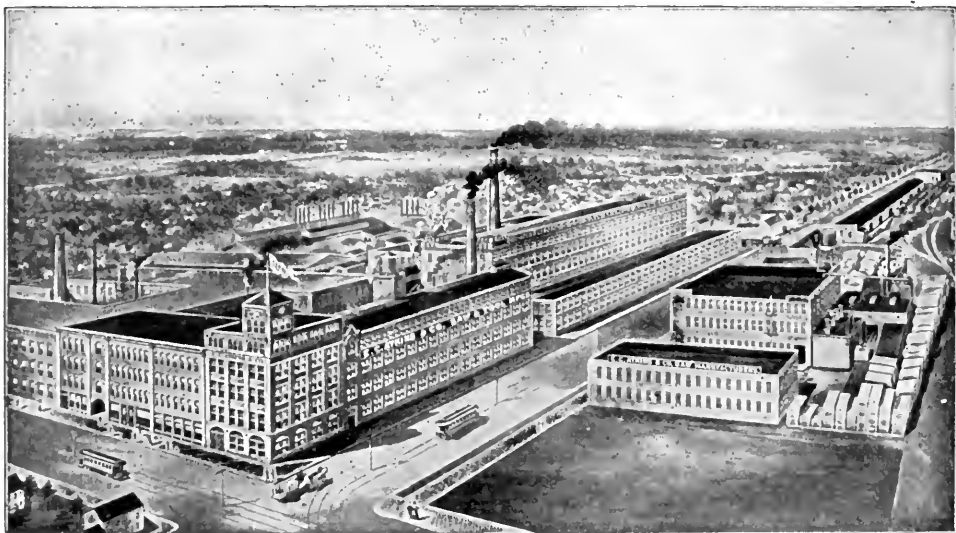
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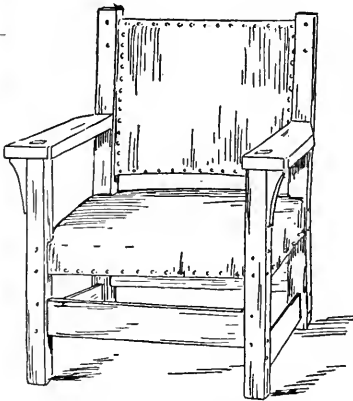
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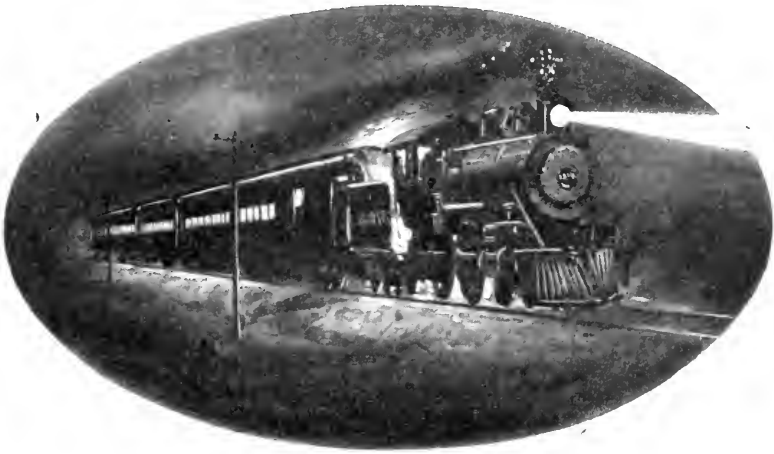
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KANSAS has long been known as a land of tall corn and billowing wheat crops, of blooded cattle and long-fleeced sheep, of fat hogs and fast horses, of rich soil and hustling people. It is not so generally known that it is also taking front rank in manufacturing by reason of cheap coal, natural gas, fuel oil and abundant raw materials. Land is still cheap. The man seeking a new home will do well to carefully inspect the "Sunflower State." In 1901 (a poor year everywhere) Kansas raised 90,333,095 bushels of wheat. In 1899, a big corn year, 225,183,432 bushels of that cereal were produced.

OKLAHOMA was first settled in 1889. In 1900 the population was 398,331. The growth since 1900 has been rapid, particularly in new railroads. Here are found, side by side, wheat, corn and cotton. Wheat is the leader—the 1900 crop was a "record breaker," 30,680,000 bushels. Cotton is the poor man's friend—the 1900 crop was 150,000 bales; its by-products are very profitable. In one county alone a corn crop of 2,800,000 bushels was harvested in one season. There are a million cattle in the Territory and a quarter of a million hogs. The Santa Fe is opening up Eastern Oklahoma.

TEXAS is the largest State in the Union. It can produce almost everything needed. It has sea coast and mountains, forests and plains, soils of every kind, a wealth of fuel, geysers of oil, growing cities and a hospitable climate. Its corn and wheat crop average 40,000,000 bushels annually. Texas gave to the world in 1901 four million bales of cotton. The lumber industry is immense. Rice is a comparatively new crop in Texas, suited to the low lands along the Gulf Coast. Experts pronounce rice a money-maker. The Santa Fe traverses the heart of Texas, with terminals at tide water.

COLORADO is popularly known as a mining State, producing gold, silver, iron and coal. Resultant of these interests have sprung up flourishing cities like Denver, Pueblo and Colorado Springs, with their big smelters and allied manufacturing industries. The principal agricultural section is in the Arkansas Valley, between Pueblo and Holly. Here are grown in profitable abundance sugar beets, melons, vegetables, small fruits and alfalfa. Ample water by irrigation and an immense beet sugar factory have attracted several thousand farmers, with room for ten times as many.

NEW MEXICO lies at an average altitude of one mile. Dry air and almost constant sunshine—the ideal country for outdoor life. It has mines of gold, copper and coal, great cattle and sheep ranches, pine forests and two magnificent irrigated valleys, the Rio Grande and Pecos. There are churches, schools, growing towns, and a refined social life. Small fruits, alfalfa and grain are the principal crops. On the wide plains cattle and sheep are grazed. In the mountains are fine mines. The Pecos Valley and Maxwell Land Grant are just now attracting special attention.

ARIZONA is in the semi-arid region. In average years enough rain falls in the hills to supply sufficient moisture under irrigation. In the Salt River Valley, near Phoenix, oranges are raised side by side with wheat; alfalfa fields nod to lemon groves and vineyards yield abundantly. Thousands of cattle are fed here each winter. Ranch life is very fascinating, healthful, and quite profitable. Around Prescott the mineral development is astonishing. It is estimated that Arizona mines have yielded \$200,000,000 in twenty-five years. Arizona has much to offer the young man who is ambitious.

CALIFORNIA California was once known only as a land of gold. Gold is mined there yet—millions of dollars a year. But other things have crowded it to one side—for example, oil wells, citrus fruits, wheat and cattle. In the San Joaquin Valley of Central California, a district 250 miles long and 50 wide, with room for 250,000 farms of 40 acres each, the small farmer is coming to the front. He raises alfalfa, has a small herd of cows, sells butter and eggs and sets out a vineyard. He arranges an orchard of figs or olives or walnuts, has vegetables to eat and sell, and a bank account at the end of the year. This is not all done at once, but sooner than "back East." Irrigation is the explanation. The mountains on each side are full of living streams. There are excellent local markets.

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ARBORICULTURE

VOLUME II.

NUMBER 4



A Magazine of the International Society
of Arboriculture: Chicago, May, 1903.

THE INTERNATIONAL SOCIETY OF ARBORICULTURE

OFFICERS

GENERAL WM. J. PALMER, President, Colorado Springs, Colo.

JAMES H. BOWDITCH, Vice-President, Boston, Mass.

JOHN P. BROWN, Secretary-Treasurer,

ARTICLES OF INCORPORATION.

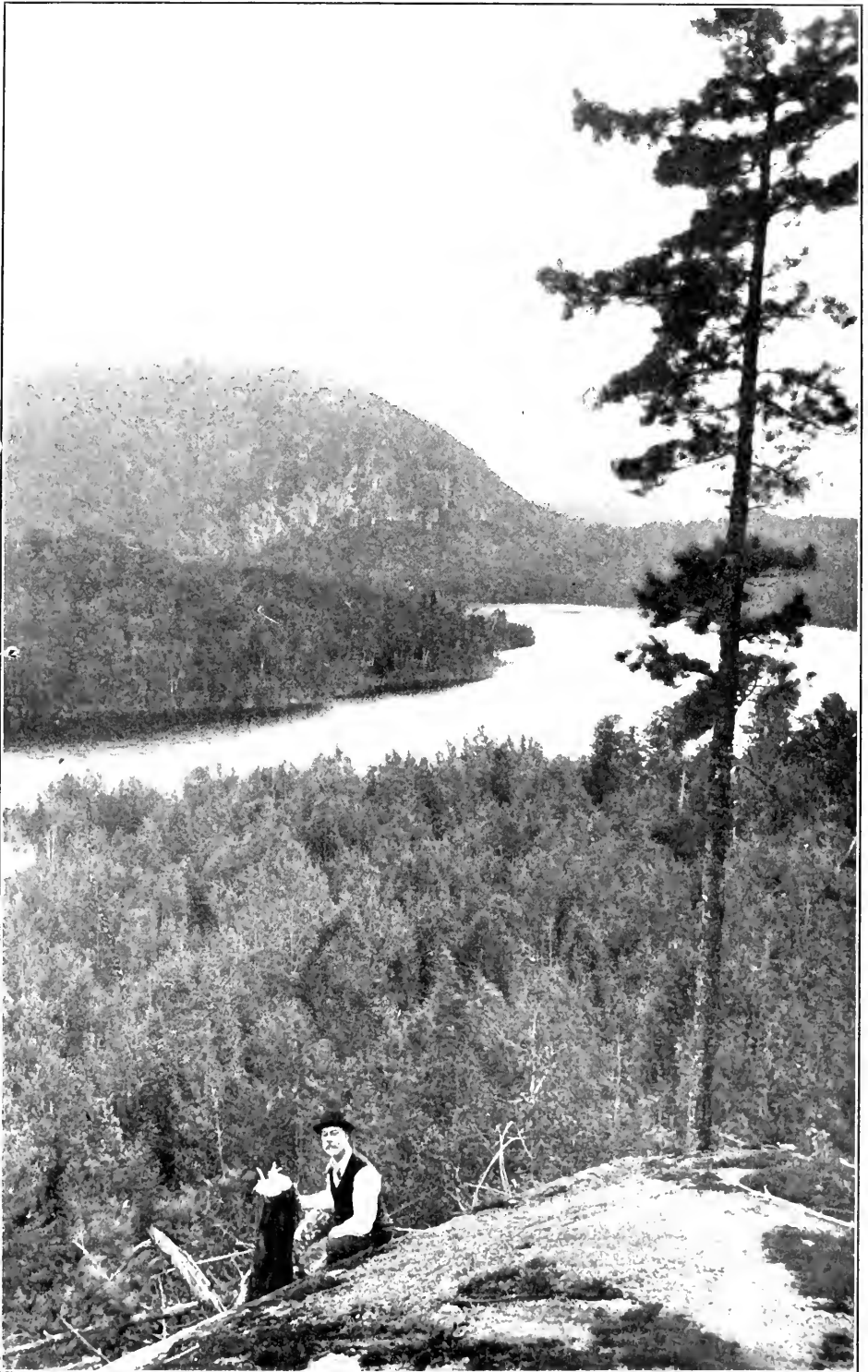
Article I.—Name. The name of this corporation shall be The International Society of Arboriculture.

Article II.—Purpose. The purpose of the Association is to introduce judicious methods in dealing with forests and woodlands; to advance and advocate a public interest in this subject; to promote the afforestation of unproductive lands; to encourage the planting and care of shade trees in parks, public and private grounds, and along streets and highways; to inspire an interest in our remaining native forests, and groves of ancient trees, and to seek their preservation; to supply information to railway officials in regard to timber culture for railway uses, and incite railway and other corporations to plant trees for economic purposes.

Article III.—Membership. Any person may become a member of this Society by the payment in advance of an annual due of two dollars, and on payment of this annual due shall be entitled to receive, regularly, one copy of ARBORICULTURE, the official organ of the society. Any person who may contribute ten dollars toward the support of the society shall become a patron. Honorary members may be chosen by the executive committee.

Article IV.—Officers. The officers of this Association shall be a president, vice-president and secretary-treasurer, who shall be elected at the annual meeting each year by ballot, and shall serve for one year, or until their successors shall have been elected and shall have accepted office, and when elected shall constitute the executive committee.

Article VII.—Executive Committee. The Executive Committee shall have entire control and management of the affairs of the Society.



IN THE QUIET OF THE ADIRONDACKS—ON THE NEW YORK CENTRAL.



THE PRIMAL FOREST, UNMARRIED BY AX OR FIRE

ARBORICULTURE

A MONTHLY MAGAZINE.



PUBLISHED IN THE INTEREST OF THE
INTERNATIONAL SOCIETY OF ARBORICULTURE.



Subscription, \$1.00 per annum.

JOHN P. BROWN, Editor, Connersville, Indiana.

Volume II.

CHICAGO, MAY, 1903.

Number 4.

The Sequoia Sempervirens, or Coast Redwood of California.

Scientists tell us that in the Pliocene age there were nearly twenty species of Sequoia, of world-wide distribution.

They grew all over Northern Europe, and in North America from the latitude of Nebraska and Dakota to Greenland and Alaska. Some of these closely resembled our two surviving species.

A mild climate and rich soil encouraged the growth of these magnificent forests, and beneath their shade flourished many plants and animals now extinct.

Then came that unexplained change of climate known as the Ice Age, and immense glaciers extended slowly down from the north over this fertile region, planing down hills, filling up valleys, and grinding off the peaks and ridges of mountains.

When it passed away, as in the slow eons of time all things pass, many forms of life had perished utterly, and failed to reappear.

Of the Sequoia, only two species survived, and these were both in California, the *S. gigantea* being restricted to the western slopes of the Sierra Nevada Mountains, and the *S. sempervirens* to the Coast Range, from the bay of Monterey to the Oregon line.

It is of the latter, the redwood proper, that this paper treats.

They are magnificent specimens of the tree world, their fluted columns rising

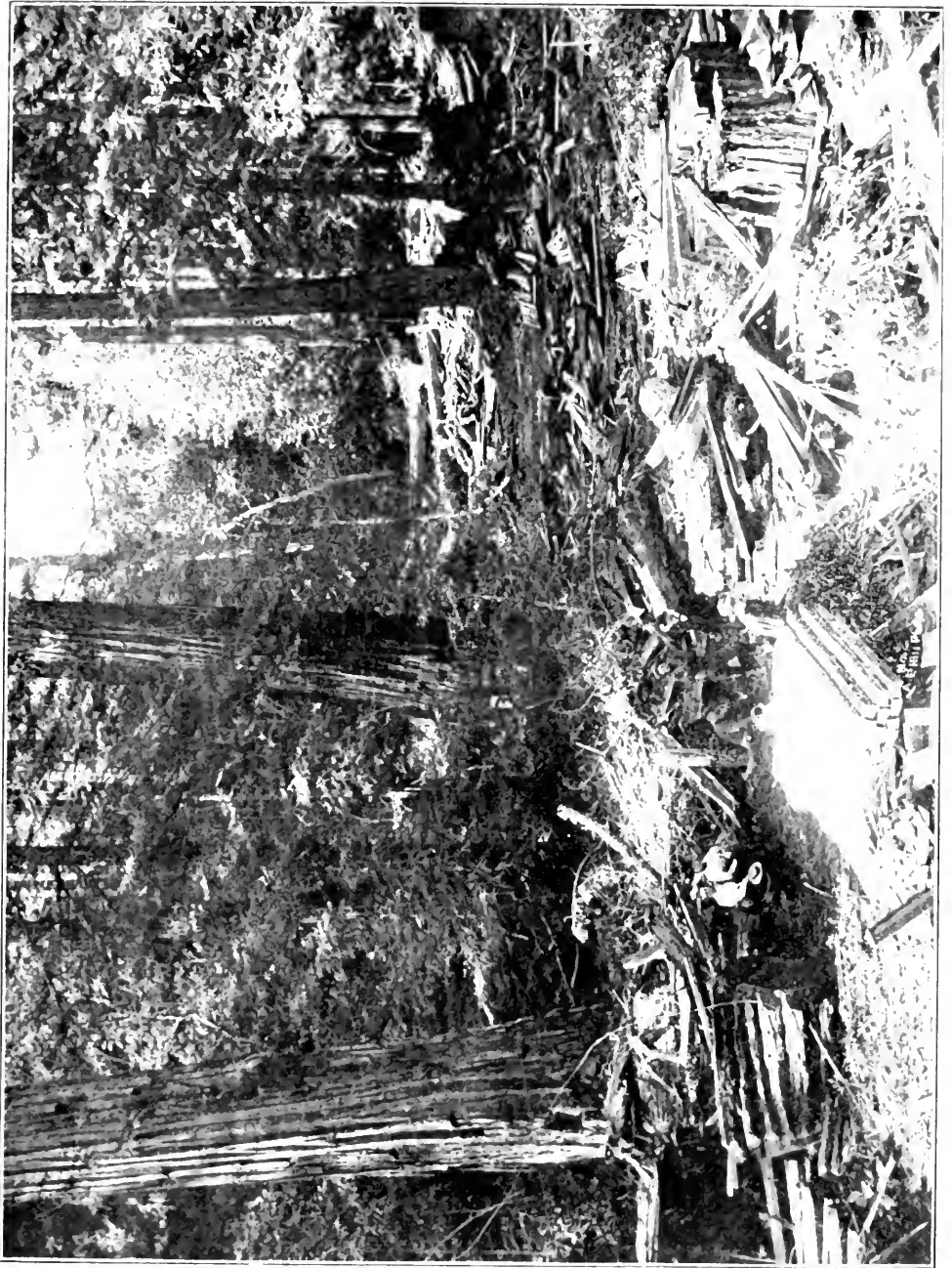
into the air a height of from two to three hundred feet and measuring from thirty to sixty feet in circumference a little above the ground.

For a third or more of the height, their trunks are clear of branches; then the boughs covered with the evergreen foliage stretch out and mingle with each other, forming a roof of verdure. The fibrous bark is of a cinnamon brown color, several inches thick. The wood is also of a rich brownish red; in quality light but firm, free and straight grained, quite durable and slow to burn. The tree is tenacious of life, the stumps even of the oldest trunks long retaining their vitality at the circumference and sprouting into a circle of fresh young shoots. It was on this account that the name *Sempervirens*—ever strong—was given to it.

Scientists differ as to the age of the largest trees, but the most conservative estimates place it at two thousand years.

When the Anglo-Saxon pioneer first penetrated into the Coast Range Mountains, he saw around him vast stretches of forest verdure, a wilderness ocean. Along the crests, down the ridges, on all the slopes and in the canyons stood the shaggy growth of centuries.

Redwoods rose in stately ranks, and around them, reaching to their lower branches, grew other coniferous trees,



GETTING OUT RAILROAD TIES

also oaks, madrones, horse chestnut, but-towood and laurel. Lower still were thickets of hazelnut, berry bushes and vines, manzanita, California lilac, wild roses, azalea and honeysuckle. Of ferns there was a great variety, the Woodwardia having fronds from eight to ten feet long.

From innumerable springs little rills trickled down to join the streams and swell the creeks, in whose waters could be found an abundance of fish. The forest abounded in game—bear, deer and smaller animals.

Into this region settlers came and secured land, taking up timber claims and acquiring a title from the government. The great commercial value of these forests was apparent, and as soon as wagon roads could be cut, sawmills were erected at convenient places on the water courses.

The trees that clothed the ridges near what is now Redwood City were the first to fall, being the most accessible, and the lumber was hauled by teams to build the houses of San Francisco.

Year after year new roads were cut, new mills put up, and the destruction of the redwoods went on.

A half century has witnessed the gradual denuding of these mountains, until now only a few sections remain whose original beauty has been untouched by ax or fire. The traveler who passes along the roads sees only here and there a remnant of the primeval forest; but he sees everywhere immense stumps, and often prone columns, stately even in their stripped and scorched condition. In some places a thicket of young growth has sprung up, presenting a surface of green foliage to the eye, but in many sections the traveler sees only a parched and barren expanse, stumps, burned logs, the dry beds of streams and a general aspect of desolation.

The building of railroad lines into the rich forests has facilitated the destruction of the trees. The branch of the Southern Pacific railroad, which reaches the town of Boulder Creek in the Santa Cruz mountains, is said to be the most profitable, according to its length, of any part of that system. Its cars haul away from this region annually millions of feet

of lumber in various forms, boards, shingles, stakes, railroad ties, telegraph poles, and cordwood. A thousand men find employment in the vicinity of Boulder Creek, and the bare and dusty hill-sides bear mute witness to their industry in the past. As a result, this region, one of the most beautiful formerly, is now one of the most barren and unattractive. Springs have dried up, water courses have shrunk to mere threads or disappeared entirely, and the winter rains, no longer held in check by the porous soil of the forests, rush away in torrents as soon as they cease to fall. Even the climate has changed. The rainfall at Boulder Creek was formerly the heaviest in the state, reaching the large amount of one hundred inches annually; it is now forty inches.

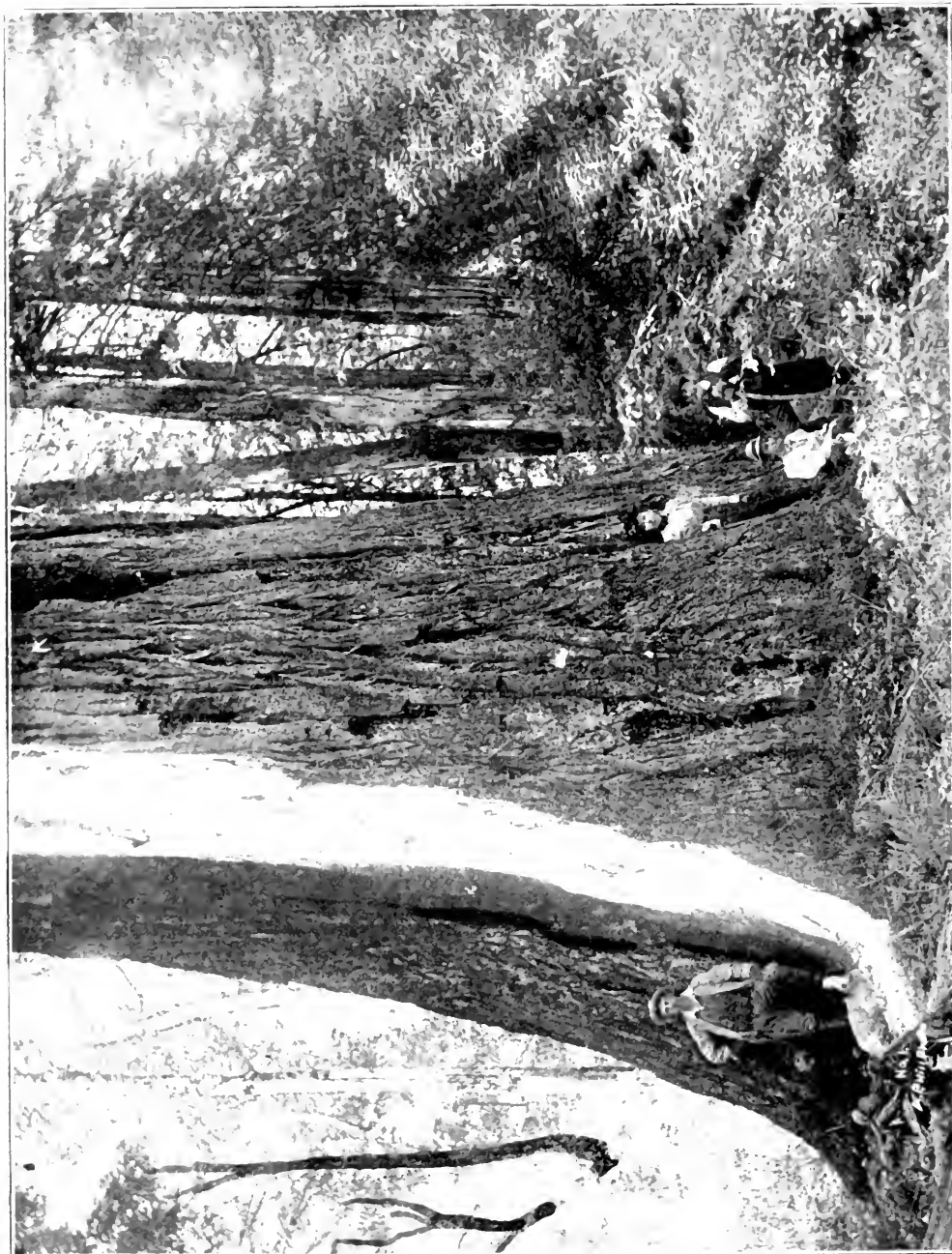
Having thus hastily sketched the history and general destruction of the redwoods, I will relate the fortunate preservation of the last surviving remnant of these forest monarchs.

THE RESCUE OF THE REDWOODS—HOW WE SAVED THE FORESTS OF THE BIG BASIN.

In the northern part of Santa Cruz county, surrounded by ridges of the coast range, lies a vast natural amphitheater, known as the Big Basin. It is a heavily-wooded tract of land, varied by hills and valleys and traversed by clear streams, which take their rise from the many springs within its boundaries. These streams, uniting to form creeks, find their way through deep, rugged gorges, and finally empty into the Pacific Ocean, not many miles away. From the seaward or western buttress—a ridge twenty-three hundred feet high—one obtains a magnificent view of the ocean on one side and the unbroken forest of the Big Basin on the other.

The land slopes away steeply on either side of this ridge, and the beholder sees, by only turning his head, the foam-fringed shore of the blue Pacific, ten or fifteen miles away, and the tranquil, dark-green depths of the redwoods.

On the seaward side he can view some traces of the presence and handiwork of man; a lighthouse here and there on a



IN THE REDWOOD FOREST THIS TREE MEANS SIX FEET AROUND

projecting point, a cleared place in the forest, the roof of a ranch home far away. But on the landward side it is just as nature left it, a solid surface of treetops down all the slopes and in all the canyons.

The Big Basin is not many miles from Boulder Creek, the center of the lumbering industry of this section, but its natural ramparts have preserved it from violation. It would be slow and costly work to cut wagon roads into it and undertake to mill the standing timber and haul it out by teams; so while waiting for the railroad to tunnel through one of its ridges and build a branch line into it, the mill men contented themselves with denuding the more accessible hillsides in the neighborhood of Boulder Creek. But redwood lumber was rising in value in proportion as it grew scarce, and at last the word went forth that the Big Basin was to be invaded, and the last remnant of virgin forest was to be given over to destruction.

Then the dormant public sentiment was aroused; then the cry went up: "Save the redwoods!" Letters began to appear in the newspapers; scientists bewailed the impending loss to the world; utilitarians prophesied the drying up of all the streams which had their rise in the Big Basin, and the consequent loss of the water for practical uses; sentimentalists deplored the despoiling of so much beauty; sportsmen remembered the deer covers and the trout pools.

Finally, in May, 1900, a party of eight consisting of representatives of these various classes, went to the place with a view of exploring it, learning the facts of the case, and seeing what measures, if any, could be taken to rescue the redwoods from total destruction.

When our purpose was announced, every facility was placed at our disposal and every courtesy shown us by the owners of the land. We went to Boulder Creek by rail, and thence by team twelve miles into the Big Basin. We took our own tents and bedding, but provisions were hospitably supplied us, likewise the services of a cook and a guide. At the end of the wagon road the team left us, and we pitched our tents on the banks

of a clear stream, fringed with elders and azaleas, and shaded by giant redwoods.

From this camp, as headquarters, we made long excursions on foot into the depths of the primeval forest. Without a guide we could not have found our way, for the trails were dim and overgrown, often marked only by obscure blazes on trees. Even old hunters, and others experienced in woodcraft, have been lost in this Basin, for it is one succession of wooded hills and valleys and running streams after another, all so much alike that the traveler gets bewildered.

Indian file, with the guide leading, we made our way through the untrodden forest, crossing streams on boulders or fallen logs, beating our way through thickets of hazelnut and huckleberry bushes, coming out into beautiful park-like openings clear of underbrush, hearing no sounds but the querulous challenge of a bluejay or the chatter of a squirrel.

It was truly:

"Primeval forest, virgin sod

That Saxon hath not ravished yet."

All around us the redwoods rose in stately ranks, their evergreen boughs blending far above our heads, so that we seemed to be walking through the aisles of some vast natural cathedral.

As we penetrated into the remote recesses of the forest, wondering what new scene of beauty would be unfolded before us as we climbed a ridge or turned the flank of a hill, we realized the joy of explorers; we understood how, in all ages, the charms of the wilderness have lured men away from civilization, and made them count as mere trifles the attendant hardships.

Some of our party measured trees and estimated their commercial value, with a view to naming a price for the land in the event of a future purchase; the sportsmen fished in the trout streams; the poet heard music in the sighing of the wind amid the lofty tree tops; while our photographer set up his camera and took many views of the forest scenery. This gentleman, Andrew P. Hill of San Jose, has been identified from the first, heart and soul, with the movement to save the



THE WORK OF DESTRUCTION

redwoods, and though many other enthusiastic workers have lent their aid by tongue and pen, by personal influence and active effort, to the cause, yet when a list of all who have participated is written, his name, like that of Abou Ben Adam, will lead all the rest.

We wandered in this magnificent forest for several days, meeting no one, hearing no human voice except that of our own party and apparently as remote from civilization as if hundreds of miles intervened between us and the haunts and homes of men. The only signs we saw to prove that we were not the first to tread the wilderness were two deserted cabins, on different sections and far apart, which had been the abode of the original owners of this land when they lived on it in order to take up their claims. These cabins stood open to wind and weather and blackberry vines grew on the heathstones and over the fallen sticks of the mud-daubed chimneys. Nature was fast reclaiming her own. Ferns, waist high, grew around the doorways, and obliterated the paths leading to spring or stream, and only the shy lizard darted across the floor which had once echoed to human footsteps.

One night sitting around our camp fire, with the murmur of the stream in our ears, and the stars visible through the interlacing redwood boughs above us, we talked of the best way to begin in the matter of trying to preserve this forest, to preserve it not only for ourselves and our friends, but for the state, for the world, for future ages.

We then and there formed the Sempervirens club, and pledged ourselves to work for the purchase of this forest as a state park. It was deemed unwise to ask the general government to buy it for a reservation, as there was already a bill before Congress asking for an appropriation for the purchase of the Big Tree Grove in Calaveras county, so we decided to solicit state aid in the matter.

We came out of the Big Basin full of enthusiasm for our project, and for the next few months we talked of little else. The movement met with warm approval from some people, with outright oppo-

sition from others, while many regarded it with apathetic indifference.

Newspapers rallied to our standard, university professors and teachers generally were in sympathy, so were such organizations as the Pioneers' Society, the Native Sons and the Native Daughters, etc.

We had gained an option on the land most heavily wooded, and the owners promised that no sawmills should be erected or cutting done until the legislature, to meet the following winter, had been asked for an appropriation. In the months that intervened a campaign of education was carried on. Circulars setting forth the project and illustrated by cuts reproduced from photographs taken by Mr. Hill in the Basin were scattered broadcast over the state; innumerable newspaper articles were written; public meetings were held, civic bodies and fraternal organizations passed resolutions. On the other hand, the movement was scoffed at as the project of dreamers and enthusiasts; hard-headed business men said it would not succeed; politicians called it a scheme to rob the state for the benefit of the owners of the Big Basin.

People, meeting us on the street, stopped to say in the soothing tone one would use to a mentally unbalanced fanatic: This idea of yours is a fine one, but it is impractical; the state will never appropriate so much money for an obscure tract of land away off in the Santa Cruz mountains. But as Tennyson says in his poem, "The Defense of Lucknow," after stating with cumulative force all the hardships and horrors of that siege—

"Ever upon the highest roof the ban-
of England blew."

So in the face of a thousand difficulties and discouragements the friends of this movement pressed on, so, figuratively speaking, above the din and conflict waved the banner of the Sempervirens club. Finally the legislature met, the bill was introduced; then came the tug of war. Friends lobbied for it, enemies opposed it, politicians wrangled over it; leading newspapers of the state took sides for and against it. Space forbids the giving of particulars; suffice it to say that the fight was a hard one. But

finally it became apparent that public sentiment was in favor of it. The bill passed the house and was brought into the senate, had a narrow escape from being snowed under, was rescued and read out of its turn and passed in the closing days of the session. The next question was: Would the governor sign it or give it a pocket veto? Strong pressure was brought to bear on him to prevent his signing it. These were anxious days for the friends of the movement. They made their last rally, and the consequence was that a flight of telegrams from all over the state reached the governor's office and lay on his desk and floor as "thick as autumn leaves in the vale of Vallambrosa."

He was convinced that the people wanted, with genuine and strong desire, to save for themselves and for posterity that heritage of the ages, that forest of redwoods. He signed the bill, and a shout of triumph went up from all who had worked for the cause. In accordance

with the provisions of the bill he named a board of five commissioners, of which he was a member by virtue of his office, to negotiate the purchase of the desired tract. Some delay ensued, as surveys had to be made, boundaries determined upon, titles looked up and other tedious details settled, but a tract of thirty-eight hundred (3800) acres, including the most heavily wooded land in the Big Basin, has now been formally acquired by the state, and is called the State Redwood Park.

The original *Sempervirens* club, instead of dissolving, as a body whose work is finished, has just been reorganized, with a larger membership than ever.

In the future it will work for the acquisition of adjoining territory, for the enlarging and beautifying of the tract thus rescued from destruction.

MRS. STEPHEN A. JONES.

San Jose, Cal.

The Colorado State Forestry Association.

PRESERVE THE FORESTS AND PLANT TREES.

The Colorado State Forestry Association has gone to work in earnest. It is offering three prizes for competitive Arbor Day tree planting by the public schools of the state—\$25, \$15 and \$10.

The offer is made through the state superintendent. The conditions on which the awards will be made are set forth in the Arbor Day Annual, now being distributed to the schools.

It is inaugurating a campaign of forest agitation for the purpose of interesting the citizens of Colorado in forestry and forest preservation.

That this is necessary is seen in the fact that forty-five years of fire and pilage have reduced her mountain forests from 36,000 square miles to less than one-sixth of that area. The gravity of the situation leads us to ask you to join in an effort to arouse the citizens to a

sense of the danger that threatens to denude their mountains.

They will print and distribute the forestry laws, and publish leaflets and bulletins of information on forestry subjects for distribution, plan for public meetings over the state, besides other means to stimulate interest to be announced later on.

Life membership fees are \$10, annual membership at \$1. Drafts and money orders made payable to Jabez Norman, secretary. Address, The Colorado State Forestry Association, Denver, Colo.

We feel assured that this association will accomplish much good and wish it abundant success in its aggressive movements. Vice-President W. G. M. Stone has long been an earnest friend of arboriculture, as also was the lamented W. N. Byers.



ADIRONDACK COTTAGE OF THE LATE PRESIDENT HARRISON.
Courtesy of the New York State Forest, Fish and Game Commission.

The Forest, Fish and Game Commission, State of New York.

A Most Interesting Report.

The eminently practical work which is being accomplished by this commission is to be commended, and the attention of statesmen in all parts of this nation is called to the grand results which are being secured through the systematic and thorough efforts of New York.

The great river systems of the state were in danger of serious interruptions in their flow from the extensive forest removals, while manufacturers were threatened with a famine in timber, which was driving many to other localities where a greater abundance of forest products could be obtained.

The commission has taken precautions to check the ravages of fire, which should be studied by legislators in every state and by our national Congress.

The cut on page — shows how a fire is extinguished before it has gained too great headway.

"As usual the causes of these fires were various, the principal ones being in their order as follows: The carelessness of farmers in burning brush for agricultural purposes; sparks from railroad locomotives; and the camp, or coffee, fires left by fishermen and hunters. Berry pickers, tramps, picnic parties, summer boarders and boys at play were each responsible for one or two cases. One fire was started by an insane man, and one caught from a charcoal burner's pit. The returns include, also, as in previous years, a large number of reports with the statement, 'Cause unknown.'

"In the returns made by the fire wardens of the State of New York for the year 1902 much of the burned territory included in their reports consisted of open country on which there were no trees, the land being covered with briar patches or shrubs of small growth. There were large areas, also, covered with huckleberry bushes, that were set on fire and burned over by the natives to increase the crop of fruit gathered annually from these places. This was especially the case in some of the Catskill towns, where the picking of berries on wild land furnishes employment each season for a

large number of people—men, women and children. These areas, if not burned over, would in time be covered with a growth of trees that would be valuable for the protective functions exercised, even if the species did not furnish marketable timber."

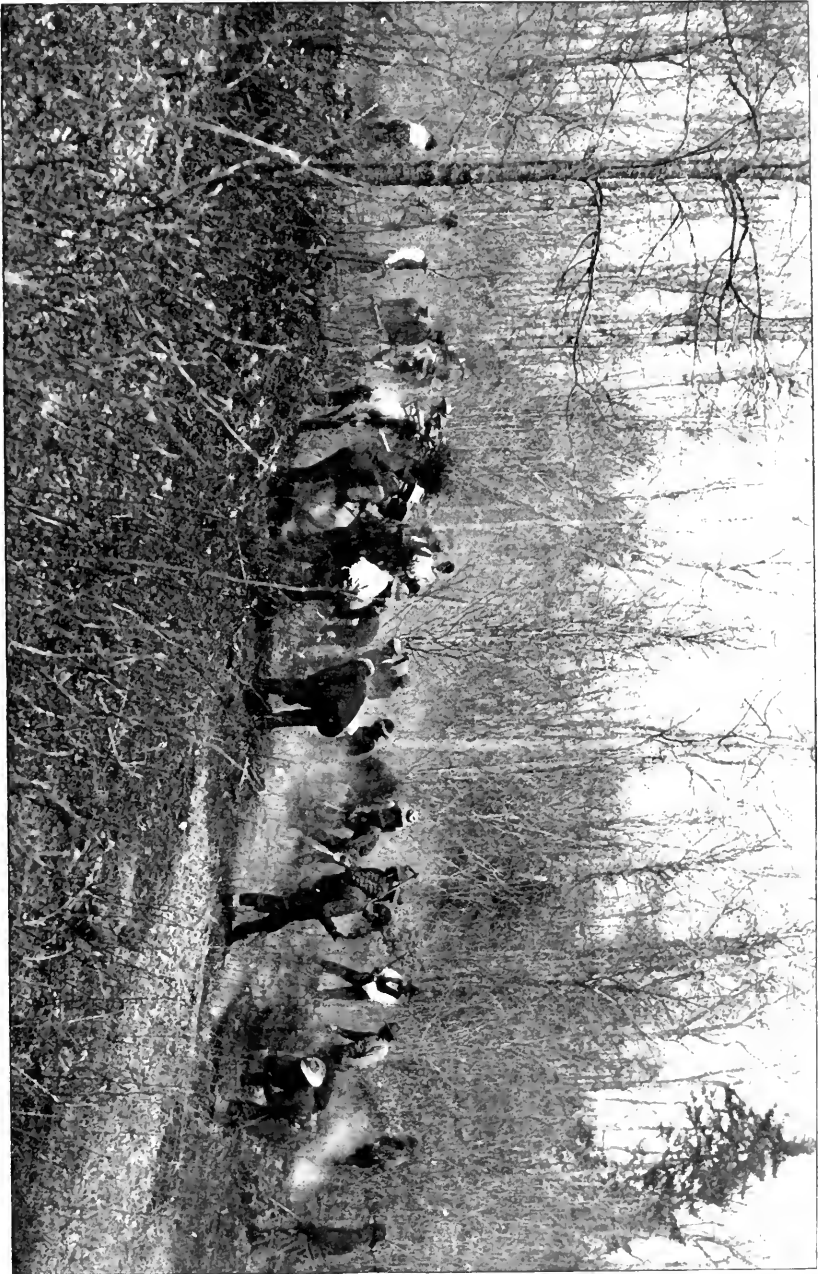
The utter indifference of most people to the results of fires and wish to shield those who are grossly guilty of arson, is shown in the report:

"Last spring the chief firewarden arrested two men in Lewis County for burning brush and logs during a period prohibited by law, and for allowing the fire to escape to adjoining forests, where it caused a serious destruction of timber. It was a second offense, the defendants having been convicted of the same violation of law in the previous year. The case was tried at Lowville before a justice of the peace and a jury summoned especially for this action. The evidence was more than sufficient to prove the guilt of the prisoners. Reputable citizens testified that they were on the ground and saw the parties heaping up the brush and logs on burning piles. The local firewarden swore that he remonstrated with them for starting a brush fire at that time in violation of the statute, and further testified that the forest fire which ensued was directly traceable to the burning brush heaps. But the jury rendered a verdict of not guilty. The evidence against the defendants, however, was so ample and convincing that the chief firewarden appealed the case to the Supreme Court, where the action is now pending.

"The details of the work of plantig 700 acres with seedling trees, white pine, Scotch pine, spruce, fir, larch and locust are of value to the general tree planter.

"In setting out the plants the men were divided into two gangs, one of which was provided with mattocks for digging the holes, while the other carried pails filled with the seedlings, the roots of which were immersed in thick muddy water. The men were formed in two parallel lines, the mattock men in the front line six feet apart, closely followed

ATTACKING A FIRE IN TIME



by the second line which was composed of the planters with their pails of seedlings.

"Three or four strokes of a mattock were enough to make a shallow hole in the sandy soil of sufficient depth for a seedling tree. The planter, who in each case followed a mattock man, dropped on his knees at each hole, and taking a plant from his pail placed it quickly in the ground, packing the loose earth closely around the roots with his hands, after which he packed it still more firmly with his foot before going to the next place. With the work thus systematically arranged, the two lines of men moved across the fields at an even pace, covering the ground at a rate that was extremely satisfactory. As the planters, in order to keep up with the mattock men, had the hardest task, the gangs changed off in their work after each crossing of a field, the planters then digging the holes and the mattock men carrying the pails."

The value of shade for newly planted evergreens is here shown:

"The thick growth of ferns which covered the ground, and could not be removed except at too great an expense, caused some apprehension through fear that it might choke the young plants or seriously retard their growth. But nothing of the kind occurred, and the little trees grew thriftily among the overshadowing brakes, which, in fact, proved valuable as a protection against the heat of the sun in July and August."

Some good advice is taken from Bulletin 131, Connecticut Agricultural Experiment Station, for 1900:

"1. The rigid enforcement of the city ordinances which forbid the bruising, injuring or destroying of trees, and the fastening of animals to trees in such a way as to injure them.

"2. That all trees standing within reach of horses in the street be protected by frames or wire netting so that they cannot be mutilated.

"3. That when limbs are removed from trees greater care should be exercised to cut them smoothly, close to, and even with the trunk and without tearing the trunk bark. The exposed wood should be painted with coal tar or paint.

"4. That the stringing of electric wires

be done only under the supervision of the Board of Public Works, and that this supervision be paid for by the company doing the work.

"5. That when trees are killed by gas leaking from the mains, the owners of the mains be required to pay to the city the cost of the removal of trees killed and of planting new trees in their places.

"6. That the land under trees in city parks be annually dressed with wood ashes.

"7. That on new streets when the building line is far enough from the street line it is desirable to plant just in front of the property line rather than just back of the curb.

"8. That trees infested with leaf-feeding insects be sprayed regularly for a few years, and thereafter as seems necessary.

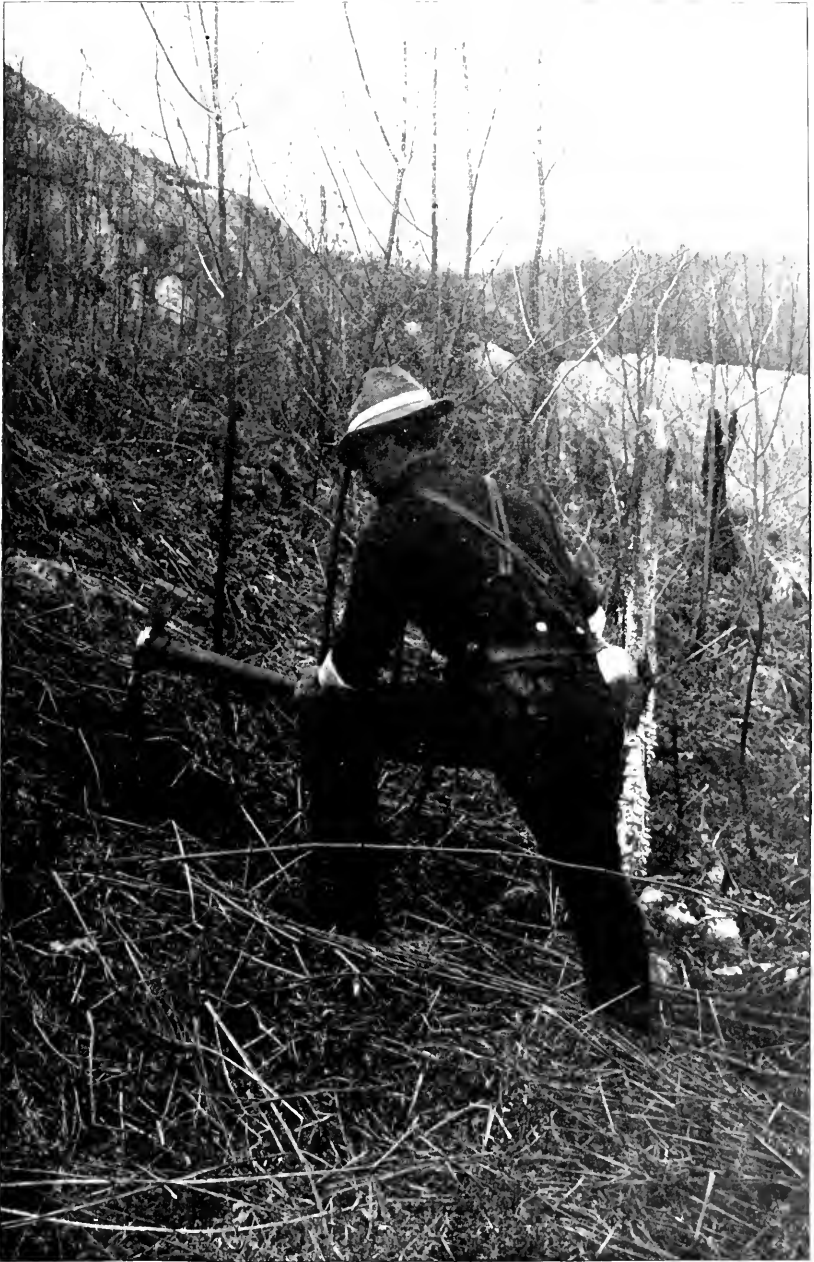
"9. That in winter, insects, and the cocoons of insects that injure the trees, be collected and destroyed."

A good suggestion in regard to pruning trees:

"The trees should be trimmed with a saw and the branches should be cut close to the trunk. Spores of fungi, which will cause the tree to decay, find a good lodging place on a ragged cut, such as is made with a dull ax. If the branch is sawed off even with the trunk of the tree the new wood will grow over the wound, while no such healing will take place if it is cut leaving a stub. The wound should be covered with lead paint. This will exclude bacteria and fungi and check the weathering without injuring the cambium and bark. March is perhaps the best month for pruning, although the season is not so important as the manner in which the work is done.

"I would suggest that wood ashes be used as a fertilizer. Stable manure contains beetles and fungi and brings them with it to the soil where it is applied, while these are destroyed by the ashes. Moreover, wood ashes contain all the elements that trees take from the soil, and hence are an ideal fertilizer."

Copies of the report may be obtained by applying to the commission, Albany, N. Y. As the report is a very expensive one only those who have a real interest should ask for it.—Editor.



MAKING THE HOLE FOR A PLANT.



PLANTING A SEEDLING TREE





About, Over and Under Pikes Peak.

During the summer of 1900 there was a scourge of caterpillars in Colorado feeding upon the foliage of the aspens. They were especially numerous about Moraine Lake, one of the principal reservoirs which supply Colorado Springs with its delicious water from the melting snows almost at the very summit of Pikes Peak.

Many of the insects crowded into the lake and some were found which had been carried through the main fourteen miles to the city, to the great disgust of the citizens.

I was requested by the editor of the Colorado Springs Gazette to visit the reservoirs and endeavor to suggest some remedy.

An all day's rain in the valley on the Fourth of July proved to be a severe snow storm upon the mountain, where we could see the snow deposited.

The next morning I ascended the peak by the cog road and found it a delightful experience. On nearing the summit the train was stalled in deep snow in a cut some five hundred feet from the top-most station. The illustration on this page will serve to show our dilemma.

We scrambled out and clambered over

the rocks and snow to the stone house at the summit, while workmen were engaged in clearing the track.

I walked all the way down, visiting all the reservoirs and groves of aspens.

Innumerable cocoons were attached to the rocks, to wild rose bushes and upon the aspen twigs; the old caterpillars were dying, having performed their life work when the eggs were deposited.

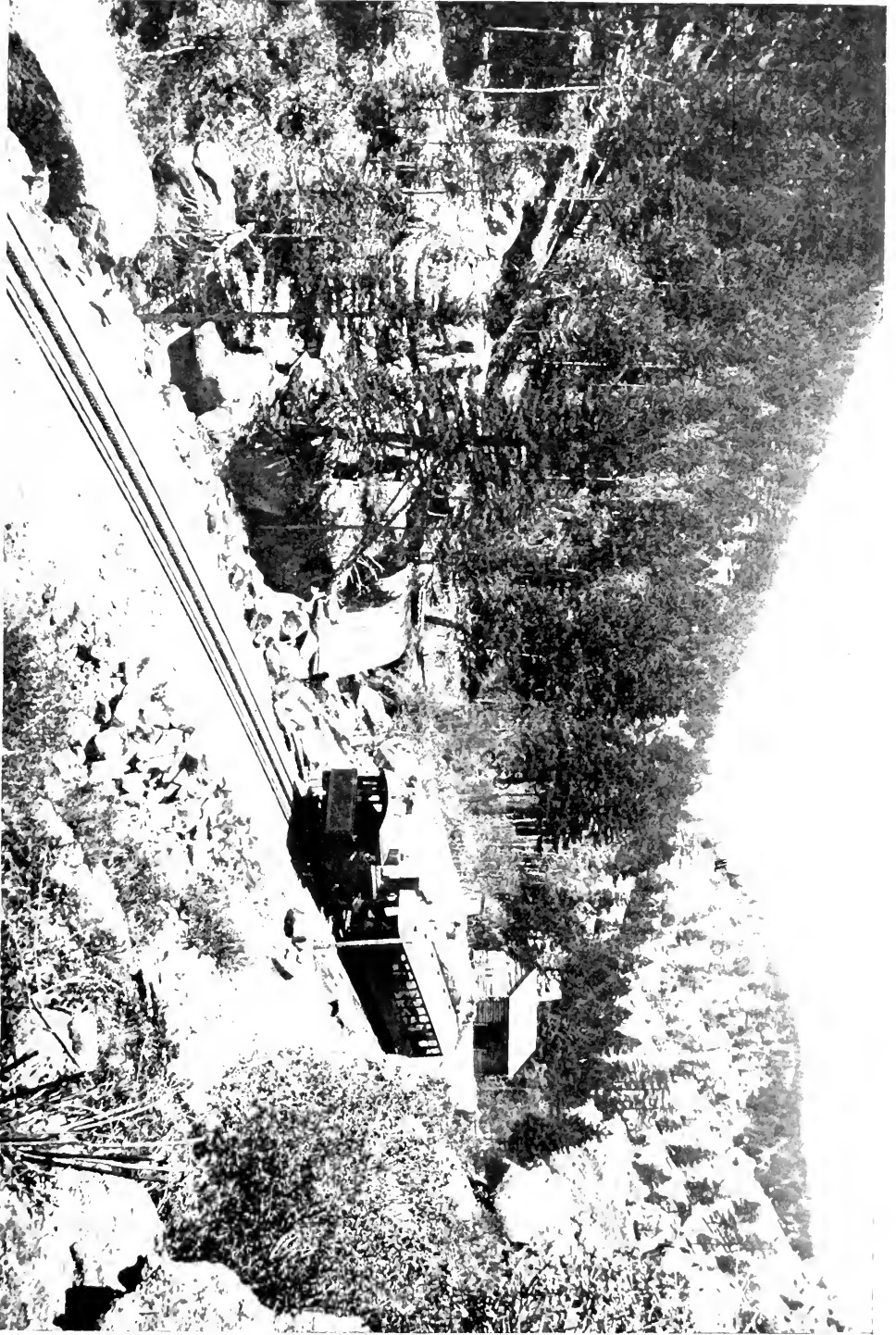
I recommended the collection of these cocoons for burning, and large quantities were thus destroyed.

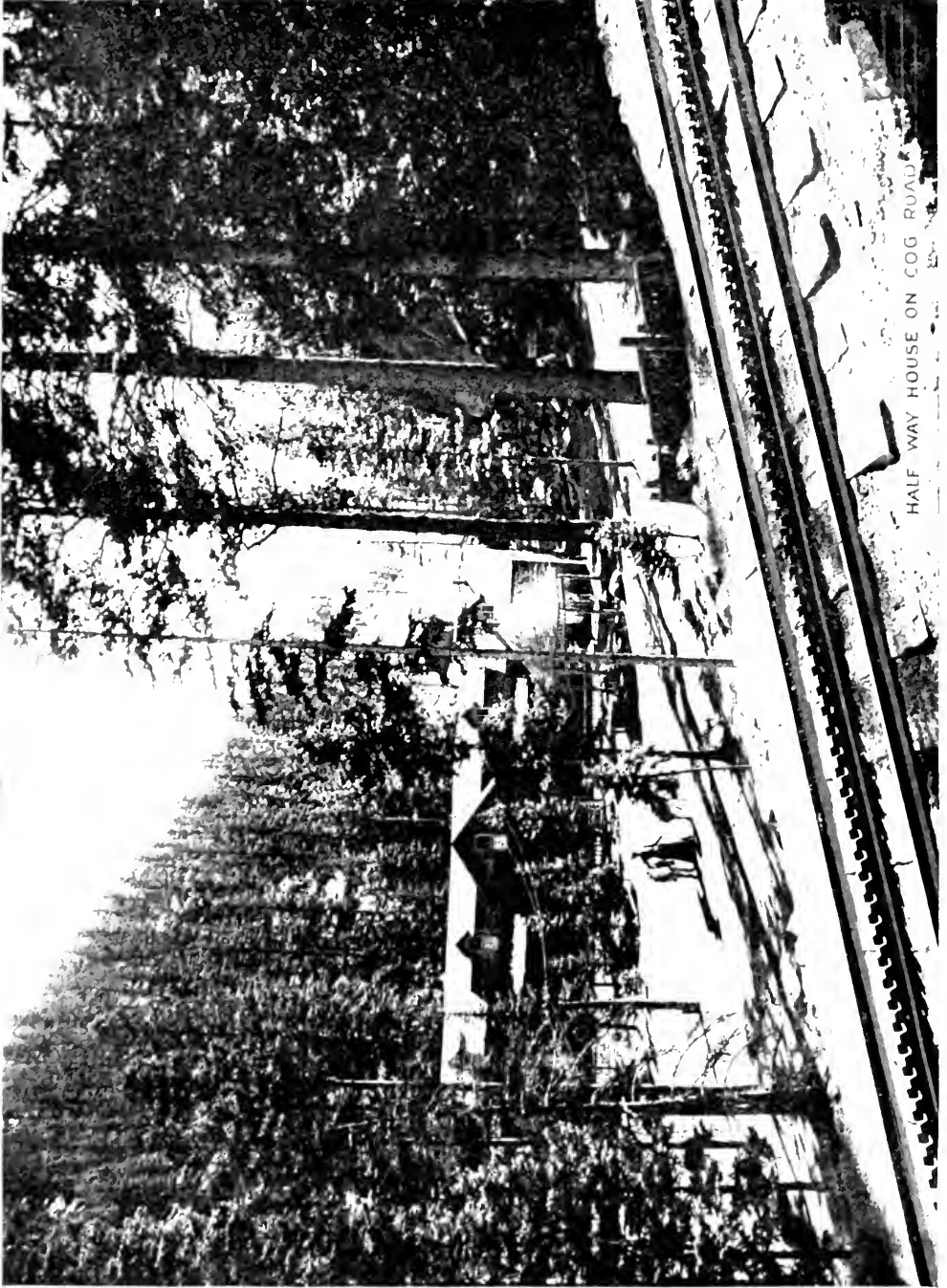
A few days later the city authorities requested me to make another and more thorough examination, accompanied by the city engineer. We went by cog road to the summit, where horses were awaiting, and rode, first to the engineer's camp a mile distant over a broad and gentle slope which was thickly covered with the most gorgeous flowers, bouquets of myosotis, forget-me-nots, being gathered daily by children to sell to passengers on the train.

The Peak is 14,147 feet high, the camp about 1,000 feet lower, the timber line being 11,578 feet.

The views from every part of the mountain are superb. Peaks which rise

MINNEHAWA FALLS—PIKE'S PEAK





HALF-WAY HOUSE ON COG ROAD

HALF-WAY HOUSE—PIKE'S PEAK

10,000 to 12,000 feet seemed dwarfed by comparison with the immense mass of Pikes Peak.

A clear stream of snow water rising on the southwest slope is conveyed through a tunnel under Pikes Peak into a reservoir on the east side, and from thence into a succession of lakes and finally through pipes to Colorado Springs.

We donned rubber clothing and went through the tunnel a thousand feet below the summit, wading through the icy stream in total darkness, save as our candles gave a dim light.

The formation of Pikes Peak, the main mountain, is of solid granite without seams and has a regularly rounded top.

On the north side is a precipice and hole said to be 3,000 feet deep. There is no appearance of lava and no evidence of volcanic action, but several indications of an explosive force, probably of gas, having at some time opened this immense hole and scattered the angular, broken rocks over the topmost point, raising the peak a hundred or more feet. The rocks are of large size, from a cubic foot to several yards in size, as seen in the illustration.

In passing through the tunnel, some 2,000 feet in length, the walls appear seamless, a solid granite mass, but at a certain point within is a broad space of several yards broken into fragments,

the same as those upon the peak. Here the walls and ceiling must be supported with timbers. This shows the same character and was broken up by the same cause that threw the rocks from the hole and left them upon the peak.

We spent the night at the camp and next day descended by way of Moraine Lake. This, as its name implies, was formed by glacial action, the rocks and the debris deposited by the glaciers making a complete dam across the valley and forming a lake a quarter section in extent.

Aspens, with some spruce, surround this lake, but there is at present no dense forest.

Here are numerous azure columbines, the state flower of Colorado, which we illustrate.

The Half Way House, nearly 9,000 feet elevation, is a beautiful spot in a grove, where everyone enjoys the rest and quiet and can take a lunch if needed.

Thousands of tourists each season walk up the trail, a day's journey, and this point offers a convenient breathing place by the brookside among the evergreens.

Minnehaha Falls is not far distant; in fact, the cog road passes hundreds of water falls and beauty spots all along the way.

Sheep, Enemies of Forest.

W. F. Cody—Buffalo Bill—wrote President Roosevelt from London in regard to sheep in forests. His letter is along the lines which ARBORICULTURE has constantly affirmed and reiterated many times.

"London, March 3, 1903—The Hon. Theodore Roosevelt, Washington, D. C.: For the benefit of future generations, the timber, and especially the underbrush, must be protected now, before it is too late, from the sheep devastating the mountain water sheds, as they have already done the valleys and table land. If sheep are allowed to browse on the

underbrush of our mountains, in less than five years from now the homeseeker, the man behind the plow, the actual taxpayer, will have to leave the Big Horn Basin for want of water to irrigate his land. No one knows this better than yourself, for you are familiar with the West.

"I am very faithfully yours,

"W. F. CODY."

ARBORICULTURE has a high appreciation of the value of sheep and of the wool industry to the United States, but *keep them out of the forests.*



"MANY FRONTIER MEALS HAVE BEEN WELL PREPARED OVER A SAGEBRUSH FIRE."

The Sagebrush of the Plains.

Artemisia tridentata.

To everyone who has crossed the plains, whether in the olden time by stage coach or with team and pony, or later in the modern railway train, the sagebrush is a familiar object, and invariably the same opinion has been formed, that it is a most worthless creation, having no importance in the scheme of Nature. Possibly this may be an incorrect impression.

The sagebrush covers the deserts of Nevada, extends into Utah and Colorado and abounds in all the plains region.

There is absolutely no vegetation in existence but to which water is essential for the maintenance of life. The *Artemisia* is one of the plants which will exist with a drink once a year, and that in minute quantities, yet with greater supply of moisture it doubles in size, attaining a height of six or seven feet. The foliage of sage being deciduous and abundant, the annual deposit of leaves, if not burned, will in time create a soil of great fertility, in which plants of a higher order may luxuriate. The roots penetrate deeply in search of moisture in the substrata, they open the earth for the action of the elements to make a perfect soil, and when the sands of the plains accumulate enough vegetable matter by the decay of leaves, roots and twigs, it is the better enabled to withstand droughts and support a forest growth. Where seeds are supplied to provide shrubs of a higher character, then step by step the advance is made until a forest will replace the sage.

The California dwarf buckeye, sumac, yucca, and a numerous list of plants suited to arid conditions may be introduced as *nurses* to protect such forest trees as require less moisture than others.

ARBORICULTURE believes that all forest and plant growths have an influence upon

electric currents, winds and cloud movements, some much more than others, but all in some degree, U. S. scientists to the contrary notwithstanding, and by utilizing the sage, with other semi-arid plants, the plains country may be made productive in the years to come.

The almost continuous winds of treeless regions carry the grains of sand along the surface and by constantly shifting their positions, prevent the growth of grasses and the germination of seeds. The sage lifts the air currents from one to six feet above the surface and prevents the sand movement, thus enabling the grasses and other plants to take root and furnish pasturage for stock.

Its roots, going deeply and having a firm hold upon the soil, cannot be blown out, while without this protection grasses would be removed by heavy winds.

The woody stems of the sage make a hot fire where neither coal nor wood are at hand. *Many frontier meals have been well-prepared over a sagebrush fire.*

Old plainmen will recognize our illustration on opposite page—the menial squaw collects the fuel to keep the tepee warm and prepares the meal for the noble warrior and hunter.

Birds are supplied with food by the seeds of the sage and grasses which grow under its protection, while small animals are sheltered by its foliage; both sheep and cattle huddle together about the sage and shrub growths seeking shelter from the storms. It is difficult to conceive of a more beneficent provision of Nature than is found in the simple shrub growths upon mountains and plains, whereby the forests have a soil of great fertility prepared, and seedlings are protected from storms and the incursions of animals, and are thus permitted to increase and cover the earth with verdure.



Nebraska's Need of Trees.

In a public address, J. Sterling Morton said: "No state of this union has planted so many trees as Nebraska," and again, "In no state is there a greater acreage of artificial forests than in Nebraska."

There is no doubt but when this was spoken it was entirely true, but now Kansas is going ahead, while Nebraska is lagging in the great tree-planting policy. More than a million forest trees will be planted in Kansas the present season, probably very far more than that number, when one man at Hutchinson will plant 300,000 in one forest.

The great sweep of prairie between the Missouri river and the base of the Rocky mountains, almost entirely treeless, is a disgrace to the intelligence of the men who are making of Nebraska one of the greatest agricultural states of the world. Much if not all of this is due to the indifference of the farm papers which supply the reading matter of western farmers. Scarce a word in any of the agricultural press offers any information upon the subject.

Along the Burlington, Union Pacific and various routes of travel one sees here and there a row of Cottonwoods or Box Elders planted about a few—seldom a block of—forest trees, while miles intervene with nothing to break the force of the winds of winter or the siroccos of summer, and this in a country where almost any variety of American forest trees will thrive.

With proper encouragement by the state legislature, removal of taxes or small bounty paid for the planting and maintenance of timber belts, the entire character of this bleak region could be changed in a few years. It is capable of demonstration that frequent belts of forest would be of immense benefit to the entire state, and other states similarly situated.

There are numerous instances where a fine wire fence has caused a snowdrift to completely blockade a public road on these prairies, while every traveler has seen the board fences erected by railways a short distance from deep cuts, to collect the snow before it reaches and fills the cut to blockade the road.

If a wire fence four feet high, or a board fence of equal height, can cause a reversion of the strong currents of wind, throw it into whirls as shown in these drifts of snow, how much greater must be the effect of a wall of forest trees at frequent intervals?

These timber belts guide the air currents upward from the surface, breaking their force and continuity, while on the lea an eddy is formed, the current being reversed and curled upwards, thus forcing the currents to a still higher course, and this effect is maintained for a great distance beyond the obstruction.

Evaporation during summer is greatly lessened where the protection of a forest belt is given, thus the growing crops have more moisture during period of drouth. Cattle are protected and require less food to maintain continuous growth.

Farm crops could not be burned up by the siroccos if heavy belts of timber were interposed at frequent intervals, for the cold air above would be mixed with the best surface currents, and the temperature reduced at every obstacle of this character. In modern electrical operations various methods are devised to retard and turn back the electric current while in flowing water the same laws are observed whereby the current is changed in direction by opposing obstructions.

In the far western portion of Nebraska are numerous evidences of a former attempt at forest growing under the Congressional Timber Culture Act. Monuments to the errors of planting unsuited trees under unfavorable conditions, mostly Cottonwoods, and the final abandonment of all interest in the subject.

MAINE AFFAIRS.

At a meeting of the trustees of the University of Maine on April 14, it was voted to establish a department of forestry at the University, and President Fellows was authorized to employ a Professor of Forestry. The last legislature granted \$2,500 a year for the support of this department.

Recent Railway Tree Plantings.

Two years ago the Rio Grande Western Railway planted 65,000 catalpa trees at Provo, Utah, in a nursery where they have been irrigated and cared for since. This is the nursery which was pictured in ARBORICULTURE for January. Since these trees were planted the Denver and Rio Grande Railway has purchased the Rio Grande Western, and the new management has just completed the planting of these trees as originally purposed by General William J. Palmer, the former president of the R. G. W.

Mr. C. M. Hobbs, General Purchasing Agent of the Denver & Rio Grande system, has had this matter in charge and has had the hearty support of all the officials of the road.

More than half of these trees were of the worthless bignonoides variety and were rejected. Twenty thousand catalpa speciosa were transplanted to station grounds throughout Utah, and to points along the lines wherever an extra wide right of way was owned by the company.

In the Valley of Utah, from Ogden southward to Springville, between the Wasatch range of mountains and the lakes, Great Salt Lake and Utah (fresh water lake), there is an extensive system of irrigation, the water coming from the numerous canyons of the Wasatch mountains.

The ditches along the railway are to be utilized in supplying water for the trees.

At a depth of from 100 to 200 feet about Utah Lake a sheet of water is found, which rises about the surface in flowing wells wherever this underflow is pierced. This furnishes an abundance of water for irrigation, the pipes being driven in one day at a cost of \$25.

In places the trees were planted sixteen feet apart on one side the track, four feet from the limit of right of way. In other localities they were planted on both sides of the road, if width of land permitted.

Some tracts where a large block suitably located occurs, the trees were set in forest form 8 by 8 feet.

The phenomenal success of catalpa

speciosa in Colorado and Utah, under irrigation, at altitudes not exceeding 5,000 to 6,000 feet, makes this experiment one of great interest to this region where arid conditions prevail. The citizens of both Colorado and Utah are greatly interested in the experiment and many have purchased catalpa trees for their own planting.

Great care has been exercised in selecting only the thrifty trees from the nursery, which have the characteristics of the true, hardy catalpa.

Such trees with their upright habit will not obstruct the view to passengers on the trains, nor yet for engineers or trainmen who must see the signals. Care was taken not to plant inside curves nor very close to telegraph wires.

The soil is usually quite fertile, much of it sandy loam, only requiring water to produce bountifully.

In a few places there is much "saleratus land," as the ranchers call it. It is not known how well the catalpa will succeed in these alkaline spots, but with an abundance of water it is believed that the soda will be washed out.

The editor of ARBORICULTURE has had charge of this work and has made several trips through Colorado, Utah and New Mexico studying conditions and planning the work, and it was through the same influence that the nursery was established.

It is this practical method of tree planting that the International Society of Arboriculture has for its object.

Twenty thousand trees have thus been planted by one railway as an Arbor Day contribution to the memory of J. Sterling Morton, who heartily endorsed the project when the writer visited him at Arbor Lodge in 1900.

OFFICE OF ARBORICULTURE, CONNERSVILLE, IND.

To the Press:—The office of ARBORICULTURE is at Connersville, Ind. All mail and exchanges should be sent to this office. The publication is printed in Chicago, and entered as second-class matter at Chicago.

Reviews.

The World's Work for April contains an able article and very timely, "The Railroads and Forestry," by Prof. John Gifford of Cornell. This article ought to attract considerable attention among the railway officials of the country, every one of whom should read it. Mr. Gifford makes some estimates which are based on the natural forests, in which a great majority of trees are useless for any economical purpose, being weeds occupying space, but having no utility. When a forest is planted in a systematic manner every space occupied by a tree of value for the object intended, all of one kind, and given reasonable attention, the results will be very different.

"There is a constant annual demand for more than 100,000,000 ties. A tree which will yield three good ties under forest conditions, in this climate, is at least fifty years old, and it is an exceptional acre which produces more than three hundred such trees. An acre of tended forest ought, therefore, to yield about eighteen or twenty ties each year. The annual demand for each mile is about 400 ties. Twenty-five acres of forest are necessary, therefore, for every mile of track. A railroad with a trackage of 5,000 miles would need about 125,000 acres of tended forest to supply itself perpetually with ties. For a large corporation this is a slight task. It spends \$1,000,000 frequently for a single bridge."

Catalpa trees 20 years old will supply five ties per tree, or 850 cross-ties per acre, an average growth per annum of 42½ ties. Instead of requiring to be renewed every six or seven years, the catalpa will last thirty years with tie plates. This would mean an annual renewal of 100 ties, or a little more than the annual growth from two acres. A railway of 5,000 miles trackage, therefore, would require less than 1,200 acres of catalpa forest. The article concludes as follows:

"Were Germany recklessly to cut her forests, a large proportion of her people would be paupers, and it would ruin many small industries dependent upon a constant supply of raw material. By de-

pleting our forests we are driving a large number of our people indoors to the factories of the cities. IT SEEMS UNJUST TO THE TAXPAYERS OF TOWN AND FARM FOR A CORPORATION OR AN INDIVIDUAL TO CUT IN A FEW DAYS A FOREST WHICH HAS BEEN CENTURIES GROWING, AND THEN TO LEAVE IT, A DESOLATE WASTE, TO THE STATE.

"The productivity of the land is the thing to consider and we are constantly consuming more of essentials. The proper policy is to spend the interest and conserve the principle. This is the aim of scientific forestry."

United States Department of Agriculture, Bureau of Forestry, sends *Conservative Lumbering at Seawance, Tenn.*, by John Foley. Lumbermen can learn much of importance and profitable to themselves by examining this Bulletin No. 39. The illustrations and descriptions are excellent.

Bulletin No. 38, *The Redwood*, gives much valuable information in regard to this California tree and the forests of the coast range. Finely illustrated.

Address Bureau of Forestry, Washington, D. C., for copies.

Circular No. 24, *A New Method of Turpentine Orchardng*. It is hoped the people of the South will profit by this investigation. The pine will be exhausted very soon, unless a change is made in turpentineing.

The Iowa Journal of History and Politics for April is a welcome addition to our literary department. The history of our country, especially the civil war period, is presented in a most instructive and interesting manner, by several writers. Questions bearing upon our nation's policy are ably discussed and the subjects presented in excellent form. Published at Iowa City, Ia. Subscription price, \$2.

Forest Leaves, a bi-monthly publication by the Pennsylvania Forestry Association, always has something of interest to all who love trees. Pennsylvania is doing a wonderful work in caring for her mountain forests, and much of the April number is devoted to this subject

Annual Report State Board of Horticulture, Colorado, takes up the question of forest reserves, and is making a strenuous effort to prevent the total destruction of the forests of Colorado. We sincerely hope the state may be aroused to some sensible action in reference to their forests. Designing men have had control long enough, and now but a small portion of the original forests of the Rocky Mountains remains. I. N. Bortels presents a valuable paper on Colorado conifers.

REVIEW OF REVIEWS.

In the multiplicity of newspapers one cannot find the time to more than glance at the headlines of some of the great dailies, and to even glance over the leading periodicals of the day would occupy the entire time of a rapid reader, leaving no time for business or other occupation.

The substance of all the magazine articles of general interest to busy men and women, condensed by a corps of able reviewers, is found each month in the *Review of Reviews*, 13 Astor place, New York. Price, \$2.50 per annum.

EVERGREENS AND FOREST TREES.

The Evergreen Nursery Company of Sturgeon Bay, Wis., is a reliable and extensive nursery, specially devoted to growing seedlings of trees for forest planting. We commend to our friends and the members of the International Society of Arboriculture this nursery, confident that quality of stock and prices will be entirely satisfactory. Evergreens may be planted in June; in fact, almost any time, so it is not too late to order.

EDUCATIONAL.

How few appreciate the complete dictionary of the English language, which, beginning in 1828, at New Haven, was published in 1840 by Dr. Webster, and has been brought to perfection by the present publishers, G. & C. Merriam, at Springfield, Mass.

Condensed into one large volume is the most complete encyclopedia in existence.

Language fails to convey to the mind thousands of ideas, but the pictures at a glance give complete information of the subject.

Ten or twelve dollars cannot be expended to better advantage than to secure the unabridged Webster for yourself and family. My own copy is in daily use and is invaluable.

PAMPAS GROVE CANNAS.

Arnold Puetz, Greeland, Fla., sends an attractive list of plants for northern planting, a specialty of fine cannas, roses and bulbs. The sandy soil of Florida is fine for growing plants and giving them a good, vigorous start, while express charges are low to every part of the United States. A basket of nice plants, the roots kept moist in a bed of moss, would be a pleasant reminder of the orange groves and the flowers of Florida.

TO THE PRESS.

ARBORICULTURE is being sent you as an exchange.

Are you interested in the forests? Do you wish to aid the people of this country in *perpetuating the forests*? Do you believe that forests are essential to the well being of the people and best interests of the nation? If so, will you not assist *The International Society of Arboriculture* in carrying on its work? How?

Well, we do not desire a simple notice that the periodical ARBORICULTURE is a publication.

Copy any or everything you wish. Nothing in ARBORICULTURE is copyrighted.

Comment on the articles. Seventy millions of people in the United States cannot be reached by our 5,000 copies monthly. You print 1,000 to 10,000 or half a million copies. Whatever you do multiplies our efforts.

If you are *opposed* to any of our theories or arguments, you will not offend by giving your reasons.

If they meet your views will they not make enjoyable reading for your patrons, and, possibly, cause many to think more seriously upon the questions discussed.

Charles Scribner's Sons, New York, have published a very charming work, "Our Northern Shrubs," by Harriet L. Keeler. The editor of ARBORICULTURE has spent more than fifty years in the study of trees and shrubs. The school child may take this book to the woods and in an hour, by comparing the numerous pictorial illustrations and remarkably plain descriptions, be able to distinguish any native shrub. It is a durable work, well printed on heavy paper, with fine engravings, while the descriptions are remarkably plain. Price, \$2 net; postage, 16 cents.

Another companion work by Scribner, from Prof. H. E. Parkhurst, "Trees, Shrubs and Vines." Every person cannot visit Central Park, New York, where these trees grow, but all may see and know them in natural forest everywhere. We commend both books as important in the study of arboriculture. Price, \$1.50 net; postage, 12 cents.

A CATALPA GROWER.

John Blair is an old Scotch gardener, who for several years was in charge of Glen Eyrie, General Palmer's home, near Colorado Springs, and now a resident of British Columbia. He writes as follows:

"Duncans Station, B. C.

"March 30, 1903.

"I have seen the first Eucalyptus tree planted in California, at Santa Rosa, a fine tree.

"I was the first to plant catalpas in Illinois. No person would buy about Chicago; now they are planted by the hundred thousands. It was named after I had introduced it, *catalpa speciosa*, the American species of catalpa. As you are going to improve the looks by planting, plant in groups or clumps, not in straight lines, not even along the roads, not all of one kind.

"Yours truly,
"John Blair."

RIVER FLOODS.

The article in our last number has attracted wide attention. It is a good thing to set the people to thinking, even if some do criticise adversely. It is only by a thorough discussion of great problems

that the nation can be aroused to action.

The New Orleans Picayune copies the article entire, as does also several daily papers in Boston, New York and elsewhere. But the Engineering News has this to say, in opposition:

"One of the most common fallacies with respect to the floods of great rivers is that they are chiefly due to the removal of the forests from the lands whence the river's tributaries flow and that the proper remedy for disastrous floods is to again cover these lands with a forest growth. Many have seen the flow of small streams greatly affected by the clearing of their drainage basins, and reasoning from the less to the greater it is natural to conclude that the same causes govern the alternation of floods and low water in large rivers.

"The current number of 'Arboriculture' sets forth anew this old fallacy, and the editor concludes a discussion of several pages with an appeal for 'a systematic reforestation of the mountain regions . . . in order that these surplus waters may be made to serve our country instead of mastering it.'

"We heartily favor the extension of forest culture and forest preservation, but every claim that such work can solve the problem of flood prevention does harm, since it creates opposition to plans for treating the broad subject of river regulation on sound engineering lines."

The sound engineering lines, we suppose, refers to the scheme for slack water navigation in the Ohio River—by a system of locks and dams. While this will enable steamboats to navigate the river in low water, yet every obstruction, such as dams in the river bed, six to ten feet high, must of necessity raise the flood surface and increase the annual damage from overflow.

The true system is to *remove* all obstructions, lower the river bed, clean out a channel through the many sand bars by dynamite and by dredging, rather than by locks and dams.

In the Mississippi, unless the system of reforestation of the mountains can be accomplished, an artificial outlet for the surplus water must be provided to Lake Pontchartrain above New Orleans.

The Engineering News continues:

"Briefly stated, the fact is that forests do not increase rainfall, and while they distribute the runoff from a given area over a somewhat longer period than would be occupied if the same area were cleared land, this conservation of the flow is chiefly of importance in increasing the low water flow and not in diminishing flood heights. Further, this effect is of practical importance only on small streams. In the case of large rivers it is too trivial to be noticeable. This is not mere theory, but actual fact, established by multitudes of observations. The floods of the Ohio and the Mississippi appear from historical records to have been as great when the forests on their headwaters were practically untouched by the axe as they are at the present day. It is true that the recorded flood heights of the lower Mississippi have increased with each great flood for several years; but this is due to the fact that the river is now confined to its channel by levees instead of being permitted to spread over the entire width of the bottom lands."

On page 82, ARBORICULTURE, for December, *Evidences of Climatic Change*, is given an historical analysis from sacred and profane writings and events covering more than thirty centuries. Forest influences during that period have changed a most fertile agricultural region, supporting a population of ten millions souls, into a desert incapable of feeding a handful of wandering tribes.

Rivers, brooks, springs and rainfall have ceased to exist in this historic locality, because of forest destruction.

Innumerable instances have occurred in Europe and Asia where following the removal of forests from mountain ranges, there have come reduced and irregular rainfall and agricultural declension. There were no records kept of rise and fall of Ohio until 1860. Yet upon only forty years of observation in the Ohio valley scientists affirm that forests have no influence upon rainfall.

Our esteemed cotemporary reaffirms "this old fallacy," which certain scientists in employ of the United States government have promulgated, without producing any evidence, and would sweep away

with a breath sturdy facts proven by Biblical authority, endorsed by Josephus Flavius, affirmed by Menander nine hundred years B. C. Galileo, Newton, Kepler and Columbus had scientists in their day whose obstinacy and false doctrines prevented them from understanding very plain laws of nature.

The earth was flat in those days, and rested upon a pile of stones. Gravitation did not exist. The earth was the center of the universe—with these scientists.

Rain, cloud movement, electric currents, winds, have laws which man has not yet solved. The human voice is carried a thousand miles through a copper wire upon an electric spark. How? Let the man answer who can prove that forests have no effect upon rainfall. The people want something beyond a mere assertion.

The effect of extensive irrigation and conservation of water in great reservoirs, together with a renewal of the forests upon the mountain range of the now arid regions, must be to greatly increase the evaporation of water from all these sources, cause its return to the earth by precipitation as rain and to hold within the now arid belt very much more moisture than has heretofore been the case, while the water flowed rapidly away.

Heretofore the rain and snow which fell in the central western states was ALL evaporated from the Pacific Ocean, traversed a third of the continent, had a majority of its bulk squeezed out upon the Sierras and the residue was given to this semi-arid territory.

If in form of rain it soon found its way back to one of the oceans, or if as snow it was but the question of a few warm days in June, when it pursued the same course.

The cultivation of extensive areas under irrigation will cause most of this water to continue the circuit—evaporate, precipitate and water the earth anew.

Instead of running off to increase the Mississippi floods, it will be utilized in the production of crops to support the increasing population of these rapidly growing states and be exported, thus increasing our revenues and national wealth.



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It also reaches the Cities of Torreon, 13,845; San Luis Potosi, 60,858; Tampico (Mexican Gulf Port), 16,313; Celaya, 25,565; Pachuca, 37,487 City of Mexico, 368,777.

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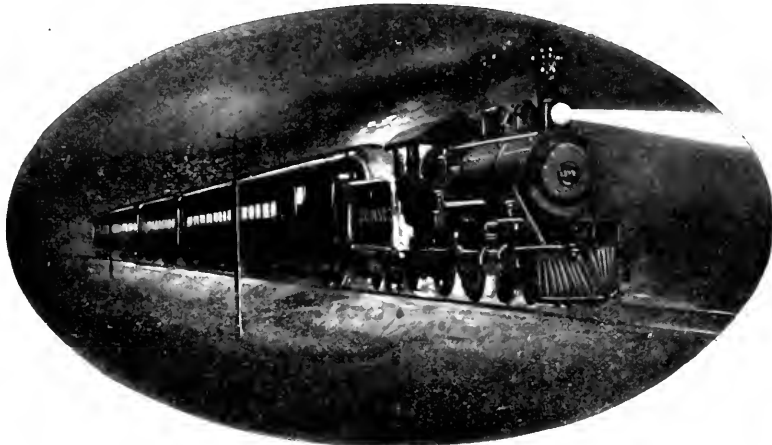
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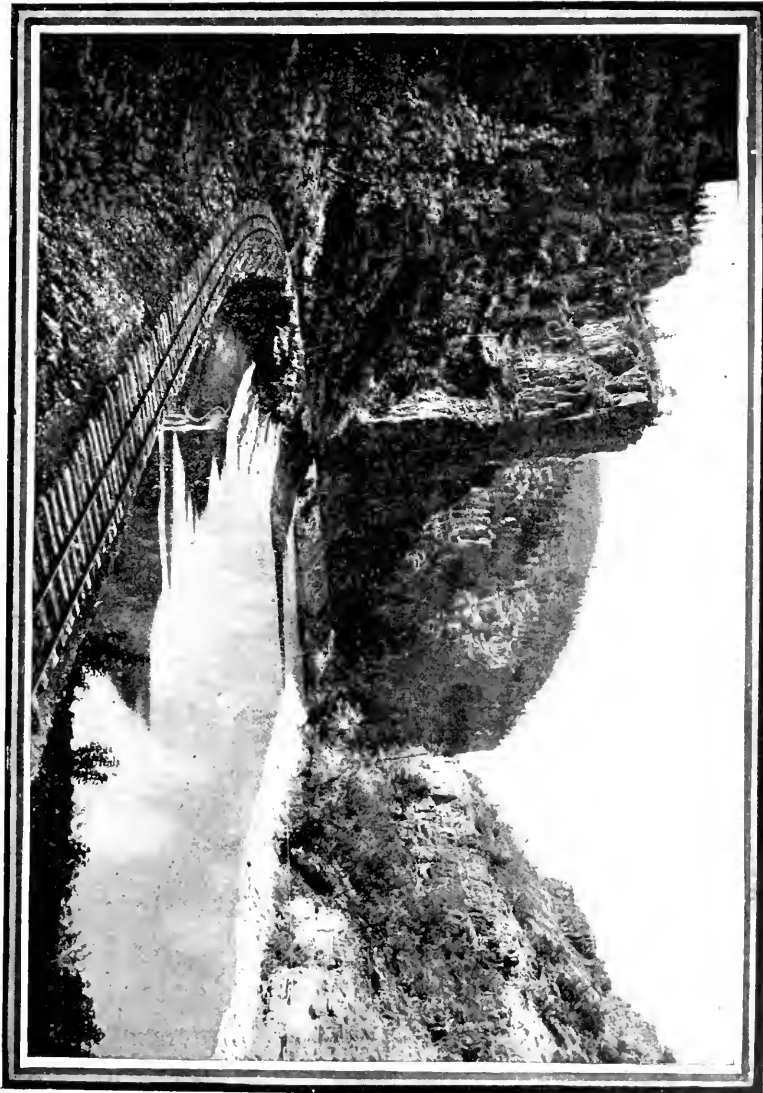
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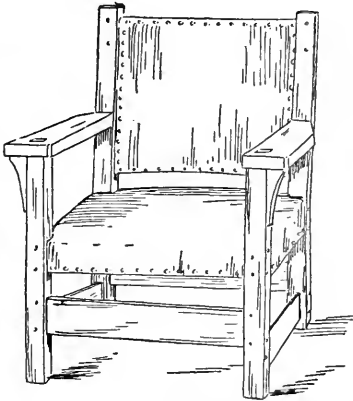
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CALIFORNIA ORCHARDS.

THE natural charm of the country side in California is very great, and to that has been added the charm brought by cultivation. In the great valleys there are miles of orchards, and in the season of bloom, the picture is one to be remembered. In the Santa Clara Valley the specialty is prunes, and "Blossom Time" is celebrated by a festival among the trees. A glimpse of the valley from some hill top is like a peep into a land of enchantment. The traveler by the Coast Line of the Southern Pacific rides for a long distance through a wilderness of fruit.

In the San Joaquin and Sacramento Valleys are vast orchards of oranges, figs, apricots and olives, to say nothing of peaches, pears and other fruit. Vineyards, too, that outrival France spread over hillsides and miles of level land in the valley. In Italy the grape gatherers know the chill of wet mornings, and picking must often be deferred until the vines are dry. Here the harvest is unhindered by dew or rain. In October the crushers are at work and grape juice runs like water. About Fresno the great raisin vineyards are a feature of the landscape, and in the season of harvest the roads are spotted with dripping juice and the air musky with the odor of crushed grapes.

The olive harvest comes later and lasts from November into February. One great orchard has 2,000 acres of gray olive trees. The berry is allowed to ripen on the tree, becoming dark or purplish black. They are picked by hand, and for oil are "procured" at once. For pickling they are allowed to develop their oil and natural salts, and are a valuable food product and not a mere relish. The oil is put up direct from the press and is absolutely pure. Two Lines of the Southern Pacific reach Southern California and two lines serve the great valleys, so that transportation is adequate. The orchards and vineyards are characteristic features of the state, and the most attractive country life in the world is found here.

Literature pertaining to the state can be had of any agent of the Southern Pacific. The "Prune Primer" has been issued and the "Orange Primer" is just out of the press. A small treatise on the olive is being prepared, the object being to encourage the use of ripe olives and of a pure oil. Booklets for the settler are carefully prepared, and the industries of the state are fully represented.

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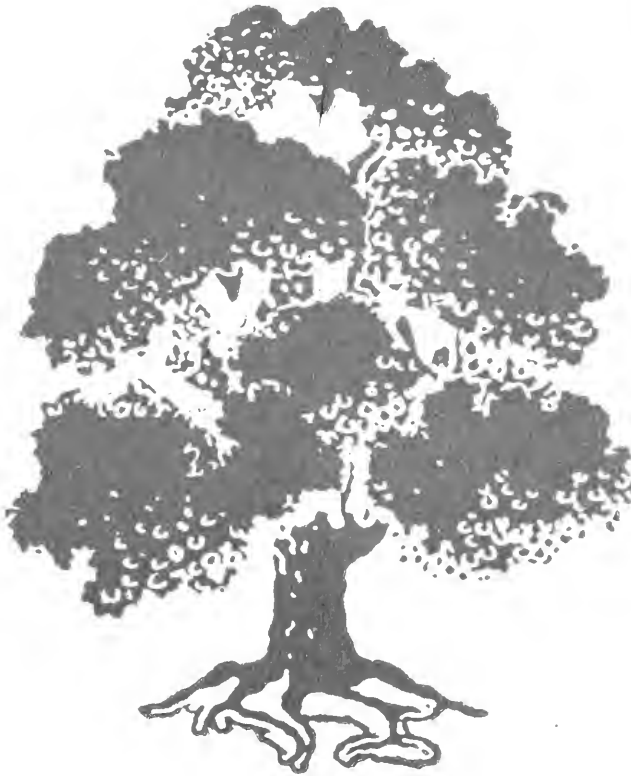
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ARBORICULTURE

VOLUME II.

NUMBER 5

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A Magazine of the International Society
of Arboriculture: Chicago, June, 1903.

THE INTERNATIONAL SOCIETY OF ARBORICULTURE

OFFICERS

GENERAL WM. J. PALMER, President, Colorado Springs, Colo.
JAMES H. BOWDITCH, Vice-President, Boston, Mass.
JOHN P. BROWN, Secretary-Treasurer,

ARTICLES OF INCORPORATION.

Article I.—Name. The name of this corporation shall be The International Society of Arboriculture.

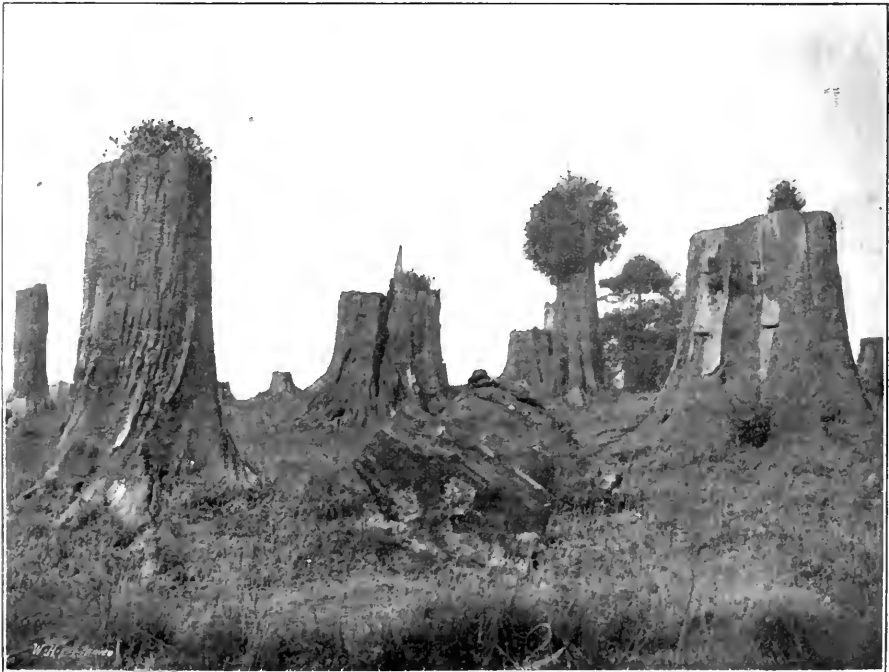
Article II.—Purpose. The purpose of the Association is to introduce judicious methods in dealing with forests and woodlands; to advance and advocate a public interest in this subject; to promote the afforestation of unproductive lands; to encourage the planting and care of shade trees in parks, public and private grounds, and along streets and highways; to inspire an interest in our remaining native forests, and groves of ancient trees, and to seek their preservation; to supply information to railway officials in regard to timber culture for railway uses, and incite railway and other corporations to plant trees for economic purposes.

Article III.—Membership. Any person may become a member of this Society by the payment in advance of an annual due of two dollars, and on payment of this annual due shall be entitled to receive, regularly, one copy of ARBORICULTURE, the official organ of the society. Any person who may contribute ten dollars toward the support of the society shall become a patron. Honorary members may be chosen by the executive committee.

Article IV.—Officers. The officers of this Association shall be a president, vice-president and secretary-treasurer, who shall be elected at the annual meeting each year by ballot, and shall serve for one year, or until their successors shall have been elected and shall have accepted office, and when elected shall constitute the executive committee.

Article VII.—Executive Committee. The Executive Committee shall have entire control and management of the affairs of the Society.

“**I** shall pass through this world but once. Any good thing, therefore, that I can do or any kindness that I can show to any human being, let me do it now; let me not defer it or neglect it, for I shall not pass this way again.”



SOME OF THE REMAINS OF CALIFORNIA REDWOODS.
“COMING EVENTS CAST THEIR SHADOWS BEFORE.”
A CHARACTERISTIC SKETCH OF A. D. 1925.



GEORGE W. TINCHER, TOPEKA, KAN.

ARBORICULTURE

A MONTHLY MAGAZINE.



PUBLISHED IN THE INTEREST OF THE
INTERNATIONAL SOCIETY OF ARBORICULTURE.



Subscription, \$1.00 per annum.

JOHN P. BROWN, Editor, Connersville, Indiana

Volume II.

CHICAGO, JUNE, 1903.

Number 5.

The Control of Wind by Forests.

"The wind bloweth where it listeth, and thou hearest the sound thereof, but canst not tell whence it cometh and whither it goeth."—John, iii:8.

Stagnation is death. Water is purified by pouring over rocks in mountain streams, and by flowing rapidly in rivers. The ocean is always in motion upon its surface, while numerous currents flow throughout its entire extent. The atmosphere takes up the poisonous gases from every source and by constant motion maintains its purity.

Even if it were desirable to turn back the current of the Mississippi and stop its onward flow, or to command the wind to be still, one would be as impossible as the other; but the current of the great river is controlled by a system of levees, and made to flow in a regular channel, and just as well can the force of the wind be regulated, and its damaging effects eliminated or greatly modified if we will but make the effort.

There is not a season which passes but we have numerous reports of great damage done by wind; uprooting isolated trees, breaking branches from those of more brittle nature, shaking the fruit from orchard trees, scorching farm crops by the hot breath of the sirocco in midsummer, freezing flocks of sheep and herds of cattle upon the ranges in winter, blockading roads and railway systems by snow drifts, carrying away large structures at times and tearing buildings in twain in exposed localities.

These occurrences are usually upon the

prairies or plains and in regions where the forests have been removed and but few trees remain, which being unsupported by surrounding forests, give way before unusual blasts.

While I am aware that storms frequently uproot trees which lie in their paths, in certain forest locations, I am also acquainted with the conditions existing in Mississippi and other states, especially in the South, where there are thick forests having evidences of storms, with wide swaths of fallen timber which were cleared by former "old hurricanes," as they are locally called.

In these localities a shallow soil of sand is underlaid with a hard pan of stiff clay, through which the pine roots fail to penetrate, the tap roots curling about like a corkscrew on reaching this impenetrable hard pan. Few strong lateral roots are formed to support the trees and the wind having great leverage, they are upturned by comparatively slight wind storms.

Yet the fact still remains that the most devastating storms and those of greatest frequency have their pathway in treeless regions, which also are without mountain protection.

Siroccos, hurricanes, tornadoes, cyclones and wind currents of every character have laws governing their movements, and such storms may be controlled or modified to great extent by proper efforts upon the part of people who reside in the locations where they prevail,

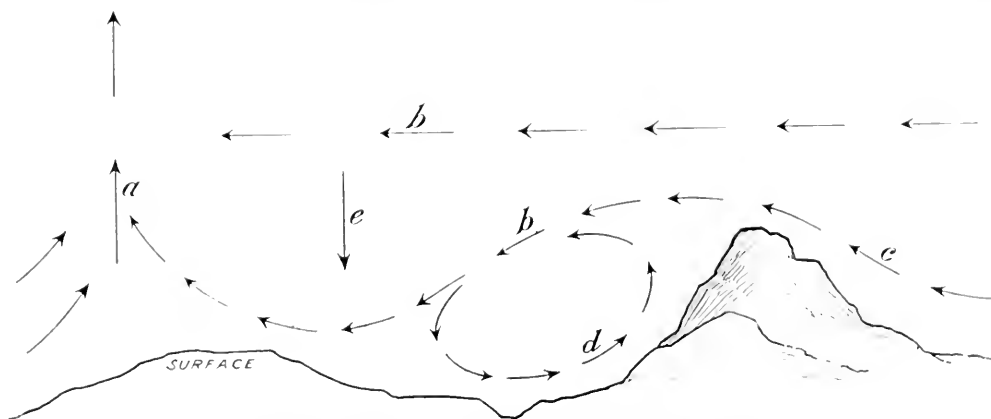
by an extensive planting of belts and groups of trees of suitable character.

The laws governing the flow of water in streams are well understood by engineers and countervailing forces are often employed to modify their influence; but it remains for us to devise and apply methods which will have a similar effect upon the wind, the laws governing which being in many respects identical with those which control the movement of water.

There are a few powerful forces which set the atmosphere in motion and give direction and velocity to wind currents.

I.

Heat, expanding the atmosphere in



VARIOUS FORCES OPERATING TO CONTROL WIND.

some localities, causes it to rise; designated by the arrow, "a."

II.

Cooler air flowing in to prevent a vacuum, "b."

III.

Natural obstructions, such as mountain ranges or forests, which deflect the currents from a direct course, "c."

IV.

An eddy or reverse current, moving in a circle in opposite direction to the main current, on the lee of any obstacle, "d."

• V.

Gravity, pressing the strata of air to the surface, "e."

The principle of the eddy is shown in the railway cut and is taken advantage of by engineers in Northern localities who erect fences a short distance from the

track in direction of prevailing snow storms. Without these countervailing obstacles the snow would fill the cuts and cause endless delays of traffic.

On the lee of these fences the snow is accumulated instead of filling the cuts. Often two or more lines of fences are maintained, the more thoroughly to protect the track within the cut.

Combinations of these various forces guide the currents of wind with varying direction and force according to the predominating influences. At times a gentle zephyr, again the terrible tornado. Where uncontrolled as upon the ocean, a ship may lie becalmed for weeks, making no progress, and afterwards be carried to destruction by monster waves

lashed into mountains by the typhoon.

We may illustrate this movement by an ideal sketch, No. 1.

The same principle explains the snow drifts upon a farm or on the roadway in prairie countries. A plain board fence and frequently a four wire fence simply causes the wind to form an eddy which deposits a drift of snow to such depth as to blockade the highway. It is often necessary to open the fields for the public travel until the roads are cleared of snow.

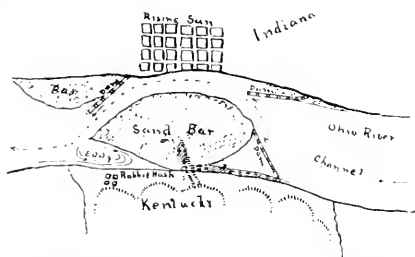
Builders of windmills understand that a high building or clump of trees, a hill or any obstruction near the wheel will prevent its successful operation when the direction of the wind is in line with such obstacle, although operating perfectly while the direction is transverse



DOUBLE LINES OF SNOW FENCES, SOLDIER SUMMIT, UTAH, ON RIO GRANDE WESTERN RAILWAY.

to such lines. Here the eddy or whirling removes the pressure from the wheel and also causes the vane to vacillate.

In the Ohio River opposite the boyhood home of the editor, is an immense sand bar, caused by a projecting ledge of rocks from the limestone hills of the Kentucky shore. In former years this bar extended entirely across the river both above and below the town of Rising Sun, very shallow water covering that portion called the channel and steamboats were grounded on this bar with fre-



CONTROLLING FLOW OF WATER.

quency. Engineers have constructed two dams projecting from the Indiana shore and one from the Kentucky side, in such manner as to confine the current so that the force of the stream deepens the channel, in order that boats may navigate more safely.

Exactly the same principle governs the wind currents. A canyon in the mountains diverts the wind, directs its course, and at times increases its velocity. A range of high mountains or sharp hills

deflect it upwards, while belts of trees perform the same service.

Locomotive engineers inform me that in time of strong head or side winds these have a decided influence upon the train, retarding its progress, and when a belt of timber intervenes the strain upon the engine is relieved and the train shoots ahead with increased velocity.

The whirlpool phenomenon in the Mississippi River, at Grand Gulf, Miss., which fifty years ago was noted as a most extraordinary instance of this reverse current, and which gave the name to the then important locality, "Grand Gulf," will be recognized by old river men, who knew the place in ante-bellum times.

The river at that time occupied the great bend, which, since the "cut-off" and change in the river bed, has become an inland slough and island. The Big Black River empties into the Mississippi at this point, while a hard clay point projected from the Louisiana shore. The combination of forces during periods of high water caused this vast pool to whirl violently. Flat boats were often caught in this eddy, and it was with great difficulty they were gotten out into the regular channel. The writer, in his boyhood, has been in this grand gulf in a skiff, and remembers the efforts he was obliged to put forth to pull his craft out of the whirling waters. This is upon the same principle which we are endeavoring to show wherein the obstacles placed in the

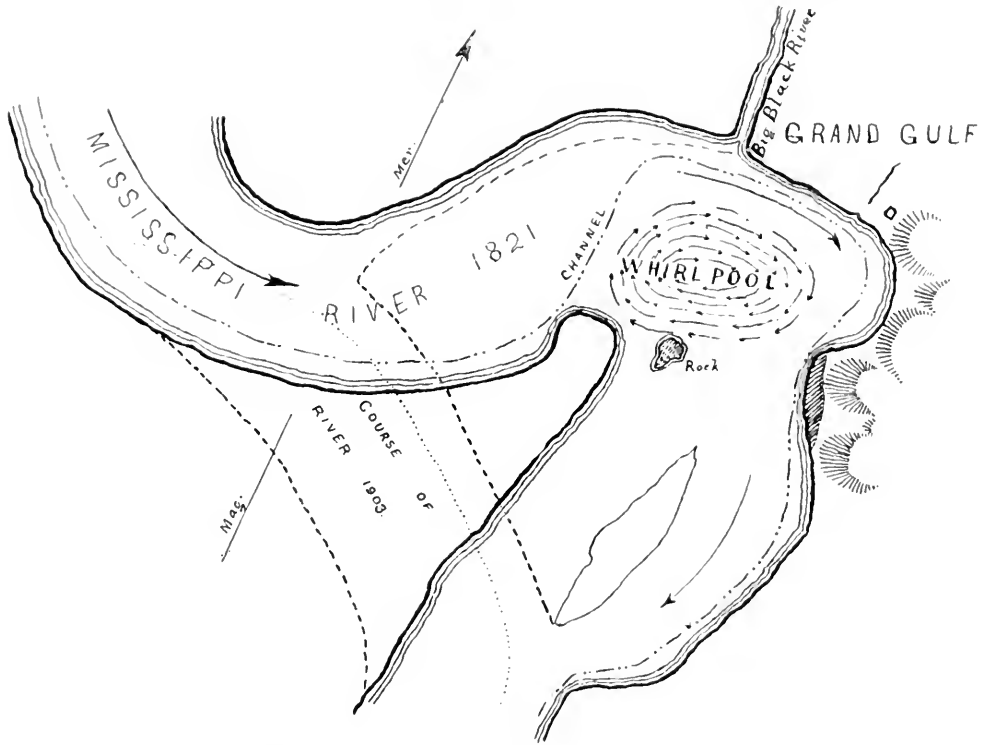
pathway of the wind will and do cause the same circular motion in the atmosphere as is seen in the moving waters.

The whirlpool, or gulf, as it was termed, was described in 1811 in "The Navigator," a periodical published in Pittsburg, but which I have never seen. It was noted on the map of a reconnaissance made in 1821, which is very nearly the same position as my memory

flected upward and mingled with the cold upper strata.

THE AMERICAN SIROCCO

Is caused by the prevailing winds from southwest to northeast during July and August, passing over a vast tract of superheated sand and sandy soil, beginning in Mexico, traversing Texas, Indian Territory, Oklahoma, Kansas and Ne-



WHIRLPOOL PHENOMENON, GRAND GULF, MISS.

recalls when I rowed through it during the fifties. When the "cut-off" was made, the Mississippi changing its course, this phenomena was destroyed and its former location is now an island of sand.

THE AFRICAN SIROCCO

Originates in Egypt. Beginning on the Libyan desert, the heated current flows Northwest, crossing the Mediterranean it reaches Malta, Sicily and Italy, traversing twelve to fifteen hundred miles of treeless, mountainless region, over desert and sea, having no obstruction until it reaches the Apennines, where it is de-

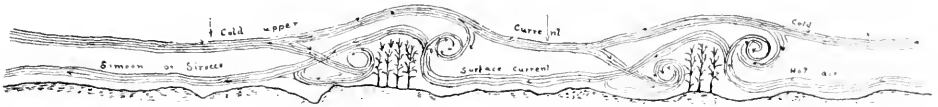
braska, reaching part of Iowa and Missouri. A region of plains without mountains, high hills or forests to break its continuity, the atmosphere takes up additional heat as it passes in succession over miles of hot and arid sands—until its breath withers all vegetation with which it comes in contact. Both man and beast suffer as well, the over-heated air being terribly oppressive. This condition can be changed by the systematic planting of trees in belts to break the continuity of the currents and prevent such an accumulation of heat by the surface currents. At each successive ob-

struction the whirls or counter currents would mingle the cold air of the upper strata with the hot surface current, equalizing the temperature by reducing the heat at the surface.

In all the region traversed by these siroccos, as well as the entire prairie country, the scant timber lies in the low valleys, the high rolling prairies having no wood, while the trees in the valley are all below the average surface. Were this

The force of the wind at the surface of the earth is what concerns us, and not its velocity at points of greater elevation, hence we may consider how best to increase the height of the current.

Sage brush deflects the wind from one to six feet, and prevents the sand motions, enabling seeds of grasses and trees to germinate; wild plum and similar bushes raise it to a height of six to fifteen feet. An osage hedge not cut back controls the



WIND CURRENTS—THE AMERICAN SIROCCO.

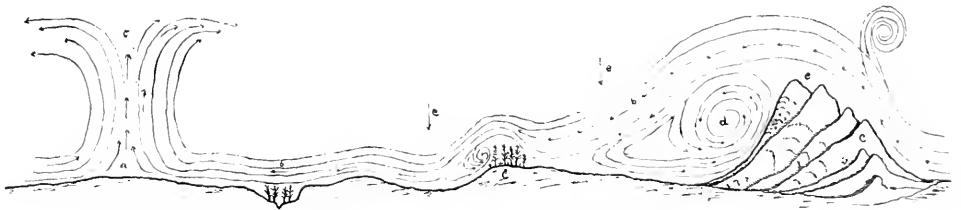
reversed, and the trees placed upon the highest lands the effect would be very different from what it now is, as the cold and hot currents would be equalized by the obstructions.

Oponents will say that hot air always rises directly and does not pass horizontally along the surface.

But water traverses a thousand miles of underground strata, enters the porous sandstone at the Great Falls of the Missouri and reappears in the valley of the

currents to height of twenty to thirty feet, while a belt of *catalpa speciosa*, properly grown will influence the wind to a height of from fifty to one hundred feet. *Eucalyptus*, a hundred and fifty feet. But these belts must be at frequent intervals to accomplish the desired result.

To construct levees, dams and engineering works for the improvement of navigable rivers, requires the authority and control of the government, and aid



CONTROL OF WIND BY MOUNTAINS AND TREES.

James, in Dakota, rising two hundred feet above the surface. Years of actual experiences, with the facts before us, it is self-evident that this hot surface current does traverse the region named each season, and these truths are well known to every resident of the territory described. The pressure of the overlying atmosphere, which is colder than the sirocco, so long as there are no mountains, forests or obstructions to divert the sirocco, hold the hot current close to the surface.

of each state benefited. And this work, which would ameliorate the condition of millions of our people, cannot be accomplished without the co-operation of the national government, each state interested, and whole communities of land owners. It will require patriotism and a high order of statesmanship among legislators to prepare and enact laws releasing from taxation the lands occupied by timber, and which will not be productive of an income for the owner for several years, but it is worthy the effort.



YUCCA GLAUCA OF THE PLAINS

The Yucca for Planting on Sand Dunes.

The intimate relation of apparently insignificant objects with those of great magnitude is often passed unobserved. The Yucca is neither a forest tree nor even a shrub, simply an herb. Yet we may find great forests successfully grown under the kindly shelter and protection afforded by this humble plant.

There are two prominent forms of the Yucca, although others are well known. The Adams thread and needle of the gardens throughout the Eastern portion of America, *Yucca fillimentosa*, and the western variety, *Yucca glauca*, which we illustrate, a dweller of the arid deserts and lower mountains of the mid. continent.

Both sorts have very large, fleshy roots, which penetrate the soil to considerable depth for the purpose of collecting and storing water for a long period of drouth.

On the mesas of Colorado, in gravelly locations, the Yucca is almost the only herb which can survive the prolonged drouths of this region.

On account of the strong, deep roots, and stored energy of this plant, it is enabled to push upward through a heavy covering of sand, and for this reason the Yucca would be a desirable plant to use upon the vast sand dunes of sea and lake coast to fix the sands which are constantly moved by heavy winds in unprotected localities.

The list of trees and plants which will grow under the prevailing conditions of ocean and lake shores, where constant winds build these mountains of sand and roll them along inland, is a very short one, since the sand buries seeds and small plants too deep for them to push through.

The first object to be accomplished is the elevation of the wind current a few inches above the surface so that it cannot pick up the grains of sand. Beach grasses of several varieties are commonly used for this purpose. But these will, in time, be covered up unless larger shrubs and trees can be started into growth and supported for at least one season, and these grown quite thickly, say 8 by 8 feet.

It is probable that the western Yucca will accomplish this object, perhaps in combination with the beach grass, better than by the grass alone.

Unlimited quantities of the seeds may be secured on the western mesas. This should be grown in nurseries a year and transplanted in the sands either 4 by 4 feet or 8 by 8 feet, with grass intermediate.

At the same time one or two year trees should be planted among the herbaceous plants at the rate of 500 to 700 per acre.

Willows, common peach (seed), catalpa, wild cherry and rapid growing trees may be interspersed with oak, various pines, etc., for permanency.

The Yucca is abundant in western Kansas and Nebraska, and if advantage was taken of its presence to plant hardy trees and shrubs, either the small plants or in some cases the seed, it would be possible at small cost to afforest much of this plains region—but common sense must be used in the selection of plants suited to such conditions.

Of course, plants which thrive in marshes only cannot be made to grow with vigor on dry plains; cottonwood and elm are among this class, but the bull pine will grow if once planted and protected. It would be a wise act if the U. S. government would turn the Botanical Garden, which is merely a politicians' garden, where thousands of dollars are wasted in furnishing congressmen with greenhouse plants and trees not of general value, into a propagating establishment for the growing of economic trees with which to clothe this western plains and Eastern Mountain lands.

Young trees which strike root quickly, and grow rapidly, should be set among the Yuccas at such distance as will ensure a permanent forest growth. After a few years, Oak and other more valuable trees may be established by seeding. Various Pines are used in such locations, but as soil is made with the gradual admixture of leaves, decaying roots and twigs with the sand, White Pine and numerous trees of value will be secured by supplying the seed.



A FINE COTTONWOOD.

The Cottonwood.

Populus monilifera. Syn. Carolina poplar, etc.

The influence which this pioneer tree has exerted in building up the great states of the West can hardly be estimated. For hundreds of miles along the trails leading to the region of gold since '49 it was practically the only tree from which the pioneers could obtain fuel with which to cook their meals and warm themselves after a tiresome day's journey. There were no streams between the Missouri river and the Continental divide but which had groves of cottonwoods and isolated trees lining their banks, and while there were some willows, box elder and various shrubs, yet the cottonwood was the only tree in large numbers.

The profusion of its seed is remarkable. The downy appendages to the seed enabled the wind to carry them in immense numbers to every nook and corner of western America. Why were there not vast forests? And why confined to low valleys and water courses? The answer is simple and fully explains the total failure of the numerous tree claims under the Congressional Timber Culture Act, and the reason for the abject failure of that well-meaning law.

The cottonwood cannot exist without large quantities of water. Its roots must be bathed in water constantly to maintain a vigorous growth. Like the elm and the willows, its habitat lies in moist places along water courses where its roots may drink freely during the growing period.

When trees of this character are removed to dry locations, as on the high, rolling plains, the insufficiency of water merely maintains life, but all vigor is lost. There are places on the prairies where water exists within a few feet of the surface. Here the cottonwood sends its roots deep and finds moisture. As a city street tree it has passed its days of usefulness, and wherever it exists other and better trees should be planted, selecting such as survive with less mois-

ture and have roots of an entirely different character from those of elm and cottonwood.

The so-called Carolina poplar is a fraud upon the public, since it is only a cottonwood, with all the defects of this tree, all its insect enemies and innumerable fungoid diseases. It was given another name by designing men to impose upon the public.

The moist lands along the Mississippi river are favorable to the growth of the cottonwood, and dense thickets formerly existed along the river's banks.

Before the extensive coal mining period, the writer, as a steambot clerk, has often watched the shores of the Mississippi for the well-known woodyards where the supply of fuel must be replenished from the cottonwood groves, since the principal fuel was from these trees.

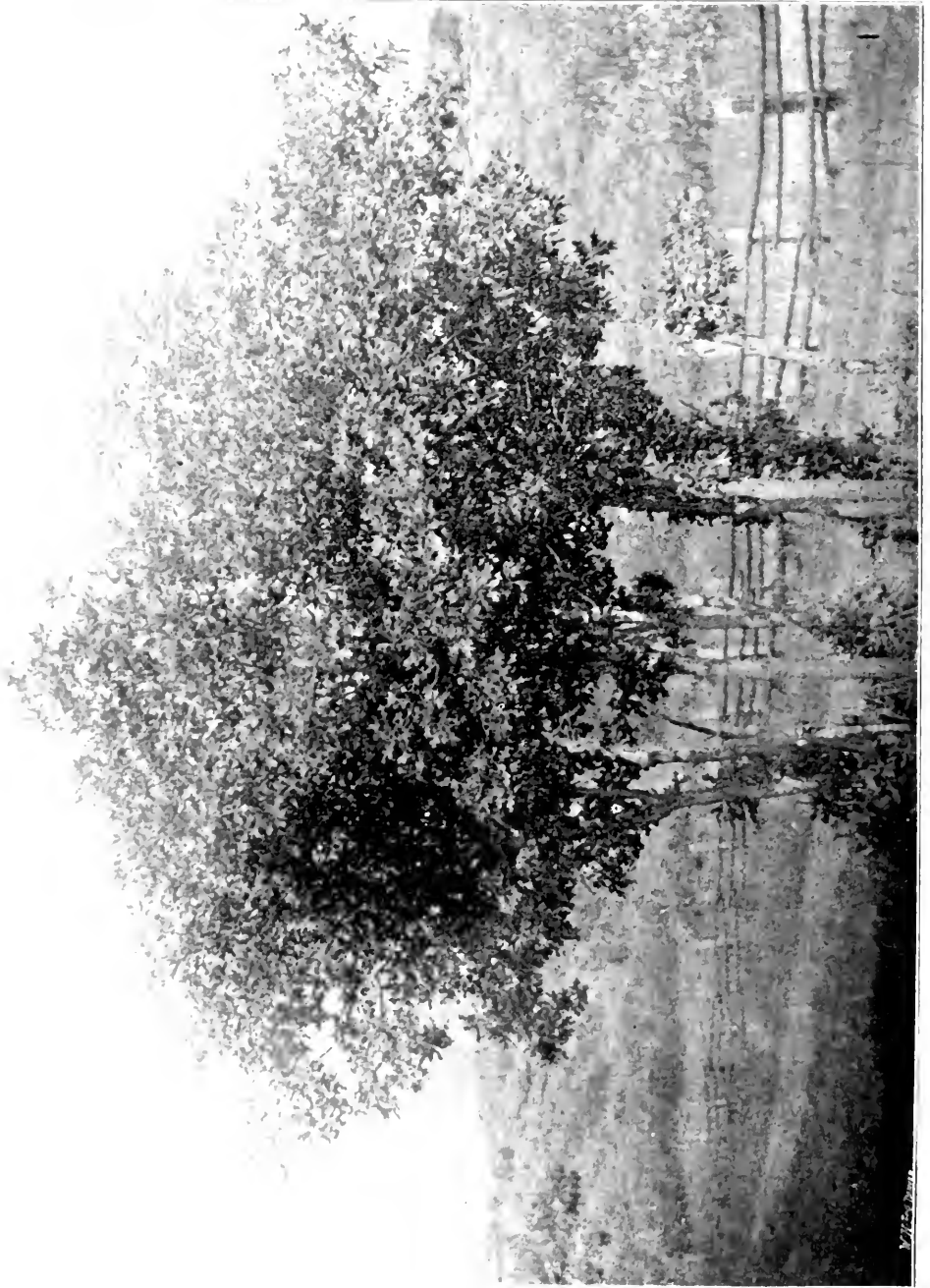
As the elevation increases at the base of the Rockies and we reach 6,000 feet, the form changes—the broad leaf cottonwood disappears and the narrow leaved variety succeeds it. Again at about 7,000 feet the aspen, *Populus tremuloides*, takes its place.

It is extremely unfortunate that the American people are not fully advised as to the worthless character of the cottonwood, under whatever name, as a shade tree, for wherever the poplars will grow (except the aspen), other and better trees will succeed.

The seriousness of the subject is seen when we realize that the oaks, elms, fine hard maples, sweet gum and other elegant trees are no longer planted, the cottonwood entirely taking their place, because of its fancied quick growth, which is its sole recommendation.

For wood pulp the cottonwood will serve a good purpose and should be extensively planted, but only on rich, moist, low-priced land, where it cannot fail to become profitable.

Our illustration is from one of the best specimens in the entire country, few cottonwoods having so perfect a form.



GROUP OF DWARF OAK AT GLEN EYRIE, COLO.

The Dwarf Oak of the Rocky Mountains.

Quercus reticulata and *Q. undulata*, with *Q. Arizona* Farther South.

The oak family is represented in Colorado and Rocky Mountain region by two varieties, which are ordinarily but low growing shrubs. They are found in the lower altitudes, 5,000 to 7,000 feet, covering many slopes. Seldom do either variety attain a diameter to exceed four inches and a height of five to fifteen feet, but occasionally, when isolated, and in favorable locality, they attain a diameter of twenty-four inches and height of forty feet.

These oaks are propagated from acorns and also from underground root stems—a clump covering four hundred square feet and comprising fifty stems are all connected by the same root system. This is at variance with the oak family regulations, as known elsewhere. We present two views of these trees, one which we photographed on the Divide near Palmer Lake, being 18 inches in diameter; the other view is a representative group, taken near Colorado Springs.

The acorns are small and form the principal food, in autumn, of the numerous small animals and birds, and, as provided by nature these animals and fowls become the great tree planters and protectors, dropping an acorn here and there, accidentally, however, which produce new clumps of oak to supply future birds with necessary food, and by destroying noxious insects, the birds also preserve the oaks from their depredations.

It would be a tedious process to cut cordwood from these small oaks; they are not suited for milling purposes; and thus to the fuel gatherer and lumberman these bushes are of no appreciable value for money making.

Nature, however, has many and varied methods of planting forests and covering the bare spots of the earth with verdure.

These insignificant dwarf oaks are of vast importance in this great scheme of nature. Where the lumberman is tearing down and destroying the trees, nature is

creating new forests and takes advantage of the oak—the birds and the squirrels to aid her.

These deciduous plants accumulate leaf mold about the base of their stems, soil is formed and held in place, snow is retained to moisten the soil, the seeds of pine, spruce and fir, dropping in the clump of bushes, take root, are protected from stock and from the scorching sun, and in a few years become great trees. Other seeds in great numbers fall to the ground, "some on stony ground," many on exposed spots where the sun quickly destroys them and where stock trample and browse them—few succeed without the protection of some friendly shrub or herb growth.

Upon a dry rocky mountain in New Mexico I found many spruce trees growing among the dwarf oak clumps, but not one elsewhere; goats and donkeys have browsed the oaks and destroyed all coniferous growths, but such as were within the dense clump where animals could not reach them. Thinned to one stem, all suckers removed, these oaks grow more thriftily, and, in good soil, well protected, make handsome trees thirty feet in height.

On the mountains, late frosts frequently destroy the early growths, and new shoots and leaves must be provided from the older wood; hence the bushes are dwarfed and by a succession of annual frosts, the trees have had their nature changed to the habit of bushes.

On the mesas browsing by animals keep them to a height of but two or three feet, yet so strong is the vigor of the root system that they survive such treatment where other plants would quickly succumb.

The attention of forest planters and the government is called to these facts, and to this plant, together with the yucca, and similar hardy, arid region growths, as a means of afforesting large tracts in the western plain country, with the aid of such shrubs as NURSES, to shade the young trees, and prepare for them a fer-



AN OAK NEAR PALMER LAKE, COLO.

tile soil, pines—ponderosa or yellow pine, cedar (juniper), piñon and many other trees can be secured.

A farmer who can only expect to live a few years, and the capitalist who wants to see the profit resulting from his investment, cannot or will not, entertain any proposition requiring years for its accomplishment.

This nation, each state, and many corporations, will continue in existence in-

definitely. The ones who will control the nation's affairs and who will carry on the business of the future Republic, should have some of the benefits which we have enjoyed and not be given the orange with its juices all squeezed out. The men of to-day are removing all the forests and leaving as *an endowment for their children* a treeless country, which the money they are now laying up for their children will never replace..

The Yosemite Valley.

In August, 1900, while making examinations of the forests in California, there was a meeting of a club of merchants, who were to discuss the subject, "Our Vanishing Forests." Mr. J. S. Bunnell, auditor of Wells, Fargo & Co., express company, had an exhaustive pa-

At the close of the meeting I was handed a letter and card, which proved to be a ticket and seat reservation in the stage line to Yosemite Valley, and the big tree grove of Mariposa County. Leaving San Francisco in the evening by a Southern Pacific train, I found even



Permission of Southern Pacific Railway.

THE THREE BROTHERS, YOSEMITE VALLEY.

per, most ably prepared, and, I having been invited to be present at the meeting, was called upon for some remarks. I emphasized the rights of the constituted authorities representing the people to prohibit the destruction of the forests where such act would make barren forever a tract of land, as was being done throughout that state.

the sleeping car reservation had been made.

Arriving at Raymond during the night we were not disturbed until morning, when, after an excellent breakfast, the stage drove up and seven passengers began the trip up the mountains.

As it was midsummer, the season extremely dry, and hot as well, there was

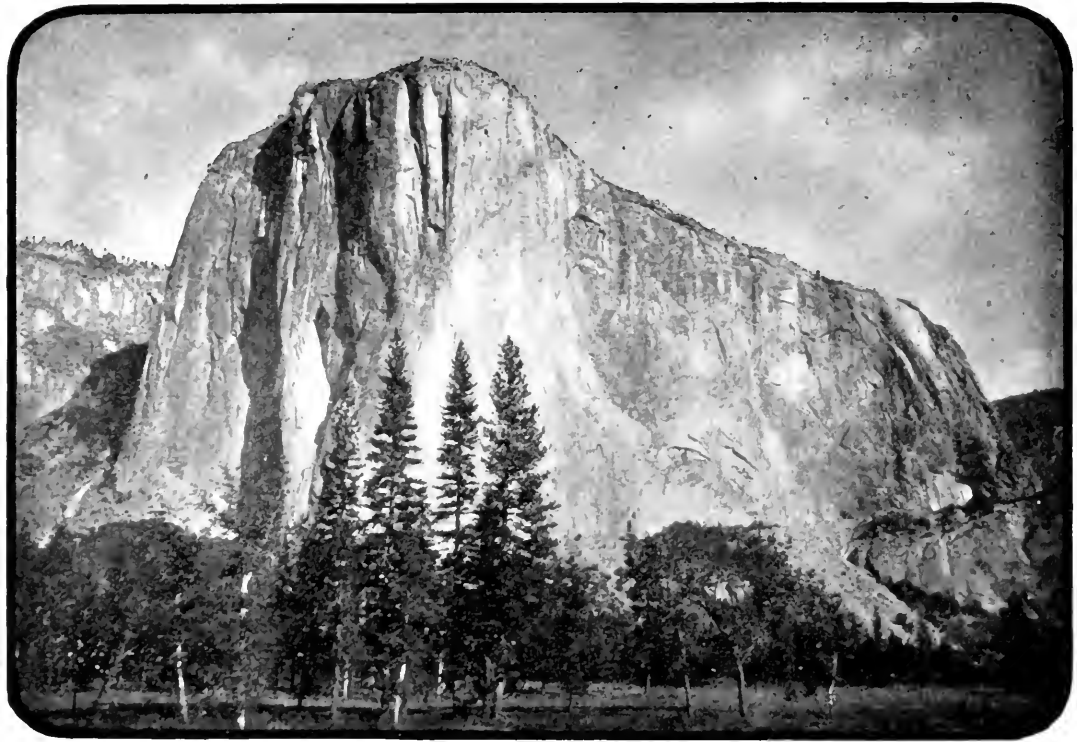
an abundance of dust, but notwithstanding this drawback, the trip was a most enjoyable one.

It was of special interest to me, as I was to see the sequoias of the Mariposa grove for the first time. In 1866 I had visited the Calaveras grove, having ridden horseback alone across the Sierras

least, but the changes of scenery at every turn of the road attracted our attention so completely that not a thought was given to any inconveniences.

Arriving at night at Wawona Hotel, we were well cared for and spent a few hours most agreeably.

At this elevation, almost at the summit



Permission of Southern Pacific Railway.

EL CAPITAN.

from Nevada to see those monsters of the mountains. The sugar pines and many other trees of the Sierra Nevada Mountains were of great interest.

A long day's journey in a stage, or open spring wagon, as it really was, with only a brief stop for dinner, the entire way being an upward climb, would be considered very fatiguing, to say the

of the mountains, with fresh, pure air, delicious water to drink, glorious scenery, we would delight to remain a week or more at Wawona, but with me time was an important factor. In less than a week I was engaged to address the Farmers' National Congress at Colorado Springs, and I could not tarry.

A few hours' ride brought us to the

head of the valley and we looked with awe at the wonderful works of nature.

To our left stood El Capitan, its base resting two thousand feet below us, while its top was lifted a thousand feet still higher than we were. The halftone pictures which we present, through the

drought. Not a drop of water moistened the rocks, although the beautiful Merced River winding at the bottom of the valley was well filled.

A few hours spent in this marvelous valley were entirely too short, no one should think of coming here for a stay



Permission of Southern Pacific Railway.

THE HALF DOME.

courtesy of the Southern Pacific Railway, give a better impression of the various views throughout this wonderful valley than any pen can do.

Probably tens of thousands of people have seen the Yosemite Falls as the water pours over the precipice, falling two thousand feet, where one has seen it as I did, during the season of excessive

of less than a week—and this I hope at some future time to do.

Seven hundred feet above the base of the rock El Capitan, in Yosemite Valley, yet half a mile below its summit is a shelf where a piece of the granite, long ago, was thrown down. Upon this shelf a bird carried the seed of a pine, depositing it among the accumulation of dust. The

rains moistened it, causing its germination. Its tiny roots crept into the little crevice and secured a footing. Little by little it spread its branches upward and pushed its rootlets deeper into the granite mass. Into this crevice water lodged, frost helped the tree to open wider the fissures and push deeper its roots, until now it has become a tree

power beyond the ken of man. We have not yet learned all the laws of nature. As we cannot explain how lightning is drawn, unseen, unheard, along the wire, carrying with it the human voice, although our friend who speaks is a thousand miles away, neither can we tell how the tree attracts the rains, gathering the moisture necessary for its existence,



Permission of Southern Pacific Railway

YOSEMITE VALLEY, CAL.

three feet in diameter and one hundred and twenty-five feet high.

From the stage road it seems a tiny shrub, as it stands alone against this massive granite wall, and it is pointed out to the tourist as the tree which grows without soil.

As I looked upon this sentinel tree I was persuaded that it possessed some

and makes its growth seven hundred feet away from the nearest soil, high up on the face of this massive granite rock.

On the return trip, again spending a night at Wawona, I visited the Mariposa grove of sequoias—several views from which have been given at various times in ARBORICULTURE.

The Pinon or Nut Pin.

Pinus Edulis.

Few forest trees will thrive in the stony soils, arid climate and great elevations of the central western mountain and plains region of the United States. *Pinus Ponderosa*, Mountain cedar and the Piñon are pretty much the extent. Mesquit, a low shrub, Texas Hackberry, and a small number of trees and shrubs of greater or less value, are found in several localities in Nature, but there are many, which, under cultivation, with a moderate quantity of water during the period of growth, are found to succeed admirably. We now have to do with natural conditions.

Piñon grows upon the lower mountains of Colorado, New Mexico, Arizona, Nevada and California, on warm slopes, and, with Red Cedar, covers the mountain sides. The seed is an edible nut, found beneath each scale of the cones and has formed the principal food of many Indian tribes. The Mexicans still gather and use them to some extent. These nuts are found on sale at many fruit stands in Denver and in some eastern cities, being relished by some who admire the peculiar resinous flavor.

The trees are low growing, seldom more than twenty-five feet high, have short trunks, branched low, and quite bushy. It is a very pretty evergreen and survives where rain seldom moistens its leaves. The only water it obtains is from the melting of the annual snowfall which is absorbed by the porous soil; this maintains life throughout the remainder of the year. Under such conditions the Piñon is of extremely slow growth.

There are approximately fifty concentric circles to an inch radius, requiring twenty-five years to increase one inch diameter; a tree of twelve inches thickness having grown for 300 years past.

Such dense wood is heavy, contains much rosin, and when seasoned for three or four years makes the very best fuel

of any known wood, burning slowly and giving out much heat.

The Piñon has too short a stem to be of very great value for mining timbers, cross-ties or lumber, but it possesses high value as a covering for the great arid plains and mesas, and performs its share in the great scheme of Nature towards climatic control. About Buena Vista, Colo., the regularity of the trees, round heads, and dark color have great resemblance to an apple orchard.

Many of the trees here are dying, and while I have not had opportunity to examine them, the appearance from the train indicates the presence of some form of destructive bark beetles. If this be the case, and without a more vigorous protective policy by the United States authorities and state officials, the Piñon, as well as the Ponderosa Pine, will be doomed in a very few years.

The Blue Jay, a bird which has more enemies among the human race than even the English sparrow, and which is maligned by many through ignorance, is the great tree planter of the Piñon, on the nuts of which he lives during a large portion of the year.

This mistaken bird is also the great protector of the pines, burrowing deep into the bark to reach the beetles and their larvæ, which are slowly but surely destroying the trees.

The state should prohibit the destruction of all forest growths by men whose only interest is to selfishly convert into money the forests which belong to the community, for no man has a right to make a barren waste of lands which have no agricultural or other value, save forest production, even though he may have a title to the land and all beneath.

The law should forbid the nefarious business which forever ends the mountain forest and terminates the income to the state from taxation because its value is destroyed.



The Black-Locust.

Robinia Pseudacacia.

We have received many letters from correspondents who ask for advice and information as to the desirability of planting the locust.

It is not generally known that the locust is a native American forest tree, growing upon the Blue Ridge Mountains in Virginia and extending on the highlands into other states.

It has long been a favorite street tree for certain locations, but is falling into disuse, largely on account of its suckering habit, sprouts coming up among the grass of lawns which are very persistent.

Botanists recognize but one form of the locust, and the closest observation I have given fails to discern any material difference other than what results from soil and location. Yet there are many who claim yellow locust and black locust to be two distinct varieties.

Some years ago I visited Long Island, where yellow locust was being sold as a distinct variety. I found a material difference in size and density of the wood grown on the north shore from the timber of the West, but in the flower and every detail decided there was but one species.

In rich loam and ample water the growth is very rank, while in the impoverished soil of the north shore the slowness of growth caused it to be more dense.

There are places where the locust is more desirable for forest planting than a majority of other trees. On clay soil, among rocks and gravel, and on poor lands which will not maintain a good growth of timber, the locust will often succeed while failure would result from planting better timber.

The wood is close grained, quite durable, and makes excellent fence posts. It is quickly renewed from the stump and from suckers when the trees are felled. When once planted the trees become permanent. Thus it is of value for the hill lands along the Ohio Valley and similar localities.

It cannot be made into lumber on account of its habit of growing in folds as it becomes old. There are comparatively few uses to which the locust can be

profitably put—fence posts being the principal one.

Every farm should have a part of the rough land in some kind of post timber.

The borers sometimes destroy entire groves, but as it gains in root power and vigor it overcomes these attacks.

The beauty and fragrance of the locust blossoms are well known. Good, rich land may be more profitably employed by planting walnut, oak, catalpa and trees which are valuable as lumber, cross-ties, etc., for which the locust is not suited. Attempts have been made to adapt locust for cross-ties, but they have all resulted in failure. Spikes cannot be driven without first boring holes and then they cannot be drawn when necessary to change track; besides the timber splits too readily.

In time of wooden block pavements, this wood was largely used, but round paving blocks have been quite unsatisfactory, except in Chicago, where they give employment to many in their frequent renewals and supply fuel in time of coal famine.

Wagon hubs are sometimes made of locust, and on the sea coast it is utilized for knees and other boat timbers, belaying pins, etc. Telegraph companies use it for pins, for insulator supports on cross-arms, for which there is an increasing demand. The durability and strength of the wood make it specially valuable for this purpose.

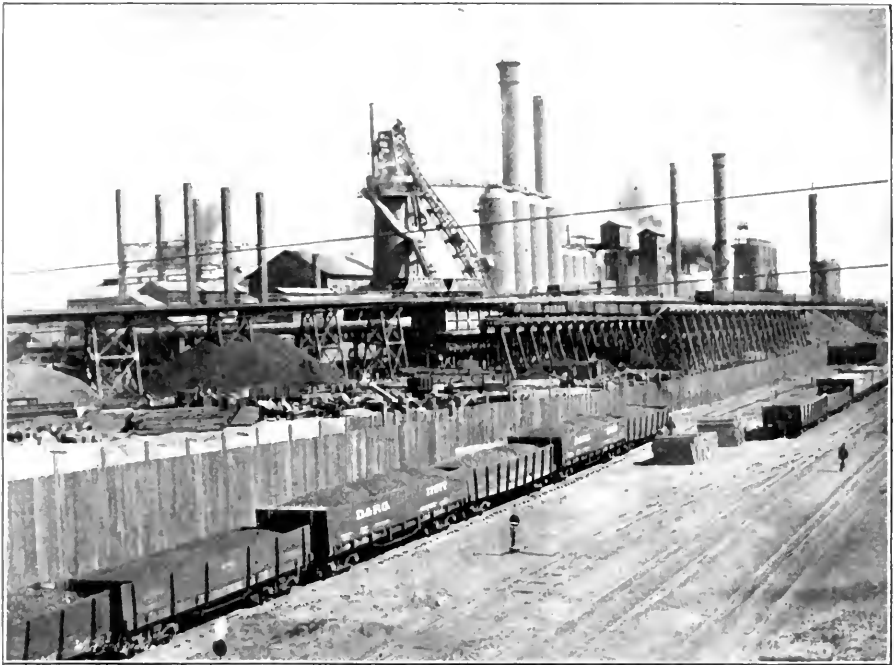
For country telephone lines where extreme length and straightness are not required, the young poles are useful.

The locust does not increase in value rapidly after it has attained a diameter of twelve inches, when it should be cut and new growths permitted.

Our illustration on page opposite is a grove of locust in Springville, Utah. The growth of the locust under irrigation, with hot, dry atmosphere, is very good. The bark has a character quite different than that in the East, being more roughly furrowed. The value of the locust for rough lands, unprofitable for cultivation, can scarcely be overestimated, since our farm fences must be maintained in all parts of America.



A LOCUST GROVE, SPRINGVILLE, UTAH.



THE STEEL PLANT OF THE COLORADO FUEL & IRON COMPANY, PUEBLO, COLO.

This is one of Colorado's greatest manufacturing enterprises. The mining of iron, its transportation to the mill, and its manufacture into the numerous structural forms, together with the mining of coal, manufacture of coke, and the transportation of these articles, makes the Colorado Fuel and Iron Company one of the grand institutions of America. No corporation in this country is doing so much for the uplifting of its employes as the C. F. & I. Co. Schools, kindergartens, hospitals, libraries, reading rooms are maintained in every camp. Each mining community has its clubroom, maintained by the company. Water-works, electric lighting plants, churches and every possible means for making the families of the men who are employed in the mines, factories, shops and railways, better contented, elevated in morals, better educated, and, in short, better citizens. What other corporation is doing so much?

It was but a few months ago that a noted speculator of Chicago made strenu-

ous efforts to gain control of this property. Many stockholders gave this man proxies, authorizing him to vote their stock, being persuaded their income would be enhanced by a change of management. The man was ingloriously defeated. Yet courts, lawyers, and those who never earned a dollar of the money which is carrying on this magnificent system of works, made vast sums in the legal battle which resulted.

It is needless to say that the innocent stockholders had all this cost expense to pay, which materially reduced the dividends they would otherwise have received. It is difficult to conceive of a better management than this company has had. It has been wise, built up from small beginnings, and with a view to the greatest benefits from the investments for the investors, and for the best interests of the employed as well.

The people of Colorado are justly proud of the C. F. & I. Co. and rejoice that the final outcome of the litigation was favorable to the men who have built it up.

Editorial Notices.

GEORGE W. TINCHER.

Topeka, Kan., whose portrait we present in this magazine, is one of the bright young men who has given much attention to the various forest problems which confront the nation.

The practical, economic side of forest planting has been his study and upon which subject he has excellent ideas. The growing of timber as a farm crop, cost, income and profit as a moneyed investment for farmers and for capitalists is a subject upon which Mr. Tinchler is an authority. His plantation of 65 acres in *catalpa speciosa* is a model and will be managed on thoroughly practical lines.

Mr. Tinchler fully appreciates the importance of a careful selection of seed, since with a mixed lot of trees, hybrids and worthless sorts, to start with, no subsequent care or management can ever make productive of good timber.

Mr. Tinchler is a close observer and studies the effects of various kinds of cultivation. While all trees are admired and have their good points, yet as an economical proposition, for making money, there is, in his opinion, nothing equal to the genuine *catalpa speciosa*.

The nation needs more such men as George W. Tinchler, who look upon the questions of forest planting and care of native forests from a thoroughly utilitarian view. There is a grand opportunity in the future for men of this character.

FORESTRY LECTURES.

The University of California has inaugurated a series of summer lectures on forestry, to begin Wednesday, July 29, and extend to August 10.

AT IDYLLWILD, SAN JACINTO MOUNTAIN, RIVERSIDE COUNTY, CALIFORNIA.

There are few subjects of more vital importance to the people of California than a full understanding and appreciation of the principles underlying rational and systematic forestry. The beneficial

influence of forests in conserving the seasonal rainfall, and hence the importance of maintaining forest covers upon mountain slopes, are now fully recognized the world over. In California, where a uniform supply of water for irrigation is so necessary, the preservation of the present mountain forests is all-important, and the foresting or reforesting of slopes and districts now bare is urgently needed. The popular mind is apt to take a sentimental view of forestry, rather than an economic one. In order to correct some of the misconceptions, as well as to bring about a better understanding of the underlying principles, the University of California will offer a special course of lectures on the subject. These lectures will be given at Idyllwild, in the main pine belt on San Jacinto Mountain, in Riverside County, as above announced. This resort is situated in the midst of a country rich in forest flora, which is thus immediately available for illustrations.

Dr. Willis L. Jepson, of the Department of Botany, and Professor Arnold V. Stubenrauch, of the Department of Agriculture, have been detailed to take charge of the work.

GOLD OR GILT.

In furniture, if a solid mahogany or other wood is wanted, the Tobey Furniture Company will supply it. There are no bargain-counter sales at Tobey's. Prices are reasonable, in fact very low; but high-grade, substantial furniture, that which lasts from generation to generation, is cheapest by all means. See Mr. Tobey's advertisement elsewhere.

SUBSCRIBERS, NOTICE.

Many subscribers are in arrears with their subscriptions. The low price, \$1 per annum, and high character of the work, with great expense attached, compels us to discontinue sending the magazine to those who do not remit.

TREES ON BOSTON COMMON.

(Boston (Mass.) Advertiser.)

"The improved appearance of the trees on the Common under cultivation must appeal to nearly everyone that passes through it. We have been in the habit of contrasting the trees with the well clipped grass plots that environed them, and they did truly suffer by comparison, but now, under cultivation, we only admire their greenness in contrast with the dark brown soil. If any are ill-shaped or have rough bark they are not noted.

"Moreover, the hunger of the trees for food and their thirst for moisture can be more readily appeased when under cultivation, and they will no doubt be less subject to the ravages of insect pests which destroy or injure the foliage. The long competition of the trees and grass, to see which would obtain most of the moisture and nutriment contained in the soil, has ended, the grass has disappeared. The trees are masters of the field, and so long as they retain control the shading of the Common is assured."

The citizens of Boston are to be congratulated on the final awakening of those in control of the Common to the fact that in the combat between a blue grass soil and trees of priceless value there can be but one outcome, eventually, in every case, the grass will obtain the lion's share of food and moisture; decrepitude will invariably result.

The axiom, old as history, "No two things can occupy the same space at the same time," is clearly applicable. If shade is dense grass will not grow—and if grass is dense trees cannot thrive.

THE PLAINT OF THE SPOILIATOR.

A disgrace to the state of Colorado for years has been the utter neglect of her forests by the state officials, timber thieving being common on public lands and with no effort upon the part of the state to prevent it.

The owner of a wildcat sawmill, who

resides at Fort Collins, writes the Rocky Mountain News at Denver a lengthy plaint objecting to the forest reservations and forest protection. Here is his opinion of Colorado frontiersmen:

"The first reserve was established, and what happened? Fire followed fire. Our frontiersmen said to themselves: Dead timber makes better cabins than green, and better firewood, too. So they immediately set fire to the timber and laid up stores enough for a lifetime; for your unlettered backwoodsman reasons in this manner: Dead timber don't make rain, nor does it make rivers or shelter game; consequently I will be allowed to take all I want of it. He reasons that way, and whenever he is shut out of the timber fires follow. The more reserves we have, the more fires. Out of seventeen big timber fires in Colorado last summer the state official who fought them says twelve were in forest reserves and on the prohibited state lands. The more strictly the laws are enforced the bigger the fires. You cannot govern western pioneers by British forest laws. They have the old spirit of '76 yet, and the dumping of the cargo of tea into Boston harbor is repeated in the Rocky Mountains a dozen times a summer."

Again he says:

"But the forest reserves will have to go. The only reason they have not already gone—gone up in smoke—is that the government is not enforcing the reserve laws. Whenever it does there is war. Nobody respects them. While the above happenings were going on three railroads and half a dozen big sawmills were cutting 200,000,000 feet of timber in a neighboring reserve without so much as consulting the authorities about it. What government!"

The entire letter is an incendiary, anarchistic effort to arouse the Colorado mountaineers to burn and destroy the timber in order to get even with the authorities who are trying to prevent the extermination of the Rocky Mountain forests.

THE WOODMAN'S HANDBOOK.

BY HENRY SOLON GRAVES.

Bulletin No. 36, Bureau of Forestry.—

It is not an easy matter to estimate the value of a forest tract, many conditions existing which must be considered for each separate locality, but there are a number of rules which will materially aid the novice in computing the quantity of wood or lumber on a given area.

Prof. Graves has gathered these from many sources and brought them together in this little handy volume, which may be obtained by writing the Forestry Bureau, Washington, D. C.

The advertising given this volume by the wildeat sawmill owners of Colorado ought to create a great demand for the book, and we hope it may. Mr. Graves should apply for the special and invaluable rule offered so generously by this individual.

A. C. M'CLURG & CO.

MISS OTILIE A. LILJENCANTZ,

If one were suddenly called upon to explain, for the benefit of inquiring young minds, just who King Canute was, it is doubtful whether a large proportion of us could go beyond the old story of the monarch who sought to control the incoming tide by a word of command. We all remember the picture of the bearded King, with his throne established on the sands, and the final victory of the defiant waves. But it seems that the fame of the real Canute rests on more glorious deeds than this, for he is an imposing figure in a new romance by Miss Liljencrantz, which is to be brought out shortly. She will be remembered as the author of a very unusual story published last spring, "The Thrall of Leif the Lucky," in which she showed a remarkable talent for the handling of mediæval atmosphere. It was romance of the kind we all like best, because the historical background was sincere and genuine, and made us feel that the author understood her ground thoroughly.

It is no easy thing to transport a reader back to the twelfth century and make him forget his improved modern surroundings, but Miss Liljencrantz seems to have been endowed with this faculty to a remarkable degree. In "The Ward of

King Canute" the monarch appears as a young man, the fiery, aggressive leader of the Danish Conquest of England. Although he is not the romantic hero of the story, his striking personality dominates the scene and the reader will be glad to know more of him, for he seems to have been entitled to a more heroic tradition than the one most generally accepted. His ward is Randalin, a beautiful Danish maiden, who serves the king disguised as a page, and of the plot itself it would be hardly fair to give the details, but we feel sure it will be eminently satisfactory to the readers who long to revive the sensations they felt when reading their Froissart and their King Arthur.

CATALPA BLOSSOMS.

Just now the Catalpa is in bloom, and as in the flowers we have the surest method of identification, trees from which seed is to be obtained in future should be carefully examined now. Speciosa is earliest, the flowers larger than any others, and has less color.

In July we shall have a color plate of the Catalpa flowers. Entirely too much carelessness exists among seed collectors.

The American Book Company has an exceedingly fine work on Mechanical Drawing, by J. C. Tracy, C. E., which we commend as the best work we have seen.

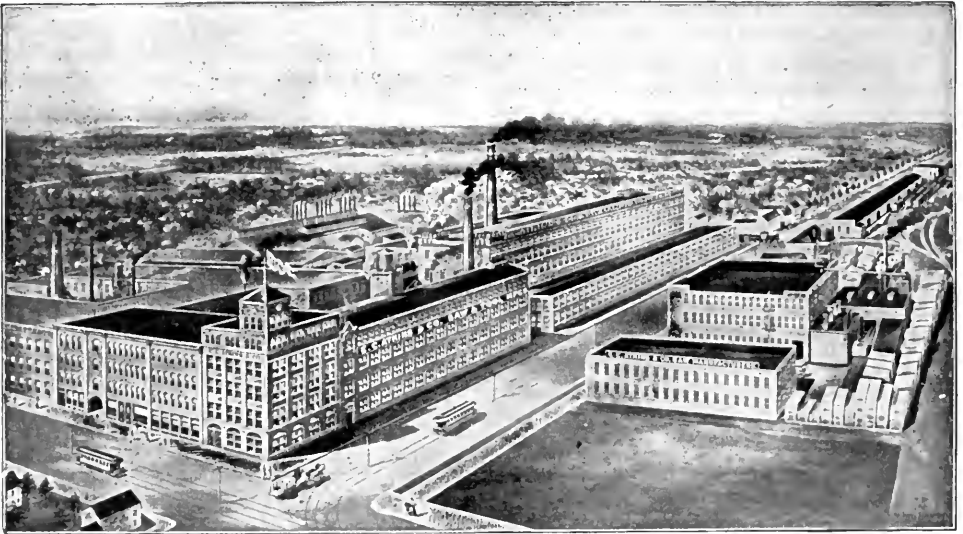
In these days a sketch or picture means much in fixing the attention upon a subject under discussion, and it is important that children be taught the art of drawing. This fact is recognized by educators who make drawing a branch of common school education.

Speaking of roses, there has been no new rose introduced for many years which has touched the popular heart as the Crimson Rambler.

Ellwanger & Barry, Rochester, N. Y., have just brought out two new rambler roses, which must attract the attention of all flower lovers—the Rubin, a full, dark scarlet, and Lenchstern, a single pink, shaded with crimson. These are worthy of extensive trial, being climbers, hardy and free blooming varieties. Price 50 cents each.

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Absolutely unmatched
Accept no other—if you want the best
Prize-winners everywhere



The World's Greatest Saw Works

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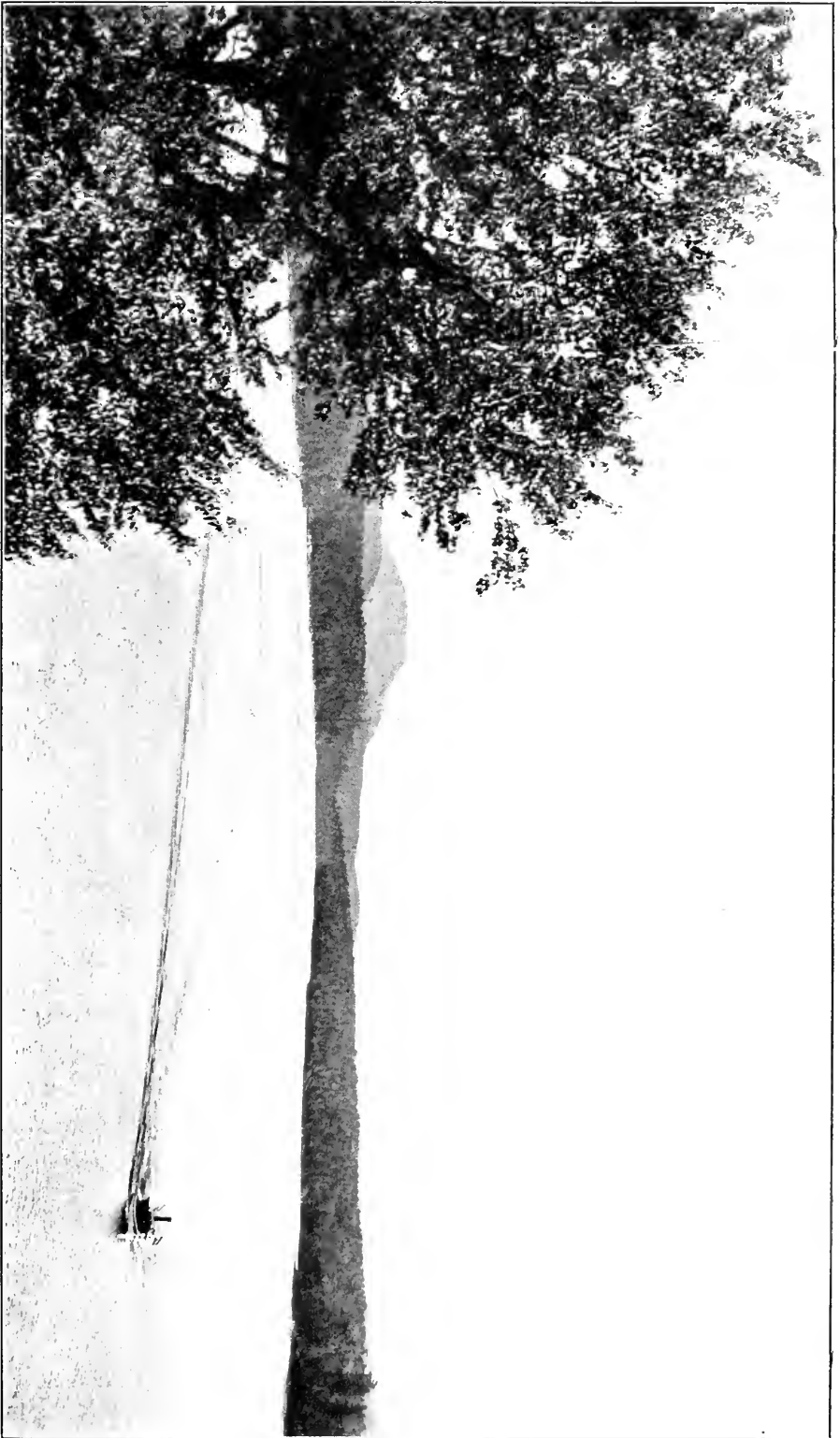
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PICTURESQUE MOUNTAIN-LOCKED RAQUETTE LAKE—IN THE ADIRONDACK MOUNTAINS,
ON THE NEW YORK CENTRAL.

From the Four-Track News.



Young People's Society of Christian Endeavor.

Twenty-first annual convention will be held in Denver, Colo., July 9 to 13, 1903. Special rates by all railway lines.

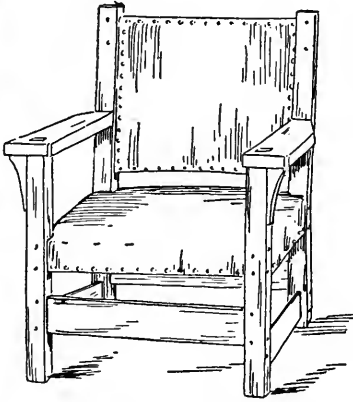
Our illustration shows the city of Den-

ver, with its background of snow-covered mountains. Other illustrations in this number of ARBORICULTURE present views in various parts of the Rocky mountains and in California, all of great interest to tourists, and which may be visited at little cost during this convention season.

Rusmore Furniture

(Trade-Mark)

Give individuality to your home by furnishing a room in Rusmore. A living room, library, dining room or "den" in this furniture is different and more artistic than any fitted with the commonplace patterns one sees everywhere.



This Arm Chair **\$17.50**
(In Leather)

Rusmore furniture is unique in its rich brown color, artistic in its plain designs and strong in its hand-made construction.

It is made in big easy chairs and couches, tables, bookcases, buffets, desks, etc.

We give careful attention to orders received by mail, and out of town customers can make selections from our catalogue—sent FREE.

NOTE—Rusmore Furniture can be obtained only from this company.

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Colorado Springs, Colorado——“The Antlers.”



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HOTEL
IN THE
ROCKY
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Unsurpassed
Health
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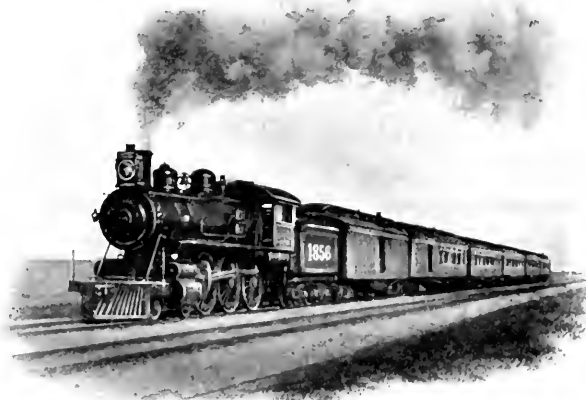
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Cuisine.

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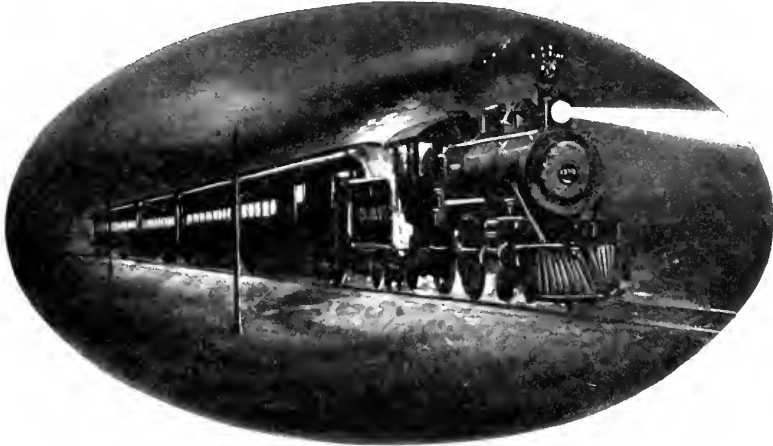
*It was the route in '49!
It is the route today,
and will be for all time to come!*



“The Overland Limited”

The famous Union Pacific train running to San Francisco in two nights from Missouri River.

E. L. LOMAX, General Passenger and Ticket Agent, Omaha, Neb.



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The World's Fair Route
From the Leading Cities of
Ohio, Indiana and Illinois
To **ST. LOUIS**

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CINCINNATI, OHIO.

W. P. Deppo,

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THE BROAD WHEAT AND CORN FIELDS AND THRIVING TOWNS OF **KANSAS.**

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THE GRAND PICTURESQUE AND ENCHANTING SCENERY AND THE FAMOUS MINING DISTRICTS OF **COLORADO.**

THE AGRICULTURAL FRUIT, MINERAL AND TIMBER LANDS AND FAMOUS HOT SPRINGS OF **ARKANSAS.**

THE BEAUTIFUL ROLLING PRAIRIES AND WOODLANDS OF THE **INDIAN TERRITORY.**

THE SUGAR PLANTATIONS OF **LOUISIANA.**

THE COTTON AND GRAIN FIELDS THE CATTLE RANGES AND WINTER RESORTS OF **TEXAS.**

HISTORICAL AND SCENIC **OLD AND NEW MEXICO.**

AND FORMS WITH ITS CONNECTIONS THE POPULAR WINTER ROUTE TO **ARIZONA AND CALIFORNIA.**

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ARBORICULTURE



ONE OF THE SEVEN CASTLES, ON LINE OF COLORADO MIDLAND RAILWAY.



Colorado, the Black Hills Yellowstone National Park

and a score of other places of interest to the tourist, offer to the seeker after rest and recreation a panorama of majestic mountain peaks, virgin forests, imposing cataracts, laughing mountain brooks, vast pleasure grounds where game is abundant and lakes and streams where the fishing is excellent.

The hotels are of the best and include all classes of service, from the elaborate completeness of the larger hotels to the more economical accommodations afforded at numerous boarding houses and hotels where prices range from \$6 to \$15 per week. The

Chicago & North-Western Railway

offers most excellent daily train service to the various summer resorts of the Great West, to the lakes and streams of Wisconsin, Northern Michigan and Minnesota, the Hot Springs of South Dakota, the mountain resorts of Colorado and Utah, and to Yellowstone National Park, California, Oregon, Washington and Alaska.

Summer tourist rates are in effect from Chicago and all points east. A series of booklets, one of which is descriptive of Colorado, another of California, and another entitled "Hints to Tourists for 1903," with detailed information regarding routes, rates and schedules will be promptly mailed upon application to

W. B. KNISKERN,
PASSENGER TRAFFIC MANAGER,
CHICAGO, ILL.

NW35

Your Vacation in Colorado

TOURIST TICKETS FOR HALF FARE

A Colorado trip this year will cost very little. We are going to sell round trip tickets from Chicago for \$30. From St. Louis \$25. Practically half fare. Eastern railroad agents will sell through tickets based on these rates. This will enable people of moderate means to spend their holiday in the delightful Colorado country. Special tickets will be sold July 1 to 10 for even less than named above.



OUR HANDBOOK OF COLORADO

which we will send if requested, without charge, tells all about the hotels, boarding houses and ranches, their prices, names and addresses of the proprietors, attractions within reach, rates for livery, the fishing and hunting, charges for guides, etc. You can get excellent accommodations for \$8 to \$10 a week. Send for a copy. Do it *today* and with the book I will enclose a circular telling about the railroad ticket rates and our fast "one night on the road" trains between Chicago or St. Louis and Colorado.

There is no place in the world like Colorado for beauty of mountain scenery and perfection of climate—it is ideal. I have never known anyone to return from Colorado disappointed. Where could you find a more delightful place to spend your vacation?

Don't forget. Send *today* for a copy of our Colorado handbook. It is well worth looking over even if you don't make the trip.

Rich Lands

in the great

Yazoo Valley

(Mississippi)

on the lines of The Yazoo and Mississippi Valley Railroad Company

Famous as the largest body of the most fertile lands producing the greatest revenue in the United States from cotton, corn, cattle and hogs

**Invest your money in these lands
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Land Commissioner

Park Row, Central Station, Room 560

Chicago, Ill.

\$33.00 TO CALIFORNIA



and to Portland and the Northwest. \$30 to Salt Lake City, Butte and Helena. (Proportionately low rates from St. Louis and the Missouri River.) These extremely low rates are on sale from Chicago daily, until April 30, and afford a most inexpensive opportunity to visit the Pacific Coast.

The most enjoyable way to go to see the most and learn the most is by way of the

DENVER & RIO GRANDE SYSTEM,

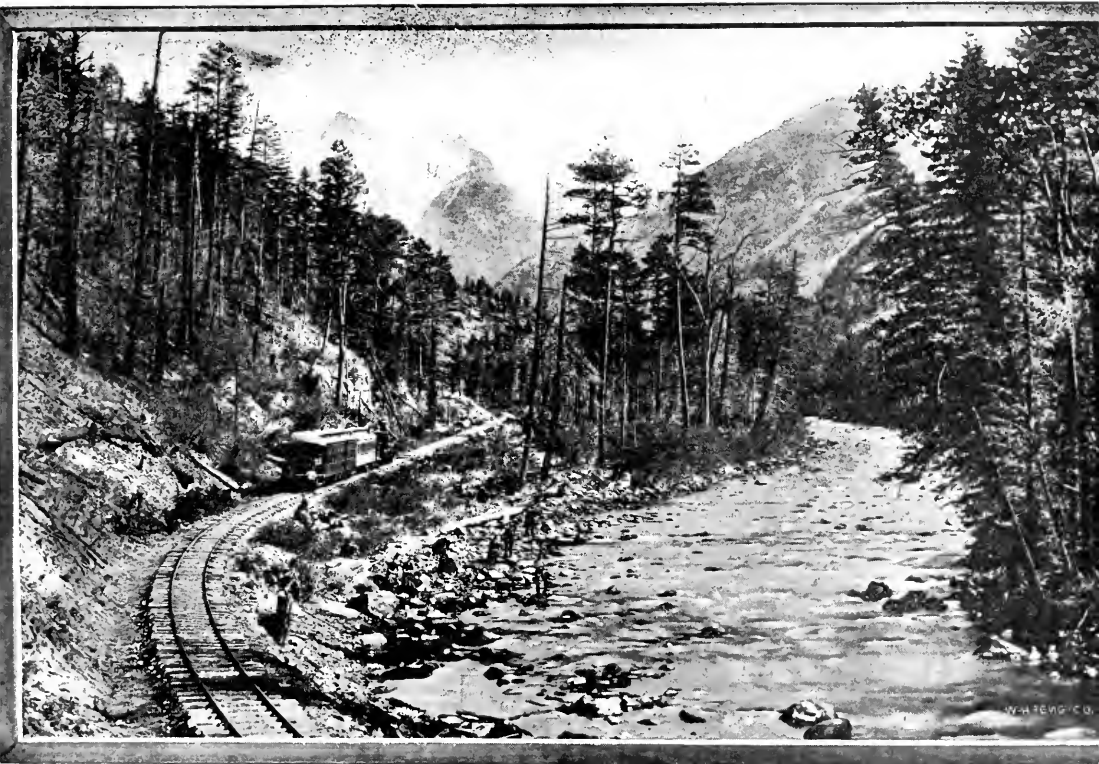
"The Scenic Line of the World,"

through Colorado and Utah and the world's famous scenic attractions. The Royal Gorge, Grand River Canon, Marshall Pass, Salt Lake City, etc., etc.

Personally conducted tourist car excursions via this route leave Chicago five days in each week for San Francisco and Los Angeles without change.

For folders, free illustrated booklets and other information see your nearest ticket agent, or address

S. K. HOOPER, G. P. & T. A.,
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LOS ANIMAS CANON, ON LINE OF DENVER & RIO GRANDE RAILWAY.

ARBORICULTURE



INSPIRATION POINT, CLEAR CREEK CANON, ON COLORADO SOUTHERN RAILWAY.



"Now is Colorado Time!"

Don't compare Switzerland and Colorado. It isn't fair —to Switzerland. Switzerland has nine peaks more than 14,000 feet high. Colorado has forty-two—all higher than the famous Jungfrau. In addition it has nine hundred lakes and more than sixty rivers.

Why not go there this summer? Rates are very low — \$30.00 for the round trip from Chicago; \$25.00 from St. Louis; \$17.50 from Missouri River points; still lower, July 1 to 10. And, if you take the Rock Island System, you will be comfortable going and returning.

Our booklet, "Under the Turquoise Sky," gives just the information you ought to have. Contains a list of Colorado's hotels, rates, capacity and surroundings. It is beautifully illustrated, interesting and practical. Sent on receipt of six cents in stamps.



JOHN SEBASTIAN,
Passenger Traffic Manager,
CHICAGO, ILL.

G.A.R.



EVERGREEN NURSERY COMPANY.

ESTABLISHED 1864.

STURGEON BAY WISCONSIN,

Is prepared to contract to furnish Trees in large quantities, and of all Standard Varieties, to owners or planting contractors of LARGE ESTATES, FOREST PLANTATIONS, or for RE-Foresting TIMBER PRESERVES.

Standard Timber Trees Our Specialty.

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Seeds and Seedlings that are of the best quality and—an important factor, too—true to name.

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1,000,000 PLANTS. Pure *Catalpa Speciosa*
and Seed of same collected in forest 5 5

WALTER P. BROWN, Manager.

CONNERSVILLE, IND.

SPECIOSA CATALPA SEEDLINGS AND SEED.

I have for sale, two to three million *Speciosa Catalpa* seedlings, twelve to thirty-six inches high. Also one thousand pounds seed of same, all the growth of 1902. : : : : :

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Calls attention to the fact, that:

IT IS THE ONLY Standard Gauge Route from the United States Frontier to Mexico City.

IT IS THE ONLY Line in Mexico that can offer the Traveling Public the conveniences and comforts of Standard Gauge Pullman Drawing Room Sleepers, lighted by Pintsch Gas.

IT IS THE ONLY Line by which you can travel WITHOUT CHANGE from St. Louis, Mo., to Mexico City.

IT IS THE ONLY Line from El Paso, Texas, to Mexico City.

IT IS THE SHORT LINE from San Francisco and Pacific Coast Points to Mexico City.

The Lines of the Mexican Central Railway pass through 15 of the 27 States of the Republic. Eight million of the thirteen million inhabitants of Mexico are settled contiguous to them.

The principal mining regions receive their supplies and export their products over it. Chihuahua, Sierra Mojada, Mapimi, Fresnillo, Parral, Guanacevi, Durango, Zacatecas, Guanajuato, Sombrerete, Pachuca, etc., etc.

When You Travel for Business, Go Where Business is Done.

There are only five cities of over 35,000 inhabitants in the Republic of Mexico that are not reached by the Mexican Central Line.

The following ten cities are reached only by the Mexican Central Railway:

Chihuahua, 30,098 inhabitants; Parral, 16,382; Zacatecas, 34,438; Guanajuato, 40,580; Leon, 63,263; Guadalajara, 101,208; Queretaro, 38,016; Zamora, 12,533; Aguascalientes, 37,816; Irapuato, 19,640.

It also reaches the Cities of Torreón, 13,845; San Luis Potosí, 60,858; Tampico (Mexican Gulf Port), 16,313; Celaya, 25,565; Pachuca, 37,487; City of Mexico, 368,777.

Daily Pullman service between St. Louis, Mo., and Mexico City, also between Kansas City, Mo., and Mexico City, and vice versa.

W. D. MURDOCK.

General Passenger Agent,

... MEXICO CITY.

THE GREAT SOUTHWEST



KANSAS has long been known as a land of tall corn and billowing wheat crops, of blooded cattle and long-fleeced sheep, of fat hogs and fast horses, of rich soil and hustling people. It is not so generally known that it is also taking front rank in manufacturing by reason of cheap coal, natural gas, fuel oil and abundant raw materials. Land is still cheap. The man seeking a new home will do well to carefully inspect the "Sunflower State." In 1901 (a poor year everywhere) Kansas raised 90,333,095 bushels of wheat. In 1899, a big corn year, 225,183,432 bushels of that cereal were produced.

OKLAHOMA was first settled in 1889. In 1900 the population was 398,331. The growth since 1900 has been rapid, particularly in new railroads. Here are found, side by side, wheat, corn and cotton. Wheat is the leader—the 1900 crop was a "record breaker," 30,680,000 bushels. Cotton is the poor man's friend—the 1900 crop was 150,000 bales; its by-products are very profitable. In one county alone a corn crop of 2,800,000 bushels was harvested in one season. There are a million cattle in the Territory and a quarter of a million hogs. The Santa Fe is opening up Eastern Oklahoma.

TEXAS is the largest State in the Union. It can produce almost everything needed. It has sea coast and mountains, forests and plains, soils of every kind, a wealth of fuel, geysers of oil, growing cities and a hospitable climate. Its corn and wheat crop average 40,000,000 bushels annually. Texas gave to the world in 1901 four million bales of cotton. The lumber industry is immense. Rice is a comparatively new crop in Texas, sited to the low lands along the Gulf Coast. Experts pronounce rice a money-maker. The Santa Fe traverses the heart of Texas, with terminals at tide water.

COLORADO is popularly known as a mining State, producing gold, silver, iron and coal. Resultant of these interests have sprung up flourishing cities like Denver, Pueblo and Colorado Springs, with their big smelters and allied manufacturing industries. The principal agricultural section is in the Arkansas Valley, between Pueblo and Holly. Here are grown in profitable abundance sugar beets, melons, vegetables, small fruits and alfalfa. Ample water by irrigation and an immense beet sugar factory have attracted several thousand farmers, with room for ten times as many.

NEW MEXICO lies at an average altitude of one mile. Dry air and almost constant sunshine—the ideal country for outdoor life. It has mines of gold, copper and coal, great cattle and sheep ranches, pine forests and two magnificent irrigated valleys, the Rio Grande and Pecos. There are churches, schools, growing towns, and a refined social life. Small fruits, alfalfa and grain are the principal crops. On the wide plains cattle and sheep are grazed. In the mountains are fine mines. The Pecos Valley and Maxwell Land Grant are just now attracting special attention.

ARIZONA is in the semi-arid region. In average years enough rain falls in the hills to supply sufficient moisture under irrigation. In the Salt River Valley, near Phoenix, oranges are raised side by side with wheat; alfalfa fields nod to lemon groves and vineyards yield abundantly. Thousands of cattle are fed here each winter. Ranch life is very fascinating, healthful, and quite profitable. Around Prescott the mineral development is astonishing. It is estimated that Arizona mines have yielded \$200,000,000 in twenty-five years. Arizona has much to offer the young man who is ambitious.

CALIFORNIA California was once known only as a land of gold. Gold is mined there yet—millions of dollars a year. But other things have crowded it to one side—for example, oil wells, citrus fruits, wheat and cattle. In the San Joaquin Valley of Central California, a district 250 miles long and 50 wide, with room for 250,000 farms of 40 acres each, the small farmer is coming to the front. He raises alfalfa, has a small herd of cows, sells butter and eggs and sets out a vineyard. He arranges an orchard of figs or olives or walnuts, has vegetables to eat and sell, and a bank account at the end of the year. This is not all done at once, but sooner than "back East." Irrigation is the explanation. The mountains on each side are full of living streams. There are excellent local markets.

For descriptive literature, and information about Homeseekers' Excursion rates, address

General Passenger Office, The A. T. & S. F. R'y System, CHICAGO.

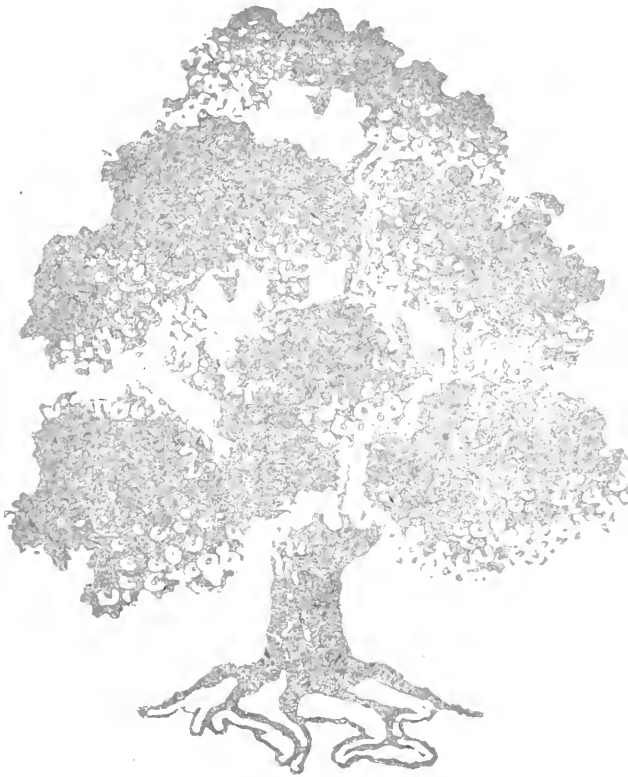
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ARBORICULTURE

VOLUME II.

NUMBER 6.



A Magazine of the International Society
of Arboriculture: Indianapolis, July, 1903.

THE INTERNATIONAL SOCIETY OF ARBORICULTURE

OFFICERS

GENERAL WM. J. PALMER, President, Colorado Springs, Colo.
JAMES H. BOWDITCH, Vice-President, Boston, Mass.
JOHN P. BROWN, Secretary-Treasurer,

ARTICLES OF INCORPORATION.

Article I.—Name. The name of this corporation shall be The International Society of Arboriculture.

Article II.—Purpose. The purpose of the Association is to introduce judicious methods in dealing with forests and woodlands; to advance and advocate a public interest in this subject; to promote the afforestation of unproductive lands; to encourage the planting and care of shade trees in parks, public and private grounds, and along streets and highways; to inspire an interest in our remaining native forests, and groves of ancient trees, and to seek their preservation; to supply information to railway officials in regard to timber culture for railway uses, and incite railway and other corporations to plant trees for economic purposes.

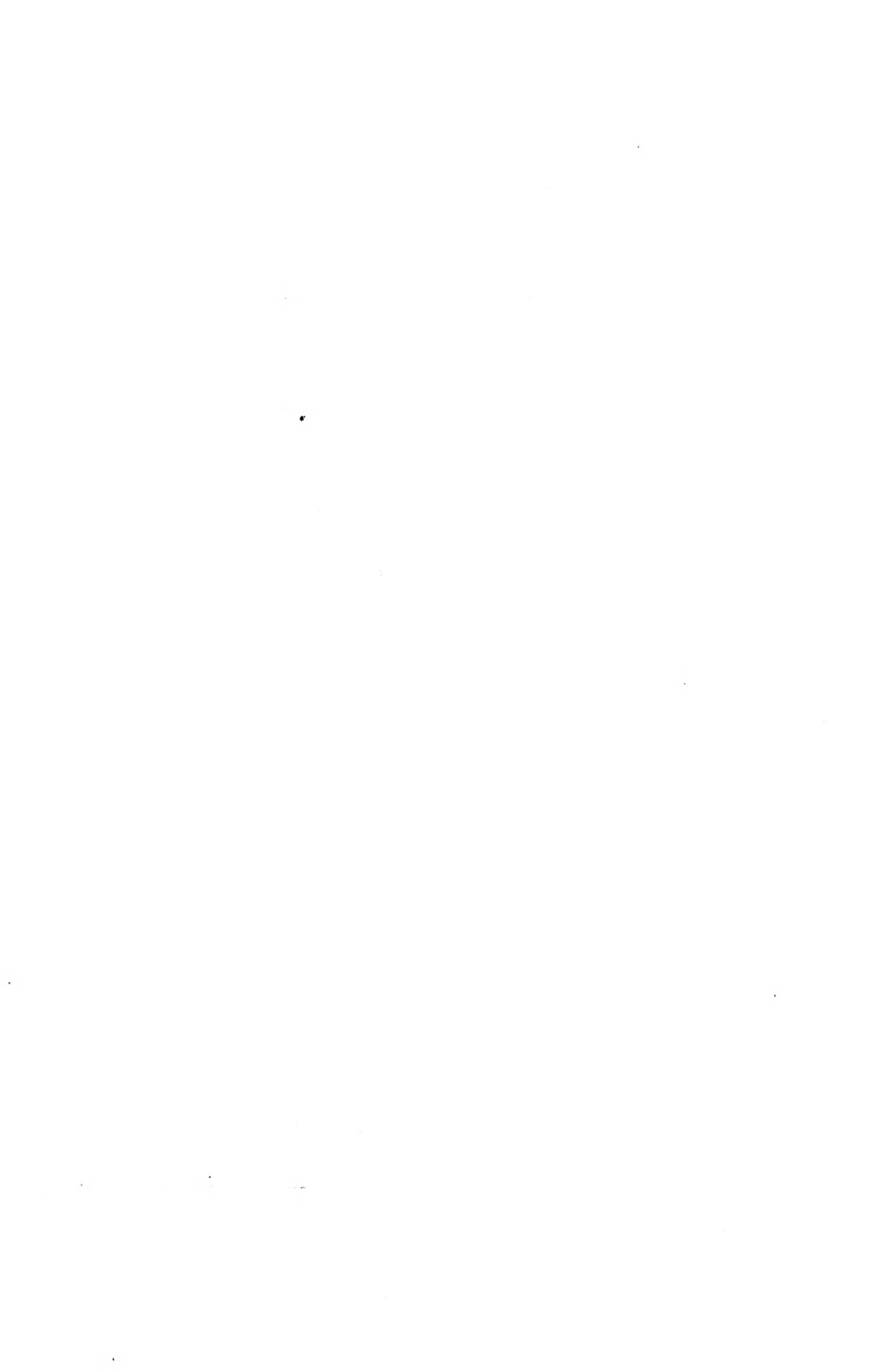
Article III.—Membership. Any person may become a member of this Society by the payment in advance of an annual due of two dollars, and on payment of this annual due shall be entitled to receive, regularly, one copy of ARBORICULTURE, the official organ of the society. Any person who may contribute ten dollars toward the support of the society shall become a patron. Honorary members may be chosen by the executive committee.

Article IV.—Officers. The officers of this Association shall be a president, vice-president and secretary-treasurer, who shall be elected at the annual meeting each year by ballot, and shall serve for one year, or until their successors shall have been elected and shall have accepted office, and when elected shall constitute the executive committee.

Article VII.—Executive Committee. The Executive Committee shall have entire control and management of the affairs of the Society.

Entered at Chicago, Ill., as second-class matter November 24, 1892.

Application for change of entry to Indianapolis, Ind., made June 2, 1903.





THE FEW REMAINING BUFFALOES.

THE W. W. WILSON COLLECTION, U.S. GEOLOGICAL SURVEY.

ARBORICULTURE

A MONTHLY MAGAZINE.



PUBLISHED IN THE INTEREST OF THE
INTERNATIONAL SOCIETY OF ARBORICULTURE.



Subscription, \$1.00 per annum.

JOHN P. BROWN, Editor, Connersville, Indiana

Volume II.

Indianapolis, July, 1903.

Number 6.

Phenomenal Meteorological Conditions—Do Forests Control Them?

The Atlantic States, where evaporation is abundant and precipitation is usually quite regular, have for the time changed climatic relations with the arid West. While the plains and prairies, which are far removed from seacoast, and the ordinarily cloudless skies of Colorado have been replaced with dense masses of oversaturated air currents, which have poured their contents in disastrous floods along the slopes of the Rocky Mountains and the plains and prairies as far as the Mississippi River, meantime a prolonged drought in New York and New England has contributed to support the forest fires, the sky being obscured by dense bodies of smoke.

WHAT HAS CAUSED THESE CHANGED CONDITIONS.

The theory accepted by scientific authorities in regard to moisture and aridity is that water evaporated by heat ascends into the atmosphere, forms clouds, which wind currents bear inland from the ocean. As temperature is reduced, precipitation occurs. Having parted with all surplus moisture during the early part of their journey, there is none left with which to moisten the earth throughout the central portion of the continent, and thus it is arid.

But there are influences which control the deposit of moisture of which authorities are ignorant.

—Electric Influence.—

Cloud movements, ability to retain moisture and precipitation are largely

caused by electrical energy, and this is controlled by obstacles in the pathway of air currents, such as mountains and forests.

Electricity passes between cloud and earth to maintain an equilibrium, gently at times, as every twig in a forest bears its part in aiding this conveyance, yet with violence when a single tree becomes the object which receives and communicates the bolt.

Through the influence of a great forest, clouds are attracted and caused to precipitate part of their moisture.

High mountains perform the same service, as they become the means of communicating electric currents. A plain from which fires have removed all trees and prevented others from growing has not the power of influencing air currents, and, as a rule, clouds pass over them. At long intervals extraordinary electrical disturbances occur and moisture is precipitated in unusual quantities during a brief period, causing freshets in valleys which were dry beds a day before. Such storms have been given the term, cloudbursts. Upon Pike's Peak, along the chain of lakes which supply Colorado Springs with water, are telephone lines, as well as telegraph stations. Upon the supporting poles, above the wires, is a common barb fence wire, maintained as a lightning arrestor. Here on the mountain electrical disturbances are of common occurrence, and it is necessary to provide safety conductors, rain and snow-storms being frequent.

In riding over the divide recently I saw on a small area one hundred prominent trees which had received a lightning stroke. High mountains and prominent trees are objects which attract the electric current, while the violence with which the disturbance occurs gauges the quantity of moisture precipitated, or, in other words, reduces the ability of the atmosphere to hold moisture in solution.

ELECTRICAL ENERGY.

The atmosphere is capable of supporting a given weight of water when distributed in minute particles as vapor, the quantity which it can absorb and hold in suspension being variable, depending upon temperature and upon equanimity of electricity, which always accompanies cloud movements. Electricity is rapidly absorbed, conducted and diffused by water. It is transferred through moist air currents to various parts of the earth. Electricity may be passive, as when its changes occur slowly and with regularity, or violent when, by contact with a good conductor, it is suddenly conveyed from cloud to earth, or the reverse.

Violent electric energy decreases the ability of the atmosphere to retain moisture, and precipitation occurs in great quantities; as these electric changes decrease the power of buoyancy of the atmosphere, a portion of its weight is discharged.

Heavy clouds hang low upon the surface. The weight of moisture which they bear brings them in contact with objects upon the surface. If these are forests, the electric changes are constant, the regularity causing gentle showers. If the obstacle is a prominent tree or spire, the bolt descends, the object is shattered, while a downpour of rain accompanies the violent energy.

In passing over a mountain chain, abrupt peaks become the conducting medium, and snow is precipitated.

CLOUDBURSTS.

This has become a popular expression where extraordinary rainfall occurs. All showers are cloudbursts, simply varying in degree. When more violent electric changes occur, as when the atmosphere

is holding moisture to point of saturation, and objects in the pathway of the clouds conduct the electric fluid instantly, intense precipitation occurs, the earth in that locality is deluged beyond the ability of the water courses to convey it quickly away, and low-lying lands become flooded.

The removal of large bodies of forests destroys the regular and systematic electric connections between earth and sky, and in consequence the electric energy becomes violent, and cloudbursts occur with frequency. The planting of forest belts in a systematic manner and the maintenance of a reasonable area of forest will equalize this electrical diffusion, rain will become more regular and impetuous storms infrequent.

The Eastern borders of the Mediterranean, previous to the time of King Solomon, maintained a population of ten millions of people. The rich agricultural region about Jerusalem at that time provided food not only for these millions of Solomon's subjects, but for the dwellers of the country round about who dealt with the Israelites. This is fully attested by all ancient writers as well as by Divine history. So long as the great range of Lebanon Mountains was covered with trees the rains were regular and abundant and agriculture was the principal occupation of the Jews.

With the removal of the forests from these elevated coasts, electrical conditions were changed, droughts became more and more frequent, agriculture became a precarious occupation, grazing took its place, and, finally Palestine became uninhabitable except to a handful of wandering Bedouins.

OUR ILLUSTRATIONS

Are mostly made expressly for Arboriculture from photographs taken by the editor, and will form a pictorial exhibit of American forest scenery, which will be well worth preserving.

Floods, Bridges and Dams—Of Interest to Engineers.

Economy in construction demands that a structure shall be substantial and permanent. The recent floods again call attention of the engineering world to facts which have been oft repeated. Water is a power which cannot be trifled with, and when an extraordinary rainfall occurs there must be ample room for its speedy exit.

In the early days of railway building, bridges were made of shortest length permissible. Abutments extended into the natural waterways, while superstructures were low to avoid heavy fills. The first cost was considered a much more important matter thirty years ago than it is at present, the result being that the limit of safety was overlooked, and many bridges were washed away by very moderate freshets.

On one Colorado line, where, during the greater part of the year, and for many years in succession, the streams are mostly arroyos, or dry beds, every bridge was carried out within a few years, and, in places, miles of track were washed away by flood waters.

One bridge, on first construction, had a 60-foot span; it was destroyed and replaced with a 90-foot bridge, and when that was, in turn, lost, an iron structure having 120-foot span, raised several feet higher, was found necessary to admit of a free passage for extraordinary rainfalls.

In after years a new management began to fill in the approaches with earthwork, but, being warned by a more experienced friend, desisted.

Upon one occasion, while I was resident engineer on location, a bridge was to be erected over an important river in the South. The grade established was lowered four feet, contrary to my judgment. I had found unmistakable evidence of a former freshet which reached the point which I had established. In two years the bridge was carried away.

There is too great encroachment upon the natural water course of streams which, at infrequent intervals, become raging torrents. Some dozen years ago almost every bridge and culvert in Kan-

sas was washed out by a freshet similar to the recent flood. Railway bridges were only saved by loading with heavy trains of iron rails.

In the city of Denver are several bridges over Cherry Creek which are both too short and far too low, which are liable at any time to be destroyed and cause much damage by backing the water when have here encroached beyond the limit of safety.

There are similar instances in other localities. The flood at Johnstown was aggravated by the low-arched stone bridge, which soon became blocked with floating debris, while the mills had intruded upon the already too narrow water course.

A month ago the Rio Grande was an insignificant brook, through which the Mexicans were wading, scarce ankle deep, to save toll over the bridge. Since that time the torrent has been four miles wide, breaking levees and doing great damage. It is the extraordinary rainfall that must be provided against, not the average precipitation.

With the general indifference which exists among all classes of Americans regarding forest influences and the continuous destruction of the mountain forests, these floods must become of more frequent occurrence, and ample provision should be made for the accommodation of a much larger flow of water than heretofore.

In the irrigation works which are being planned greater precaution should be observed in the strength of dams and size of spillways.

One-third as much water fell in Colorado during the first week in June, the present year, as the average for an entire year.

The editor of *Arboriculture* has many duties which call him to distant points. Since beginning this work he has traveled more than four thousand miles each month in the performance of his duties in connection with the Society. If correspondence is not as prompt as it would seem proper, this fact will explain it.



PINUS PONDEROSA.

YELLOW PINE FOR THE WEST.

(Pinus Ponderosa.)

In our March number we gave an account of the pinery on the divide between Denver and Colorado Springs. During the past month a more thorough study has been made of this very interesting body of pine.

The elevation is from 7,000 to 7,700 feet, Denver being 5,200 and Colorado Springs 6,000 feet.

The land is sandy, sandstone cropping out on the higher points.

Before the settlement of Colorado there was an extensive body of timber in this locality. Denver, Pueblo and Colorado Springs were built from timber cut on this divide. In 1865, while constructing the Kansas Pacific Railway, this forest supplied the bridge timbers, lumber and crossties, which were hauled four hundred miles. At first mule teams were used, which, in the Indian wars then progressing, were captured and run off; but the energy and determination of the builders of this pioneer railway were equal to the emergency, and thousands of oxen were purchased from Mexico. Since buffalos were roaming the plains in great numbers, these lean animals were abhorred by the savages and went unmo-lestled.

Several cuttings have since been made. The Colorado Southern and Denver & Rio Grande were built from timber grown here.

At present there are growths of all sizes, from seedlings one to ten years old standing thickly over portions of the land, up to trees of six to sixteen inches thickness.

It is interesting to note the difference in size of trees having the same age. Some standing thickly, thirty to the square rod, are only an inch or two diameter, while others having more room, four to the rod, are six inches through and forty feet high. This shows the importance of artificial thinning. It takes nature many years to accomplish what man can do, with a small amount of labor in destroying surplus growths, in a brief period.

In the Black Hills of South Dakota there are large forests of pinus ponderosa. In visiting this vicinity in May, 1897, I discovered immense quantities of bark beetles, which were killing the trees, and made report upon the subject, first to the Pioneer-Times and the Independent, of Deadwood, and later to the Conservative, J. Sterling Morton's paper, as follows:

MR. BROWN'S TRIP.

Mr. John P. Brown, Secretary of the Indiana Forestry Association, writes the Conservative the following account of his Western trip:

"I have been several days in the Black Hills, observing the work of the destructive beetles, which are devastating the pinus ponderosa forests throughout the Hills.

"Tuesday, in company with Mr. H. G. Hamaker, Forest Supervisor, I went fifteen miles from Deadwood, into the Spearfish Canyon. Upon the mountains there are numerous spots of brown and dead trees, killed by beetles in former years—one to three years since; other spots have a slight yellowish cast, the foliage not yet dead, while in many cases the work is so recent that no change in the foliage is discernible.

"Wednesday, in company with Mr. W. E. Smead, superintendent of the Homestake mine, I traversed the hills about Lead City, finding many young trees, four to eight inches in diameter—the second growth forest—affected.

"Thursday, with Prof. W. V. Hunter, of Nebraska State University, I made another trip to Spearfish, taking the entire day.

BEETLES AT LEAD CITY.

"The young trees at Lead City were so infested with destructive beetles I estimated 10,000 beetles and larvæ in a single eight-inch tree. These were smaller than the ones found at Spearfish, and some eight species of predatory insects were present in small numbers.

"In the large timber of Speartish Creek were the larger species of beetle, and in vast myriads. I should be moderate in estimating 200,000 in one tree thirty inches in diameter, which we examined. This insect devours the inner bark, burrowing along between the sapwood and bark, severing the latter completely, so that in time the tree dies, at times not until the following spring.

"The small beetles are one-quarter-inch and the large ones three-eighths-inch in length, black and brownish color, many white larvæ being present. Probably one-fourth of the timber is already destroyed. The grand Black Hills spruce seems not to be affected.

WILL BE VERY DESTRUCTIVE.

"So great is this devastation that nothing will prevent a total destruction of all the pines in the hills, including the magnificent second growths which cover the higher mountains, except a speedy action by the government to destroy the pests.

"I counted only twenty birds in all during a week's stay in the Black Hills, only two of which were woodpecker species. Were birds abundant there would be no serious injury by the beetle. The dead bark, twigs, leaves and worthless wood should be burned and the dead timber sold to consumers without restriction.

"A large number of woodpeckers might be introduced to protect the unaffected trees. While the entomologist will study the habits of the beetles and the parasites and predatory enemies, yet the thing to do is to act at once in destroying the beetles which are in such numbers in the dead trees.

"Audubon societies should be organized in this region to educate the people, young and old, that birds are their friends. I have no patience with those scientists who teach boys to make collections of birds' eggs, a fact which is worse than that of ladies wearing the feathers of birds upon their hats."

I sent an urgent communication to the Interior Department, Washington, asking that speedy steps be taken to prevent the increase of these beetles, but, as in all

government affairs, it has taken six years to get out a bulletin on the subject, and it may, in another decade, take some action.

Fortunately for the divide pine, there are but very few insects in the timber, and reasonable care will preserve it. There are large numbers of birds present, which may explain the freedom from pests. Here the pine is encroaching upon the prairie, and, if aided, would cover the entire country.

Pinus ponderosa, besides being the most valued lumber tree of the Middle West, is essentially an arid climate tree. It is the one tree of the American continent upon which the afforestation of the plains region must depend. There is no good reason why the bull pine should not be covering the semi-arid prairies from the foot of the Rockies to the Missouri River on all tracts not required for agriculture. Can the officials of this Nation and the States show an exalted patriotism and begin this important work?

FOREST FIRE REMEDY.

By far the most important subject connected with the forestry question in the United States is how to prevent disastrous forest fires. It is criminal in officials of the government to dally with this question. Experience of half a century in all portions of the country has amply proven the cause. There is no necessity for further investigations on this point. Spontaneous combustion may set fire to greasy rags in an overheated factory, but never in open air and in the forests. Criminal carelessness among smokers, campers and those who burn that they may purchase the wood are the dominating causes.

What is wanted is a remedy. Let the forests be turned over to the War Department, a branch of this government that has the power, and the wholesome respect of all. With stringent rules, enforced by those whose authority is unquestioned, there need be no fires in the future.

The Springfield Republican has the following on this subject, which we indorse:

THE CEMENT PAVEMENT CRAZE.

Trees which have required twenty, forty or even sixty years to attain their present beauty and usefulness along the streets of American towns and would-be cities are being sacrificed in the craze for geometric precision in laying sidewalks. The root system of every tree is destroyed on one side of the tree in deep excavations for these cement pavements, and it can only be a very few years when disease and decrepitude will remove these shade trees, which have been so mutilated by a set of ward politicians, who, being elected to office and feeling their importance, order destruction of all trees.

One correspondent tells how a Cincinnati suburb was saved the loss of a most beautiful avenue by a vigorous protest through the daily press.

A MADISONVILLE, OHIO AVENUE.

It may interest some of our readers to learn how a few pen strokes proved mightier than a sword and saved a whole half mile of beautiful shade trees from wanton destruction.

Among the many fine suburbs of Cincinnati there is one which has always taken particular pride in its beautiful shrubbery and majestic trees, but which came very near sustaining an almost irreparable loss through certain proposed improvements.

When the decree went forth that cement sidewalks were to be laid along one of its finest avenues, which skirted the railroad a half mile, property owners, sooner than have the handsome shade trees bordering the entire length of the avenue disturbed, willingly consented to take down their fences and sacrifice the required number of feet off their lawns to give the pavements the required width. Four years later, when a new set of councilmen were holding sway, attention was turned to the grading and curbing of this same avenue, and those in authority thought it would be a good

scheme to widen it slightly, and, to this end, condemned the trees. Property owners became not only highly, but righteously, indignant over the proposed sacrilege, and did all in their power to avert it. Prominent railway officials, whose property fronted the avenue, and who gloried in the trees with commendable pride, became furious when they found that all their pleading with Council were set at naught, and that the wise-acres (?) were determined to push the matter through at its very next meeting.

Indignation and ravings failed to master proceedings, but it fell to a woman to conquer the situation. She seized her pen and sent a statement of facts to the city press, saying: "It was to be hoped that those in authority could be brought to see, to let well enough alone. Should the trees be disturbed in spite of all protest, the property owners would demand the village to take up the cement walk, refund the feet appropriated, set up their fences and relay the cement where the trees vacated.

"Now that the trees are of age, having been planted just twenty-one years ago, they are able and entitled to speak for themselves, and the very prospect compels them to cry out: 'We don't want any jackass to butt against us.'"

The article appeared in print on the morning of the very day in which Council was to meet. The last clause had shot home with telling effect, and as not one of the men cared to assume the implied identity, the proposition was indefinitely tabled, and has so remained for ten years.

Farmers often think they are wasting too much land when they devote an acre to trees which do not produce fruit, and at most only one row of trees can be permitted on the outer border of the farm. "They shade too much ground;" "The roots sap the soil and rob the crops." These are some of the objections urged to bodies of trees. The arguments are delusive. The vast influences of heavy belts of trees far outweigh the injury done to a few rows of corn.



THE GRAY BIRCH OF NEW ENGLAND.

The Gray Birch of New England.

UNPROFITABLE FORESTS.

Several causes combine to give the general farmer an impression that a woodlot is unprofitable.

(1) The manner of planting by nature. Birds and squirrels, the great tree planters of the earth, never consider the question of economy for the land owner; their own supply of food is the principal thought.

(2) When a farmer removes a tree it is with some definite object in view. In opening a farm, the walnut, ash, oak and chestnut, which could be split readily into rails, were taken for fencing; sugar trees and hickory were cut for fuel, while the better trees were used for building lumber. Inferior trees were left because of the difficulty in working them up. As a result, the younger members of the family, who have now come into possession, find a majority of the trees in the wood lot to be weeds, or those having the least value.

In Indiana the principal remaining trees are beech, difficult to split into stovewood, of slight value for lumber, decaying too quickly to be used for posts—in short, it is an unprofitable tree for the economies of the farm or workshop; a magnificent tree for ornament, a splendid shade, one of our finest forest trees, yet, economically, a weed.

In New England the gray birch is very abundant, possessing the least value of all trees, yet covering large areas which should be growing white pine, chestnut or walnut. The scarlet maple is a fine shade tree, but unprofitable to the land owner—simply a weed.

Throughout the South a host of small growths, with bamboo or cane, occupy space which should be producing oak, cypress or pine.

It is difficult to classify weeds and useful trees, since what may be a weed in one locality may be desirable in some other place, but the predominance of inferior trees in many places creates the impression that forests are not profitable and should give place to some annual grain or hay crop.

The lumberman scours the country for timber which possesses the smallest proportion of unprofitable forest growths. In the redwood region he finds giant trees and but few weeds. Other speculators in timber land, since the white pine is nearly gone, buy immense tracts of fir and cedar in Washington and Oregon, where the trees are 200 to 300 feet high and stand thickly on the ground, all the space being occupied by one or two kinds of trees.

The value of a timber tract lies in its being all of one kind, and that of highest value. Herein is the secret of artificial plantations. Eliminate all weeds. Have every tree of the same timber, with every space occupied, planting in systematic method at proper distance apart. In this manner the wood lot will become the most valued part of the farm.

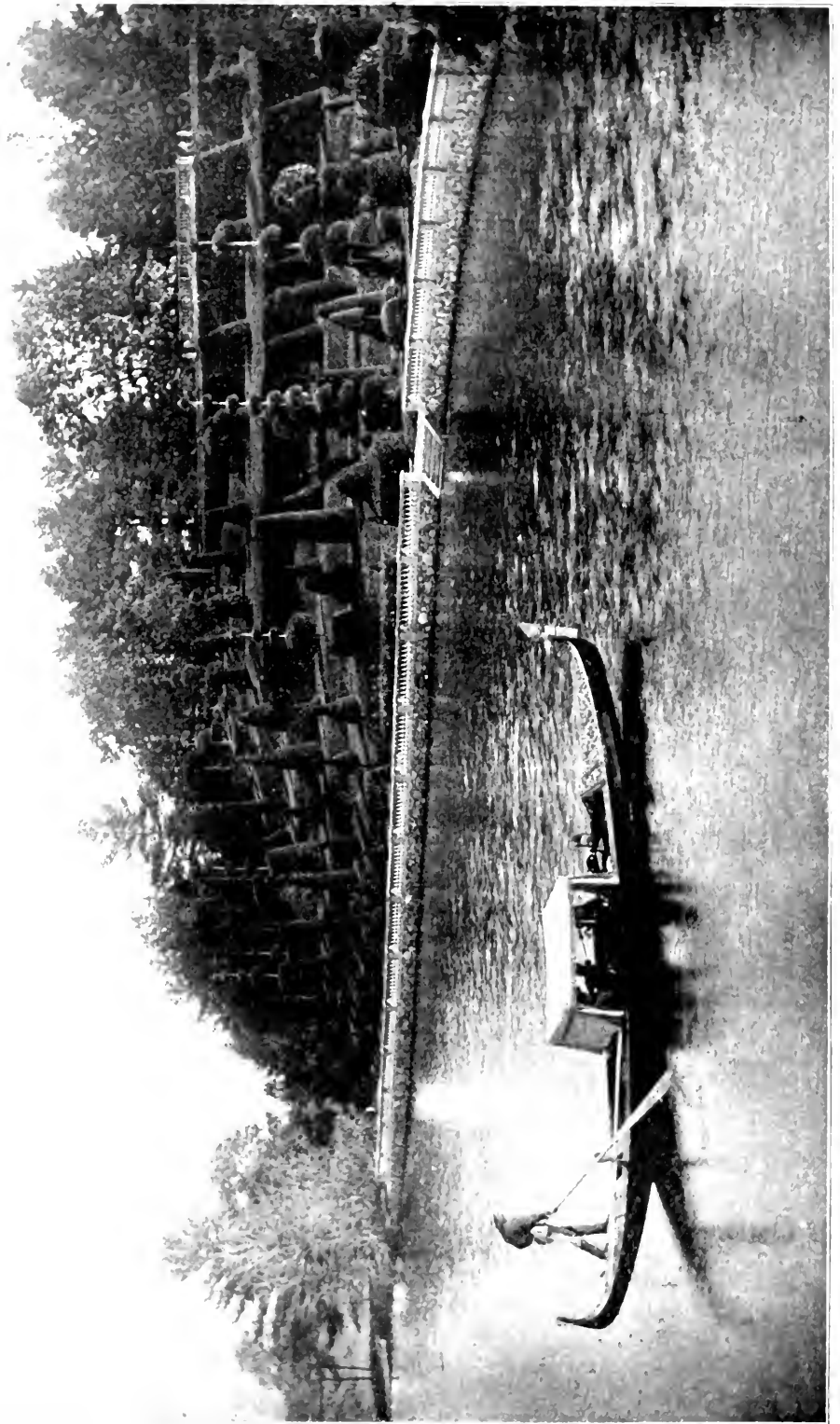
THE FARMERS' REVIEW,

Of Chicago, is not only a first-class, reliable paper, but is one of the few farmers' journals that at times gives some information upon forest topics. Several important articles have from time to time appeared in the Review.

After all, the farmers of the United States are the ones upon whom must fall the duty of growing forests, and it is to the everlasting disgrace of almost the entire agricultural press that this question is totally ignored, and farmers are unable to obtain information either of the necessity for maintaining forests, the methods of planting, kinds of trees to plant, or the income which may be expected from forest planting. It is time some of the periodicals which go to the farmers exclusively should have something to say upon this subject.

The object of this magazine is to extend the influence of the International Society of Arboriculture and serve as a medium of communication with its members.

See inside front cover, Purpose and Membership.



ITALIAN GARDEN.

The Red Cedar for Snow Guards.

Last month we had an illustration of snow fences for protecting railway cuts from snow drifts, and explained how the wind was thrown into whirls and caused to deposit the snow upon the lee of such obstructions. The height of the obstacle governs the distance from its base at which the snow will be deposited. The great expense of maintaining wooden fences for this purpose would suggest some other and more durable substitute than boards.

A living hedge, which could be kept at a regular height, and which could be successfully grown in arid locations and high altitudes, as well as in moist regions, would be a desirable acquisition.

Some of the cretaegus thorns may well be used in some moister locations, such as in Central Nebraska, and eastward to New England. The dwarf oak might be utilized in portions of the Rocky Mountains.

Probably the best plant for this purpose for almost all situations is the red cedar, or juniper, planted in hedges at proper distance from the track.

Some score of years ago the Burlington road attempted to control the snow by planting deciduous trees. This was all right for a while, but as the trees increased in height the snow was thrown into the cuts, causing much additional trouble in clearing the tracks.

The cedar is a kindly plant, easily transplanted, grows almost everywhere, and may be pruned into any desirable shape, being easily kept at the height of a fence or hedge.

I do not consider that there is more than one variety of the tree now under consideration. *Juniperus Virginiana*, or red cedar, yet there are many forms, changed probably by locality. In Maine and New England the trees assume an upright, slender habit, some of them being like a Lombardy poplar in form. Similarly, many on the Hudson River are very erect.

In the mountains and crags of Tennessee and Southern Kentucky the cedar makes a much larger tree—is spreading,

irregular and much branched. On the slopes of the Rockies it shows very great age, yet is dwarfed, spreading, with short trunk.

In Kansas and Nebraska, in better soils, it grows thriftily, and differs from both Tennessee and Eastern shapes, being rounded and regular.

In the Garden of the Gods it takes on a silvery color, as do many Colorado conifers.

Nursery-grown evergreens, with compact roots, may be readily transplanted, but those grown wild extend their roots to great distances and they cannot be saved. The sap of evergreens is resinous, and, when once dried, cannot again be moistened, the sap becoming hardened so it cannot flow. Never allow them to remain exposed to air or sun.

Trees 18 to 24 inches high are proper size. In order to show how readily the cedar may be pruned into all imaginable forms, we have engraved the Italian Garden of the late Mr. H. H. Hannewell, at Wellesley, Mass.

This magnificent specimen of landscape architecture has been mostly if not entirely formed by continuous pruning with a definite object in view, of the juniper or cedar growing so abundantly in the vicinity.

The office of Secretary and Treasurer of the International Society of Arboriculture is at Connersville, Ind.

FOREST LEAVES.

The official organ of the Pennsylvania Forestry Association, in its June number, contains much useful and interesting reading matter and a number of fine engravings. Forest fires occupy a large proportion of the space. State reservations are discussed. Levees and reforestation form the basis of one good article. This number is considerably improved over all former issues.



The Arapahoe Glaciers, Colorado.

During the summer of 189—, in order to study the coniferous forests of Colorado, I engaged with the survey of the Colorado Northwestern Railway, running a line from Boulder to El Dora. Upon one occasion I climbed to the summit of Mount Baldy (not all of them, for Baldy is a legion in numbers), at times clambering over snow forty feet in depth. From this summit I had a magnificent view of the Arapahoe peaks, which were but a very short distance away.

By courtesy of J. Raymond Brackett, professor of comparative literature of the University of Colorado, we are per-

mitted to use his photograph of the glaciers on the Arapahoe Mountain.

The Colorado University at Boulder, located, as it is, at the base of America's grandest mountains, is exceptionally well situated for the study of forests and plant life of both mountain and plain regions.

Boulder is famous for fine strawberries and other fruits; trees in great variety grow at this elevation under irrigation. One may eat strawberries in the morning and by noon be in the region of clouds ten thousand feet high, among the spruce at the limit of plant growth, among perpetual snow banks.

WHY WE HAVE CLOUDBURSTS.

Chicago Inter Ocean.

John P. Brown, Secretary of the International Arboriculture Association, set forth in the *Inter Ocean*, recently, why he felt sure that America was threatened with an era of floods.

In accounting for the cloudbursts so frequent in recent years, he said: "Excessive rainstorms are the result of electrical disturbances, and electrical storms are caused largely by the absence of trees in large bodies."

On the same morning were published accounts of terrific rainstorms in South Carolina, destroying 150 lives and a vast amount of property; a cloudburst in West Virginia, which destroyed two towns; downpours of rain in Indiana that flooded several towns, and excessively heavy storms in other States.

Every day for two weeks there has been a record similar to this. It has been, in truth, a season of cloudbursts and heavy and sudden rainstorms, and nearly all of the storms or cloudbursts have occurred in the treeless districts of States like Kansas and Nebraska, or in districts in South Carolina, Ohio and Indiana that have been stripped of their trees.

Thirty years ago we heard of few cloudbursts outside of the mountain districts. The theory then was that the clouds, after sweeping across the plains, struck the cool mountain sides, and there precipitated water in floods. Now, however, we have these cloudbursts occurring in Illinois, Indiana and Ohio, as well as in the mountain States.

In 1885 a cloudburst destroyed the town of Paso de Cuarenta, Mexico, and 175 lives were lost. Five years later a cloudburst on the Yang-tse River, in China, drowned 100 persons. These were notable events then. Mr. Brown, in his article on Sunday, contended that the conditions in this country were approaching those that have prevailed for many years in China. This may not be true, but cloudbursts on the very day that his article was published were as destructive of life and property as the

cloudburst in Mexico in 1885 and the cloudburst in China five years later.

Of the recorded cloudbursts in this country from 1874 to 1885, more than half were in Colorado, Utah, Nevada and Arizona. But the most destructive was near Pittsburg, Pa., in which 134 lives were lost and property to the value of \$500,000 was destroyed.

In one day in 1885 over sixty storms of wind and rain prevailed in territory between Illinois and the Atlantic. These storms destroyed 10,000 buildings, killed 800 persons and wounded over 2,500. In nearly every case the fiercest storms were in the treeless districts.

The events of every flood year since 1885, crowned by the disasters of the last month, give force to the contention that the destruction of forests has multiplied cloudbursts and floods, and that to bring about a change in conditions we must plant trees not by the thousand, but by the million.

FORESTS AND FLOODS.

Birmingham, Ala., News.

Mr. John P. Brown, Secretary of the International Society of Arboriculture, contributes quite an interesting article to the *Chicago Inter Ocean* upon forests and their bearing upon flood conditions. Mr. Brown has devoted forty years' study to the subject which he discusses. His views cannot be dismissed, therefore, as would those of an empiric. The present floods, he says, are the result of forest denudation, and the country is entering upon a long period of floods. He makes the direful prediction that in half a century the most fertile regions of the United States will be sterile. The decline in productiveness of China he ascribes to its lack of trees. Yet America has destroyed more timber in sixty years, according to Mr. Brown, than China made away with in 3,000 years. Commenting on this article, the *Inter Ocean* says:

"Putting aside Mr. Brown's dire prophecies, it must be admitted that present conditions are very much as he represents them in this article. Formerly

forests skirted the banks and shaded the headwaters of rivers like the Ohio and the Mississippi. The porous soil was held in place. The rainfall and the melting snow sank into the ground to feed springs and to furnish a regular supply to streams.

"The forests have been cut. The rich porous soil has been washed away. Now the snow, unprotected by trees, melts quickly. The rainfall is swept in great volumes into the rivers. In the treeless sections electrical storms produce cloud-bursts. Everywhere the volume of flood water has increased. This is Mr. Brown's theory and there is no mystery about it.

"The only remedy is reforestation of areas shorn of timber. Something has been done in this direction. There are planted in the United States every year about 5,000,000 trees, but in the same year we destroy 9,000,000 acres of trees. In other words, for every tree we plant, we are cutting down two acres of trees.

"Instead of planting 5,000,000 trees each year, Mr. Brown insists that we should plant 500,000,000. If the people can be aroused to a full appreciation of the danger and to a knowledge of the remedy that is necessary to prevent this continent from becoming what China is, all the prophecies of Mr. Brown will come to naught.

"If the remedy for floods and unproductiveness is the planting of trees, the trees should be planted. But in this enormous undertaking the people of the cities and the people of the farms and the ranches must join hands with one another and with the government."—*Birmingham, Ala., News.*

IT IS WORTH CONSIDERING.

Cincinnati Commercial Tribune.

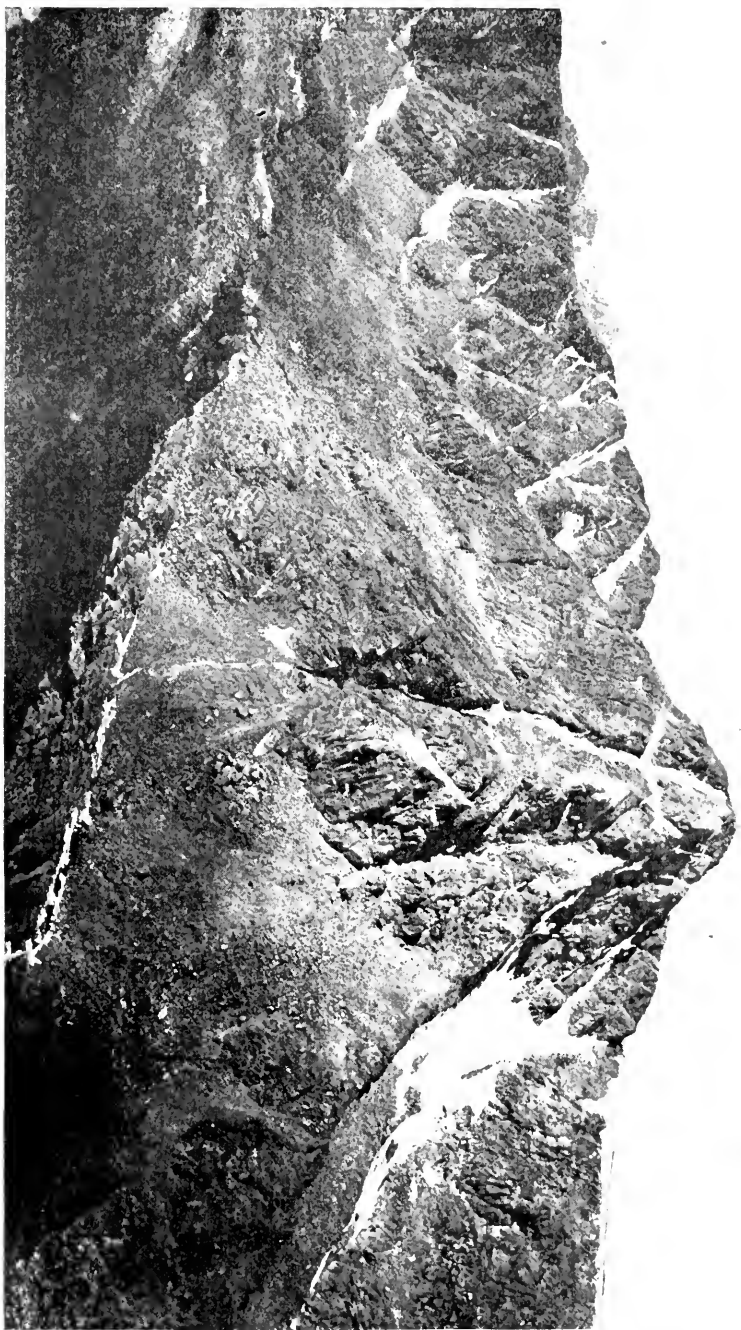
John P. Brown, Secretary of the International Society of Arboriculture, prophecies, according to the *Inter Ocean*, that the country is entering upon an era of disastrous floods, and that:

"In twenty-five years floods like those that have prevailed this season in Kansas, Nebraska and Missouri will be general throughout the continent, and within half a century the great agricultural

regions of the United States will be as sterile as the deserts of Arizona or the plains of China."

Just how Mr. Brown knows all this is among the unknowable things; nevertheless, what he says is worth considering, because of the reasons he gives. Claiming that Americans are destroying annually 9,125,000 acres of woodlands, and that more timber has been destroyed on the American continent in the past sixty years than China has destroyed in 3,000 years, Mr. Brown supplements his claims with figures which are startling in his support. It is, beyond contradiction, the fact that floods have become more and more frequent and more and more disastrous as the forests are destroyed; that the seasons are later and more unreliable, and that the exhaustion of the moisture necessary for the welfare of the crops, but used in the making of floods, is followed by periods and seasons of drought, completing the destruction of that which the floods overlooked.

It is not alone by laying the ax at the foot of the tree that forests are destroyed. The mountains of Maine, Vermont, New Hampshire, New York, Pennsylvania, Maryland, Virginia and West Virginia are giving frightful testimony of the fact that the fire is mightier than the ax, and it is not difficult to believe that Mr. Morton is right when he says that not less than 25,000 acres of forests are destroyed daily—9,125,000 annually. The time is at hand for calling a halt, a strenuous halt, at the hand of the authorities, Federal or State, or both. The tariff as an economical question has been settled. The financial question disturbs no one, for the public will neither have it disturbed nor be disturbed by it, and the country would be immeasurably benefited by State Legislatures taking up the question of forestry and settling it as Congress has settled the question of immense reservations in the far Northwest. If State action could be supplemented by the establishment of a forestry reservation in the Appalachian range, the question would be on the way to settlement as accurately and as beneficially as the tariff and the finances have been settled.



MOUNT OF THE HOLY CROSS.
One of the fine views of the Rocky Mountains, on line of the Denver & Rio Grande Railway.



Spruce Trees, Planted by Birds, on High-Cut Redwood Stump.

The above photograph illustrates the work of birds, which have brought seed of spruce trees and deposited it on top of a high-cut redwood stump. The young spruce are now several years' growth, their roots penetrating the wood of the stump. As this is twelve feet high, there is no possibility of the roots having any connection with the soil. There are a score of these spruces upon this stump.

The stump is an illustration of the waste of timber owners in the redwood and fir forests of the Pacific coast.

FOREST RESERVES.

There is great activity among the opponents of government control of the remaining bodies of timber and its protection from fires and spoliation and the perpetuation of such forests as only the National government can do. The cattlemen of Wyoming are specially deter-

mined that the timber of that State shall be open for pasturage for their herds, and dire political results are threatened if the President does not comply with their demands.

A correspondent of the Sacramento, Cal., Bee writes an article in opposition to the creation of a reserve in Nevada county, as follows:

"The choicest of Nevada county's timber belt is either already cut over or owned by the railroad company or persons interested in the lumber business. The railroad company pays taxes on over 118,000 acres and lumbering interests control more than 50,000 acres of good timber here. More than 200,000 acres of timber land, assessed at from \$1 to \$5, are producing a constant revenue to the county treasury.

"Two million dollars has been invested at Overton, \$1,000,000 at the paper

mill at Floriston, and easily \$1,000,000 more in other mills throughout the county, giving employment during the summer months to more than 2,500 men, and all these industries providing a yearly income to the county. We want more mills and factories. We need the timbers for our railroads and mines, and the lumber for our flumes and mills and buildings.

"Lock up our forests and you will close down our mines and deprive 2,500 men of employment about our lumber camps, and take from the county tens of thousands of dollars yearly in taxes. Cull out the large timber that is ripe for the saw, and give the new generation of pines room to grow. Follow in the track of the sawmills, if you will, as they have traveled the county, and you will find that every slope is green with the verdure of the second growth, almost large enough for lumber.

"We have noticed no change in our water supply since early days. The creeks are no drier in the summer and no fuller during the rainy season, for vegetation is abundant on every hand.

"If the creation of the temporary forest reserve in Nevada county becomes permanent, besides being of incalculable detriment to the prosperity of our inhabitants in general, it will aid only the owners of present denuded timber tracts, practically worthless for timber purposes, for several years to come, to exchange them for marketable timber lands.

"The extent and value of our mineral wealth is little appreciated, and we rely upon the abundance of our timber to induce the development of our thousands of mines. Why uphold a proposed law that, to benefit the few, will wreck a county?"

Analyzed briefly, this opposition to a reservation has no argument.

(1) Retard Development.

Temporarily this may be the case. To put a big force in the timber and clear it off rapidly, as Californians are doing, creates a boom in labor, in export lumber, in weekly pay rolls, and in big profits for the brief period while the boom lasts. Then comes the reaction: no labor; no export; no timber for Americans.

On the other hand, as a reservation the timber will be held as a permanent source of income for the Nation, continuous employment for a moderate number of men forever, employment for capital in various industries so long as the Nation lasts. To the State of California and the County of Nevada there will be a permanent source of income.

(2) Miles of Barren Waste Included in the Reserve.

If this be true, there can be no valid objection to the creation of a reserve, nothing being lost where nothing exists. Something may be induced to grow under judicious government control, while in private hands, or open to public spoliation, this will be impossible.

(3) Land Belongs to Railway, Which Will Receive Scrip in Exchange.

With one breath he denounces the railway for wanting the reservation, while in the next he is concerned lest the railways suffer for want of timber which exists in this "barren waste."

Well, if the railway can find any choice unoccupied lands on which to file, it is more than any one else can do. They are not in existence.

(4) Corporations Pay Taxes on 168,000 Acres, Assessed at \$1 to \$5.

An income of probably \$21,000 in taxation. Timber lands are worth a great deal more money, and if economic methods are employed, a moderate quantity of ripe timber removed each year, a greater sum than \$21,000 would be received each year for centuries to come.

(6) \$4,000,000 Are Invested in Mills.

This is no reason why the owners should be permitted to clear and make barren these forests, cutting all growths, as is now being done. These forests should be made permanent, and all timber lands now owned by the Nation should be held in perpetuity for the benefit of all Americans, and not given over to speculators for devastation.

The observation, or want of observation, of this writer in regard to change in water supply is far from true, as shown by Professor Hillgard and a host of authorities, who have found the streams much shrunken since the work of clearing has been so vigorous in California.

THE FOREST FIRES—WHAT REMEDY?

Springfield, Mass., Republican.

The sun rode the skies all yesterday, the moon stood high in the western heavens, last evening, red as the forest fires whose dense smoke, brought here on the rushing winds, caused their angry aspect. Small local fires have for weeks past made the hills blue with haze, and the light scent from low-running fires in the leaves has been frequent enough; but now the air is dense with the heavy burden of green forests destroyed over vast tracts. For in our Eastern desert of drought, covering New England, New York, part of the Middle States, the Canadas, and the Maritime provinces, forest fires are raging in almost every quarter, and the destruction of the resources of this part of the earth is going on in a way that will see our hills as bare as Spain's before many generations. In years when there is a pretty equitable distribution of rain and shine over these regions, few fires of importance occur here, but they will occur elsewhere—in Minnesota or Oregon or Ontario—for there is no year without the visitation of drought in some quarter of the country. We are having probably the most prolonged spring drought ever known, and the woods are as dry as tinder.

How great the damage from these fires will be depends on the power who controls the rain clouds, for rain alone can check the fires in the woods of Maine, New York and Canada. During nine dry weeks the virgin forests have been turning from green to brittle brown, and the ground about the tree trunks has become powder dry, so that even the roots of the great trees are smoldering. The winds which have brought the smoke to the south have fanned the fires in the north into an uncontrollable fury. Maine will be worst despoiled, for a chain of flame is flickering across the State, linking Houlton to the Rangeley Lakes, while Bangor, Augusta and Portland are half blinded with the yellow smoke. The big lumber companies will be the chief losers, as far as money goes, for they own the great north woods, and the settlements are few

and far between, yet two have been swallowed by the hurrying flames.

The fires make sad news for the sportsman, for many deer and moose will perish, and others will be driven far from well-known hunting grounds. Already they have flocked to the larger lakes in great numbers in their frenzied rush for safety. There are many miles of forest which, of course, will remain untouched, but some of the best known woods and trails are already burned over. Two big fires are burning on the shores of Moosehead Lake, one near Greenville and the other near the rugged sides of Mt. Kinco. It is almost too much to hope that the Allegash will escape in its entirety, and it is yet too early to receive reports from there. All through the Aroostook country the fires are sweeping, and a big section of railroad track has been burned out. Down on the western border of the State the smoke hides the Rangeley Lakes, and there are big fires in Bemis and Rangeley townships, while another is eating its way into the heart of the forests which hide Big and Little Kennebecago. Similar stories come from the northern part of Quebec, where the forests are on fire, and Roberval is cut off from the rest of the world. The woods near the Grand Descharge are said to be on fire, and other fires are burning around the shores of Lake St. John. All along the path of the little railroad which climbs over the Laurentian hills the woods are burning, and the destruction is said to be great. From the southern end of the Adirondacks, as well as from the shores of Lake George, come reports of big fires, and it is their smoke which choked us yesterday.

In Western Massachusetts tracts of hundreds of acres have been swept by flames, but our woods have been cut over and burned over too often to give opportunity for a tremendous forest fire, such as were known in the eastern edge of the Berkshire hills nearly half a century ago. The bits of woodland are few indeed where there remains the deep mold and the rich duff which supplied the former forests with nourishment and kept the mountain streams full; that has been burned out, and its results are plain

enough in the drying up of the brooks in summer and the lessened volume of the rivers and insufficiency of water powers, as well as in the dwindling of the trees and their slow growth to replace the old forest by sprouts—the very beginning of a seedling forest being rare indeed, except where some old monarch pine or oak has spread its offspring over some open lot whose cultivation has ceased. This burning away of the leaf mold is one of the most absolute ruins of the work of ages possible, for in a virgin forest this deposit has been centuries in accumulating, and yet a few hours of fire will sweep away the gift.

We hear a great deal about what the government is going to do about forestry, and the reports of the new Bureau of Forestry make interesting reading and abound in valuable suggestions; now we are told that the Bureau is going to investigate the phenomena of forest fires by students who will be on the spot. It is doubtful whether scientists can add anything that is at all practical to what is known about the phenomena, for what is really necessary is to prevent them, and for that an army of forest wardens would be necessary, and fire-extinguishing apparatus at every point of danger. We can suggest how this army could be provided, with an absolute economy of men, money, morals, politics and every imaginable matter. Close up the losing venture in the Philippines, put the army back on the peace basis, and devote the waste of war to the real interests of the Nation in this excellent fashion.

For, really, the future existence of this people, or any people, will depend, in some generations, on forestry laws and their enforcement. It is not an overestimate that \$25,000,000 of actual, existing property, in the way of lumber and firewood, goes up in these forest fires every year; it is probable the figure might be doubled. A reading of the report of the Secretary of the Interior for a series of years is very suggestive on this point. But in witnessing the progress of a fire nothing can be contributed to preventing it. Is it supposed there is a microbe of conflagration which the scientific expert can catch? There is such a microbe: it

lives in the match that the careless fool lights his pipe with, in the little campfire of a fishing party, in the spark from a locomotive. Once that spark, that still-burning match end, those smoldering embers, catch hold of the leaves when they're dry—the fire races, and in fifteen minutes as many men will have as much as they can do to stop it. Certain things can be done to cut off a fire, certain things to check and turn it back, in any given tract. If in a great area of government forest, or in such regions as the forests of Maine or Vermont, or the Adirondacks, lanes were cut so wide that the fire would not jump them, that would save much; but these lanes would not avail against a really raging forest devourer, which leaps in the air and lights trees rods away in such a drought as this.

On the other hand, it is patent to all who walk through the woods that a narrow byroad will often make a barrier to the ground-running flames; and no one who has often fought fire in the woods has failed to see at some time such a fire go out of itself, lie down and make an end, as if by magic. Perhaps the scientists can find the cause of that. Of course, a back fire can be set against the wind, and if the distance be judiciously calculated and energy enough employed in forcing the backward progress, it may work. But it comes back to this: that if forest fires are to be prevented there must be wardens of the forest, with rangers under them. And one thing must be added: The time is near when the government, in the interest of all the people, must enact and enforce regulations in regard to the cutting of timber and the burning of brush, etc., not only for the public domain, but for all private owners, since the private owner has no right to bankrupt posterity for his personal

TO ADVERTISERS.

Arboriculture goes to every civilized nation and is read by the most intelligent people of our country.

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WOOD AS A CROP.

Philadelphia Record.

The wood crop is a valuable one, and the only obstacle in the way is the length of time required for its maturity. Growing trees for timber requires no labor after the young trees are planted, other than to clear out the ground until they are well started, for once they secure possession they will crowd down all opposition. The capital invested will be the land, the value of which depends on its location, quality and adaptation to more immediate and remunerative crops. It is claimed that forest growth increases the rainfall, promotes healthfulness and renders the climate less variable, as well as serving to mitigate the force of winds and preventing destruction of buildings and crops. There are sections where the walnut can be grown to perfection, and many of the choice timbers used in the arts can be grown and made to produce knots until the time arrives for cutting down the trees. There are thousands of acres of land that cannot be conveniently worked with the aid of farm implements, such as hillsides, mountain slopes and rocky lands that are too stony for cultivation. The growth of timber along the roadsides would serve as protection against drifting snows and scorching suns and also add to the beauty and ornamentation of the grounds. The trees will sometimes grow where other crops fail, and by utilizing the unprofitable lands there would, in time, be derived a large return, while a general tree planting by the whole community would greatly aid in mitigating the severity of drought, also tempering the cold of winter. Arbor day has been instituted with a view of inducing co-operative effort in tree planting, but the work can be best promoted by the farmers' clubs and by a joint operation of the farmers in an entire section. Allowing each tree thirty feet of room (that is, planting the trees thirty feet apart in checked rows), an acre will permit of about fifty trees. They will not be ready for market, to be sawed up into lumber, until they are about twenty years of age. Their value

will then depend on the kind of trees and the number of feet of lumber that can be sawed from each tree. If the trees are twenty-five feet apart, about sixty-five trees can be grown on an acre, but the closer the trees the slower the growth and the sooner they must be cut down. Each acre of land can be made to produce \$1,000 in choice trees in twenty years, or at the rate of \$25 per acre annually, while the yield of nuts will more than pay the interest on the capital. No correct estimate can be made of the value of an acre of walnut. In Indiana recently trees sold at the rate of \$3,000 per acre, but they were very large. If an application of ashes be given the trees every year the growth will be increased. The profit arises from the utilization of land that would remain idle if not occupied by trees.

Colorado

LAND BOARD ASKS EXCHANGE.

The Land Board of the State of Colorado will submit to the United States government authorities, through Register Woodruff, a proposition to exchange agricultural land for all of its timber land. The State has not the means to properly protect its forests, and would in any event prefer to have agricultural lands, as they are the more valuable for State uses.

The proposition is an excellent one. The State of Colorado is totally unable to protect its timbers from spoliation, and will not expend any money to prevent extensive conflagrations. If the United States will do both, and it can if it wishes, it would be far better for all concerned that such a trade should be made. But if no better care is to be given the timber than has heretofore been accorded by the State and Nation, then it matters little which or who is the possessor.

Springfield, Mass.

Mr. John P. Brown:

Dear Sir—I should like to tell you what I do with Arboriculture. First, I read it with interest and look at the illustrations with admiration. There is no magazine that I ever see which excels them. It would be hard to equal some. That Indian woman, with the sagebrush and the tent close by, was a charming composition, besides the fine execution. The Columbinas of Colorado, the Yucca Glauca and the views in the Yosemite are equally beautiful, while the rest are not far behind them.

I cannot go to tree planting on my little city yard, but I can and do talk, and I send the numbers away. At first they went to friends in Vermont, but I am sending them now to Colorado and Oklahoma, and this morning I wrote to the Oklahoma friend to whom I was sending it, urging her strongly to read it and lend it and keep it in circulation where it would do the most good.

In New England we are getting roused to the necessity of preserving what forests we have left, and renewing—or replacing—those that have been recklessly destroyed. We have two schools of forestry within our borders, perhaps more. Our newspapers, too, frequently present the subject in one aspect or another.

M. L. O.

HOTELS OF GREATEST EXCELLENCE.

In no portion of the United States can more elegant homes be found among the great hotels than at The Antlers, Colorado Springs, and The Adams, in Denver. They are both new, and everything necessary for the comfort and pleasure of the guests is amply provided.

Mr. L. A. Kittredge, the present manager of The Antlers, was years ago in

control of the old Antlers, which burned, and is well known as a gentleman and an able manager.

Mr. H. Marnechi needs no commendation. He leads in his profession.

THE SUNSET MAGAZINE,

Published at San Francisco, monthly, at one dollar a year, is one of our choicest exchanges. "President Roosevelt in California," with many illustrations, is the principal feature of the June number. "Arbor Day in Santa Clara Valley," by our friend, Miss Carrie Stevens Walter, is an excellent description of the valley, and shows the interest among Californians in arboriculture. "The Indians of the Great Northwest," a series of fine paintings, is of much interest, as are other papers.

Students of political economy, writers on any subject of public interest, as well as business interests, find great benefit from the use of properly selected newspaper and magazine articles. We supply such on any topic desired, and at reasonable rates. Address, for terms, etc.,

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REPORT OF THE MICHIGAN FORESTRY ASSOCIATION

Contains several excellent illustrations. "The Carolina Poplar for Wood Pulp," by L. B. Rice; "The Jack Pine of Michigan," by Filibert Roth, and several other excellent articles are all worthy of careful study. Mr. Charles W. Garfield, of Grand Rapids, is President of the Commission, an earnest man, and is succeeding well in creating an interest in the remaining forests of Michigan.

The Four-Track News for June presents some extremely interesting articles, with original illustrations, including "Where the Nile Flows," "The Restoration of King Moose," "The Trans-Siberian Railway," "The Most Wonderful of Rivers," and other articles of equal interest. Geo. P. Daniels, 7 East Forty-second Street, New York.

THE EXPEDITION OF LEWIS AND CLARK

And the early exploration of this country in 1804. Reprint by A. C. McClurg & Co., Chicago. Some extracts may serve to illustrate many lessons which we have from time to time given in Arboriculture:

"Wednesday, March 6, 1805.—The day was cloudy and smoky in consequence of the burning of the plains by the Minnetarees. They have set all the neighboring country on fire in order to obtain an early crop of grass which may answer for the consumption of their horses, and also as an inducement for the buffalo and other game to visit it.

"Friday, 29th.—Every spring, as the river is breaking up, the surrounding plains are set on fire, and the buffalo tempted to cross the river in search of the fresh grass which immediately succeeds to the burning. On their way they are often insulated on a large cake of ice, which floats down the river. The Indians now select the most favorable points for attack, and as the buffalo approaches, darts with astonishing agility across the trembling ice, sometimes pressing lightly a cake of not more than two feet square; the animal is, of course, unsteady and his footsteps insecure on this new element, so that he can make but little resistance."

Nearing the Great Falls of the Missouri, another Indian mode of taking buffalo is described:

"The mode of hunting is to select one of the most active and fleet young men, who is disguised by a buffalo skin round his body, the skin of the head, with the ears and horns, fastened on his own head in such a way as to deceive the buffalo. Thus dressed, he fixes himself at a convenient distance between a herd of buf-

falo and any of the river precipices, which sometimes extend for some miles. His companions in the meantime get in the rear and side of the herd and advance toward the buffalo. They instantly take the alarm, and, finding the hunters beside them, they run toward the disguised Indian or decoy, who leads them on at full speed toward the river, when suddenly, securing himself in some crevice of the cliff which he had previously fixed on, the herd is left on the brink of the precipice. It is then in vain for the foremost to retreat, or even to stop; they are pressed on by the hindmost rank, who, seeing no danger but from the hunters, goad on those before them till the whole are precipitated, and the shore is strewn with their dead bodies."

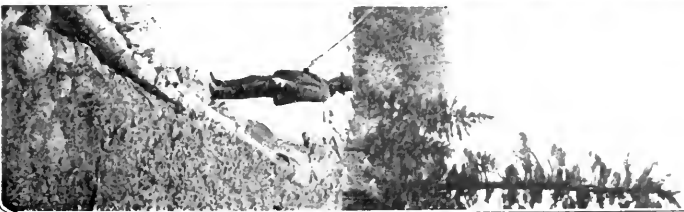
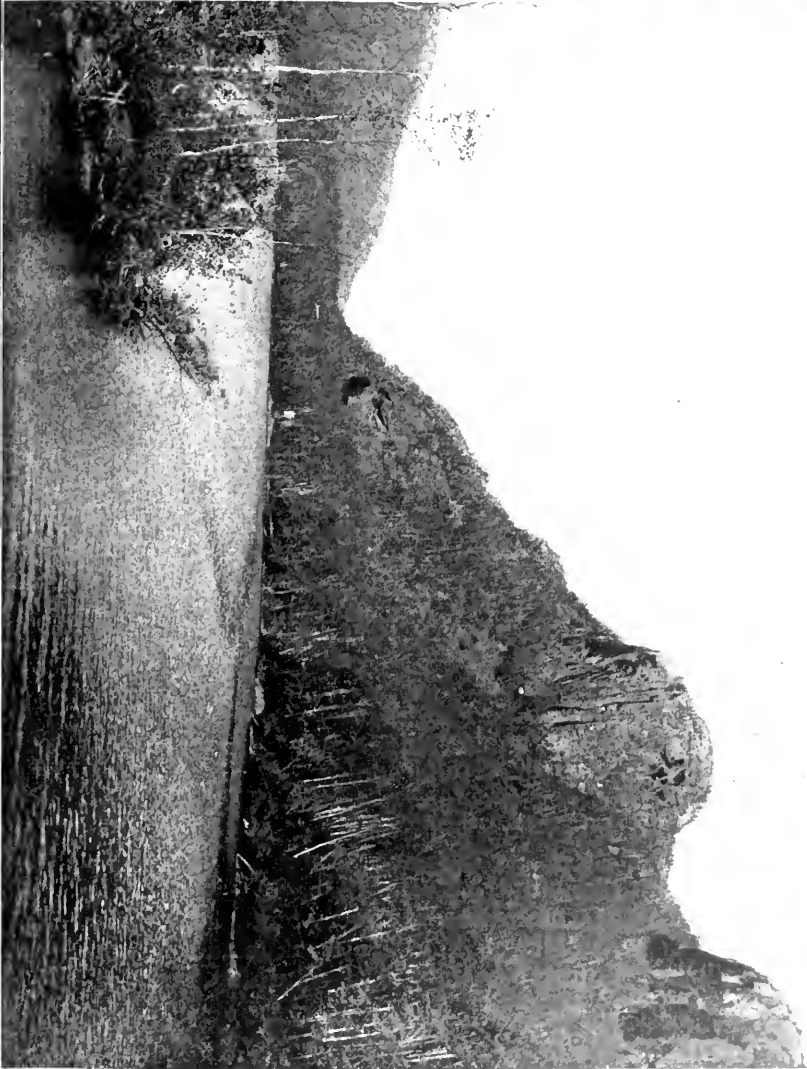
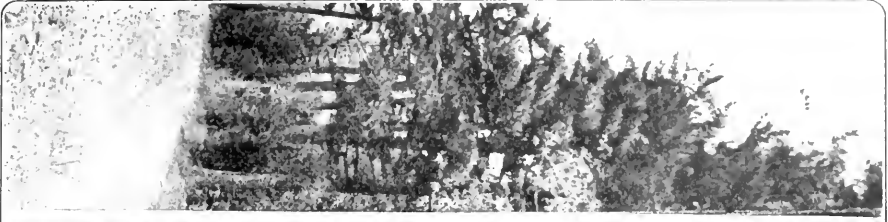
Our frontispiece is a good picture of a group of these animals taken by the Indians for food and by the whites for their pelts and for sport. The great herds have been destroyed, and, with the exception of one or two small collections, these wanderers of the plain are gone.

The Indian practice of burning the grass of the prairies, maintained by the whites for the purpose of encouraging a new growth of fresh grass, has destroyed the forests and made a dry region the more arid.

TO OUR PATRONS.

Arboriculture will hereafter be published and printed by Barnes & Warner, Nos. 19-21 South Alabama street, Indianapolis, Ind. Electrotypes and advertising matter should be sent to above address, which will be considered the legal publication office.

The editorial office will remain at Connersville, Ind., where all mail, exchanges and correspondence should be directed.



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Our booklet, "Under the Turquoise Sky," gives just the information you ought to have. Contains a list of Colorado's hotels, rates, capacity and surroundings. It is beautifully illustrated, interesting and practical. Sent on receipt of six cents in stamps.



JOHN SEBASTIAN,
Passenger Traffic Manager,
CHICAGO, ILL.

THE GREAT SOUTHWEST



KANSAS has long been known as a land of tall corn and billowing wheat crops, of blooded cattle and long-fleeced sheep, of fat hogs and fast horses, of rich soil and hustling people. It is not so generally known that it is also taking front rank in manufacturing by reason of cheap coal, natural gas, fuel oil and abundant raw materials. Land is still cheap. The man seeking a new home will do well to carefully inspect the "Sunflower State." In 1901 (a poor year everywhere) Kansas raised 90,333,095 bushels of wheat. In 1899, a big corn year, 225,183,432 bushels of that cereal were produced.

OKLAHOMA was first settled in 1889. In 1900 the population was 398,331. The growth since 1900 has been rapid, particularly in new railroads. Here are found, side by side, wheat, corn and cotton. Wheat is the leader—the 1900 crop was a "record breaker," 30,680,000 bushels. Cotton is the poor man's friend—the 1900 crop was 150,000 bales; its by-products are very profitable. In one county alone a corn crop of 2,800,000 bushels was harvested in one season. There are a million cattle in the Territory and a quarter of a million hogs. The Santa Fe is opening up Eastern Oklahoma.

TEXAS is the largest State in the Union. It can produce almost everything needed. It has sea coast and mountains, forests and plains, soils of every kind, a wealth of fuel, geysers of oil, growing cities and a hospitable climate. Its corn and wheat crop average 40,000,000 bushels annually. Texas gave to the world in 1901 four million bales of cotton. The lumber industry is immense. Rice is a comparatively new crop in Texas, suited to the low lands along the Gulf Coast. Experts pronounce rice a money-maker. The Santa Fe traverses the heart of Texas, with terminals at tide water.

COLORADO is popularly known as a mining State, producing gold, silver, iron and coal. Resultant of these interests have sprung up flourishing cities like Denver, Pueblo and Colorado Springs, with their big smelters and allied manufacturing industries. The principal agricultural section is in the Arkansas Valley, between Pueblo and Holly. Here are grown in profitable abundance sugar beets, melons, vegetables, small fruits and alfalfa. Ample water by irrigation and an immense beet sugar factory have attracted several thousand farmers, with room for ten times as many.

NEW MEXICO lies at an average altitude of one mile. Dry air and almost constant sunshine—the ideal country for outdoor life. It has mines of gold, copper and coal, great cattle and sheep ranches, pine forests and two magnificent irrigated valleys, the Rio Grande and Pecos. There are churches, schools, growing towns, and a refined social life. Small fruits, alfalfa and grain are the principal crops. On the wide plains cattle and sheep are grazed. In the mountains are fine mines. The Pecos Valley and Maxwell Land Grant are just now attracting special attention.

ARIZONA is in the semi-arid region. In average years enough rain falls in the hills to supply sufficient moisture under irrigation. In the Salt River Valley, near Phoenix, oranges are raised side by side with wheat; alfalfa fields nod to lemon groves and vineyards yield abundantly. Thousands of cattle are fed here each winter. Ranch life is very fascinating, healthful, and quite profitable. Around Prescott the mineral development is astonishing. It is estimated that Arizona mines have yielded \$200,000,000 in twenty-five years. Arizona has much to offer the young man who is ambitious.

CALIFORNIA California was once known only as a land of gold. Gold is mined there yet—millions of dollars a year. But other things have crowded it to one side—for example, oil wells, citrus fruits, wheat and cattle. In the San Joaquin Valley of Central California, a district 250 miles long and 50 wide, with room for 250,000 farms of 40 acres each, the small farmer is coming to the front. He raises alfalfa, has a small herd of cows, sells butter and eggs and sets out a vineyard. He arranges an orchard of figs or olives or walnuts, has vegetables to eat and sell, and a bank account at the end of the year. This is not all done at once, but sooner than "back East." Irrigation is the explanation. The mountains on each side are full of living streams. There are excellent local markets.

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It also reaches the Cities of Torreon, 13,845; San Luis Potosi, 60,858; Tampico (Mexican Gulf Port), 16,313; Celaya, 25,565; Pachuca, 37,487; City of Mexico, 368,777.

Daily Pullman service between St. Louis, Mo., and Mexico City, also between Kansas City, Mo., and vice versa.

W. D. MURDOCK,

General Passenger Agent.

... MEXICO CITY.



Colorado, the Black Hills Yellowstone National Park

and a score of other places of interest to the tourist, offer to the seeker after rest and recreation a panorama of majestic mountain peaks, virgin forests, imposing cataracts, laughing mountain brooks, vast pleasure grounds where game is abundant and lakes and streams where the fishing is excellent.

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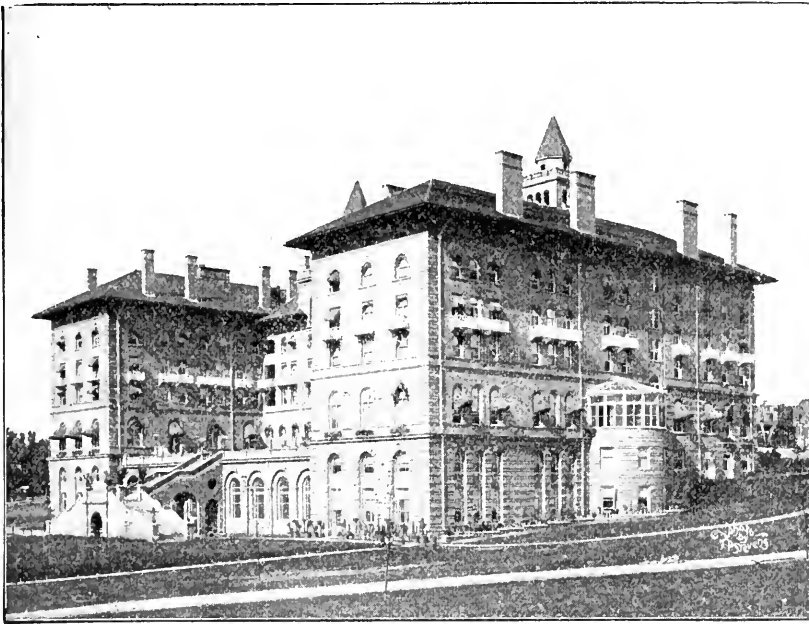
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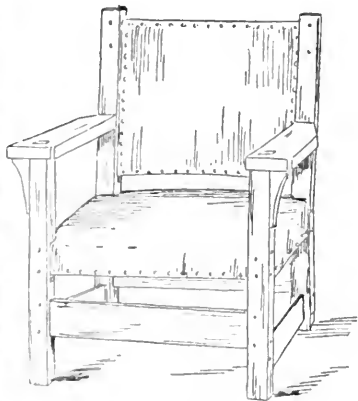
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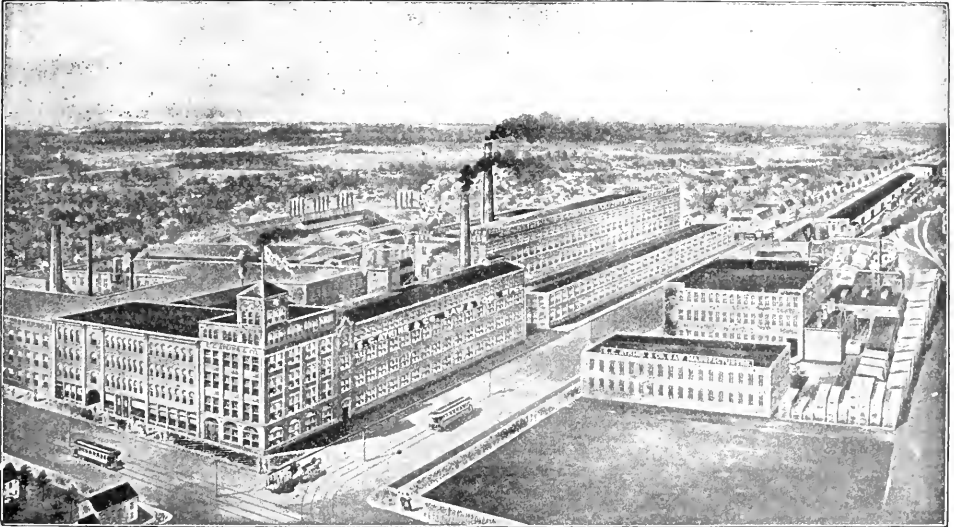
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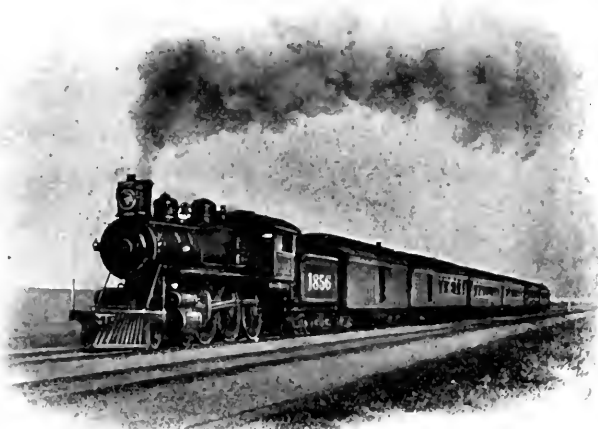
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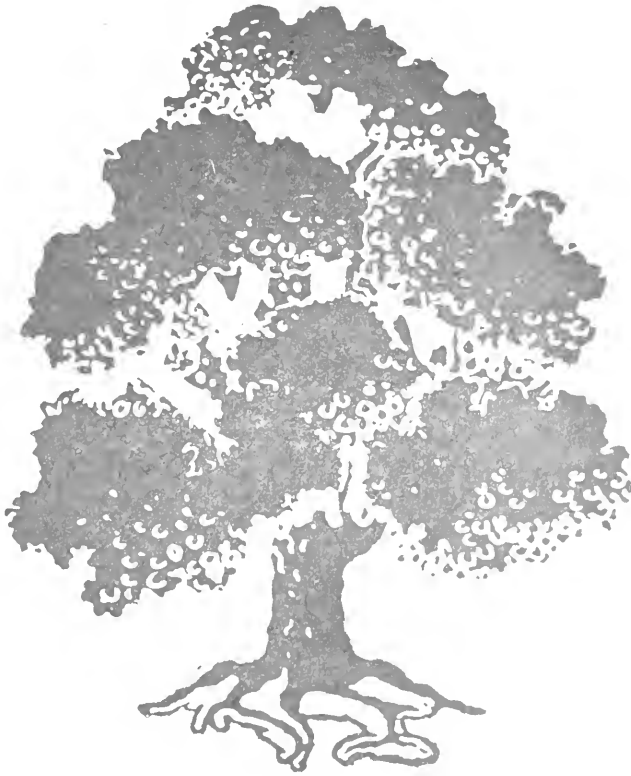
Chicago, Ill.

MEXICO NUMBER

ARBORICULTURE

VOLUME II.

NUMBER 7.



**A Magazine of the International Society
of Arboriculture: Indianapolis, August, 1903.**

THE INTERNATIONAL SOCIETY OF ARBORICULTURE

OFFICERS

GENERAL WM. J. PALMER, President, Colorado Springs, Colo.
JAMES H. BOWDITCH, Vice-President, Boston, Mass.
JOHN P. BROWN, Secretary-Treasurer,

ARTICLES OF INCORPORATION.

Article I.—Name. The name of this corporation shall be The International Society of Arboriculture.

Article II.—Purpose. The purpose of the Association is to introduce judicious methods in dealing with forests and woodlands; to advance and advocate a public interest in this subject; to promote the afforestation of unproductive lands; to encourage the planting and care of shade trees in parks, public and private grounds, and along streets and highways; to inspire an interest in our remaining native forests, and groves of ancient trees, and to seek their preservation; to supply information to railway officials in regard to timber culture for railway uses, and incite railway and other corporations to plant trees for economic purposes.

Article III.—Membership. Any person may become a member of this Society by the payment in advance of an annual due of two dollars, and on payment of this annual due shall be entitled to receive, regularly, one copy of ARBORICULTURE, the official organ of the society. Any person who may contribute ten dollars toward the support of the society shall become a patron. Honorary members may be chosen by the executive committee.

Article IV.—Officers. The officers of this Association shall be a president, vice-president and secretary-treasurer, who shall be elected at the annual meeting each year by ballot, and shall serve for one year, or until their successors shall have been elected and shall have accepted office, and when elected shall constitute the executive committee.

Article VII.—Executive Committee. The Executive Committee shall have entire control and management of the affairs of the Society.





VOLCANO COLIMA.
From Tuxpan, on Mexican Central Railway.

ARBORICULTURE

A MONTHLY MAGAZINE.



PUBLISHED IN THE INTEREST OF THE
INTERNATIONAL SOCIETY OF ARBORICULTURE.



Subscription, \$1.00 per annum.

JOHN P. BROWN, Editor, Connersville, Indiana

Volume II.

Indianapolis, August, 1903.

Number 7.

Under Mexican Skies.

For two hundred miles north of El Paso, in New Mexico and Texas, and the same distance south of the Rio Grande, in Mexico, the desert is in evidence most of the way. Mesquit, yucca, cacti in variety, with herbs and shrubs of arid growths, are everywhere present. Rolling hills, sloping plains, with glimpses of distant mountains, make up the desert picture.

Southward are the tablelands, with an elevation of from 5,000 to 8,000 feet. There are numerous valleys of remarkable fertility, producing corn, wheat, alfalfa, sugar cane, cotton, with vegetables and fruits in profusion.

THE SKIES OF MEXICO.

Are something wonderful; the blue is intense, while the light, scattering clouds float slowly about the horizon, but as they come in contact with the higher mountain peaks they cling to the mountains and accumulate in dense masses, until relieved by a brisk precipitation amidst discharges of lightning.

AGRICULTURE.

With the richest kind of soil, kindly in its nature, easily worked, having a fairly abundant rainfall, agricultural productions should be vastly greater than they are.

The plow in use, which we illustrate, is responsible for the small production of farm crops. By the use of

IMPROVED AMERICAN PLOWS.

Loosening the soil to an increased depth, pulverizing it and giving a greater body of mellow earth, it will absorb and retain

the moisture from every rainfall, and thus aid growing plants in obtaining nourishment. The same power exerted by the ox teams, with good plows, would double the agricultural area of the Republic simply by increasing the soil depth.

ECONOMY OF WATER.

Water evaporates rapidly in summer weather, and under the present system of plowing and cultivating there is little absorbed by the shallow soil. Frequent cultivation with a harrow or fine toothed cultivator, which keeps the surface pulverized, will break up the capillary attraction and thus check evaporation.

Manufacturers of farm implements will do well to study the needs of the Mexican farmers. Oxen are the sole draft animals of the country for farm work. The men have for many generations driven the cattle as they now do. The ox bow is attached to the head and horns of the animals. Energy is transferred from the driver to the team through the medium of the needle-pointed "pica," or prod. One hand is required to handle this instrument of energy, while with the other the plow is manipulated. Of what use, therefore, are two handles to a plow? An American cannot handle an improved plow with one hand. How, then, can a Mexican?

To sell plows in the Republic of Mexico one must be devised which is suited to the slow motion of the ox and the man. It must be balanced so that with one hand it may easily be manipulated,

and then skilled workmen, not mere salesmen, must be sent to Mexico to teach the farmers how to use them. The manufacturer who is wise enough to build an implement suited to the needs of this people, and instruct them in its use, will lay the foundation for a profitable and permanent business.

WRONG IMPRESSIONS OF MEXICO.

When we see the rude implements and ancient customs, it is asserted that Mex-

ico is far behind the civilized world. This, in some respects, is true. Yet in the four centuries' experience in the art of irrigation and in the laws secured for the management of her forests Mexico is far in advance of the United States, while in her structures of masonry we can learn much from her experience. An exchange of ideas would be profitable for both nations. Some of our agricultural schools could learn much from the farmer and irrigator of the Republic.

Forests of Mexico.

Officials of the Republic who have carefully studied the subject mention that there were forests on the tablelands and that rainfall was much greater years ago than now. Tradition says that the Spaniards cleared away these forests, since which the rainfall has been greatly diminished. Certain it is, there are now no extensive forests on the great plains of Mexico.

There are the remains of great systems of reservoirs for irrigation, with aqueducts of brick supported upon arches, which still remain, where the water was carried through tunnels and over valleys for long distances, but by reason of droughts and decreased precipitation these are now of little or no use.

Forests cannot exist without water. Regular and copious rainfall cannot prevail without a production of forests. Aridity is invariably accompanied by scant shrub growth, or entire absence of plant life.

When it is considered that Mexico, especially the Southern portion, is narrow, with large oceans on either side, lying in a tropical region where evaporation is constant and extreme, the questions naturally arise: Why is there not greater precipitation? Why are there not large trees and dense forests, which always accompany moist tropic conditions? In his history Prescott relates that at the time of the invasion there were large and dense forests, which were not uncommon upon the higher tablelands.

Have climatic changes occurred in Mexico which destroyed the forests? And what caused the change? Or has the destruction of these great forests caused

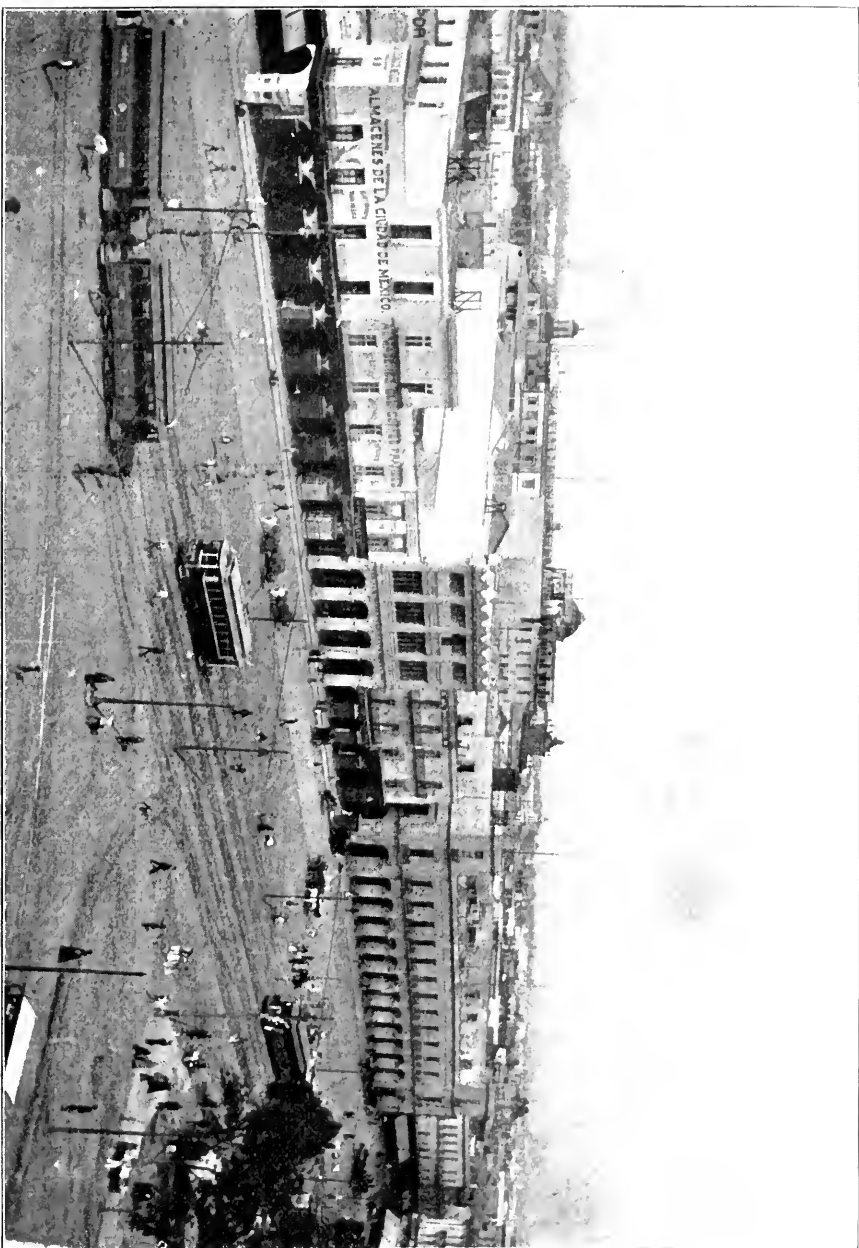
the change and induced aridity? If the former is correct, there can be no remedy. All must be left to time and the caprice of nature to effect a change. But if the latter be the true diagnosis, then it is within the power of man to replace these forests and thus secure as favorable conditions as existed before the removal of the trees.

Spain's history has been one of forest destruction, and her climatic condition and agricultural degeneracy are the result of this indiscretion. Americans have closely followed Spain's footsteps, and the great forests of the United States have been wantonly sacrificed, while the results are daily becoming more apparent in drought and flood.

With a wiser government than either, Mexico is giving protection to her remaining timber lands, and will, in time, overcome the evils caused by acts of former generations.

The tropical forests of Mexico occupy the low coast lands and borders of streams at low altitudes. The pine is upon the elevated mountain tracts, while the great area of the Republic, the tablelands, are practically bare of valuable timber trees. It is apparent that Mexico has no timber to spare for export. Her forest resources are none too great for home consumption. A limited quantity of mahogany and especially tropical hardwoods along the coast will be exported, as it is not available for economic transportation to the interior.

On the low moist lands a jungle of vines, undergrowths and numerous plants having no commercial importance for wood are growing among the valuable



CITY OF MEXICO.

timber trees which are scattered and quite difficult to remove for shipment.

The pine is not dense as a forest, and while in the aggregate there is a considerable quantity it is difficult of access and generally not of the highest quality. Pine lumber sells in the cities at from \$20 to \$35 per thousand feet.

The pine which is accessible is being made into lumber and fuel. By far too large a quantity of pine is being cut into fuel, as coal is scarce and expensive on account of long distances for transportation.

Oak is also largely used for fuel for engines. It is not of a character to be very useful in construction. The trees are short-bodied, the grain, twisting and interlocked, is very difficult to work with ordinary tools. The variety seems to be closely related to the English oak, *Quercus Robur*. While some of the trees are of fair size, the majority is dwarf and of slight commercial value. Its location, upon mountain slopes with slight moisture, would naturally prevent a vigorous, healthy growth.

MESQUIT.

The most numerous of trees upon the table lands is the mesquit, which is of extremely slow growth and seldom attains a diameter of ten inches, with a very short trunk and low head. The wood is heavy, close-grained and durable. When large enough it is sought for and made into cross ties, although far more is used for fuel, of which great quantities are taken to the railroads for shipment.

ASH.

Ash is planted in all the plazas, and frequently upon the streets, making a handsome shade and beautiful trees. It is said to have been indigenous to Mexico, but close observation has failed me in finding any ash except where planted by man. The variety much resembles *Fraxinus Alba* of the Northern United States. One reason for not thinking it an indigenous tree is the habit of casting its leaves at various seasons; one tree in full leaf, another almost bare; one tree with seed ripe and falling, another quite immature. Since this tree has become

naturalized, as it were, and is of high value in the arts, it should be planted in forest as a timber tree, for profit.

SAUZ (WILLOW).

All along many ditches and in moist localities large numbers of willow trees have been planted, *Salix Babylonica* being common. As an ornamental tree, for shade, it is well adapted, but it possesses no economic value for timber. It would be better were the eucalyptus planted in such places, if only for fuel, cutting out alternate trees from time to time. These trees are not killed by cutting. They are soon reproduced from the stump.

CHARCOAL.

Owing to the slight need of fuel for heating purposes there are no stoves, furnaces or fireplaces in Mexican homes. In the kitchen ranges and ovens charcoal is preferred, and in this form the fuel is brought in on burros and is on sale everywhere.

ARTIFICIAL FUEL.

Is imported from Wales, made from coal screenings, with asphalt or coal tar as a binder, and compressed into uniform blocks 5x6x8 inches, with rounded edges, one railway, the International, using this exclusively. Although handled frequently, on shipboard and cars, it holds its form without much breaking. This has a high heating power.

Nature has been very profuse in her gifts of plants to Mexico. The flora is very extensive. Climate, soil, moisture, continuous growth, all combine to favor arboreal creations. Magnificent flowers, varied foliage, delicious odors, grand displays of tropic and semi-tropic plants, but in economic timber trees there seems to be a serious scarcity.

In order to create a sensation in which their scientific (?) investigations should be exploited, certain professors from the Field Columbian Museum, of Chicago, have resurrected the brutal sun dance among the Indians, which the Indian Department has been trying for years to break up. The sooner such science (?) is abolished the better for civilization.



PLOW.



CATHEDRAL.

Architecture.

There is a minimum of wood used for house construction in the cities of Mexico, and there is absolutely nothing to burn except what furnishings the houses may contain. The walls are solidly built of stone and brick, or, in the less costly structures, of adobes, which are thickly plastered inside and out with mortar or stucco. The floors are of brick, stone or tiles, while the roofs are of brick, laid in mortar, or, in some cities, of semi-cylindrical clay tiles. Many roofs are arched with brick, laid flat, not on edge, and it is marvelous how slight a curve is given some of these arches. Yet they support heavy weights and have lasted through centuries.

Flat brick roofs are supported by 6x6 inch hewn pine joists, placed eight inches apart. These joists are often twenty feet in length. The doors are heavy, hanging upon ornamented wrought strap hinges, and secured by strong hand-made locks, which have remarkably large, complicated keys. Practically the only wood used in construction are the doors and joists which support the roof.

The church roofs are invariably of brick arches, usually several arches in each.

There are no such fire-traps in Mexico as those Mansard roofs of French and American cities, or the frail dwellings of China, or the universal wooden structures which have made fire insurance so great a burden in the United States, and which cause so great and continuous expenditures for fire protection.

Insurance in the Mexican Republic must be almost eliminated.

I ascended the circular stairways of numerous old church towers. All are built of cut stone, so laid in the wall as to strengthen the narrow tower, form the steps, and also build the central post running from bottom to top of every tower. From these elevations the best views of the city and country were obtained.

In the hotels, as in private houses, the large open courts around which the buildings are constructed are filled with trees

and plants, a fountain helping to cool the atmosphere, while beautiful flowers, growing in large, handsome vases, give a tropical appearance to every place. All stairways are of stone. Except in the center of the more populous cities, the houses are of one story. All structures are built for durability, many having survived through centuries.

Mexican houses are very comfortable for either warm or cold weather, as neither the heat nor frost can penetrate. They are clean and scrupulously neat, while sanitation is unusually good. A simple mat of native reeds or a rug covers the floor. The rooms are quite large, with high ceilings, giving ample air circulation. There are many features which could be profitably adopted by American architects, which, in modifications, would greatly improve country and city homes of the United States. Both Moorish and Spanish styles prevail.

The gardens within the inner courts are often marvels of beauty. Trees, fruits of the tropics, vines and flowers, fountains and masses of fragrant blossoms are abundant in every home. The plain exterior of Mexican homes is more than compensated for by the elegance of these interior courts.

Except in comparatively few cases of modern structures in the larger cities, Americans build for to-day. As much outward show as possible for the smallest sum of money. Wood has heretofore been the most abundant material, and, on account of price of labor, cheapest in construction.

In Mexico all structures are permanent. Magnificent Cathedrals, containing grand paintings of the old masters, in large numbers; elegant hotels, as near proof against fire and decay as human skill can make them; brick, stone or tile form the walls, floors, roofs and stairways; aqueducts built centuries ago are as perfect as when erected. The Mexicans are masters of the art of irrigation and of masonry.

The Eucalyptus in Mexico.

Several varieties of eucalyptus are growing in various portions of the Republic, but there seems too little interest in the trees and slight appreciation of its immense importance. The odor of the eucalyptus has caused it to be called by the people, camphora.

Twelve years ago the Mexican National Railway imported from California a car-load of eucalyptus trees, which were planted along its line, but all died, from what cause is not known. From the general success which is apparent in every portion of Mexico, and that with no care given it, the indications are that the trees were overheated and killed in transit. There is not the least doubt but the eucalyptus will not only grow, but will prove of inestimable value to the country.

The Mexicans have not fallen into the disastrous habit of pollarding the eucalyptus, which is practiced in California, and was illustrated in a recent number of *Arboriculture*. Hence the trees are all very tall and symmetric—valuable for the timber which is contained in a long, straight trunk.

Since all the native trees of Mexico's tablelands, except some of the mountain pine, are short-bodied, and thus of slight commercial value, it must become apparent that trees of real worth, growing tall and forming trunks which will produce much lumber and valuable timber, are greatly needed in the Republic, and since such trees are not indigenous to the region, they must be planted. It is an assured fact that many such trees will and do grow vigorously under proper influences.

There are more than one hundred varieties of the eucalyptus family growing in California and many more in Australia, New Zealand, Hawaii and other Pacific countries. Comparatively only a few are of special interest.

Among the many important qualities

of the eucalyptus a few may be noticed. For ocean piers, piles of eucalyptus are in demand because of its resistance to the attacks of the teredo, so many California trees have been pollarded, or cut off, to form a branching head, few trees suitable for this purpose can be secured.

For wagon work, axles, spokes, tongues, etc., eucalyptus is an excellent substitute for oak, as it possesses the necessary qualities.

For carriage manufacture, spokes, bent felloes, bent shafts and poles, axles, singletrees, doubletrees and bodies, where hickory is used, the toughness, strength, elasticity and firmness of eucalyptus make it of special value.

By steaming, the wood of eucalyptus is easily bent into any shape, and, when seasoned in this position, retains its form.

Some varieties are used for foundations under water, where great durability is desired.

Other kinds are suited for inside finish, as they take a fine polish and have a highly ornamental figured grain.

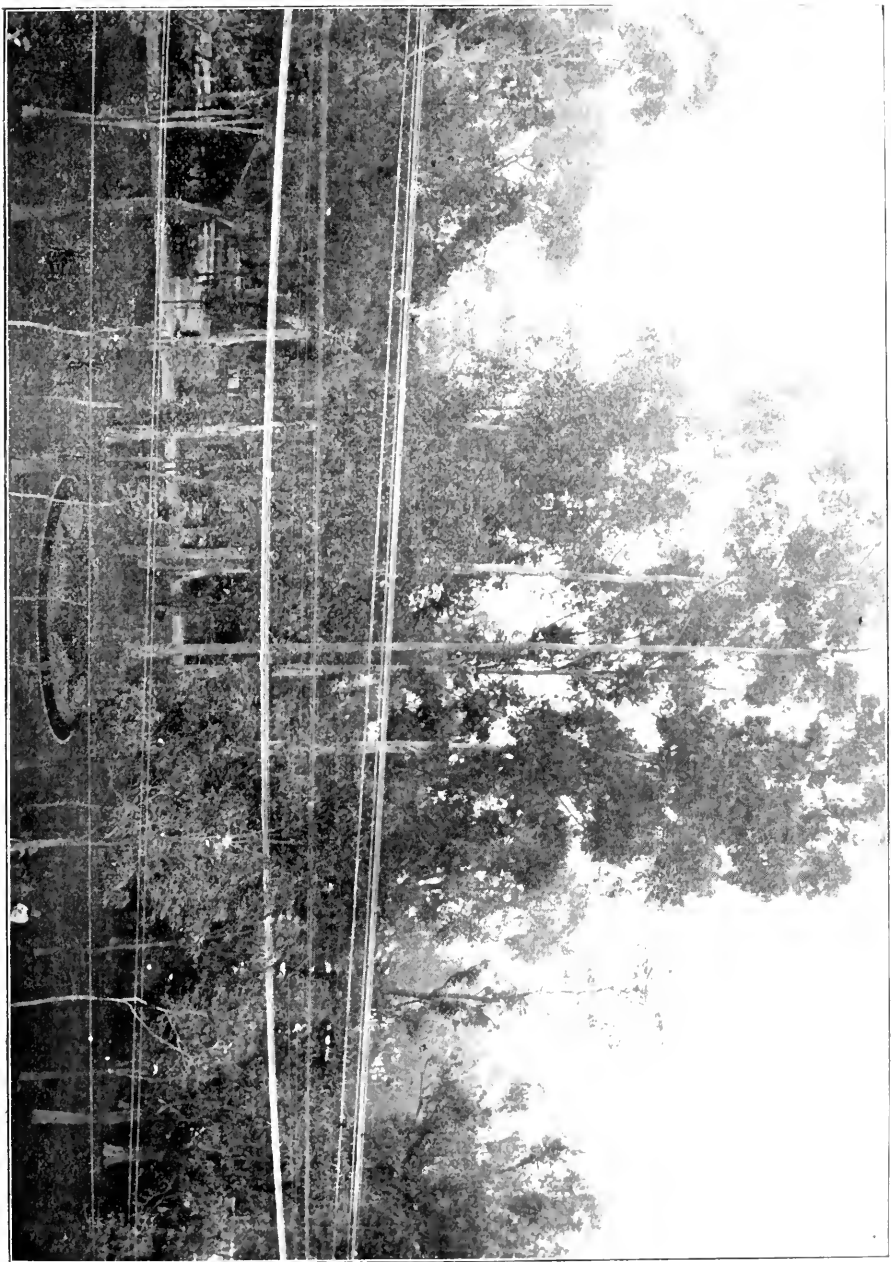
Many thousands of insulator pins for telegraph cross-arms are being used, as careful tests have proven it to be 20 per cent. stronger than oak or locust.

Its growth is extremely rapid if ample water is supplied. Some varieties succeed with a small supply of water.

A willow or alamo tree will occupy as much land, requires as much water and demands as fertile soil as the eucalyptus, yet when grown the value will be but an insignificant sum, while the eucalyptus is worth a large sum of money.

The margin of streams, borders of ditches, shores of lakes, etc., are specially adapted to the growth of the eucalyptus.

No tree will make so much cordwood for fuel in a given time as eucalyptus. The scarcity of fuel in Mexico would suggest its cultivation for this purpose.



EUCALYPTUS AVENUE, NEAR MEXICO CITY.

Arboriculture in the Republic.

My investigations have not been entirely satisfactory along this line, yet the trip was not by any means fruitless.

Mexico possesses comparatively few trees of great economic value, and little attempt is made at improvement. There is considerable pine on the higher mountains, but it is scattered; there are no dense pine forests. Near the railway, none; all has been cleared. Americans are here trying to secure concessions in pine lands, but the Government seems to understand the case and refuses to give away its valuable possessions.

One official informed me that the climate had changed very materially since the clearing by the Spaniards 300 years ago. Others confirmed this opinion, assuring me that aqueducts and irrigation works, once carrying vast quantities of water, are now valueless, there being no continuous flow of the streams which formerly fed them.

There is much small shrub growth on the higher land, which has an influence to a certain extent, but its economic value is extremely small. Eucalyptus has been planted to some extent and succeeds well, the principal variety being *Globulis*. But, like the residents of California, few appreciate its vast importance.

Among the many varieties of eucalyptus there are some which will thrive on all the hills and produce in the future an abundance of lumber and timber.

CATALPA.

Two years ago one hundred catalpa trees were sent to Mexico City for experiment. I have made several ineffectual attempts to find them. I did not find a large catalpa tree in the Republic, but found quite a number of smaller sizes in various cities.

Ash, ailanthus, honey locust, black locust and some other Northern trees are growing well in Mexico, as well as tulip poplar.

Considering the various conditions existing and plant growth which I found, I am certain that the catalpa will become a prominent and successful tree in many portions of the Republic.

The Republic of Mexico is as yet a vast undeveloped country. In the low east coast and Isthmus land the heat is that of the tropics, and the productions are also tropical, but on the great mesas of the north and elevated country about Mexico City the temperature varies but slightly during the year, vegetation is continuous, combining the products of the temperate with those of the semi-tropic regions.

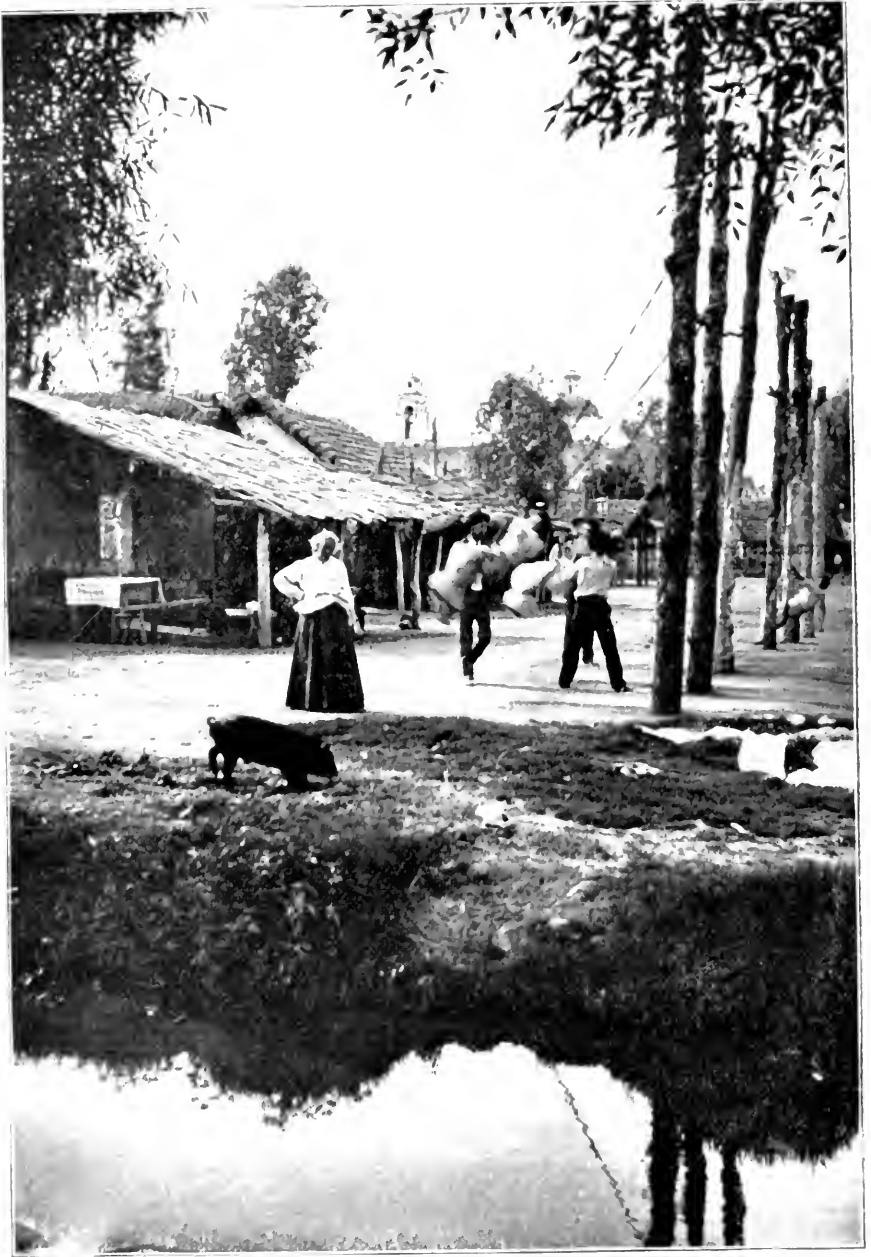
I saw a disc gang plow of best American manufacture drawn by two mules or oxen, hitched at the end of the tongue, a pole sixteen feet long. Too far from the draft, not easily controlled, and machine enough for four powerful horses. The driver made a series of crooked lines across the field, doing no good whatever. His ox team with native one-handed primitive plow would have done better execution in such hands.

Proper information in regard to the use of these implements is needed. Manufacturers of agricultural (and other) machinery would do well to bring a number of practical men from the States to teach the natives how to use the machinery. There is no doubt but with improved tools and intelligent instruction there will be great advances in all branches of business.

The same mistake is being made in Mexico as in California in using so much pine wood for fuel. Engines burn it on the railway. It is shipped to the city for sale, and is made into charcoal universally. By doing so seed trees are destroyed, and such as are not suitable for lumber are made into fuel. It were better these trees should be left to grow into good lumber and perpetuate the forests. There is much wood of no value except for fuel—enough, I should think—and the pine should be saved.



EUCALYPTUS TREES IN ALAMEDA, CITY OF MEXICO.



IXTICALCO
In Floating Gardens and Vega Canal, Swinging.

Floating Gardens.

While the City of Mexico is eight thousand feet higher than sea level, there are in the vicinity several lakes and marshy tracts which require extensive drainage operations. The Viga canal is one of these great drainage systems, and upon it are numerous barges, which transport farm and garden produce from the market gardens to the city. Flat-bottomed boats, propelled by a pole, convey passengers to the Floating Gardens. One of these boats is seen in our illustration.

The gardens are located upon marsh land quite similar to the tule lands of California. The soil is composed of decayed reed and grass roots, being entirely of vegetable mould and quite fertile. Ditches at frequent intervals drain the gardens and furnish means of communication by canoes and small boats to the larger canal, and thus to the city. Here are the great market gardens, where vegetables are grown for Mexico's consumption. Here, too, are grown the magnificent flowers which form one of the principal attractions of Mexico City, the flower market being a wonder in the quantity and exquisite beauty both of the individual tropic flowers and the magnificent floral forms, which are made with great taste and skill.

Street cars also connect the city with the villages upon the Viga canal, and they are well patronized.

Our illustration of the swings and home scene at Ixtacalco show this form of amusement.

Volcano Colema.

Colima, the only active volcano in North America, is now in eruption. Our illustration shows the mountain with a stream of vapor rising in an immense column.

I spent one day and two nights at Tuxpan, on the Mexican Central Railway, taking many photographs of the volcano and of the country surrounding.

At night the sudden explosions were

accompanied with fire, and clouds of fine sand were scattered for great distances, but no lava was seen. The mountain has two distinct cones, only one of which is in eruption. The other is called the cold mountain.

The distance from my point of view was about ten miles. I ascended 1,200 feet upon a mountain near Tuxpan to procure a better view of the volcano than could be had from the plain, but during most of the day the clouds gathered and hung about the high peaks, 15,000 feet elevation, and seemed to be attracted, scarce moving for hours. At the same time the sky was absolutely clear in all other directions.

The eruptions are not continuous, but intermittent, occurring several times during the day and night.

Colima is nineteen degrees from the equator and is in view from a point within a mile of the Mexican Central Railway station, Tuxpan.

When an explosion occurs the clouds of vapor rise to a great height, making a very beautiful appearance.

At a distance of a few miles no danger is apprehended, yet the Indians who occupy the villages upon the mountain slope abandoned their homes temporarily when the volcano gave evidence of continuous eruption.

One of the handsomest trees of our Southern States is the *Grevillea Robusta*, or Australian oak. It will not stand more than 25 degrees of frost, probably, at least not below freezing point. Of this tree Mr. D. C. Green, of Bartow, Fla., writes:

"The *Grevillea* is not altogether an ornamental tree. I purchased one in 1898. It could easily have been carried in my pocket. It is now, at five years of age, thirty feet high, twenty-seven inches girth. It has outgrown an oak which stands near by, and which is thirty years old, and will soon get ahead of a pine neighbor which is fifty years old. For firewood the *grevillea* is equal to oak."

Irrigation.

From the time of the Conquest Mexico has practiced irrigation. The long aqueducts of masonry, the arches of brick, to carry streams of water over broad and deep valleys, are still in good preservation, although constructed three centuries ago. Dams of cut stone, with presses or reservoirs of great extent, and distributing canals, convey water from the canyons to the fields far away.

Rude as may be the implements, and fixed in ancient habits as are the people, yet they are adepts in the art of irrigation.

Mountains have been pierced with tunnels to bring the precious fluid from distant valleys, for on the elevated lands agriculture is dependent upon irrigation to extend the season of plant growth beyond the rainy period.

The dry and rainy seasons are more marked in Central Mexico than in the Eastern United States, although in California similar periodic rains occur, and during the rainless months water must be supplied.

There are great agricultural valleys throughout the tablelands of Mexico, where corn, cotton, sugar cane, alfalfa and small grains are grown, while the *Maguey* is one of the principal products, pulque being as much a national drink among the poorer classes as beer is in Germany, wine in France and whisky in Kentucky.

Upon the lowlands near the seacoast, where the air is more moist, irrigation is unnecessary.

There are places where, on rough, rocky hills, bare of soil, have been built large cities. Here, in excavations in the rocks, filled with soil from a distance, are growing fine shade trees. Walls of masonry have been erected, four or five feet square, two feet high, about these trees, in which water is poured to irrigate them. This also protects the trees from careless people and stray stock.

Some of the great trees, as the one which we illustrate, the cypress of Montezuma, at Chapultepec, have been religiously cared for during more than 400 years.

Temperature.

During July and August the telegraph brought reports of very high temperature throughout the United States, the thermometer being reported to register 105 degrees at times. In Central Mexico, at the same time, the weather was extremely pleasant, with but 70 to 75 degrees Fahrenheit. Towards the close of each day a dark cloud would usually appear, and suddenly a rain of brief duration indicated the rainy season. Frequently these rains occurred at night.

This equable temperature makes the tablelands of Mexico a most pleasant region for summer residence or travel. At no time was it unpleasantly warm, while at night blankets were always acceptable.

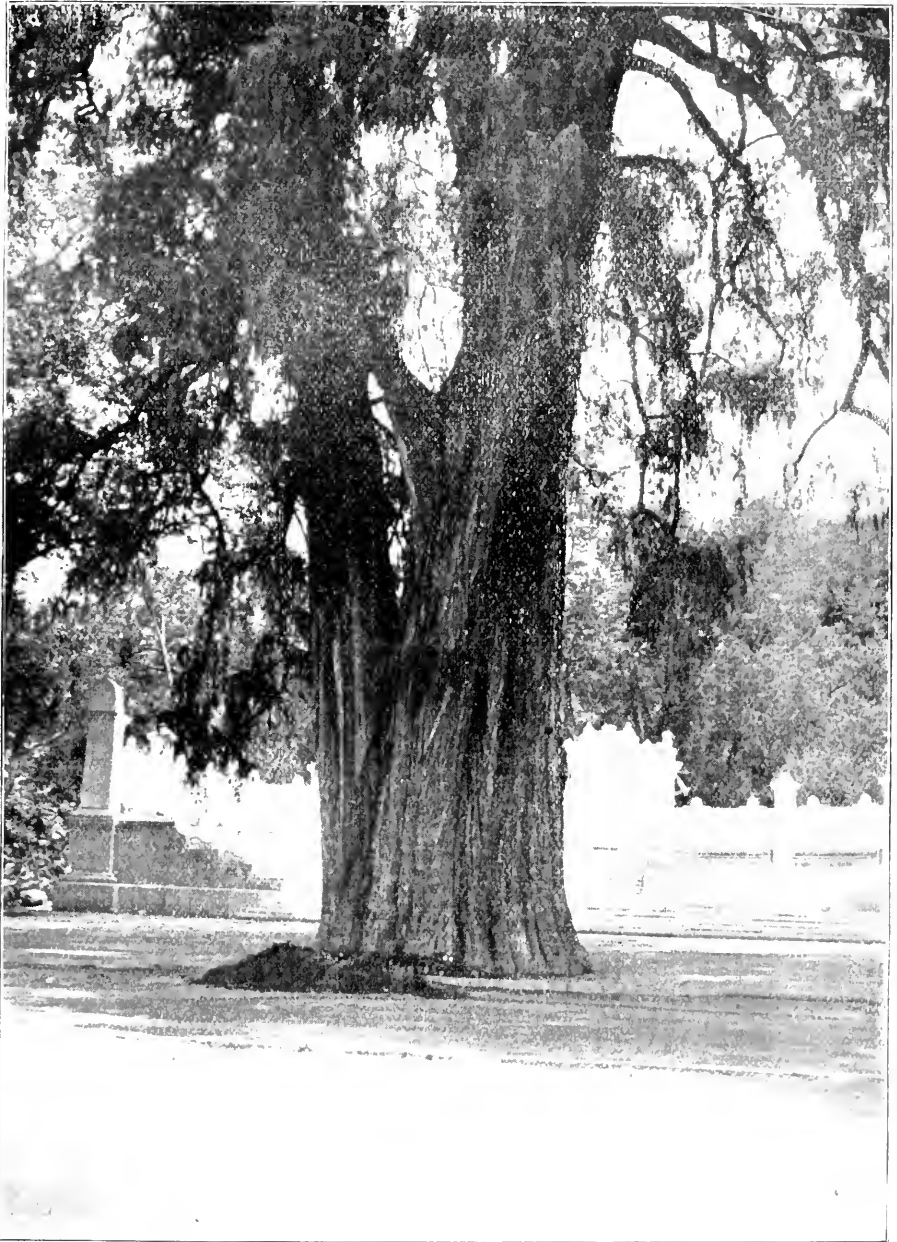
Forestry Laws.

The forestry laws of Mexico have been constructed along French lines and are immeasurably superior to those of the United States. We shall soon have a translation of these laws and give the substance of each. Briefly, the forests are protected by the Government, forest fires are infrequent, and, when they occur, immediate and thorough investigation is made as to the cause, and persons who are guilty of starting fires are severely punished.

The Government refuses to sell the forest lands, but leases the right to cut timber under official direction. The official brand placed upon a tree must show when timber is exported, else the wood is confiscated. The importance of the forests is recognized in their laws.

Notice.

Our friends must appreciate the efforts of the editor to make ARBORICULTURE instructive, attractive and useful. Money is required to keep up such an advanced publication. Please remember this and send such contributions and subscriptions as will aid in the finances of the Society. Address all communications to
 JOHN P. BROWN,
 Connerville, Ind.



MONTEZUMA CYPRESS, CHAPULTEPEC, MEXICO.



INDIAN VILLAGE, IN FLOATING GARDENS.

Agricultural Experiment Station.

An agricultural experiment station is maintained at Mexico City. I visited the buildings and grounds. The location and soil are well chosen. There are many small trees and shrubs, some of great beauty. The stock, mostly Holstein cattle, was very fine.

The weeping willow seems to be a favorite about the moist lands of Mexico. Its shade is refreshing, and as a tree it is ornamental; but why grow so many trees which possess no valuable qualities upon land of such high value, when the eucalyptus and catalpa will thrive under the same conditions and produce lumber and timber of the highest value, and yet are equally ornamental for shade?

A series of experiments which would illustrate European and American methods in farming, showing various improved implements, and planting a variety of forest trees not common to the country, especially those of high value in manufactures and for economic uses, would be of immense import to the Republic.

If to this permanent exhibit American and European manufacturers should send specimens of their wares, with experienced men to operate them and show their use, it would add to their sales and benefit the farmers of Mexico.

The railways would doubtless bring representative citizens from various portions of the Republic, at reduced rates, if not free, for instructions and for observations.

It would well repay the United States Government to send a number of students from the various colleges to Mexico to learn of her people more of irrigation, of masonry and many things in agriculture, in which Mexico so greatly excels. There is not an architect in the United States but could gain some valuable lessons in building and in planning structures by a tour of observation through our neighboring Republic.

Pyramids of Cholula.

The pyramids, now consisting of three artificial earth mounds, were old when the Spaniards first landed in Mexico. The larger pyramid erected by pre-historic people rises to a height of more than one hundred feet, and covers probably forty acres. It is surmounted by a church of great antiquity. Stone steps lead to the summit by a very easy ascent. By a winding stone stairway we reach the top of the tower and walk out upon the brick roof, where a panorama of wonderful beauty is spread out before us. The peaks of Popocatepetl and Iztaccihuatl are in plain view, although not now in eruption. In former times these two volcanoes blazed before these ancient mounds, as in awe the Indians offered their sacrifices. The churches, with lofty spires and venerable with age, which are seen from Cholula heights, number a score, and seem but a stone's throw distant. In some the ornamentation is of wondrous beauty. Four and five hundred years are given as the age of many.

The plaza was alive with people, buying and selling wares of many kinds, as well as fruits and edibles. The valley is a series of fertile farms, fields of corn, maguey (pulque) and other crops. The people are happy and contented.

Cholula Station is on the Interoceanic Railway, and is directly at the base of the largest pyramid, so one may go from the City of Mexico or from Puebla to the village without change of cars.

The old church in which the Indians made a stand against the invading Spaniards still stands, and is well worth a visit.

The surrounding country is a rich agricultural region of great interest.

Where did the immense quantity of earth come from with which to erect monuments of such magnitude? How long ago were they constructed? Whether by slaves or voluntary labor? are speculative queries. The worship of the sun, sacrifice of human lives and various religious rites occupied the minds of prehistoric men, rather than the business industries of modern civilization.



HOW CATALPA SPECIOSA GROWS IN NATURE.



CATALPA SPECIOSA IN FOREST.



CATALPA BIGNONOIDES IN BLOOM, A TREE TOTALLY WORTHLESS FOR TIMBER

Down on the Wabash.

In preparing January Arboriculture every illustration of catalpa trees was taken in their winter garb; the true form of the trees was thus apparent, not being hidden by foliage. On June 24, in company with Mr. W. D. Stern, we visited several of the catalpa slashes down on the Wabash. One tract of fifty acres, in the river bottoms, we found five hundred catalpa trees, varying from thirty to one hundred inches girth, all naturally planted. It is safe to say not one is less than eighty feet high, some being more than one hundred feet. They are usually straight, and in size, symmetry and general appearance equal to the oak, white ash, shell-bark hickory, sycamore, walnut, sweet gum and pecan, with which they are associated in the slashes.

On one farm we found a tree which had grown from a catalpa stake in the stake and ridged rail fence built in 1818, when the prairie was first settled. At one foot from the ground this tree measures six feet diameter, at six feet height its girth being eleven feet. This tree, being in a fence line, had been cut back in early age, and formed a low, branching head; the main branches are two feet through. There are many instances where catalpa trees have grown from posts, stakes, and even blocks of the wood beneath buildings have taken root, budded and grown into immense trees.

We saw a great many farms which were fenced entirely with catalpa rails, which still remain in the worm fences after seventy or eighty years' service, and scarce a farm but which has miles of fencing the posts of which are all of catalpa; many of these have been in continuous use fifty, seventy and eighty years.

So valuable do the land owners consider the catalpa that on some farms rows of trees taken from the swamps are planted along every fence line, and one may travel for miles along the public highways beneath the shade of catalpa avenues. Here and there are piled cords of catalpa fence posts to season for future use.

Old men who have lived in the same locality since the first settlement of the prairies in the early part of the last century, speaking of the durability of catalpa wood, say, "It never rots, but wears out with the weather."

One man says he has used catalpa for kindling his fires every morning for more than sixty years, being better than pine. On one large farm where there are several miles of catalpa trees planted in fence rows, trees for the early plantings were dug from the slashes, while those later planted were purchased from some nursery. In every case these latter plantings are worthless bignonoides, and, being now in bloom, are easily determined.

It is so easy to gather vast quantities of seed from the low growing, spreading trees, like that shown on the opposite page, that seedsmen, tempted by low prices and large profits, deal in these worthless seeds, and after years of patient waiting the farmers learn the true character of their purchase.

To illustrate the persistency of the catalpa, and that when once planted it becomes a permanent forest, we were shown a pile of stumps which were dug from the adjoining field last season. This field was cleared forty-one years ago, and the catalpa stumps have lived, sending up fresh sprouts every season for forty years, and had finally to be dug out. All other stumps had decayed long ago.

These stumps sprouted every year and made large growths, but the field was required for cultivation and the owner was compelled to dig them out eventually.

The views given in this number, as well as those in the January magazine, were photographed by the editor and were engraved expressly for Arboriculture. We will give other illustrations from time to time. Few people realize the vast importance of this tree, and usually confound it with the worthless kinds, which are so common in every locality. In our next number we will give a colored plate of the flowers.



MORE CATALPA TREES IN FOREST.
Reproduction From Stump of Fallen Tree

Editorial Notes.

On July 18 a messenger from the National Palace brought to Porter's Hotel a letter from President Diaz, inviting me to call upon him on Monday afternoon. I was extremely fortunate in having the acquaintance of Dr. Foid, a gentleman who, in addition to being an expert linguist, is also a thorough master of arboriculture, having been for many years director of forestry stations in France. Dr. Foid volunteered to accompany me on my visit to the President and to act as interpreter.

The President gave me a cordial welcome to the Republic of Mexico as representative of the International Society of Arboriculture, and expressed gratification for the visit and the interest taken in his country. I was assured that the Government would co-operate with our Society in all efforts to advance the cause of arboriculture.

President Diaz is well informed in regard to prevailing conditions, and various plans were discussed for the extensive planting of trees about the borders of lakes and moist locations throughout Mexico.

Experiments will be made at once to test the adaptability of several species of forest trees not indigenous to Mexico.

I was also received by Sr. Genl. Manuel Gonzales Cosio, Minister of Fomento, with whom I had a very interesting interview. The Minister assured me of his interest in the subject and explained at length the forestry laws of Mexico.

Unusual honors were accorded our Society by all the Government officials, as well as by many prominent citizens of the Republic.

Our friends will please remember that Arboriculture is now published at 19 to 21 South Alabama street, Indianapolis, Ind.

All mail and communications for the editor should be sent to Connersville, Ind.

Americans who visit the City of Mexico, and who do not speak the Spanish language with fluency, at times have a difficulty in making their wants known.

Porter's Hotel, on San Francisco street, in the immediate business part of the city, is an excellent hotel, with the best cuisine, large, pleasant rooms, and everything as nearly to suit Americans as a Mexican hotel well can be. Mr. Porter is an American and many of his employes speak English. I was better pleased at Porter's than any hotel that I found in the Republic. The prices also are very moderate, considering the difference in value of Mexican and American money.

The Forest Nursery and Lumber Company has been incorporated under the laws of Ohio. The company will grow forest trees for sale and plant large areas of forest. The hardy catalpa will be the principal trees planted.

This company means business, and is the first extensive corporation especially organized to plant forests as a commercial enterprise, although many thousands of acres have been planted by individuals and railways.

J. W. Myers is President; D. N. Myers, Vice President; R. C. Kinneman, Treasurer; W. D. Stem, Secretary. Office, Ashland, Ohio.

There is a world of enterprise in the newspaper world, of which few people have any conception. One London journal has bought a million acres of Newfoundland timber land to maintain a perpetual supply of white paper. Just think of it!—an area equal to one mile in width and about 1,600 miles in length. What a forest, all to supply the printing presses of one establishment! When we stop to consider that one metropolitan paper is but a small affair compared with a grand total, it will be seen that the wonderful call upon our forests from the newspapers alone is beyond the comprehension of the novice.

Among Books.

For many years Gray's Botany has been a standard, and in almost every particular it is still and will continue to be an authority in the United States, but in a great number of cases a work prepared so long ago as Dr. Gray's must needs be brought up to the present time by such additions as experiences and recent discoveries may demand.

Harvard University owns the copyright of Gray's Botany, and it is by direction of Harvard that these Outlines of Botany have been prepared by Dr. Leavitt. Price, \$1.80. American Book Company, Cincinnati, Chicago, New York.

A. Flanagan Company have a series of books for schools and young people which we find to be extremely interesting and instructive.

"A Little Journey to Germany" gives a short account of everything of special interest which one sees in traveling through the German Empire.

"A Little Journey to Mexico," by Marian M. George, we find to be very correct in descriptions and in illustrations, which are profuse.

"Life on the Farm" is a scientific explanation of many processes in farm operations, but written in plain and interesting language which the young can understand.

The Bobbs-Merrill Company, Indianapolis, have just published "The Song of the Cardinal." Lovers of nature, especially those who recognize the beauty, cheerfulness and usefulness of birds, will appreciate this poetic story by Gene Stratton Porter. It is finely illustrated, and profusely so. We would specially commend this book to those who are so devoted to birds as to keep a redbird in confinement in a cage of two cubic feet capacity. This is a handsome work for the parlor or library.

Strangers in Mexico never fail to enjoy a visit to Chapultepec. The grounds are kept in the highest state of landscape art. The trees and plants are all grand. The old cypress trees, especially, attract attention by their immense size and rare beauty, the one illustrated being 400 years old. It stands at the base of the cliff, a majestic sentinel guarding the citadel. The entire slope of the hill is a mass of verdure, trees, vines and plants characteristic of the tropics. Upon the battlements about the citadel are immense vines of bougainvillea, emblems of peace, hiding all symbols of war.

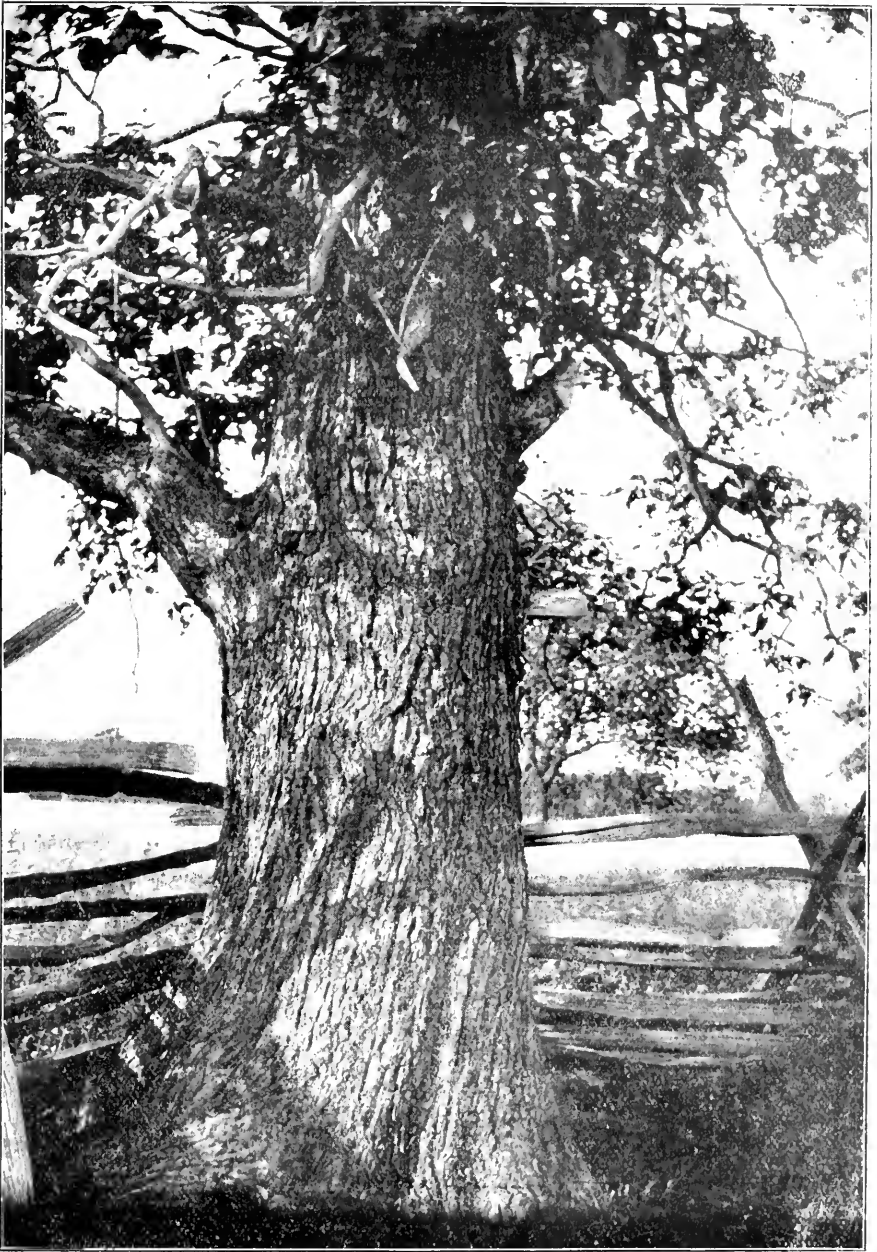
The National Palace, which was occupied by Maximilian and Carlotta, is full of richest decorations and most elegant furnishings.

The National Military School occupies one portion of the citadel. I spent a day here, and was shown unusual courtesies by officials and students.

Nowhere in the world can there be found a finer body of young men than are in this school—courteous, gentlemanly, studious, intelligent. Such leaders and defenders as will come out of this class of young men insure the safety of Mexico in the years to come.

Upon a mountain between Mexico City and Cuernavaca, at an elevation of 10,700 feet, I saw large fields of maize, or Indian corn. This crop, in a more northern latitude, is confined to tracts of less than 5,000 feet elevation. True, in some special cases in Colorado early sugar corn is grown at 6,000 feet elevation, but not as a crop.

Neither agriculture nor mining have been developed as in the United States. The richness of soil, abundance of moisture and an all-the-year-round season would suggest possibilities for Mexican farm crops not heretofore dreamed of.



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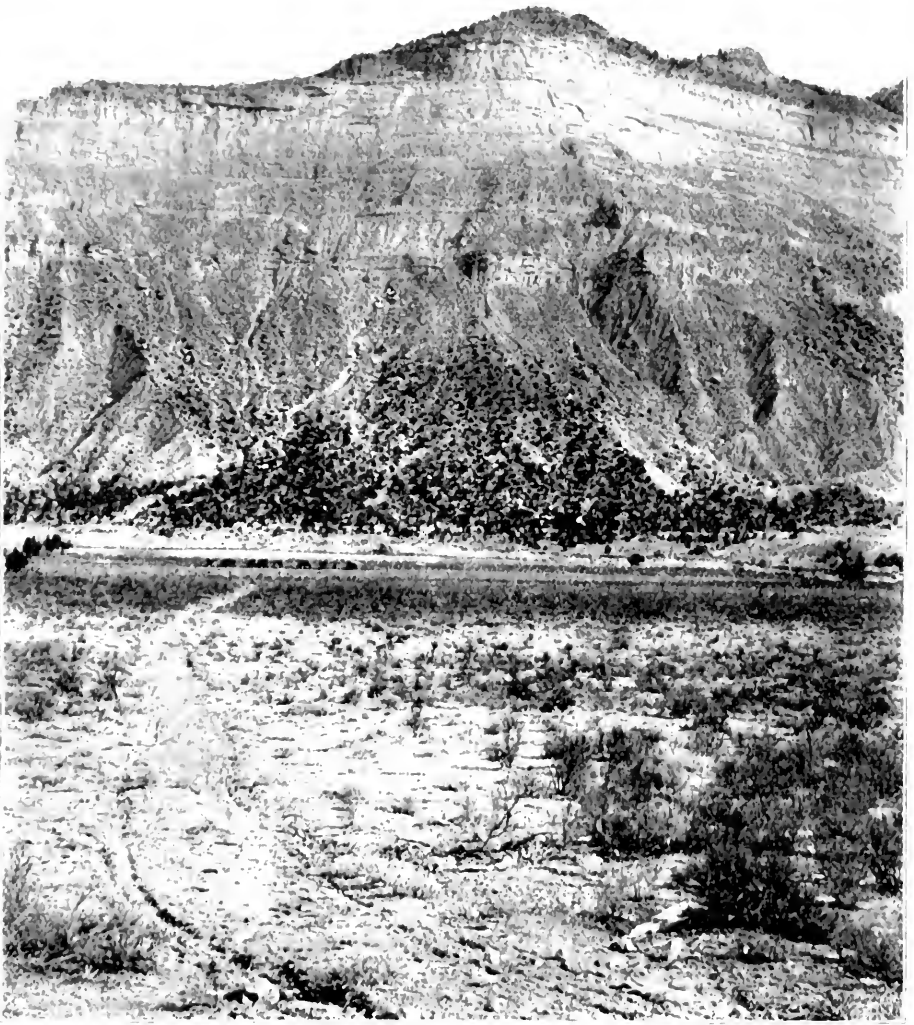
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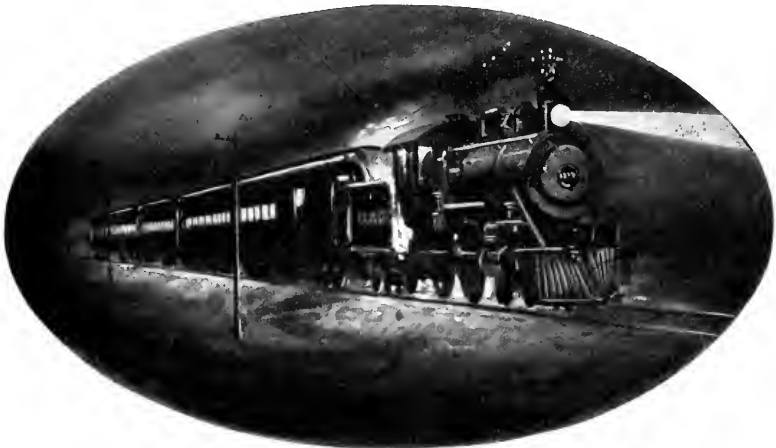
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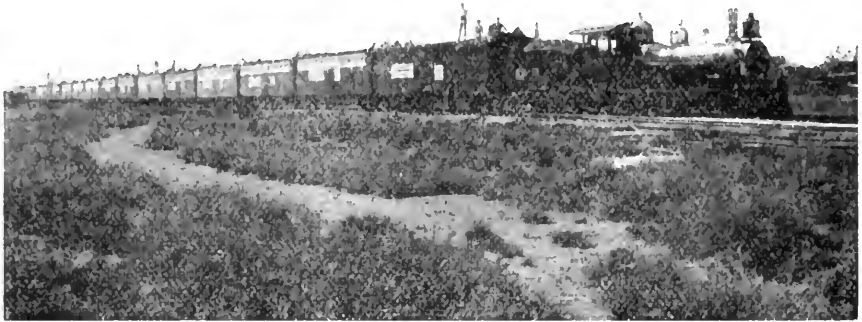
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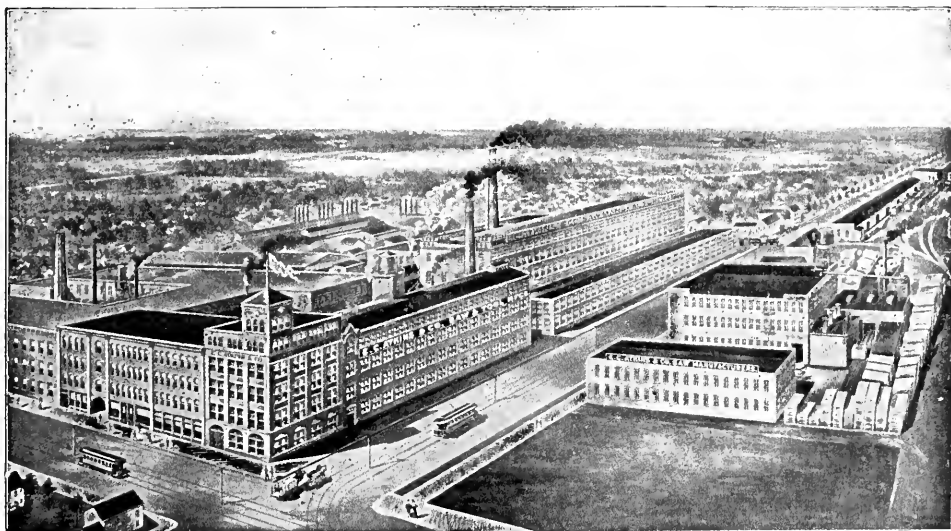


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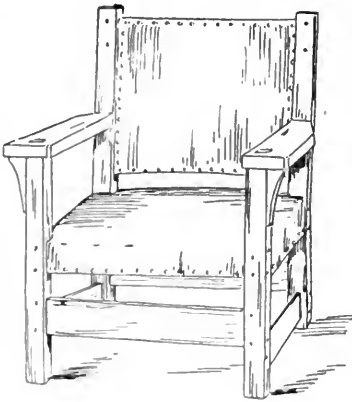
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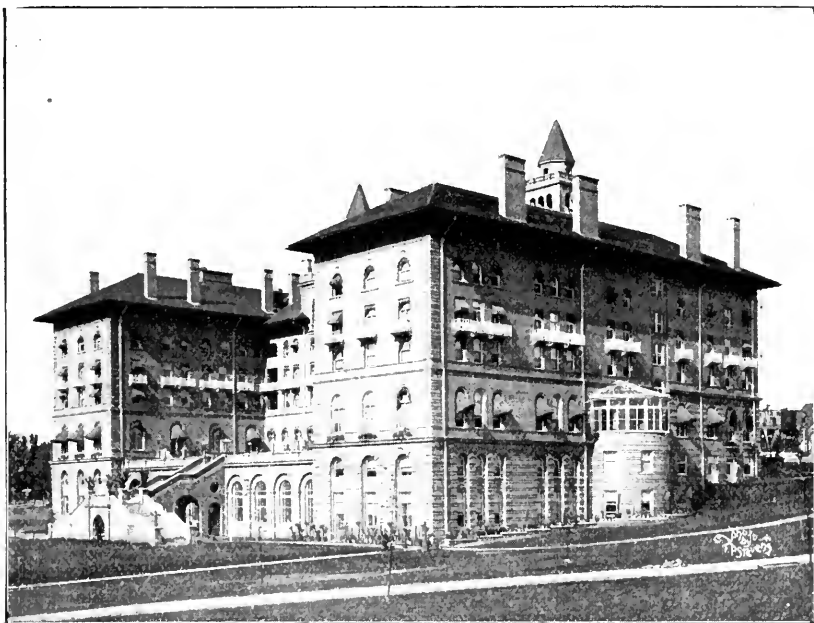
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Many are satisfied to live in Northwest Texas, having proved the value of the land in this region as a good Crop Raiser. Not only Cattle, but Wheat, Cotton, Corn, Feed-Things, Cantaloupes, Garden Truck and Good Health flourish here—in a district where Malaria is impossible and very little doing for Jails and Hospitals.

Land, which is being sold at really low figures—tho the constantly increasing demand is steadily boosting values—is still abundant; and Farms and Ranches of all sizes, very happily located, are being purchased daily.

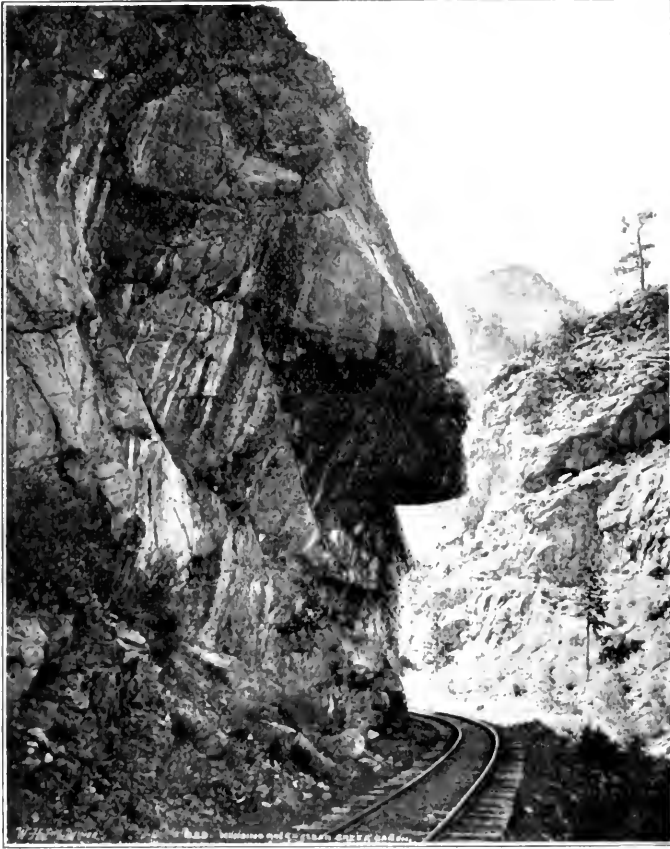
We will gladly supply all askers with a copy of a little Book published by the Northwestern Texas Real Estate Association, which contains an interesting series of straight forward statements of what PEOPLE HAVE ACCOMPLISHED along the line of

“THE DENVER ROAD.”

PASSENGER DEPT., FORT WORTH, TEXAS.

N. B.—We find our passenger patronage very gratifying. It is necessary to run three trains daily each way as far as Wichita Falls, and two clear thru. We continue, the year round, the excellent Class A service that insures the preference of Colorado and California Tourists, Winter and Summer. By the way, we offer now more than half a dozen routes to California, the newest being via Dalhart (also good for Old Mexico), with first-grade Eating Cars all the way.

We sell a Home-Seekers ticket, good thirty days, at one and a third fare for the round trip, allowing stopovers at Vernon and points beyond, both ways.



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HARDY CATALPA A SPECIALTY.

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To any one sending us the full name and address of a customer for a new piano, piano player, or Regina Music Box, we will give a **Beautiful Leather Music Roll** absolutely free, whether we make the sale or not. Mention Arboriculture and send the name of the customer to

The SMITH & NIXON PIANO COMPANY,
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"Now is Colorado Time!"

Don't compare Switzerland and Colorado. It isn't fair—to Switzerland. Switzerland has nine peaks more than 14,000 feet high. Colorado has forty-two—all higher than the famous Jungfrau. In addition it has nine hundred lakes and more than sixty rivers.

Why not go there this summer? Rates are very low \$30.00 for the round trip from Chicago; \$25.00 from St. Louis; \$17.50 from Missouri River points; still lower, July 1 to 10. And, if you take the Rock Island System, you will be comfortable going and returning.

Our booklet, "Under the Turquoise Sky," gives just the information you ought to have. Contains a list of Colorado's hotels, rates, capacity and surroundings. It is beautifully illustrated, interesting and practical. Sent on receipt of six cents in stamps.



JOHN SEBASTIAN,
Passenger Traffic Manager,
CHICAGO, ILL.

Rich Lands

in the great

Yazoo Valley

(Mississippi)

on the lines of The Yazoo and Mississippi Valley Railroad Company

Famous as the largest body of the most fertile lands producing the greatest revenue in the United States from cotton, corn, cattle and hogs

**Invest your money in these lands
while they are so cheap**

Write for Pamphlets and Maps

EDWARD P. SKENE

Land Commissioner

Park Row, Central Station, Room 560

Chicago, Ill.

The Mexican Central Railway Company

LIMITED

Calls attention to the fact that:

IT IS THE ONLY Standard Gauge Route from the United States Frontier to Mexico City.

IT IS THE ONLY Line in Mexico that can offer the Traveling Public the conveniences and comforts of Standard Gauge Pullman Drawing Room Sleepers, lighted by Pintsch Gas.

IT IS THE ONLY Line by which you can travel WITHOUT CHANGE from St. Louis, Mo., to Mexico City.

IT IS THE ONLY Line from El Paso, Texas, to Mexico City.

IT IS THE SHORT LINE from San Francisco and Pacific Coast Points to Mexico City.

The Lines of the Mexican Central Railway pass through 15 of the 27 States of the Republic. Eight million of the thirteen million inhabitants of Mexico are settled contiguous to them.

The principal mining regions receive their supplies and export their products over it. Chihuahua, Sierra Mojada, Mapimi, Fresmillo, Parral, Guanacevi, Durango, Zacatecas, Guanajuato, Sombrerete, Pachuca, etc., etc.

When You Travel for Business Go Where Business is Done

There are only five cities of over 35,000 inhabitants in the Republic of Mexico that is not reached by the Mexican Central Line.

The following ten cities are reached only by the Mexican Central Railway:

Chihuahua, 30,098 inhabitants; Parral, 16,382; Zacatecas, 34,433; Guanajuato, 37,816; Leon, 63,233; Guadalajara, 101,295; Queretaro, 38,016; Zamora, 12,533; St. Louis; Irapuato, 19,640.

St. Louis; connects the Cities of Torreon, 13,845; San Luis Potosi, 60,858; Tampico, 16,313; Celaya, 25,565; Pachuca, 37,487; City of Mexico, you will

Pullman service between St. Louis, Mo., and Mexico City, also between St. Louis, Mo., and vice versa.

W. D. MURDOCK,

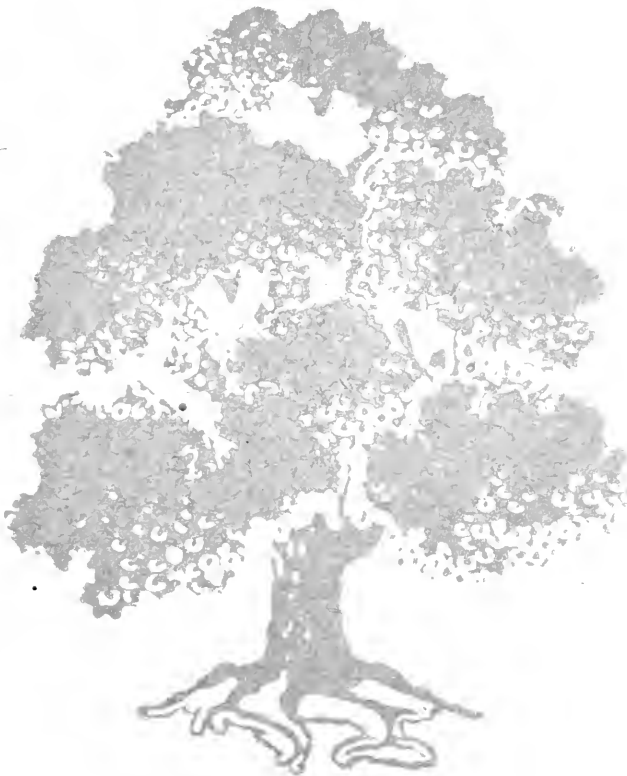
General Passenger Agent,

... MEXICO CITY.

ARBORICULTURE

VOLUME II.

NUMBER 8



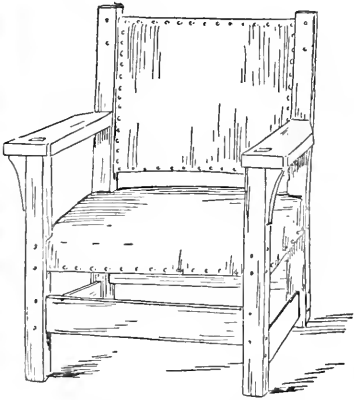
A Magazine of the International Society
of Arboriculture: Indianapolis, September, 1903.

Russmore Furniture

(Trade-Mark)

Give individuality to your home by furnishing a room in Russmore.

A living room, library, dining room or "den" in this furniture is different and more artistic than any fitted with the commonplace patterns one sees everywhere.



This Arm Chair **\$17.50**
(In Leather)

Russmore furniture is unique in its rich brown color, artistic in its plain designs and strong in its hand-made construction.

It is made in big easy chairs and couches, tables, bookcases, buffets, desks, etc.

We give careful attention to orders received by mail, and out of town customers can make selections from our catalogue—sent FREE.

NOTE—Russmore Furniture can be obtained only from this company.

**THE TOBEY FURNITURE COMPANY,
Chicago.**



Colorado Springs, Colorado ————— "The Antlers."



Absolutely
Fireproof

The Finest
Hotel
in the
Rocky
Mountain
Region

Unsurpassed
Health
Giving
Climate

Grand
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Unexcelled
Cuisine

European and American Plans.
OPEN ALL THE YEAR

L. A. KITTRIDGE
Manager



The "ADAMS"

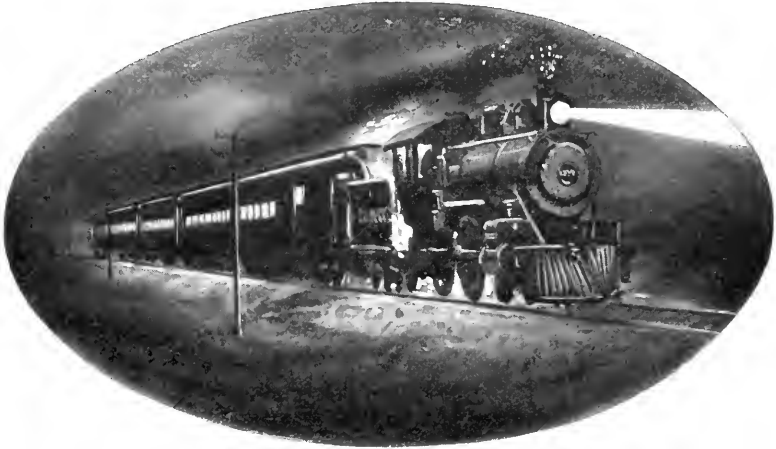
Denver's new
and most modern
Hotel

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and
American
Plans

Everything the
best. Telephone
local and long dis-
tance in every
room

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The Antlers,
Colorado Spr'gs
Manager

Welton street cars
from Union Depot
pass the Adams



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From the Leading Cities of
OHIO, INDIANA & ILLINOIS
To **St. Louis** —

Write for Folders

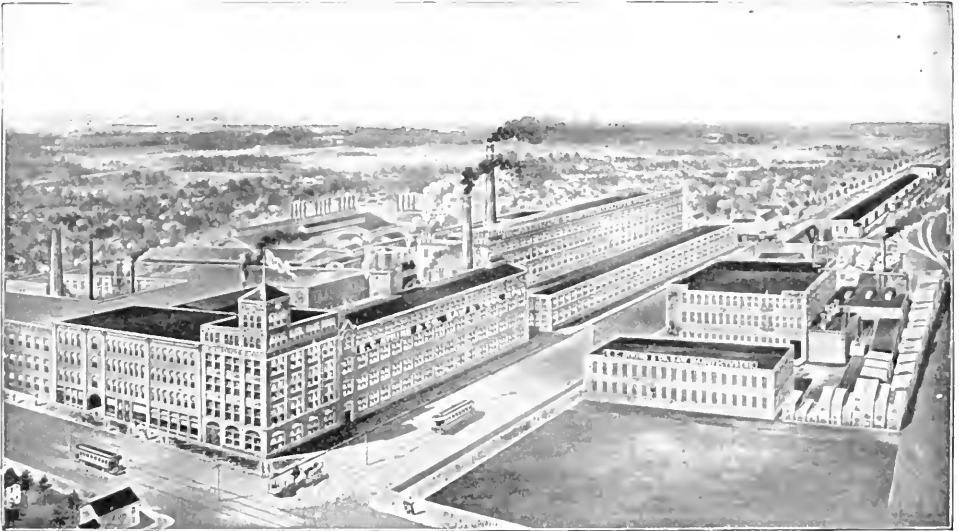
Warren J. Lynch, Gen'l Pass. Agt.

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Accept no other—if you want the best
Prize-winners everywhere



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Not States, But—

Oklahoma is not a State. Neither is Indian Territory. And yet, at the last census, their population was almost as great as the combined population of Arizona, Delaware, Idaho, Montana, Nevada and Wyoming. *To-day it is greater.*

Their area is equal to the combined area of all the New England States, with Delaware thrown in for good measure.

The largest city in the Twin Territories is only fifteen years old, but it has a population of nearly 35,000. There are eight other towns with a population of 5,000 or more, besides innumerable smaller places of from 100 to 3,000.

No section of the United States is growing more rapidly or building on a firmer foundation. No section offers greater opportunities to the man who is looking for a new location. This is as true of the professional man as it is of the farmer and merchant.

Oklahoma and Indian Territories are gridironed by the lines of the Rock Island and its sister system, the Frisco. Every town of importance is on one or the other of these railroads.

We have issued and will gladly mail to anyone who will ask for them, two little books descriptive of the Southwest. One book is called "Men Wanted." It contains a list of the business openings along the lines of the Rock Island System. The other is entitled "Rock Island States Southwest." It describes at considerable length those portions of the Southwest which have been thrown open for settlement by recent extensions of Rock Island lines.



JOHN SEBASTIAN, Passenger Traffic Manager,
Rock Island System, Chicago, Ill.



CHICAGO AND NEW YORK 20 HOURS

20th Century Limited

A train for
busy people

Saves a Day

You can transact a half day's business in Chicago and get to New York next morning in time for a full day's business in that city — and vice versa.

If there is any truth in the old adage "Time is money" the service of the "20th Century Limited" will make it good.

Five Sumptuous Cars —affording all the conveniences of the leading hotels.

Leaves Chicago, daily, 12:30 P. M. Arrives New York, 9:30 next morning.
Leaves New York, daily, 2:15 P. M. Arrives Chicago, 9:15 next morning.

**Lake Shore & Michigan Southern Ry.
and New York Central R. R.**

For "Book of Trains," or information about travel over the Lake Shore,
address, A. J. SMITH, G. F. & T. A., Cleveland, Ohio

Rich Lands

in the great

Yazoo Valley

(Mississippi)

on the lines of The Yazoo and Mississippi Valley Railroad Company

Famous as the largest body of the most fertile lands producing the greatest revenue in the United States from cotton, corn, cattle and hogs

**Invest your money in these lands
while they are so cheap**

Write for Pamphlets and Maps

EDWARD P. SKENE

Land Commissioner

Park Row, Central Station, Room 560

Chicago, Ill.

The Only Double Track Road between Chicago And the Missouri River



The Chicago & North-Western Railway announces the completion of its new double track between Chicago and the Missouri River at Council Bluffs.

Three fast trains each way daily between San Francisco and Chicago, and two per day between Portland and Chicago, provide for passenger traffic between the Pacific Coast and the East over this transcontinental highway. These through trains are operated on fast and convenient schedules. They are drawn by powerful locomotives and carry an equipment of Sleeping Cars, Reclining Chair Cars, Observation, Dining, Parlor, Library and Buffet Cars of the most approved type.

The perfectly ballasted roadbed of heavy steel is maintained in the highest state of efficiency, equipped with automatic block signals, interlocking switches at railway crossings, and all devices for the safety and comfort of passengers known to modern railway management.

The 9,024 miles of railway embraced in the North-Western System penetrate to every point of importance in Wisconsin, Iowa, Nebraska, Northern Illinois, Northern Michigan and Southern Minnesota, with eastern terminals at Chicago, Peoria and Milwaukee.

The Overland Limited, daily between San Francisco and Chicago, via the Southern Pacific, Union Pacific and Chicago & North-Western railways, is the most luxurious train in the world. It possesses the most complete arrangements for the comfort of passengers and is operated on fast and convenient schedules,—less than three days en route between the Coast and Chicago.



VOLCANO COLIMA.
From Tuxpan, on Mexican Central Railway.



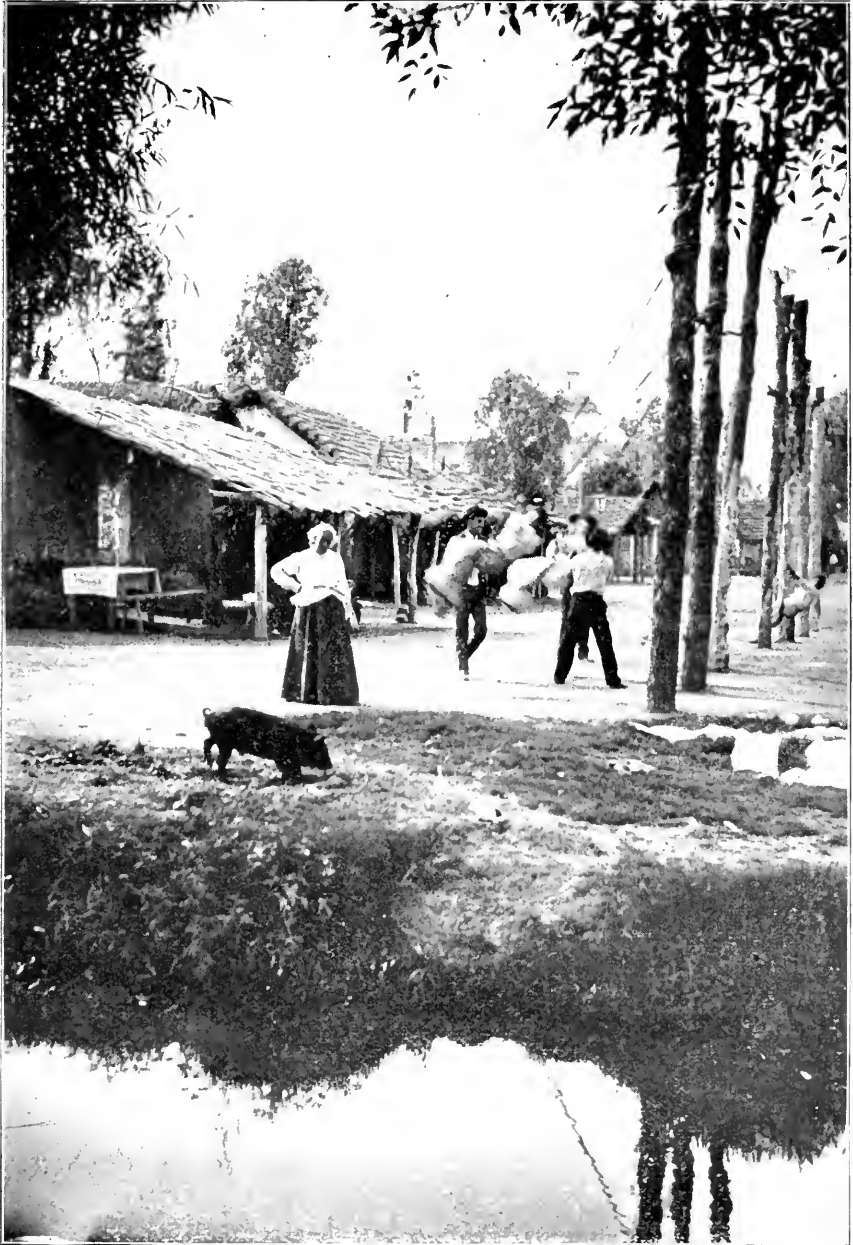
CITY OF MEXICO.
View from top of National Palace.



Another View of Mexico City, from National Palace.



MEXICAN PLOW AND PLOWMEN.



SWINGING, AT INTECALCO ON THE VIGA CANAL.

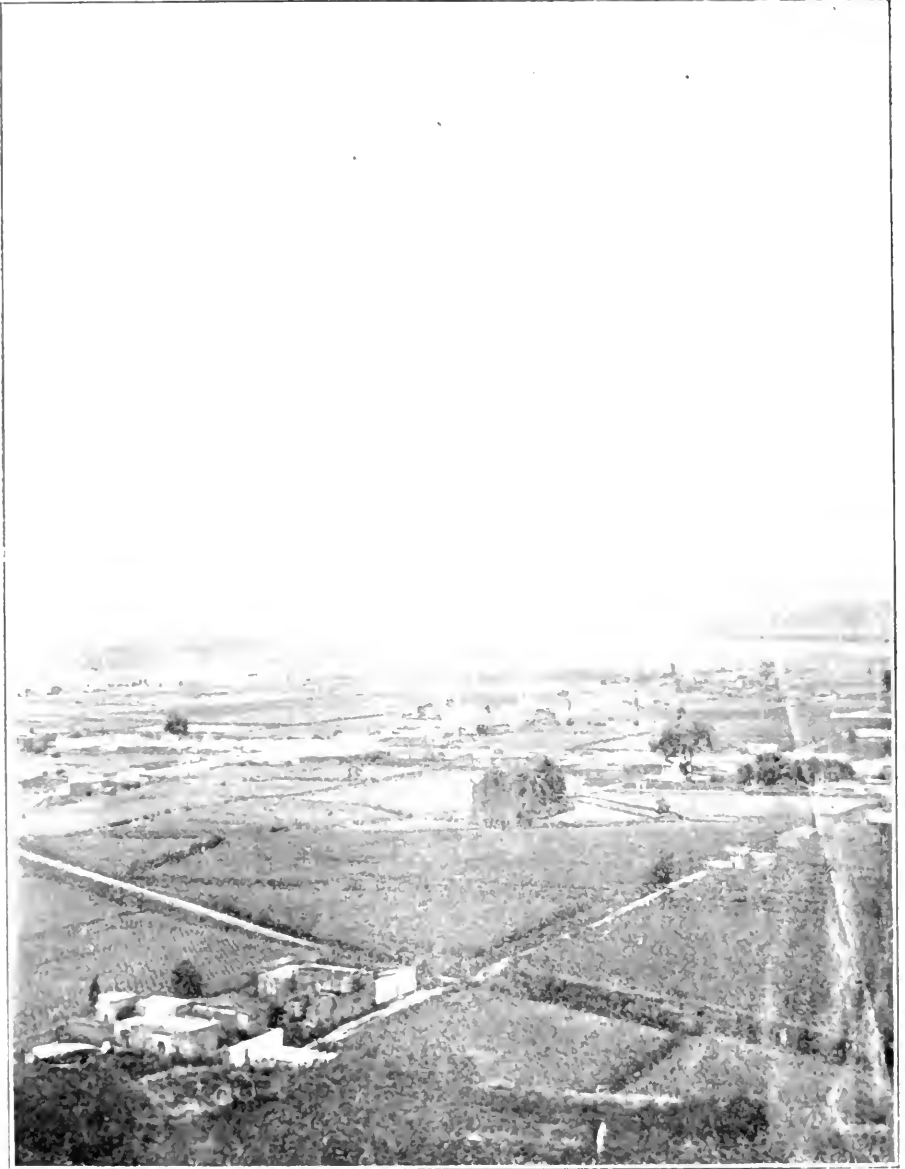


THE GREAT CYPRESS, CHAPULTEPEC, MEXICO.

Taxodium mucronatum.



AN INDIAN VILLAGE IN THE FLOATING GARDENS, MEXICO.



POPOCATAPETL.
View from Top of Chalula Pyramid.

ARBORICULTURE

A MONTHLY MAGAZINE.



PUBLISHED IN THE INTEREST OF THE
INTERNATIONAL SOCIETY OF ARBORICULTURE.



Subscription, \$2.00 per annum.

J. P. BROWN, Editor, Connersville, Indiana.

Volume 11.

Indianapolis, September, 1903.

Number 7.

Mexico's Volcanos.

We illustrate in this number two of Mexico's historic mountains. Popocatepetl which has long been extinct as a volcano, and Colima now in active operation.

The surface formation throughout Mexico shows a distinctive volcanic origin and the remains of craters and volcanic peaks are very numerous. Many of the higher mesas are covered with rough, igneous rocks, while over a large area of the rolling lands are porous strata indicating the flow of volcanic mud which has hardened to a greater or less degree, yet not always into solid stone. In plowing some of the fields a shallow layer of soil has been formed by action of the elements while immediately beneath lies this volcanic deposit.

Among the most noted volcanoes are Popocatepetl, 17,784 feet elevation, Ixtaccihuatl, 15,705, and Malintzi, 12,462, all long since extinct, while Colima the only active volcano is 12,728 feet high.

Large portions of the earth surface have during the world's history, been convulsed with earthquake upheavals and volcanic eruptions. It has been a great period since the volcanoes of Mexico were pouring forth fire and lava. The country is now and has

been for a great while tranquil.

Colima, in the southwestern portion of the Republic is intermittently active. Its crater seems not to be totally closed, but a small quantity of vapor escapes continually. Ashes or fine sand are deposited upon the slope of the mountain when a sudden explosion occurs.

This is probably in the character of a steam safety valve which permits the escape of gases from within the earth which would otherwise force an outlet with earthquake violence.

Parties who have ascended to the summit of Popocatepetl have preserved photographs which show the great extent of ice and snow at this elevation, although but nineteen degrees removes from the equator.

A volcano in action is one of the grandest sights which human eyes ever beheld. One watches the little stream of smoke or vapor, scarcely distinguishing it from the floating clouds which hang above the top of the high mountain, the wind from the east carrying the vapor in a slight horizontal stream. When suddenly an explosion takes place, the column pours out with such force and volume that it rises to the height of several miles, apparently, in whirling, curling masses as is seen on our engraving of Colima, driven upwards by a force greater by far than any power of which man has any knowledge.

The Honey Locust.

Gloditschia triacanthos

An unwarranted prejudice exists among many who plant trees, against this, one of the most magnificent shade tress of America.

Where in all the wide world can be found a handsomer tree than the one which we illustrate on the opposite page?

No tree in existence possesses a more beautiful or more graceful foliage, sprays of which were shown in *Arboriculture* for October 1902.

The trees are perfectly hardy in all portions of the United States, it being one of half a dozen species of American trees which have survived through thirty years of neglect, among the hundreds planted by S. T. Kelsey for the Santa Fe Railway in western Kansas.

The Honey Locust has few insect pests and no serious disease to contend with. It is by no means a slow growing tree, if reasonable care is used in the planting and subsequent treatment. If one will plant a tree in a hole suited only for a fence post, by all means stick a Cottonwood in, but if a satisfactory progress in growth is desired and expected, in any fine tree, large holes, well filled with good soil must be prepared.

Few, if any of the beautiful avenues of trees in Washington City surpass those of the Honey Locust which were planted by William Saunders while he was Commissioner of Parks for the District of Columbia.

There is not one tree in Salt Lake City which is so handsome or so grand for shade as those on Second Street South, about Second West. Here are several very large and fine Honey Locust trees which ought to be a pattern for Utah tree planters.

The Honey Locust makes an excellent screen, where planted closely, and is used in places, for a hedge, but does not thicken up sufficiently to make an effective protection against hogs.

It has no bad habit of suckering, is one of the cleanest of trees in existence and is entitled to a high place in the estimation of all tree lovers.

Among trees for city streets, where dust, smoke, street pavements, tramping,

and the constant improvements which are so objectionable to almost every other tree, the Honey Locust grows right along, affording a shade and grateful for the little favors it receives. Yet with better treatment it shows its gratitude in the brighter color and greater beauty of its foliage.

But little pruning is required with this tree as it naturally forms a round head with spreading branches if left to choose for itself.

The tree shown in our illustration has simply been left alone. No knife having ever been applied in pruning. The soil is fertile however. The spread of branches covers sixty feet diameter and it is about that height.

The Honey Locust is an acacia—and has no relationship with the black or yellow locust which is *Robinia pseudacacia*.

The flowers are inconspicuous and would not be found except upon close examination. These are succeeded by long, broad curled pods, which contain the hard, horny seeds, embeded in a sweetish, honey like wax.

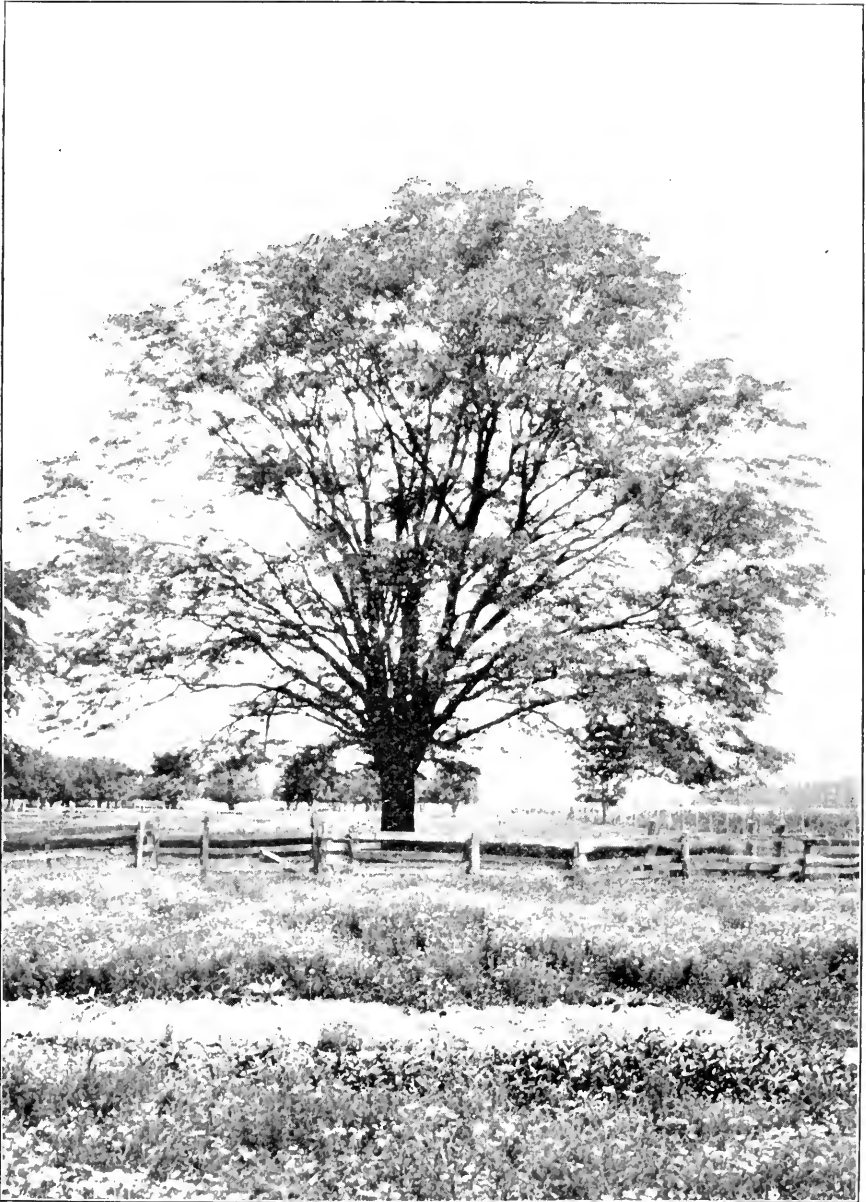
A small variety, *G. aquatica* grows in swamps.

There is a disputed question in regard to the durability of the wood when used for posts, my understanding, however is that mature wood, seasoned, is quite durable.

The wood is of a redish color, with quite a handsome grain. It makes excellent lumber, suitable for any cabinet work, but the supply is insufficient to give it a market value.

The ease with which it is grown, hardness, rapid maturity, and general value of the timber should commend the Honey Locust for extensive forest planting.

In sprouting the seed for planting they should be soaked in quite hot water for a long time. Otherwise they may remain in the ground several years. When cattle eat the pods, of which they are fond, the seeds are softened while passing through the animal's stomach, and all grow the first season. Thus they are found in pastures in dense thickets.



THE HONEY LOCUST.



The Water Supply of an Inland City.

An unlimited quantity of water, of the purest quality procurable, is the greatest boon which inhabitants of any locality can desire. The health, comfort, business, prosperity and hap-

piness of a community, to a very great degree are dependent upon this indispensable article.

It has been demonstrated in the great cities of the world that the greater the quantity of

pure water furnished per capita to the population, the smaller the percentage of disease and consequent death rate.

Water contaminated by alkaline or other objectionable mineral solutions, or from the savage discharge from other great cities, is recognized to be the cause of innumerable diseases and great efforts are made to avoid the use of water from such contaminated streams, or by some means to purify the water.

The editor of *Arboriculture* in the capacity of a civil engineer. Sundry times been called upon to examine sources of water supply of several cities, and upon several occasions ascended Pikes Peak and visited the reservoirs where the pure snow water is collected and furnished to Colorado Springs and vicinity, at one time passing through the tunnel under Pikes Peak.

There are few cities which possess a water system of such magnitude with water of great purity and in such abundance as has the City of Indianapolis, Indiana, equaling as it does that of the melting snow of the Rocky Mountains.

It seems strange that the citizens of Indianapolis should know so little of the character and magnitude of the works which furnish them so amply this water; which at present is obtained from thirty-four ten inch wells, sunk 350 feet into trenton rock, having in the start passed through 90 feet of river gravel and sand.

The ordinary demand of the city is for fifteen million gallons daily, although during the hot summer months, while much sprinkling of lawns requires a larger quantity and twenty million gallons are used.

There are now 200,000 people in Indianapolis and this daily consumption is 100 gallons for each inhabitant.

Three enormous pumps, the largest 2 have ever seen in any city, 33 inches diameter with five feet stroke, each throwing 666 gallons at every plundge, are operated by three compound, tripple expansion engines. This pump combination discharges twenty million gallons daily into the city mains with a pressure of forty-five pounds per square inch, increase to one hundred and twenty pounds during every alarm of fire.

Besides there is another pump with fifteen million gollons capacity, and one of seventeen million gallons which are operated as required.

The Water Company is erecting still a larger pump, to be completed in November, which will have a capacity of thirty million gallons every twenty four hours.

These figures are astounding but yet absolutely correct.

There is in process of construction an immense filtering system which will be the most perfect and complete filtration plant of the world.

There are three filter beds, each having an area of one six-tenths acres, with a capacity of mire to ten million gallons. In the bottom of these beds are hollow, perforated tiles over which there will be seventeen inches depth of coarse gravel, screened and warhed Upon this gravel is to be spread four and a half feet depth of pure clean sand, and four feet depth of water will cover this.

As the water slowly filters through this bed of sand, gravel and perforated tiles it will be cleaned from every impurity, all bacteria being removed.

The water then will flow into closed collecting galleries which are eight feet lower than the filter beds. There are two of these galleries, each containing two and one half million gallons. These are covered, being arched with concrete and from which all bacteria and impurities will be excluded.

From here the water will pass directly to the pumps and into the mains.

As the filter beds become clogged one bed at a time will be emptied of the water and the impure surface sand will be removed. This will be replaced with fresh, clean washed sand.

A trainway engine and car² is busy transporting the gravel and sand from the river where it is screened and washed by machinery, a dredge taking the material from the river.

Besides the regular supply of water which will be most ample for all purposes of the city, five million gallons may be at once turned into the pumps in case of fire.

It is safe to say that when these plants shall be completed, and that within a few months, there will be an abundance of pure water to supply a city of half a million people.

The grounds are kept in excellent condition, the buildings are handsome and substantial, and the plant is unsurpassed by any in existence.

Our Duty at Panama.

As we push forward to the building of an Isthmian Canal in the tropics we should not forget certain historic truths:

First—In all time, ancient and modern, no work of any size has ever been done in or near the tropics *except by slaves under the lash.*

Second—The Isthmus of Panama is near the heart of the tropics and has one of the very worst climates in the world, both as to heat and as to disease.

Third—The Suez Canal lies far to the north of the Panama latitude, has a far better climate, was a comparatively easy work. Yet in building it the lash swung all day long and the wretched slaves died like flies. Had Egypt not then been furious despotism, the canal probably could not have been built.

Fourth—All the labor for Panama must be imported, will therefore be unacclimated. In digging the part which we have now bought the French imported their labor, practically enslaved it, with difficulty resisted the scandal and outcry caused in France by the pestilence-like mortality—the slavery was winked at, as in the case of Suez.

If we can keep laborers alive at Panama, can keep them at work without enslaving them and driving them to their tasks under the lash, we shall achieve a wonderful triumph.

Our contracts with the sub-contractors must have very carefully-drawn labor clauses, not as to hours or wages, but as to slavery and the lash.—*Exchange.*

Indiana State Fair.

The State Board of Agriculture has brought the State Fair of Indiana up to a high standard and it now ranks as a national institution, being to the fairs of the west what the Madison square stock shows are to the Atlantic States.

No city in the United States has better hotel facilities for housing and feeding immense numbers of people who attend great conventions and come long distances to State fairs, than has Indianapolis. The hostleries are all of the highest character and are abundantly able to accommodate all who apply.

THE STREET CAR SYSTEM

of Indianapolis is not excelled in any city of the world. Electric lines, with liberal system of transfers, new, commodious, comfortable and sanitary carriages, that which attain a speed that while being safe, yet quickly convey the largest crowds to and from the fair grounds, while also caring for its patrons throughout the city.

SOUSA'S FAMOUS BAND.

A few years ago the manager adopted a very liberal system of premiums and as a special attraction engaged John Phillip Sousa with his world famous band.

The money proved to have been well ex-

pected, for no where is Sousa more popular than in Indiana, and the throngs who have attended his popular concerts have added greatly to the finances of the fair.

This year Sousa's Band will give two concerts at Tomlinson Hall, the largest auditorium in the State, in the evenings of September 16 and 17, playing in the Grand Stand at the fair grounds during the afternoons.

THE RACES

The State Fair will be held during the week from September 14 to 19.

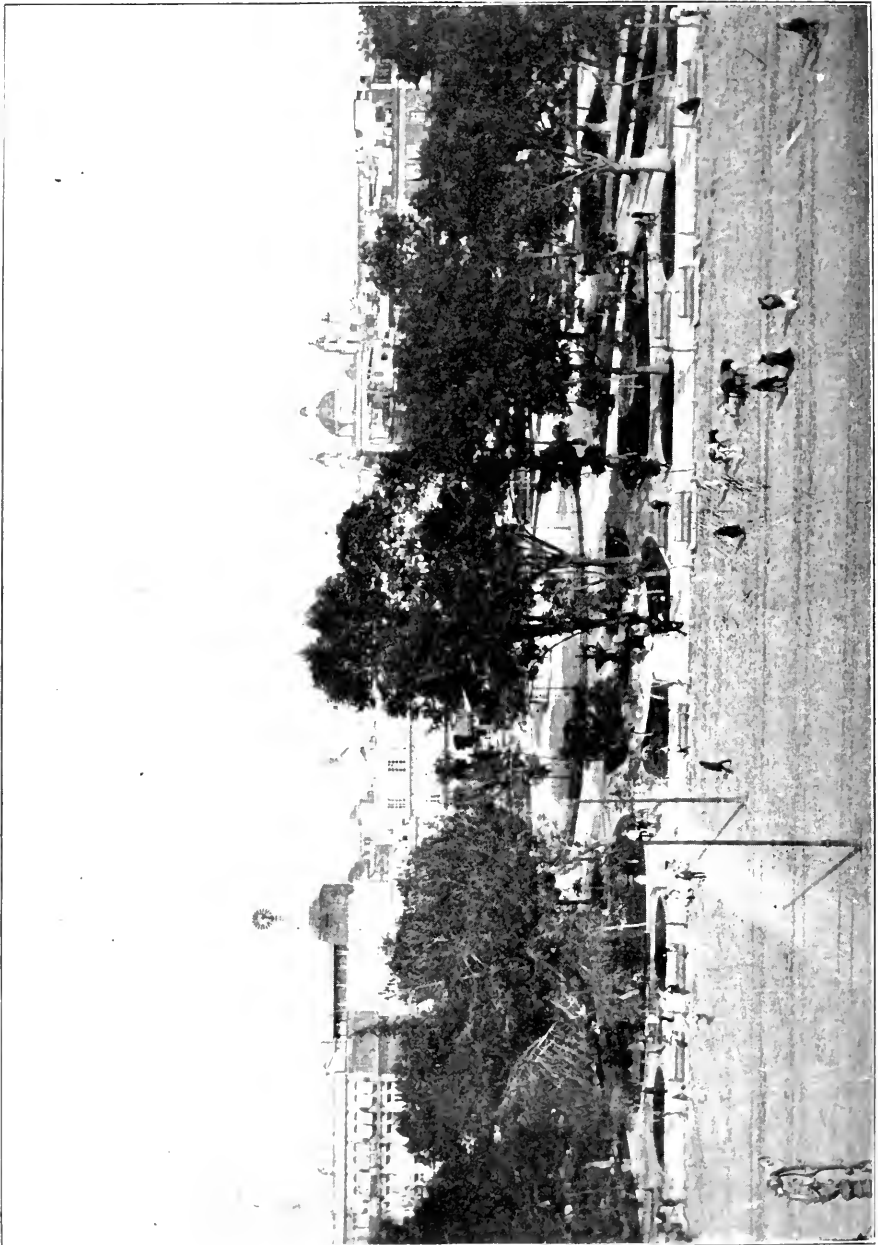
Three races are advertised for each day, with purses ranging from \$600 to \$1000.

Over one thousand horses are entered for exhibition in the various classes and for the races.

AGRICULTURAL MACHINERY.

The farmer who has plowed, sown, cultivated and harvested his crops, working as many hours as a farmer does, is entitled to a week of relaxation.

And the State Fair is the one place where every farmer may go, take his family, enjoy the week and learn more than his experience and observation during the year has taught him. The State Fair is a great educator, when comparison may be made between the articles on exhibition.



THE PLAZA, GUADALAJARA, MEXICO.



THE CATALPA SPECIOSA.
As it Grows in Nature.

The Mexican Central Railway.

The Mexican Central Railway, Ltd., extends from El Paso, Texas, where it connects with the Santa Fe, Rock Island and Southern Pacific systems, southward to the City of Mexico, with many branches reaching almost every city, while agricultural and commercial centers are all connected by this railway system.

It is a vast and important enterprise. The railways are to the Mexican Republic just what they are to our own country, absolutely indispensable in these progressive times.

The stage coach, the burro, ox teams and saddle horses traverse the mountain regions to mines and timber lands not yet reached by railways, but there are no means of communication so rapid, convenient, comfortable or as economical as is the modern railway.

This road has a total mileage, 3,211 miles in operation with other branches under construction.

We learn by the annual report of the Board of Directors that:

The tie renewals for 1902 were 631,972, costing \$720,919.

During the years from 1883 to 1902, one decade, the number of new ties placed in tracks was 6,554,513, which at the average rate would cost \$7,882,690.

It will be seen, therefore, that the problem of timber and cross ties for the future is one of vast importance to this Company.

The Mesquit, a native low growing tree, furnishes quite a number of excellent ties, but this variety of wood is of extremely slow growth, and as the country tributary to the railway is being cleared rapidly for fuel and other purposes, the Mesquit will not afford a permanent supply.

Many ties are made from the native oak, which is also of extremely slow growth, and is not being reproduced with rapidity in the rougher and semi arid lands.

Pine is not durable, although many pine ties are used.

A treating plant is, or soon will be in operation, which will extend the durability of pine and soft woods.

It is well that the question of growing trees which may be utilized in future for various timbers and especially cross-ties, should be carefully considered by this, and all other corporations.

Trees which will grow in a dozen or a score of years into lumber and timbers, may be counted upon the fingers of one's hands. Those which can also be used where strength and durability are required may be summed up in less than half a dozen, the whole world over.

It is extremely fortunate that the few really valuable rapidly maturing trees, suitable for railway use may be successfully grown in extreme southern localities.

There are many streams of water, artificial canals and irrigating ditches, margins of lakes and moist places where tree growth will be successful and rapid. The plan of planting economic forest trees for commercial purposes is no longer an experiment, it has long ago passed that stage.

Capitalists are investing their money in forest plantations and are assured of a certain and remunerative income from these investments.

The rate of tree growth per annum is well known from many years careful study and measurements. It is therefore a mathematical problem, capable of demonstration, just what may be expected in a dozen or a score of years, and large plantations should be established speedily to supply the increasing demand of commerce and manufactures for wood for various purposes. \$720,000 spent each year for new ties to take the place of those decayed, and this for one railway company, is an astounding statement—but ten per cent. of this annual expenditure would insure a perpetual forest which will afford all the timbers required for all time to come.

It is well worth the most careful consideration by the great financiers who furnish the money to build, equip and operate great railway systems.

Forests and Floods.

There is a lesson in the dreadful floods that have wrought so much destruction in the United States during the past few months, and it should not be permitted to go unheeded. These floods have undoubtedly been growing more frequent and more serious from year to year, and the cause is not far to seek. John P. Brown, secretary of the International Society of Arboriculture, has devoted forty years to the study of forests and floods. He predicts floods of much greater destructiveness and of far wider range than those that have recently occurred. He goes so far as to say that within twenty-five years floods like those that have occurred this season in Kansas, Nebraska and Missouri will be general throughout the continent, and furthermore, that within half a century "the great agricultural region of the United States will be as sterile as the deserts of Arizona or the plains of China." He bases this unpleasant prediction on the fact that the American forest are being destroyed at a most alarming rate, so that unless some reform is introduced they will practically be gone, within half a century. The destruction of the forests in the mountains permits the rains to rush off immediately. The result is on

the one side arid lands, and on the other disastrous floods.

The United States is one of the few civilized countries of the world where the important subject of forestry has been almost entirely neglected. In the countries of continental Europe, particularly in Germany and Switzerland, the strictest laws are enforced relating to the preservation of the forests. A man cannot cut trees on his own land without first obtaining permission. When trees are cut down, others have to be planted to replace them. Yet, in those countries the subject of forestry is not nearly so important as it is throughout a large section of the United States, where rain falls only during a limited period of the year.

Some of our public-spirited men, including the President, have been diligently preaching the gospel of forest preservation, but hitherto they have been little heeded by the mass of the people. Perhaps, since the occurrence of these pregnant object lessons, it may be possible to arouse a public sentiment on the subject that will result in an urgent demand for affective legislation to prevent a continuance of the present ruthless policy.

The Philippines.

The *American Herald* has this to say of the Philippine situation, which seems to be a correct opinion.

A good observer in the Philippines writes that the Caucasian is an exotic there. "He will tolerate existence in the tropic under special inducements, but only for a short time. Every body is going home at the earliest possible moment. Women and children suffer much more than men, and it is on their account in a majority of the cases that the men profess to be so eager to see "the states." Tropical diseases, tropical pests, a summer all the year around, long distances from home, few amusements, poor transportation facilities are among the

reasons which Americans assign for not liking long residence in the tropics. This merely repeats British experience in India. No ruler there stays to help, or criticise, or moderate his successor. No white man who makes a fortune in India builds a great house or buys an estate for his descendants. The planter, the engineer, the foreman goes back to England before he is sixty, leaving no child, or house or trace behind. Others, drafted commercially to carry on the work, come out to India to bear the white man's burden; but the race does not take root there. Neither will Americans in the Philippines. This is not the end which the islands will serve."

Replace the Forests.

In a state where hundreds of acres of good timber are destroyed every year by the sheer carelessness of campers and where other hundreds go down into the maws of the sawmills, the restoration of the forests may not be a timely subject, in that it is as much of an error to have your skirmish line too far in advance of the main body as it is to hold it too near.

There is something attractive and significant about a healthy tree. It means love of home and regard also for the comfort of your neighbors. In a yard where the trees are "rusty" for want of water and where theramnants of the grass are interspersed with weeds you may look in the background for the sign of a frayed out professional. Even the dog slinks and there is no laugh of children in the surrounding air. Then look at the baked farmhouse—treeless and vineless. No wonder the children desert it for the town and city. Indeed, hardly anything is quite as forbidding as a farmhouse without trees, and healthy trees at that.

Over in Wisconsin, where millionaires have been created by marketing the forests, one of the state senators, Hon. N. P. Bird of Peshtigo, himself a practical lumberman, is about to inaugurate an extensive experiment in pine growing, and this, too, in spite of the declaration of other practical lumbermen that the replacing of the pine forest cannot be MADE TO PAY, holding that since it takes a century to grow a pine fit to cut the culture of such pine is not profitable and therefore not feasible.

At no distant date, observes the Milwaukee Sentinel, forest growing will be a subject in which the people of the country will have a deeper interest than they have at present, and upon which their knowledge will be greatly increased. As yet the inevitable results of the fearful waste of timber that has been going on since the forests were attacked for the wealth they contained have not been seriously felt, but

before the present century ends the woes of a timberless country will be upon the people. The benefits that have accrued from the clearing of the land are so evident in the present that it is difficult to realize that they will be followed by disaster, but, to quote a writer in the Independent, "it is not using too strong language to say that the day will come in America when our descendants will find no language bitter enough to word the cursings of their hearts upon the lumbermen of to-day."

To the lumberman add the careless camper, as this is the season of the year when he is too much in evidence in Utah, Wyoming, Colorado and Montana. The federal timber agents are not sufficiently numerous to keep him in check. What he needs is the adverse public opinion which, in the early days, made horse stealing dangerous and unprofitable.

In many of the European countries, where forest culture is regarded as an exact science, the people have learned in that dearest of all schools—the school of experience. They have finally reached the point where it is not a question of what will pay from the lumberman's viewpoint, but what will save the country from the evils of denudation. And there is some comfort in the knowledge that with great care and expense they are preserving their forests—even adding to them. Whenever the beginning may be made to repair as far as possible the damage that has been done, it must be undertaken with the knowledge that the generation making it cannot profit by it. The benefit will be for those who come long after. It is perhaps, too much to hope that the beginning will be made before necessity compels it.

The person who plants a tree and cares for it should be regarded with favor by all right-thinking men and women.

Arboriculture in New Zealand.

Four letters in one mail from New Zealand, all from different portions of the Dominion and each along the same lines, indicate the burning interest in the subject of a future timber supply.

The Dominion Government of New Zealand has been planting very largely of American forest trees and the International Society of Arboriculture has been in constant communication with the forest officials, and has sent large quantities of seed, the last consignment being fifty pounds of *Catalpa speciosa* seed.

From plantings of *Catalpa* made last year at thirty stations only one was reported as a failure. The bright prospects from the almost universal success of this lot of seed, determined the government upon a more extended series of experiments.

Numerous private plantings have been made by our correspondent's at Christ Church, Devonport, Canley Park, Knapsdale Gore, Fendalton, Dunedin and Adiscomb, all of which report success to greater or less extent.

When it is considered that New Zealand has soil, climate, seasons and location so very different from what exists in Indiana, winter occurring during our summer, spring during our autumn, it will be seen that in these extensive series of experiments, if only a small propor-

tion survive it is all we should reasonably expect, but the indications are for a very great success in all places.

The forest growth in portions of New Zealand, like that of Australia, where we have many subscribers, is largely of such trees as the *Eucalyptus* and these have proven well adapted to the semi-tropic regions of America. Others have extensive tracts of very inferior wood growths.

It is to improve these areas where the trees are of lesser value, that it is hoped to succeed in growing American forest trees and especially the *Catalpa speciosa*.

Originally this tree was found in but two states of the union, and in a very restricted area of each, in all not to exceed one hundred miles square, yet it is now growing successfully in portions of Europe, Asia, in all of the United States and in the South Pacific Islands.

The Dominion Government has sent to this society as a contribution, quite a quantity of seeds of Australia forest trees, for gratuitous distribution to citizens who may desire to plant such trees, but the United States authorities have demanded a prohibitive import duty on these seeds, although the Treasury Department was fully informed of the object and intention of this society in their distribution.

Minor Industries of Mexico.

The allurements of great cities, the excitements of every branch of business, the innumerable forms of amusements, an aggregation of human beings huddled together in restricted apartments which cause an exodus from the farm, to swell the population of commercial centers, is by no means confined to the United States.

Mexican cities and large towns contains by far the greater portion of her population. It were better this were not so in all countries, and were agricultural pursuits better understood and rural life and pleasures were thoroughly appreciated, the health, comfort and well beings of millions would be greatly improved.

Each city or district in Mexico seems to have a distinctive industry. Sugar cane is grown to a considerable extent, that being

confined by soil, moisture, elevation which gauges the temperature, and facilities for transportation.

The sugar has not the attractive appearance of commercial sugars in the United States, but possesses a larger portion of saccharine matter.

Corn is grown everywhere. And like many good farmers in our own country carelessness in selecting the seed, causes the loss of millions of dollars in the aggregate.

Of the great plantations where coffee, sugar, rubber, tropic fruits etc., are grown for export, we will discuss in another number.

MEXICAN DRAWN WORK.

At Aguas Calientes, where the immense shops of the Mexican's Central Railway are

being erected, and where the baths are so noted, the name of the city, translated being "hot water," a large portion of the population, the women and girls, are engaged in making the delicate and very beautiful linen drawn work.

Through the open door way of the houses one sees the frame upon which the linen is stretched, with several women surrounding and busy with their needles in fabricating the various designs.

These articles range in size from a tiny handkerchief or doiley to a bed spread of most intricate designs.

At every incoming train hundreds of vendors display these wares for sale to the foreign passengers. This drawn work is as distinctive as the laces of some European cities, and in its production the women show great taste, extreme neatness, and patience.

In Aguas are several very fine old churches, some well kept parks or plazas, a large smelter, street railways and several attractive features peculiar to Mexican cities.

LEATHER.

It is quite common upon the haciendas or great farms of Mexico to wear clothing made in part of fine leather which is highly ornamented with silver,

This material is mostly made at Leon where extensive tanneries are located.

Gloves, belts, and numerous articles of goat and other leathers as well as shoes are made here.

STRAWBERRIES.

One locality, Irapuato, has established a world wide reputation for the abundance, high quality and continuous supply of strawberries, and at every train and every

day throughout the entire year and every year, one may buy magnificent strawberries fresh from the vines from venders who have them tastily arranged in beautiful baskets woven by the people here, each holding about half a gallon of this excellent fruit at remarkable reasonable prices.

Hotels and dealers in other parts of the Republic obtain their supply of berries mostly from Irapuato.

SILVER FILIGREE WORK.

In the suburbs of Mexico City, are the artists who fabricate those delicate pieces of jewelry of silver wire, made into various forms as flowers, butterflies, etc. These articles may be purchased at any of the curio stores and jewelry establishments, but it is exceedingly interesting to see the workmen make these elegant and graceful designs.

FLORAL ART.

The absence of extreme cold at any portion of the year enables florists to grow in greatest abundance the many beautiful flowers which in the Northern United States may only be propagated under glass. The forms are usually made of willow or osier withes with the fresh leaves remaining on the twigs.

Often they are of enormous size four to five feet across. Camclias, tuberoses, jasamines and other handsome tropic flowers are used with a freedom which seems extravagant to dwellers of the Northland.

The Flower Market at the plaza in Mexico City is the principal place to see the finest of these floral designs.

Forest Fires.

But a few weeks ago the woods throughout the eastern Atlantic states were ablaze, the smoke so dense as to interfere with ocean navigation on the coast. The matter seems to have been quickly forgotten. The daily press, seeking fresh news to lay before their readers, should not let this lesson pass, but insist upon a thorough fire

protection that such an evil shall never occur again.

We reprint an editorial from the *Newark, N. J. Advertiser* of June 6.

FOREST DESTRUCTION.

The direct money loss by the destruction of woodlands by fire is the least part of the loss involved. The value of a forest is

twofold, its money value to the owners and its economic value to the public and the State.

A house burned can be replaced in a few months, but the cunning of a man cannot replace the destroyed forest. The work of forest restoration must be left to nature, which takes years to bring a tree to maturity. In many instances of fires it is impossible to replace the forest growth.

This being true, it is extraordinary that our forests should be left without adequate protection by the government. The railroads are permitted to run their trains through forest sections and scatter sparks right and left to start destructive conflagrations, when the law should compel the

use of spark arresters. At the same time the woods and forests are unpatrolled, and when a fire is started it is allowed to travel over a large area before efforts are made to stop its progress.

The prolonged drought in the Eastern States is teaching a costly object lesson, which can hardly be lost upon our lawmakers. Hundreds of square miles of valuable timber have already been destroyed in several States, together with mills, dwellings and growing crops. The losses in New Jersey will probably exceed those of any previous year. Longer neglect by the State Legislature to provide safeguards for the woodlands of the State will be simply criminal.

A Setback For Scientific Forestry.

LEBANON, O., *Reporter*.

People interested in scientific forestry will regret to learn of the suspension of the Cornell College of Forestry. This is a serious setback for a movement in practical education from which very much in the way of good results was expected. Instead of the blow being administered by ignorant outsiders it seems to have been given by the scientific foresters themselves.

According to all accounts, the suspension of the institution was due to the inability of the heads of the college to use good judgement in construing the purpose of the grants of \$165,000 worth (30,000 acres) of forest and \$50,000 in money. Since this was done on account of complaints of denudation of forests by lumbermen, the plain purpose was to aid and demonstrate the preservation of forests. Preservation does not mean denudation. But the college took the ground that the purpose was to teach the pupils how to utilize forest products and proceeded to give the instruction which they could have obtained in any lumber camp by denuding 1,500 acres of land in three years and replanting, according to the legislative report, only 275. The instruction that the state intended to secure

was how to preserve the forest by removing only the fully matured timber, leaving the forest as a whole intact. This the college appears to have wholly failed to do, and it is fairly chargeable with the failure to continue the appropriation. In view of the efforts being made throughout the country in the direction of forest preservation and the urgent necessity for such efforts the failure of this experiment in New York is to be regreted."

The spectacle of a Forestry College, supplied with funds by the state to give practical instruction in forest perpetuation going extensively into the work of milling and destroying the few remaining forests of the state as a money making enterprise, must awaken the friends of practical forestry to the fact that so called scientific forestry as taught by many scientists is a dismal failure.

What has befallen New York is about to be accomplished in Indiana, where a sawmill is being erected by the Forestry Board as a means of educating Hoosier farmers in the mystery of saving the forests. And this upon the property bought by the state to be preserved as a permanent forest reserve.



SCIENTIFIC FORESTRY ILLUSTRATED.

Plant Trees.

A timely word from South Dakota, *Mitchell Gazette*

The crying need of this country is more trees. Trees of any kind. White willow, box elder, soft maple, cotton wood, poplar or anything else that will grow quick and make a wind break. Plant them in hedges, in groves, in sink holes, along sloughs and creeks, anywhere and everywhere that there is a chance for them to grow. Set them deep and cultivate them all you can. If you can't cultivate them put a mulching of straw six inches deep around them to keep down the weeds, keep stock away from them and they will do the rest. They will stop the fearful drying winds that now sweep up from the arid plains of Nebraska

and burn up the crops; they will put an end to blizzards, for the very essence of the blizzard is an unbroken stretch of prairie over which the wind can sweep and grind the snow to powder; they will prevent droughts by preventing the surface moisture from running off into the streams. They will break the coal trusts far more effectually than any legislation that can be devised. In time they will solve the question of cheap lumber and a score of other problems that harass and distress the inhabitant of these fertile plains. Plant acres of them and you will a heritage of verdure which will bless your community for all time.

California Caring For Her Timber.

The Legislature of California appropriated \$15,000, for a study of the forest question.

The *Redlands Review* says:

"California desires to know those facts about its forests that will guide in the passing wise forest laws. It desires to know, for instance, what disposal should be made of the State forest lands, what should be done to regulate the cutting of timber on them, how forest fires may best be restrained, whether tree planting in denuded areas will pay, etc.

Work in securing all the information necessary for a forest police for California the bureau of forestry has begun this summer. The work is of such magnitude that several years will be required to complete it, but valuable and suggestive results will be secured each year.

Six men are now examining public lands in the State to determine what parts of them are suitable for national forest reserves and similar studies will be made of lands owned by the State in order to determine the uses to which they may be best put, who should administer them, and what sort of administration they should have. A forest map of California will be made, showing the location of all forest areas and distinguishing between the different kinds

of forest. In connection with the forest map will be a study of important trees in order to learn with exactness the commercial range of the valuable species.

Investigation may be made of the effects of lumbering on the forest in order to determine what ought to be done to cut over lands. It is of great importance to know what happens to the land in different parts of the timbered regions after it is cut over by the lumberman—whether it comes up again in timber or whether it becomes waste land.

Effects of fire on the forest especially after lumbering, and what may be done by the state to prevent fire, are subjects that will take a long time to work out. In September E. A. Sterling of the bureau will try to determine what is the cheapest and most effective method of protecting from fire land that has been lumbered. This bureau will also make a study of the chaparral lands of Southern California in order to learn whether it will pay to plant them with timber trees. A very interesting question has been raised as to whether chaparral which includes a great variety of scrub trees, such as manzanita, scrub oak, valley mahogany and scrub cherry—will retain the moisture in the soil as well as timber trees. Chaparral grows denser



THE CATALPA.
As it Grows on the Wabash.

than timber trees, and often reaches a height of 20 to 25 feet and a diameter of 16 to 18 inches.

There is a vast amount of theoretical investigation going on in the United States. Armies of men making explorations studying the things which have been well known for ages, while very little practical work is being accomplished.

Nothing is being done to restore the forests but the plans are being discussed, and much money expended in play which should be applied to earnest, honest, actual

planting of trees, protection from fires, and the preservation of water sheds.

What California wants are some more such practical men as T. P. Lurkins of Pasadena who actually plants trees in large quantities.

Chaparra and other shrub growths, will prepare a soil in which pine, spruce and redwood seed may be sown, and in time, under the shrub protection they will make forests. A little help extended to nature will enable her to accomplish forest restoration.

Forest Nursery and Lumber Company.

We are in receipt of the new comprehensive prospectus of this new organization which is located at Ashland, Ohio, W. D. Stem, Secretary.

Every farmer in America should give this subject earnest attention. To grow a crop of wheat, corn or other crop, from the selection of the seed, preparing the land, sowing, cultivating and harvesting the crop, requires constant attention, much labor, many risks and considerable outlay of capital, not until the crop is sold is the grower relieved of his care and anxiety. This must be the routine year after

year. All that the farmers realize from this continuous round of labor, is a moderate sum in wages for his time.

A dozen years hence there will be such a demand for timber, lumber, ties, fence posts and wood of all kinds as has never been dreamed of and now is the time for the progressive farmers of America to prepare for supplying this want.

Twelve years only are required to produce valuable timbers which will pay a greater interest upon the land and investment than ten times as much area in annual crops.

Is it not worth your consideration?

Beautiful Gladioli.

Last spring we received from Arthur Cowee, Berlin, N. Y., a package of his new seedling Gladiolus. These are now in bloom and a blaze of beauty and bright colors. The range of color is wonderful, white in its purity, all shades of pink and crimson, and as the purple predominates in some the flowers become almost a maroon in shade. The making of these delicate flowers are marvelous and attract

the attention of every visitor.

One or two Gladioli seldom give any satisfaction, they should be in a mass of fifty or a hundred, and planted at intervals they give a continuous exhibition from June to the time of frosts.

We have grown Gladioli for many years, and although ours were as good as any seen elsewhere, we must admit the superiority of Arthur Cowee's bulbs.

General Miles is an advocate of the disarmament of all nations. It is not to be supposed that he has taken this up because he is no longer a warrior. Grizzled soldiers who know what war is are more opposed to it than others who never fired a gun. Miles is an example of the soldiers who went to the field because his country needed him, and he can very consistently advise peace, but he cannot tell the

Europeans anything about the evils of standing armies that they do not know. Any of them would be glad to quit if the other fellow would do the same.

NOTICE.

While Arboriculture is now published at Indianapolis, Indiana, all mail for the Editor should be sent to Connersville, Indiana.



AN APOLOGY.

Our readers will see in this number of the magazine a repetition of the illustrations used in the August number.

We spared no expense in procuring fine half-tone engravings and in the preparation of our last magazine, but the printers were imposed upon by a local firm of paper dealers who supplied an extremely low grade of paper and before it was discovered two-thirds of the magazine, was printed.

The result was a very unsatisfactory magazine, the illustrations therefore are repeated in this number in addition to the regular illustrations and subject matter.

OUR ILLUSTRATIONS.

With few exceptions the engravings in Arboriculture are made expressly for this magazine from photographs taken by the editor.

We aim to present the subjects under discussion in an attractive manner, with brief arguments enforced by views which demonstrate the points at issue.

The photographs of Catalpa trees presented in Arboriculture convey more emphatically than any words can do the true character of this noble American tree, while the Mexican scenes portray the architecture, trees, amusements and home life of our neighbors.

Our illustrations always carry a lesson and point a moral.

The rainfall in Mexico during the first six months of the present year has been more abundant than that of many previous years. Notwithstanding this, however, the rain in some parts of the country have not been sufficient for the needs of the agriculturists. The heaviest rainfall recorded this year has been in Cordova, State of Vera Cruz, where it amounted to 130 inches. At Lerdo, in the State of Durango, on the other hand, only 4 inches of rain has fallen during the present season. *Mexican Herald*.

Indianapolis is not free from the craze of certain architects and builders who, in order to show off some fine architectural effort, must destroy every tree in the vicinity.

The Greenfield, Ind., Commissioners cut down every fine tree before building the new Courthouse.

Cleveland, Ohio, architects destroyed the Euclid avenue trees, the finest in the world, to display fine stone front residences, and so the managers of the Heron Art Institute, following the example of the St. Louis Fair Commissioners, would remove the most beautiful trees of the city. The citizens of Indianapolis are vigorously remonstrating.

The union organizations have forgotten the first principle of American independence—that all men are entitled to the free pursuit of life, liberty and happiness.

It is within the province of every man to join a union, if he so chooses, for the betterment of his condition, and Arboriculture does not oppose the unions. And it is equally his privilege to refrain from so doing if he so prefer.

The right to labor and earn the bread for self and family is the highest privilege of an American citizen, and no organization may curtail the right.

It is the duty of this Government to protect all its citizens who wish to work against mob rule, and picketing is the method of a mob to injure the business and persons of American citizens. Mob violence should be punished with severity, whether it be to lynch a negro or picket a business establishment. Both are contrary to justice and the rights of Americans.

Foreigners who have come to America to make their home are apt to misinterpret our principles, and construe liberty as meaning license.



CATALPA TREE

Grown from the Stake of a Stake and Rider Rail Fence.

Government Protection of Forests.

An exchange, in noticing and largely quoting a recent article in these columns on the subject of the forest fires, criticises the statement that "the time is near when government, in the interest of all the people, must enact and enforce regulations in regard to the cutting of timber and the burning of brush, etc., not only for the public domain, but for all private owners, since the private owner has no right to bankrupt posterity for his personal gain." This is the comment of our esteemed contemporary:—

That isn't so easy. While the owner of timber may be prevented from cutting or burning it in a manner to injure or endanger other property owners, yet the state cannot compel him to forbear cutting it without paying him. It is his property; the fact that rainfall is unfavorably affected by the clearing of his land is too remote an injury to warrant the state in depriving him of his right to realize profit by clearing it. It might be wise for the state to take over wild lands and keep them uncut; but they would have to be paid for.

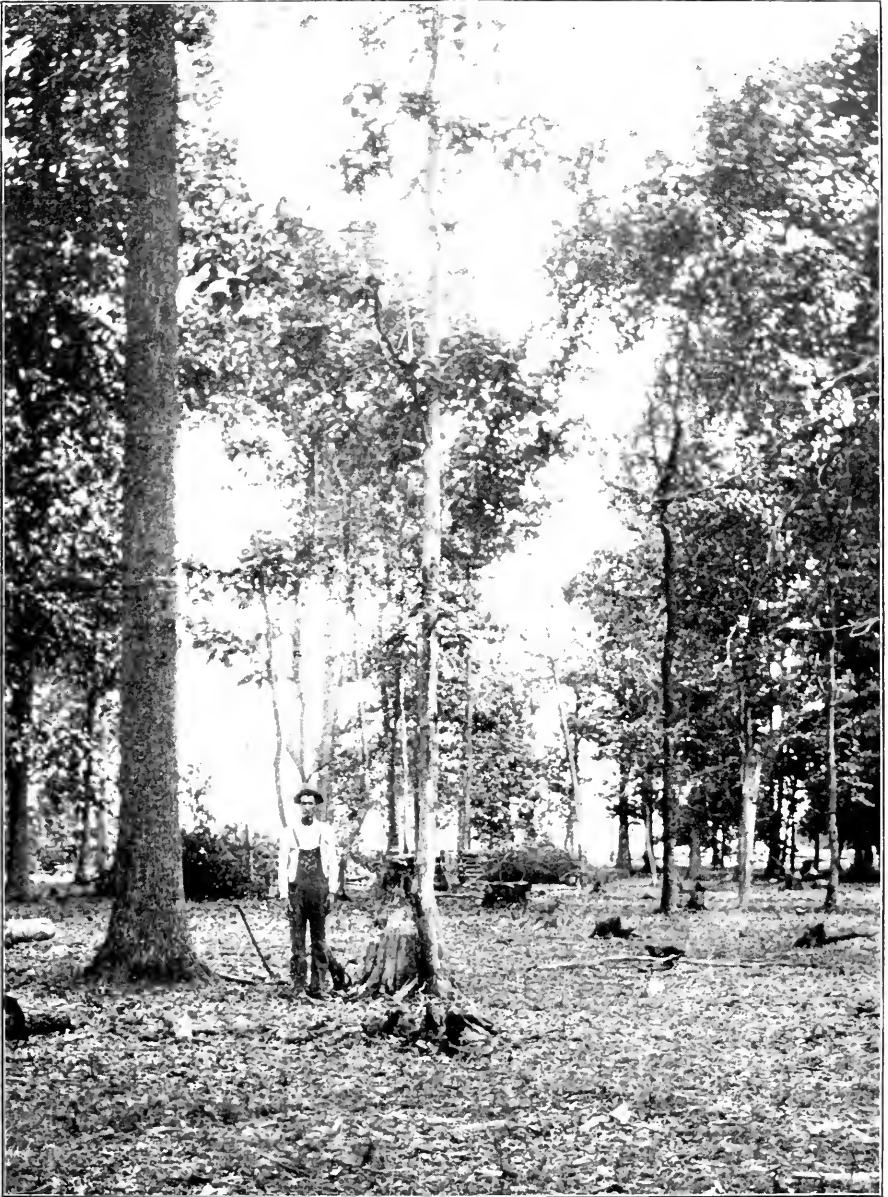
And yet the writer of the above should know that in every European country the state in one degree or another assumes authority over the forests; those in private hands as well as those which are part of the public domain; and what is done in Germany, France, Switzerland and Russia can also be done in this country. Every European state has a forest policy, and though none of these policies is perfectly or finally settled, in each it is recognized that as the cause for the preservation and increase of forest is the protective value of the forest cover, private interest cannot be expected to meet the necessity adequately, hence the state steps in.

In France, after long continuance, beginning with the Revolution, of the policy of selling off the state forests, which by 1871 had reduced the area to but a fifth of the original holdings, there has been a steady buying back of state property in the forests, and their increase is also furthered by giving to individuals and communities pecuniary assistance in reforestation on a large scale. The state now owns about 2,800,000 acres, some 12 per cent of the total forest area, managed by a staff of 700 officials and protected by 3500 guards. "Private forest property is absolutely controlled as regards clearing; no clearing may be done without notice to the government authorities, and in mountain districts not without special sanc-

tion." In France village and city corporations hold over 27 per cent of the forest area, and these must submit their plans of management to the state forest department for approval, and they are debarred from dividing their holdings, "thus insuring continuity of ownership and conservative management." The state is continually expending money in buying and reforesting worn-out lands and in reservoirs to check the torrents which pour from the denuded Alps, Cevennes and Pyrenees. In Switzerland, after a long struggle, the federal government became in 1898 the executor of the protective laws in all the cantons, and now no clearing whatever can be done without permission of the authorities. France and Switzerland are republics, and the will of the people has done this. It can do the same in this big republic, and whether it be done by federal action or by action of the several states, the people will come to the same conclusion here, on the principle that a man cannot do what he will with his own, if it be contrary to the interest of all. It's the foundation of society, but it has scarcely yet begun to govern states.

In Italy, which also is virtually a government by the people, there are statutes nearly 30 years old which outline state interference to a large degree, placing nearly half the area not owned by the state under government control, "namely, all woods and lands cleared of wood on the summits and slopes of the mountains above the upper limit of chestnut growth, and those that from their character and situation may, in consequence of being cleared or tilled, give rise to landslips, caving or gullyng, avalanches and snowslides, and may to the public injury interfere with water-courses or change the character of the soil or injure local hygienic conditions." —Springfield, Mass., *Republican*.

In Russia a very elaborate restrictive policy was made into law in 1888, and the interesting fact is that its enforcement is placed largely in the hands of the people of each locality, covering private lands, and the provisions are ample for instruction and for execution, the government helping in all. This is the course that the United States, as a whole or through the several states, must enter upon. At present any small farmer as well as any lumberer, can ruin the interest and prosperity of a region by carelessness and wanton destruction. It must stop. Liberties themselves must be held in trust.



REPRODUCTION FROM STUMP OF FALLEN TREE.

“For there is hope of a tree, if it be cut down, that it will sprout again.”—Job xii, 7.



NIAGARA FALLS ON THE NEW YORK CENTRAL.
A Very Unusual View, Taken From the Tower.

The Forest Nursery and Lumber Co.

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Buy only PURE, HARDY CATALPA for planting.
They produce the most valuable lumber in the shortest time of any of our American trees * * * *
We are prepared to fill your order for any number of trees for fall or spring planting * * * *

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THE FOREST NURSERY AND LUMBER COMPANY,
ASHLAND, OHIO.

**“But Where to find that happiest spot below;
Who can direct, when all pretend to know?”**

—GOLDSMITH.

Many are satisfied to live in the northwest Texas, having proved the value of the land in this region as a good Crop Raiser. Not only Cattle, but Wheat, Cotton, Corn, Feed-Things, Cantaloupes, Garden Truck and Good Health flourish here—in a district where Malaria is impossible and very little doing for Jails and Hospitals.

and, which is being sold at really low figures—tho the constantly increasing demand is steadily boosting values—is still abundant; and Farms and Ranches of all sizes, very happily located, are being purchased daily.

We will gladly supply all askers with a copy of a little Book published by the northwestern Texas Real Estate Association, which contains an interesting series of straight forward statements of what PEOPLE HAVE ACCOMPLISHED along the line of

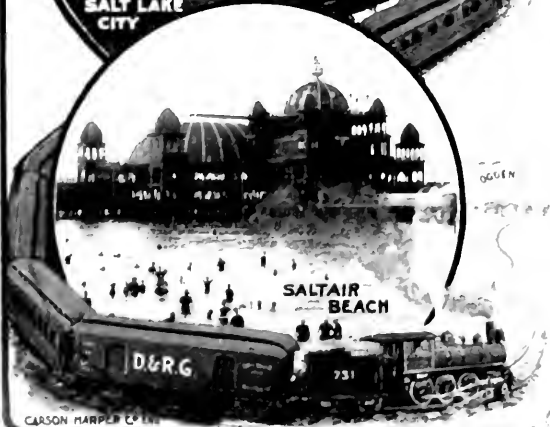
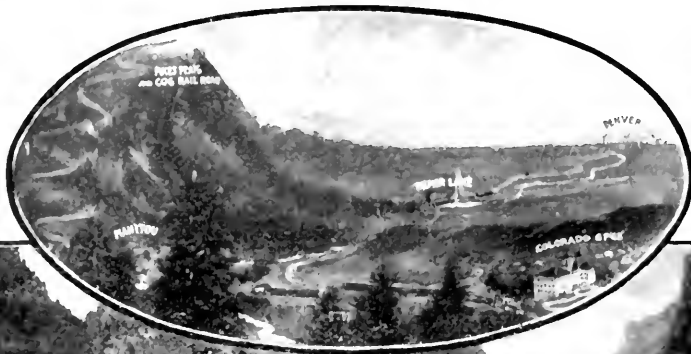
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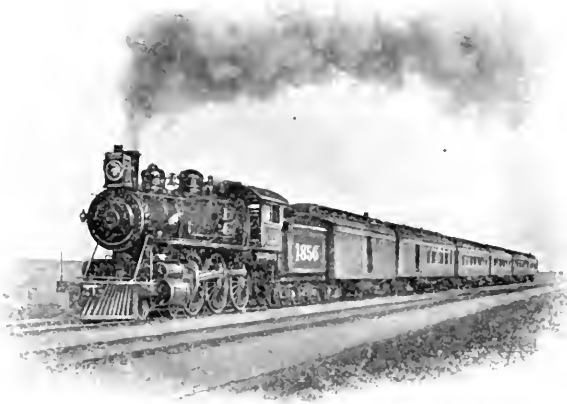
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THE GREAT SOUTHWEST



KANSAS has long been known as a land of tall corn and billowing wheat crops, of blooded cattle and long-fleeced sheep, of fat hogs and fast horses, of rich soil and hustling people. It is not so generally known that it is also taking front rank in manufacturing by reason of cheap coal, natural gas, fuel oil and abundant raw materials. Land is still cheap. The man seeking a new home will do well to carefully inspect the "Sunflower State." In 1901 (a poor year everywhere) Kansas raised 90,333,095 bushels of wheat. In 1899, a big corn year, 225,183,432 bushels of that cereal were produced.

OKLAHOMA was first settled in 1859. In 1900 the population was 398,331. The growth since 1900 has been rapid, particularly in new railroads. Here are found, side by side, wheat, corn and cotton. Wheat is the leader—the 1900 crop was a "record breaker," 39,680,000 bushels. Cotton is the poor man's friend—the 1900 crop was 150,000 bales; its by-products are very profitable. In one county alone a corn crop of 2,800,000 bushels was harvested in one season. There are a million cattle in the Territory and a quarter of a million hogs. The Santa Fe is opening up Eastern Oklahoma.

TEXAS is the largest State in the Union. It can produce almost everything needed. It has sea coast and mountains, forests and plains, soils of every kind, a wealth of fuel, geysers of oil, growing cities and a hospitable climate. Its corn and wheat crop average 40,000,000 bushels annually. Texas gave to the world in 1901 four million bales of cotton. The lumber industry is immense. Rice is a comparatively new crop in Texas, suited to the low lands along the Gulf Coast. Experts pronounce rice a money-maker. The Santa Fe traverses the heart of Texas, with terminals at tide water.

COLORADO is popularly known as a mining State, producing gold, silver, iron and coal. Resultant of these interests have sprung up flourishing cities like Denver, Pueblo and Colorado Springs, with their big smelters and allied manufacturing industries. The principal agricultural section is in the Arkansas Valley, between Pueblo and Holly. Here are grown in profitable abundance sugar beets, melons, vegetables, small fruits and alfalfa. Ample water by irrigation and an immense beet sugar factory have attracted several thousand farmers, with room for ten times as many.

NEW MEXICO lies at an average altitude of one mile. Dry air and almost constant sunshine—the ideal country for outdoor life. It has mines of gold, copper and coal, great cattle and sheep ranches, pine forests and two magnificent irrigated valleys, the Rio Grande and Pecos. There are churches, schools, growing towns, and a refined social life. Small fruits, alfalfa and grain are the principal crops. On the wide plains cattle and sheep are grazed. In the mountains are fine mines. The Pecos Valley and Maxwell Land Grant are just now attracting special attention.

ARIZONA is in the semi-arid region. In average years enough rain falls in the hills to supply sufficient moisture under irrigation. In the Salt River Valley, near Phoenix, oranges are raised side by side with wheat; alfalfa fields nod to lemon groves and vineyards yield abundantly. Thousands of cattle are fed here each winter. Ranch life is very fascinating, healthful, and quite profitable. Around Prescott the mineral development is astonishing. It is estimated that Arizona mines have yielded \$200,000,000 in twenty-five years. Arizona has much to offer the young man who is ambitious.

CALIFORNIA California was once known only as a land of gold. Gold is mined there yet—millions of dollars a year. But other things have crowded it to one side—for example, oil wells, citrus fruits, wheat and cattle. In the San Joaquin Valley of Central California, a district 250 miles long and 50 wide, with room for 250,000 farms of 40 acres each, the small farmer is coming to the front. He raises alfalfa, has a small herd of cows, sells butter and eggs and sets out a vineyard. He arranges an orchard of figs or olives or walnuts, has vegetables to eat and sell, and a bank account at the end of the year. This is not all done at once, but sooner than "back East." Irrigation is the explanation. The mountains on each side are full of living streams. There are excellent local markets.

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ARBORICULTURE

VOLUME II.

NUMBER 9.



A Magazine of the International Society
of Arboriculture: Indianapolis, October, 1903.

THE INTERNATIONAL SOCIETY OF ARBORICULTURE

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ARTICLES OF ASSOCIATION.

Article I.—Name.—The name of this corporation shall be The International Society of Arboriculture.

Article II.—Purpose.—The purpose of the Association is to introduce practical methods of tree culture in parks and woodlands; to advance and protect the interests of arboriculture; to procure and disseminate information and assistance for the improvement and raising of the state of arboriculture in all the principal grounds, as well as on farms and in large cities, and to disseminate and encourage practical methods of tree culture, and to take all the proper and lawful steps to supply information and assistance to the general public for railway use and in all other cases where applications to plant trees for decorative purposes.

Article III.—Membership.—Any person may become a member of this Society on payment of an annual fee of two dollars, and on payment of a dollar as a contribution to receive, regularly, one copy of the *Journal of Arboriculture* of the Society. Any person who may contribute towards the support of the Society shall be considered a member. Resolutions may be entered by Correspondence.

Article IV.—Officers.—The officers of this Association shall be a President, a Vice-President, a Treasurer, and shall be elected annually at a meeting of the Association, and shall serve for one year, or until their successors are elected in their stead, and shall have accepted the duties of their office, and shall be a committee.

Article V.—Executive Committee.—The Executive Committee shall have the general control and management of the affairs of the Society.



ARBORICULTURE

A MONTHLY MAGAZINE.



PUBLISHED IN THE INTEREST OF THE
INTERNATIONAL SOCIETY OF ARBORICULTURE.



Subscription, \$1.00 per annum.

JOHN P. BROWN, Editor, Connersville, Indiana

Volume II.

Indianapolis, October, 1903.

Number 9.

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Catalpa Blossoms—How to Distinguish Catalpa Speciosa.

For our frontispiece this month we are permitted to present a colored plate of the flowers of catalpa speciosa, and for comparison one flower, No. IV, is the Japanese variety, kempferii, which has become so common in the United States. Another single flower, No. II, is bignonoïdes, while No. III is a hybrid. The great extent to which the inferior varieties and hybrids have been grown and distributed throughout the world by careless nurserymen and ignorant seed collectors, make it imperative that seedsmen, nurserymen and dealers, as well as farmers, should familiarize themselves with the methods of detecting worthless seeds and trees.

Through the kindness of Miss Henrietta Wilson, of the Art School, Cincinnati,

Ohio, we were able to have made a water color drawing from the natural flowers, while Messrs. Williamson, Haffner & Co., Denver, Colorado, made the plates for its reproduction.

Kempferii, it will be observed, has a very distinct color by which it is easily distinguished, although this shading is lost in the hybrids.

There is no forest tree which hybridizes more readily, by insects which carry pollen from flower to flower, than does the catalpa. There are innumerable mixtures among seedlings, where several varieties are growing near together, some of which closely resemble speciosa, while others differ very materially.

The flowers of hybrids also show the characteristics of both parents, some being

nearly as large as those of *speciosa*, while others greatly vary in size.

Whether large, upright forest tree are obtained, or crooked dwarfs, will depend upon the care used in selecting trees from which to collect seed.

The following peculiarities of the trees should be observed and differences noted :

1. There is no one feature so important as to secure seed from trees of upright habit. True *catalpa speciosa* is as distinctly upright as is the Lombardy poplar. It is only necessary to see the photographs shown in many numbers of *ARBORICULTURE*, which were taken from natural groves, both in the forests or slashes and out in the open ground, to know the habit of this tree.

One may as well expect to produce Norman or Clydesdale horses by breeding Shetland ponies, or heavy Durham cattle from Jersey stock, as to anticipate growing forests of *catalpa* where seed of dwarf trees are planted.

The matter of first importance, therefore, is to secure seed from tall growing, straight trees, and upon such trees but a small quantity of seed will be found, and which is expensive to collect.

Oriental forms of *catalpa* seldom exceed twenty feet in height. *Bignonoides* has a spreading, very crooked and irregular habit, and possesses far less vitality or stamina than does *speciosa*.

2. The next important means of identification is in the bark of the trees. *Speciosa* should have a thick, heavy bark, deeply furrowed, the ridges quite prominent as seen in the half-tone illustration on page 203 of *ARBORICULTURE* for August.

The bark of other varieties is inclined to scale off and does not form ridges. A good illustration of *bignonoides* is found on page 132 of our January number. The real character of the bark is not seen in young trees.

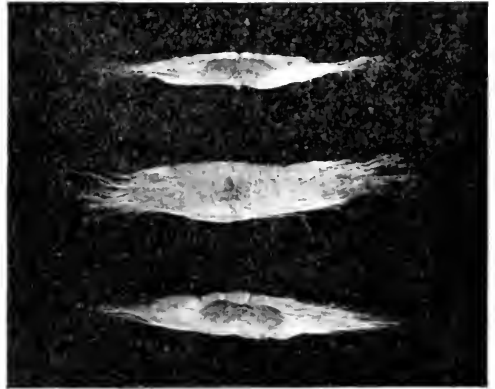
3. While the trees are in blossom compare the flowers with our colored plate. While *speciosa* begins to bloom about two weeks before the others in the same locality, yet late blossoms of this variety are prolonged until flowers of other sorts have opened. Sometimes favorable locations advance the blooming period of the inferior trees, while in unprotected spots, not far distant *speciosa* may be retarded so that all flower at the same time.

Notice the comparative size of the individual flowers. There is not a great difference in depth of color in the markings of the flowers but the inferior sorts have a narrow white margin, while *speciosa* has a broad border of pure white, which lightens the color effect.

4. Examine the seed pods. For some reason while *speciosa* produces as large a cluster of flowers as other varieties, only one or two pods are developed, and these are from fourteen to eighteen inches long and three-fourths of an inch thick.

Bignonoides, the southern form, produces from four to six pods to each cluster. These are from six to eight inches in length, and a half inch in thickness. Pure oriental *catalpas* have from eight to fourteen pods, the size of a new lead pencil.

5. Next observe the seed as it is being gathered. *Speciosa* seed has a broad pencil of filaments at each end. In the inferior varieties these filaments are drawn to a point and sometimes twisted.



SEED OF CATALPA.

The ease and rapidity with which seed may be collected from low, spreading trees, like those shown on page 99, January *ARBORICULTURE*, and on page 298, August number, together with the enormous quantity of seed produced by the worthless varieties and hybrids, sorely tempt unscrupulous persons to gather them, and many thousand pounds of such seed have been distributed throughout America to the serious injury of planters, who are thus inclined to condemn the *catalpa* without knowing the tree.

Railway Cross Ties.

The inventive genius of Americans has been largely employed during the past quarter of a century in an endeavor to adapt some substance or combination of materials as a support and fastening for steel rails, and which should become a substitute for wooden cross ties.

The cost of buying ties is not the greatest expense. Transportation often becomes a very great factor in estimates. And when to the ordinary transportation there is added freight to and from a treating plant, it adds materially to the total cost.

The constant tearing up of the roadbed, removal and disposition of the decayed or worn ties and their replacement with new ties is the great cost of track maintenance of all railways.

When ties can be placed in position and remain thirty-five years as it may be when catalpa is used, the cost of repairs will not be ten per cent of the present expenditure. This question is therefore of moment to stockholders and financiers who supply the cash with which to pay these bills, to know that these expenses can be greatly reduced.

Steel and iron in innumerable forms have been tried; ties of vitrified clay, wire combinations, glass, concrete alone and in combination with metal have been devised; solid stone and many other substances have been experimented with and patents for improved cross ties form a large collection in Washington.

Even before the general public began to realize that timber might become a scarce article in America, at an early period, engineers and thoughtful men were anticipating such scarcity and pondering as to what could take the place of wood. But so far there has been no substitute discovered which is sufficiently economical, adaptable, and so satisfactory as wooden ties.

A certain degree of elasticity is essential, where the jars of a heavy railway train, with the terrible forces which are exerted in side thrusts, especially on short curves, for no matter how solid it is thought best to make the road bed, there must yet be an elastic cushion beneath the rails, and no substance is so well adapted

to receive and overcome these continuous blows as wood.

One of the latest designs for ties is a reversed T rail imbedded in cement concrete, the rails being bolted to the metal flange of the tie.

A few such ties have been used, being placed between regular oak sleepers in the track, and have apparently stood this test, but it is probable if such concrete ties were continuous, and required to support the entire traffic, unaided by intermediate ties of wood, that they would soon disintegrate under the vibration and jarring of heavy trains.

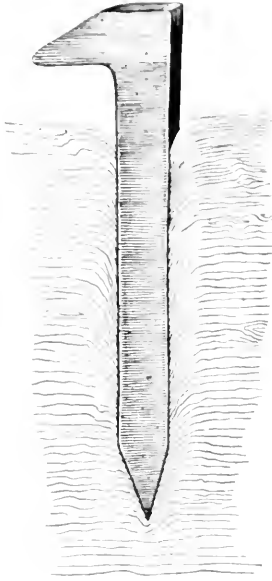
In a foundry it is the practice when breaking up heavy castings for the purpose of remelting, to let a heavy iron weight fall from an elevation upon the metal to be broken.

The force thus employed to reduce solid masses of metal is very slight as compared with that exerted by heavy freight trains moving around reversed curves. Often there are two powerful engines pulling in one direction, the rear of the long train is acting with great force in a contrary course while intermediate portions of the train jump from side to side with an incalculable momentum. It is not difficult to account for spreading of rails, broken rails and strained track which is not discovered until some fast express train finds the break and rolls into the ditch.

If beneath the castings at the foundry there is a solid foundation the repeated blows soon fracture the metal. But if there be an elastic cushion beneath, it may be pounded a year before it will yield.

The old experiment of an athlete supporting an anvil on his chest while a comrade rains heavy blows upon the iron, is but another illustration of this subject. Bolt a hundred pound steel rail to an inflexible metal or concrete tie and something must give way under the frequent passage of heavy traffic. Bolts must give way as they do in frog crossings and constant repairs become necessary.

The driving of a railway spike into a wooden tie pushes aside the fibers of the wood and forms an elastic cushion for each spike, while the wood itself forms an elastic foundation over which the traffic is borne in safety.



Hard woods, as in some of the tropic growths where ties must be bored before spikes may be driven, are very much less flexible and are inelastic for want of this cushion.

The slow process of removing bolts and replacing them, in case of accident or in change of track which may become necessary, is a serious objection to the use of bolts as fastenings for cross ties.

Iron and steel are rapidly corroded by oxydation when in the presence of moist earth, and while paint or an asphaltum coating may protect for a while, yet these substances are destroyed by moisture and the acids ever present in soils, leaving the metal unprotected. The increasing use of electricity on railways, even the quantity generated by engines for lighting, hastens this process of corrosion since there is a direct current between the trains and earth through rails and ties. If the latter be of metal, both bolts and metal ties must be rapidly weakened by this rusting process, yet hidden from view it may be after some serious accident that the discovery is made.

On some European railways steel ties are in use, but conditions in Europe and America are very different. Scarcity of wood and high price of ties on account of transportation for great distances make it specially desirable that some substitute be adopted. Lower wages for labor encourage a greater use of metal. Straight tracks within minimum grade, more substantially constructed roadbeds, shorter lines of roadway, dense population and lighter traffic, with greater care in all operating departments, combine to discourage the use of wooden ties which must largely be brought from America, where the demand is already greater than the supply, and make possible in Europe the use of metals which on American lines will long remain impracticable. Dense population, greater support per mile of roads operated, low rates of interest, and financiers who are satisfied with smaller dividends, place European roads on a different footing from those of the United States. Yet it has not been decided in Europe that metal ties are profitable, nor how durable and economical they may be as compared with ties of suitable wood.

One railway in Mexico has part of its track tied with steel. Many of these ties are cracking, while the fastenings are easily disarranged, being secured with keys driven into raised projections which are punched through the sheet of steel and bent upward to receive the rail flanges.

The trains have a rigid motion, less pleasant to the traveler than those of other roads which have elastic wooden ties.

The life of wooden ties has been gradually shortened in the past two decades because of the inferior wood used in their construction.

Formerly none but the best heartwood of the trunks of large white oak trees would be accepted. As timber became more valuable for lumbering, the tops, small immature trees, and knotty portions were accepted by the inspectors while competition became great among purchasers for various railways.

Rock Oak and various forms of the Red and Black Oak families under sundry names, were received in certain proportions, and many roads were glad to secure chestnut, pine, redwood and many other

kinds of timber growing in the vicinity of the lines.

From nine years' duration as the best heart white oak, the average has fallen to four or five years.

This has led to the more extended use of treating plants, the inferior woods thus being made available through antiseptic solution.

The redwood of California is rapidly worn by the grinding motion of the rails acting upon sand which finds its way between the tie and rail. The use of tie plates but partly overcomes this rapid wear.

Beech, which is totally worthless when placed in contact with moist soil, is trebled in durability by the ordinary zinc chloride treatment.

Red oak, good for only four years, may be extended to twelve by chemical treatment. White pine and other woods may be made to last from ten to fifteen years if the treatment is thorough.

In Europe the creosote used in preservation of timber is a product of wood distillation.

The great expense of this material has led to the use of coal tar products, under the name of creosote, but it is much inferior. Both processes are too expensive to justify their use in treating cross ties and a resort is had to a by-product of the smelters, zinc chloride.

Glue and other substances are used by the various preserving plants to fix the zinc in the pores of the wood, but in time it is liable to be re-dissolved and washed out, leaving the wood subject to attack by the fungus which causes decay.

One variety of wood, a native of the United States, is in itself proof against decay. In the fiber of the wood there is stored away those antiseptic substances which makes it practically immune to the attacks of rot fungus.

This is *catalpa speciosa*, many articles of which have lasted through more than a century.

The earliest railways of southern Indiana, southern Illinois and southeast Missouri, were constructed through or near the catalpa slashes or swamps and whenever possible to secure this wood, which even through the sixteenth century had gained a reputation for extreme durability, it was used for telegraph poles, bridge timbers and cross ties or sleepers.

Engineers of that period were profuse in their admiration and praise of the catalpa as a most enduring wood and well suited to those uses, but through the changes of officials which have taken place, the identity and location of most of those ties has been lost, yet enough remains to convince reasonable men of the high character of catalpa for durability and adaptability for ties and poles.

The great abundance of white oak in the middle states up to a recent period and the low price of ties, has prevented a careful study of this *subject* except with a few earnest men.

One catalpa tie, which was in the L. & N. tract for fifteen years, is now in possession of the engineer's department of the Illinois Central Railway.

Another for twenty years in the Cairo Division of the C. C. C. & St. L. Railway is in the Big Four Engineer's office at Cincinnati, Ohio.

On page 380 will be found other evidences.

Mr. Barney, the Senior, the veteran car builder of Dayton, Ohio, mentioned several ties and timbers which had been in use for very long periods, while Dr. John A. Warder, Mr. Robert Douglas and others, a quarter of a century ago, offered abundant evidence in this regard, all being enthusiastic in praise of the catalpa for railways.

There is no reasonable doubt that cross ties made of sound, seasoned catalpa wood will last thirty-five years, or five times as long as oak, seven times as long as redwood or pine.

A forestry organization was recently effected at Cincinnati at a meeting held in the Gibson House parlors. Hon. John B. Peaslee, John H. McMackin, Herman Serodino, Charles T. F. Fennel, Adolph Leue, Charles Prior and Charles A. Gehrlein are the committee of organization. We wish them abundant success.

Please remember that *ARBORICULTURE* is published at Indianapolis, but mail for the editor should be sent to Connersville, Ind. Subscription price, \$1.00 per annum.



A FENCE POST IN CONSTANT USE FOR SEVENTY YEARS ON FARM OF AUGUSTUS SIEGEL, ALBION, ILL.

New Evidences of the Durability of Catalpa.

The editor of ARBORICULTURE has contended for many years that if a railway were using catalpa cross-ties they would require to be renewed but twice in a century, that is, that the durability of these ties would be thirty-five years.

There has been an abundance of evidence of the lasting qualities of this wood, given by engineers and railway officials during the past century, but the proof now discovered and made public in this publication is of most positive character and is indisputable.

When trees may be grown in so short a time as sixteen years, which will last in the track as cross-ties twice the length of

time required for the trees to grow, it is worthy the attention of all railway officials and is of especial interest to stockholders who furnish the money for expenses.

In 1872, the old Air Line Railway began laying tracks through Edwards county, Illinois. In the construction of this road large numbers of catalpa cross-ties were used, the timber secured in the swamps adjoining. Some old citizens of the locality informed me several months since that some of the ties still remained in the track and that they could find them.

Through the courtesy of Mr. H. B. Spencer, general manager Southern Railway, St. Louis, I was permitted to make a

search for these ties and remove such as were desired. On September 17, 1903, in company with Mr. Charles Crackel, an old-time resident, I made a search and between Albion and Brown's we found three of the original catalpa ties, all of which were sound and in good preservation after thirty-one years continuous service.

Thirty-one years ago thirty pound rails and four inch spikes were in use and ties of present thickness were not required. These ties were therefore but five inches thick. In modern reconstruction with ninety pound rails and six inch spikes these sleepers are not thick enough, the long spikes passing entirely through the wood. For this reason most of the catalpa ties have been removed.

The section foreman, Mr. Wm. L. Wheeler, who assisted in taking out the ties, says he has been on this immediate portion of the road, in some capacity for twenty-one years and has taken out several car loads of these old catalpa ties solely on account of thinness, none were badly decayed. He never knew one to break as oak ties frequently do when the bearing at times is in the center and rails with weight of trains are insufficiently supported. The wood, he says, holds the spikes perfectly. Mr. Wheeler says furth-

er that no catalpa ties have been put in track during the twenty-one years of his service here. The ties are eight feet, eight inches in length, being eight inches longer than standard ties now used.

Many citizens who saw the track laid thirty-one years ago remember these ties and have observed them from time to time. The evidence is complete as to their time of service. During this thirty-one years five sets of white oak ties have been decayed and removed, yet the catalpa is sound today.

A white oak tie lasts one-tenth as long as the time required to grow it, while these catalpa ties grow in sixteen years and last twice the length of time.

The telegraph lines of this Air Line Railway were largely of catalpa, several hundred of which still remain in use after thirty-one years of service. One of them was removed and will be placed on exhibition with the cross ties. It is but slightly decayed just at surface of the ground. The pole is of but six inches thickness and twenty feet length and the probable age of the tree was but ten years.

A fence post secured in the same location has a verified existence of sixty-five years, while another has been in use eighty years.

Preserving Timber.

The United States department of agriculture is continuing its investigations on the preservation of timber, with the idea of increasing the lasting quality. Could the duration of service of railroad ties be doubled it would to a considerable extent relieve the pressure on our forests for the supplying of lumber for such use. It is said that the railroads above all others are feeling the growing scarcity of trees. They use every year over 110,000,000 ties, merely to take the place of those decaying and wearing out. This takes no account of the new lines being built. Preservatives are being used on various kinds of trees in the southwest. We know that nature long ago learned how to so preserve wood as to render it as durable

as stone. Shall we be able to discover her secret?—*The Farmer's Review*.

Yes, the secret has been revealed. The catalpa tree has the power of gathering from the soil such elements as are antiseptic; these are built into the fiber of the wood and resist decay. These substances are never washed out, never lose their antiseptic qualities, but make the catalpa the most enduring of all woods.

Several items in this number of ARBORICULTURE prove this assertion. The fact was known to the North American Indians that the catalpa would last for a century, and it was taken advantage of by the early engineers of the west, who used it whenever procurable.



IN YANBY, CHINA (L. CHEN, P. CHEN, & KANG)

Prairie Kansas to be a Forest Center—Profitable Tree Culture at Hutchinson—\$30,000 Realized From Catalpa Posts.

Forty years ago the great sweep of prairie in Kansas was only broken by a ridge of foliage which bordered the banks of some of the streams, cottonwood and willows principally, with a larger belt of better timber in the eastern portion in the bottoms of the Kansas, Marais de Cygnes and Missouri rivers.

As these streams have all cut deep into the prairies, no trees were visible from the grass-covered rolling hills until suddenly coming upon the margin of a stream the winding skirt of woodland came in view. Today there are hedges, orchards and groves of timber seen from every portion of the state. The pioneers of Kansas, realizing the necessity for shade, shelter, fuel and adornment, planted millions of trees. Unfortunately many of these groves were of a character not always the best nor most useful, yet they are trees and have served their purpose as such.

A dozen years ago Mr. L. W. Yaggy, of Lake Forest, Ill., purchased 1,500 acres of land in the valley of the Arkansas river, near Hutchinson, and upon this he planted 800 acres with apple orchards and on 500 acres he planted catalpa trees. The catalpas were not all planted at one time, but, beginning with 80 acres, as an experiment, and seeing the success of this, continued planting with increased confidence until 500 acres were covered.

The trees were set in rows six feet apart with four feet space between the trees in the rows. Cultivation continued for about three years when the shade became dense enough to prevent the growth of grass and weeds. A few trees were cut out from time to time, when fence posts were needed,

and later, as funds were required for current expenses, others were sold, but no systematic thinning was begun until five years ago when the earliest planting demanded more space, alternately ten rows were removed and three rows were left to check the force of the wind.

The trees which were cut have again attained considerable size from sprouts which have grown from the stumps. On portions this experiment has been repeated. One block so cut over last winter now has shoots twelve feet high and six inches girth, some of which we picture on page 385.

Eighteen hundred trees were set on each acre, or almost a million in all.

On another and larger tract alternate rows have been cut out, and made into fence posts, for which there is great demand. There are several ricks of posts now ready for shipment which contain forty carloads, 2,500 to 3,000 being loaded on a car. Fifteen carloads have been sent away this season. This represents a total of 137,000 posts cut during the past winter, while during the three or four years since they began cutting, three times as many have been removed and sold. The price obtained has varied greatly. Some were so small as to bring but $3\frac{1}{2}$ cents each, while others sold for $12\frac{1}{2}$ cents. Yet a large number were of eight-foot lengths and commanded 25 cents each. The average price has been 10 cents.

Of the 500 acres planted from ten to eleven years ago, the land cost \$40 per acre, or \$20,000, while the sum received at wholesale for the first thinning has been considerably more than \$30,000, or fifty per cent. more than the cost of the land, while the plantation still remains with



FORTY CAR LOADS CATALPA POSTS YAGGY FARM, HUTCHINSON, KANSAS.

1,000 healthy trees upon each of the 500 acres. As the trees are yet entirely too close, extensive thinning must be made, and there may be taken out 360,000 trees with great advantage to the remainder, for which \$30,000 more will be realized.

This 1,500 acre farm with its 800 acres of apples has required a large expenditure in its maintenance, and when it has been necessary to pay large bills for labor, machinery, buildings, etc., the catalpa plantation has been the gold mine which supplied much if not most of the funds. As money was needed the sale of posts has provided the cash. The owner realizes that it was a happy thought which induced him to plant so many catalpa trees, and only wishes the entire farm was in forest. The estimated value of this catalpa plantation today is \$200 per acre, or \$100,000, although it has a prospective value of as much more, for the steady and permanent increase from sale of posts and similar timbers is much greater than could be realized by any other crop which can be grown.

THE ARKANSAS VALLEY.

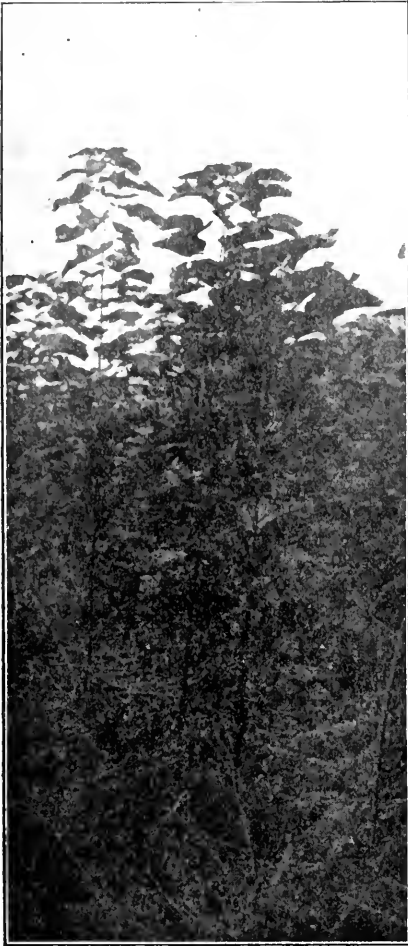
From Pueblo, Colorado, to far down into the Indian Territory there is an underflow of water, a sheet extending for several miles on each side of the river bed, in which wells may be obtained at a moder-

ate depth, all along the valley. The sandy soil is moist with water ascending by capillary attraction, which enables tree roots to reach moisture and maintain growth even when water has ceased to flow upon the surface in the bed of the stream during extreme drought. In some places there is a hard-pan which is difficult for roots to penetrate, but this will, in time, be overcome as the now impervious strata becomes broken up by more thorough cultivation and by action of tree roots.

This portion of Kansas is destined to become a great center for artificial forests, as the conditions are extremely favorable to tree growth. Water is found at from six to twenty feet.

There are many other large plantations already established in the valley and throughout Southern Kansas. Messrs. Underwood & Viles have 400 acres growing and propose increasing their plantation very greatly.

Mr. Wilder, auditor of the Santa Fe railway has 40 acres, but this has been so totally neglected that no results can ever be expected. Mr. G. Monger, at Eureka, has a large tract of several hundred acres. The Farlington tract of 1,200 acres has been often referred to in ARBORICULTURE. Probably the best managed plantation is that of Geo. W. Tidcher, of Topeka, who has 65 acres.



CATALPA, ONE SEASON'S GROWTH, YAGGY PLANTATION.
HEIGHT, 12 FEET.

There are many other large catalpa farms, while many farmers have from five to ten acres each, to keep up a supply of posts and firewood.

It was at Hutchinson that S. T. Kelsey, thirty-five years ago, planted one of the experimental forests for the Santa Fe Railway. In these experiments a large variety of timber trees were planted. Long years of neglect have caused the loss of almost every kind except cottonwood, catalpa and honey locust, which have vitality to maintain existence under unfavorable conditions.

The phenomenal success of the catalpa in these early experiments have led to the planting of so many forests and groves in Kansas.

RICHMOND, IND., Sept. 5, 1903.

Mr. John P. Brown:

I am glad to know that the work in which you are engaged is receiving attention from many new sources, and I certainly hope that our State of Indiana will be benefited especially, from this agitation.

I have just returned from a trip through Europe and after seeing that beautiful country with its fine forest and parks and splendid roads almost invariably lined with trees I am more than ever impressed with the need of our country in that line.

I enclose a contribution to help the work along.

A. H. B.

THE MENACE OF THE FOREST.

The climatic history of the Old World will repeat itself in America. If forest destruction, at its present rate of recklessness, should continue much longer, our continent will have to dry up. So will an orator who should venture to urge that fact upon a boodle legislature, in this era of lumber trusts. But the fact remains, and its significance may be inferred from the experience of the Mediterranean coast lands, where thousands of god-gardens have been turned into Gehennas of wretchedness and desolation. By tree destruction alone a territory of 4,500,000 square miles has been withdrawn from the habitable area of our planet. The physical history of the Eastern hemisphere is the history of a desert that originated somewhere near the cradle of the Caucasian race—in Bactria, perhaps, and, spreading westward and southward, has blighted the Edens of three continents like a devouring fire and is now scorching the West coast of Africa, and sending its warning sand clouds far out to seaward.—*Dr. Felix L. Oswald, in National Magazine.*

The value of the forest is illustrated during the present summer by the flow of water in the Platte which is now only 103 cubic feet per second, whereas normally this season of the year the flow is 350 feet per second. There has been no cutting of ditches and as the snow fall was as heavy as usual the only explanation lies in the destruction of the mountain timber with the result that the snow was exposed to the sun and melted early in the year.—*The Colorado Real Estate News.*

The Pennsylvania Railway's Experiment.

A recent number of the *Chronicle*, Chicago, has a lengthy article upon the forest project of the Pennsylvania Railway Company. As this has been copied extensively by the press, it seems timely to discuss the subject in connection with other items regarding wood for cross ties. We copy a portion of the *Chronicle's* story:

"For several years the railroads have been confronted by a shortage of wooden ties and the problem has grown so serious that many of the roads have discussed the matter in their annual reports. The forestry commission has complained that the destruction of the forests of the country has resulted in drouths and various organizations have insisted that the forests be preserved, but at the same time they have failed to show the railroads engaged in extending and improving their lines how they can get necessary material without destroying the trees.

SOLUTION OF THE PROBLEM.

"The Pennsylvania system, through the officials of its construction department, believes that it has solved the problem and the planting of 50,000 young locust trees will be commenced early this fall. Some experimental work has been done along the middle division and the results have been so favorable that the work will be carried on on a larger scale. Several thousand trees are already in flourishing condition on the line between New York and Pittsburg and the company is preparing to surprise its competitors by utilizing additional tracts for timber culture.

"In purchasing the right of way the company was obliged to take possession of more land than was absolutely necessary for its use and this was leased for agricultural purposes. A great deal of the property is now in use as farms, but where it has been found that the land is suitable for the cultivation of the locust it is the intention of the company to terminate the leases which are now in force. The present experiment will be continued from year to year by the planting of additional trees and it is expected that the project

will relieve the company of much of the delay and at times total inability to procure material for ties. While locust is not the best wood procurable for this purpose, the company figures that its supply will make it possible to replace old ties whenever they are found to be imperfect. In addition to this the company will need large quantities of wood for posts and other uses and these will be supplied from the locust forests owned by the corporation."

In J. Sterling Morton's *Conservative* some three years ago the editor of ARBORICULTURE had a lengthy article in favor of the black locust—*Robinia pseudacacia*—recommending the farmers of the west to plant it for fence posts. At various times during the past forty years he has presented the subject to the public as of importance for the consideration of farmers. The history, character and value of the locust is well known to ARBORICULTURE, but when a company proposes to grow locust for ties it will learn by experience what ought to be known to them by observation without the necessity of costly experiment.

The locust is indigenous to the Allegheny and Blue Ridge Mountain regions. There are hundreds of square miles in the rougher portions of those mountains, and upon rough, rocky hills all over the country, which are more suitable for locust thickets than for cultivation or for any other timber growth. It is a valuable wood for fence posts. Young, sappy wood is not lasting, but matured timber is of very great duration.

The locust has a habit of growing in folds, the annual growths overlapping and thus does not form a smooth, solid trunk, as do other trees. In sawing into timber the portions fall apart and cannot be made into boards. The wood splits readily and is thus preferred for working into split posts. If locust is used for ties the holes must be bored. A spike cannot be driven into seasoned wood unless a hole has been previously bored. When a spike (or nail) is once driven into locust, and the wood seasoned, it will break off, but can

not be withdrawn. There is no more elasticity in a locust tie than in cast iron.

In track removals it will be found extremely difficult and slow work with cross ties of locust, as much so as with metal ties. Of course by boring, and using screw spikes, as has been recommended frequently, this might not be so objectionable.

One habit of the locust makes it invaluable in a forest, that is its suckering propensity. It sprouts from stumps and also from every broken root. Once planted in forests it is permanent. As posts are cut young trees soon spring up to take the place of those removed. The same habit will be found very seriously objectionable on the line of road, as it is very difficult to destroy the young suckers.

The *Chronicle* mentions that the Pennsylvania Company will plant locusts on the farms which it owns. That is well, millions of fence posts will be needed, but

50,000 trees seems a remarkably small number to start with—when the company requires seven million ties each year.

Fifty thousand trees would plant one of the company's farms of one hundred acres, while it will require all the farm land which the company owns to furnish ties for the system. The Illinois Central road began by planting 300,000 trees, which will be but a drop in the bucket for that road. Let the Pennsylvania engineers forget the unfortunate experiment the company made with a hybrid catalpa some years ago—and which has prejudiced the company against the most important tree on the continent. Let them investigate before committing the company to a project which must end in disappointment, as did the former experiment. Elsewhere in this number of ARBORICULTURE will be found the true solution of the cross tie problem.

AMERICAN INVESTMENTS IN MEXICO.

It has been estimated that American investments in Mexico amount to \$500,000,000, and with them has gone the energy and the enterprise of the men who have advanced the money.

The interest on the part of Americans which has thus been awakened in Mexico has brought that country almost immeasurably closer to the United States than it was before the first American-built railroad pushed its way southward from the Rio Grande into the interior of the republic.

American capital has been accepted with pleasure by the intelligent and progressive citizens of that country, and thousands of them have joined in the various enterprises which through these investments have been put in motion. The result is seen in a wonderful improvement in nearly every part of the republic, and evidence of progress on every hand suggests for Mexico a great and prosperous future.

The strong government of President Diaz has made these investments safe, and there is good reason to believe that his successor will in these and other important particulars follow in his steps.

CALIFORNIA LETTER.

Editor of Arboriculture :—

A forest fire has been raging now for weeks east of the Lorna Prieta, highest point in the Santa Cruz Mountains of the Coast Range, near our ranch. Other fires along the high wooded ridges on the Saquel, towards Santa Cruz, met and joined this fire with the result of making the days dark with smoke and falling ashes and lighting up the horizon on the east at night so that we could read coarse print by the glare. The heat and the constant dread of being robbed of house and home a second time by the forest fire, made it impossible for me to do anything except watch the fire advance.

I am heartily in sympathy with the aims and endeavors of ARBORICULTURE, and only hope that some measure may be advocated and carried out by which our forests, our homes and the lives of people living on ranches and among timbers may be protected.

Very sincerely yours,

MRS. J. C. M.



THE ARTS PALACE.

The World's Fair Progress.

We visited the grounds of the World's Fair at St. Louis last week and were surprised at the rapid progress which has been made. The management is deserving of great praise for the vast amount of work accomplished.

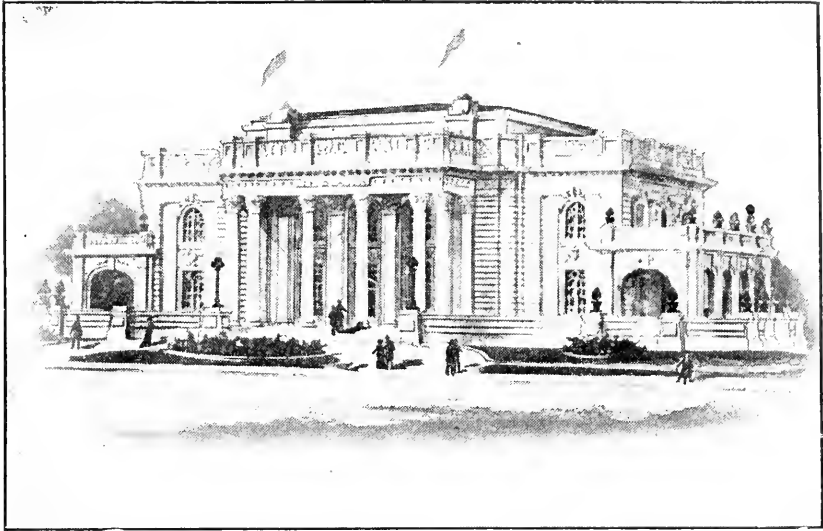
In forestry we are informed that a competitive exhibit is arranged between Germany and the United States. That is, the great system which has been practiced for hundreds of years will be practiced on a tract of land devoted to this exhibit, while our American system (?) will be placed in competition—German Foresters against America.

Two tracts of land, already partially covered with trees, and each about five acres in extent, have been assigned to the United States and German governments, as the laboratory for their tests. The two lie side by side, so that the visitor may walk through what the Americans call an "arboritum" and observe all methods of forestry, and then step across into what the German designates as a "forest garden," and learn the German method.

No trees will be cut from either tract. Rather, transplanting will be resorted to and when the Exposition opens miniature forests, perfect in every detail, with narrow gravel walks winding in and out, may be seen. Every tree that thrives in the latitude of St. Louis will be represented and the specimen can be easily designated. Attached to each tree will be an aluminum label on which will be stamped the botanical and common names.

In one respect the exhibits will be the same. Each display will embrace practically the same number of trees and they will be practically of the same varieties. Here all similarity ceases. The treatment will accord with the practices in vogue in the respective countries. In the American arboritum the trees will be planted, trained and pruned according to the American idea. In the German forest garden will be reproduced, in the miniature, the effects that obtain in the Fatherland, and the story of how the wonderful forests of that wonderful country have been preserved through ages, and renewed from time to time, will be told by practical demonstrations.

The exhibits will be in charge of the most expert foresters to be found in the two countries. Interest will not center in the exhibits merely because they represent all that is best in the forestry of both countries, but because of the practical demonstrations and tests that will be made every day of the Exposition. Trees will be transplanted and the most approved apparatus for this work will be shown in actual operation. Trees will be pruned and trained, and all of the implements used will be a part of the exhibit. Trees will be inoculated with disease, and when the disease is fully developed the most approved treatment will be accorded the affected trees. Careful date will be kept on all such experiments and the results will be made known, together with a full description of the treatment in order that the preservation of the forests may be accomplished.



INDIANA BUILDING.

ART PALACE BUILDING.

The Art Palace of the Louisiana Purchase Exposition, now well on the way toward completion, differs in one important essential from the art buildings at Chicago and those at Paris. All the exhibits will be installed upon one floor—there will be no upstairs galleries, no long staircase to ascend and descend. The authorities of the department demanded the observation of four conditions in the planning of the Art Palace. First, that the galleries should be adequately lighted; second, that they should be well ventilated: third, that the buildings should be so arranged as to afford the free circulation of large numbers of visitors without danger of congestion, and, fourth, that the structure should be fire-proof. It is sincerely hoped that the architects to whom the task of designing the buildings was entrusted will accomplish the desired results.

INDIANA BUILDINGS.

Indiana's state pavilion at the World's Fair will be an up-to-date club building. The architecture will be of the French renaissance. Marshall S. Mahurin, of Fort Wayne, Ind., is the architect. The building will occupy a splendid position in the state group, facing the north, and fronting on two of the main avenues. Arkansas' site is across the avenue on the north and Iowa's building, already up, is on the east. Rhode Island's building will be immediately west. The outside dimensions of the Indiana building are 100 by 135 feet. It will stand on a rise of ground, with terraces reaching down to the street level.

One thousand cash subscribers have been added to our list during the past sixty days. This will give our friends an idea of the interest taken in ARBORICULTURE. These came from New South Wales, New Zealand, Brazil, Mexico, and various portions of the world, besides each of the United States.

FROM TREE TO NEWSPAPER.

It is one thing to make a newspaper, with the appliances of type-setting machines, presses and paper, and purveyors of "copy" all at hand, and quite another to make one without any of these advantages. Yet, even under such circumstances, a journal can be turned out, and in a remarkably short time, too.

A very curious experiment was made by certain German manufacturers of paper and wood pulp. The object of the experiment was to determine the shortest time in which it was possible "to convert the wood of a standing tree into paper, and the latter into a journal ready for delivery."

The experiment began with the felling of three trees in a forest near the manufacturers' establishment. This was done in the presence of two of the manufacturers and a notary, whom they had called in to testify to the honesty of the experiment, at 7:35 a. m. Further steps in the conversion of the living wood into paper are thus described:

These trees were carried to the manufactory, where they were cut into pieces twelve inches in length, which were then peeled of their bark and split. The wood thus prepared was afterward raised by an elevator to the fine defibrators of the works. The wood pulp produced by the machines was then put into a vat, where it was mixed with the necessary materials. This process finished, the liquid pulp was sent to the paper machine. At 9:34 a. m. the first sheet of paper was finished. The entire manufacture had thus consumed but one hour and fifty-nine minutes."

At this stage of the experiment the owners of the establishment, accompanied by the notary, carried some of the newly made sheets of paper to a printing office located at a distance of two and a half miles from the manufactory. At ten o'clock, exactly, a copy of the printed paper was placed in the hands of the experimenters. It had taken, therefore, just two hours and twenty-five minutes to

change the wood of a living tree into a printed journal. The trial was a most interesting one, and well illustrates the perfection to which modern machinery and processes have been carried.

TO RAILWAY OFFICIALS.

The January number of ARBORICULTURE is a valuable reference book, containing much valuable information in regard to catalpa. We still have a few copies which may be obtained by writing the editor at Connersville, Ind. The subscription to ARBORICULTURE is one dollar per year, and this number, the monogram on the catalpa tree, will be sent to all new subscribers who ask for it.



A GROUP OF CATALPA TREES IN OPEN GROUND,
SOUTHERN ILLINOIS.

Book Reviews.

FOLLOWING THE DEER — Messrs. Ginn and Company, Boston and London, have issued this extremely interesting book of MR. WILLIAM J. LONG.

Mr. Long is a pleasant writer, a student of nature and tells of the woods of Maine and the big and little game which inhabit them. His description of Old Wally, a pot hunter, is good and shows the difference between a genuine sportsman and the fellows who kill everything in sight for their market value. Many excellent illustrations display both the beauty and dexterity of the wild deer.

The book teaches some lessons of value, most important is the right of a noble animal to live where no real necessity exists for its destruction.

Nature studies all have an interest, none more so than *Following the Deer*.

PRINCIPLES of AMERICAN FORESTRY—by SAMUEL B. GREEN. John Wiley & Sons, New York and London.

Never has there been so marked an interest in forest perpetuation in America as at the present, and books upon forestry are being multiplied. The name of Samuel B. Green carries with it a certainty of thorough mastery of this subject.

Professor Green goes into detail in a most practical manner. To young or old—all who wish true information, how to manage a forest, what trees are adapted for various purposes, and a discussion of all forest topics, will find in this new work a helpful instructor. A tabular classification of the important timber trees is worth far more than the cost of the book. Schools should have it as a reference and text book. Price, \$1.50. ARBORICULTURE will supply this work by mail at above price.

National Publishing Company, Philadelphia and Chicago, are preparing for the holidays of 1903 "OUR MOTHER GOOSE," by Newton H. Jones. Newspapers, books and magazines, to be of inter-

est in the modern days, must be profusely illustrated. Man at all ages, from one year to eighty, is attracted by a picture and this nursery story book will prove of great interest to the little ones, all of the old nursery rhymes being embellished by the artist's skill. Mothers will be pleased to see the joy of their children in learning the old stories in new dress.

THE AMERICAN BOOK COMPANY.

ARBORICULTURE is friendly to the cause of education. It is the educated man who appreciates the benefits of the forest, and is willing that others in coming time shall enjoy the same advantages which we enjoy. It is the man of education who is patriotic in the highest sense; who wishes the greatest good for our nation for all coming time. And thus we favor such means of education as will promote true patriotism in our youth.

The American Book Company produce the very best books, published in the highest style of book art. Their works are of moral as well as intellectual worth. To this company we are indebted for a majority of the school and college text-books and the advance in school literature.

The following taken from *Fresh Bait for Fishers of Men*: "An extraordinary phenomenon has been noticed with regard to the chestnut trees in one of the famous avenues of Brussels, since the installation of the electrical tram-cars. The foliage of the trees on one side of the tramway begins to turn brown and drop early in August; then they bud and blossom again in October. The trees on the opposite side of the tramway behave like ordinary trees, for they lose their foliage in the late autumn and do not put forth fresh blossoms until the spring. Botanists are inclined to believe that the cause of this singular state of things is due to the electrical current which passes under the ground acting upon the roots of the trees."

New Publications of the Bobbs-Merrill Company.

HISTORY AND TRAVEL. — THE CITY OF THE KING. By Mrs. Lew Wallace. With many illustrations of scenes in the Holy Land. 12mo, Price, \$1.00 net.

Mrs. Wallace has divided her descriptions of the Holy Land into two parts, the first of which is concerning the childhood of the child Jesus, what He saw, and what manner of outward life greeted His eyes as He journeyed from Galilee to Jerusalem to attend the Feast of the Passover. It describes the scenes on the journey, the appearance of the ancient city, the gates, palaces, wells and gardens of Old Testament History.

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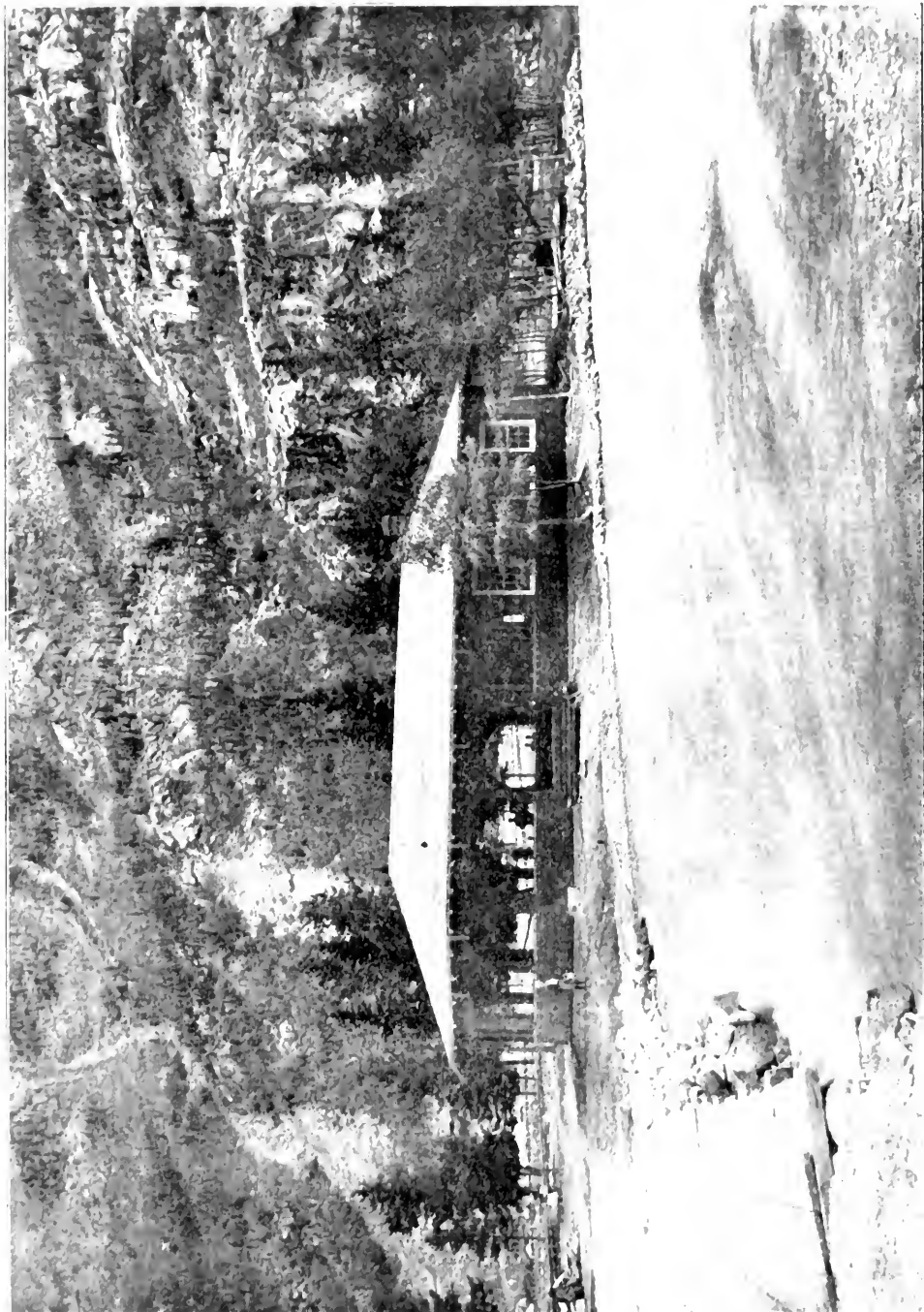
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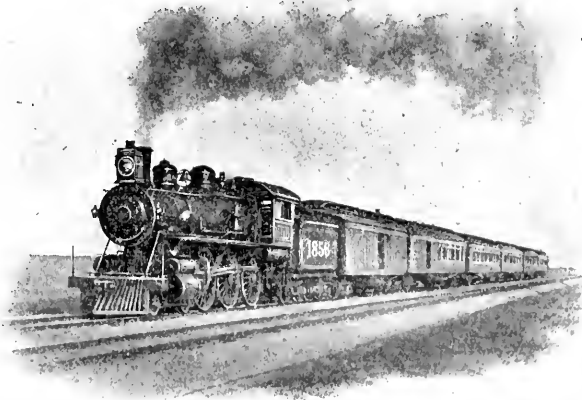
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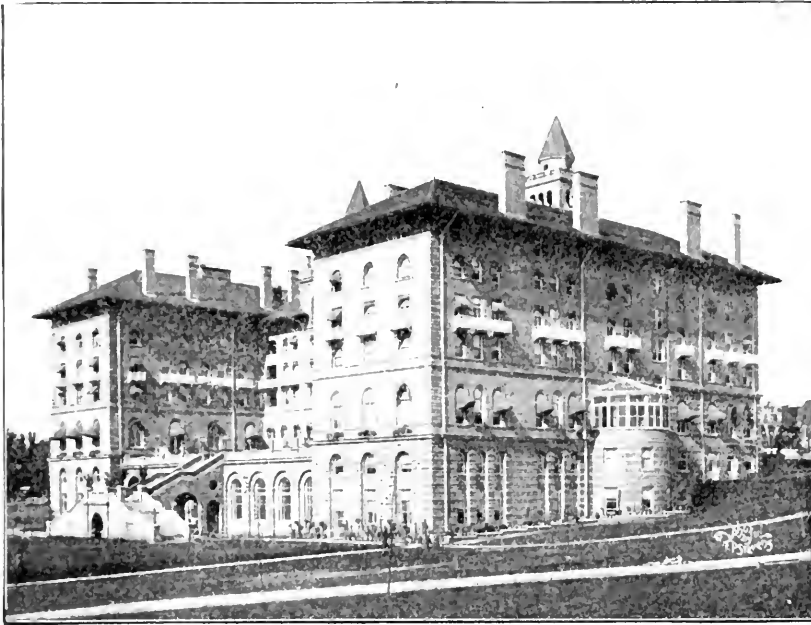
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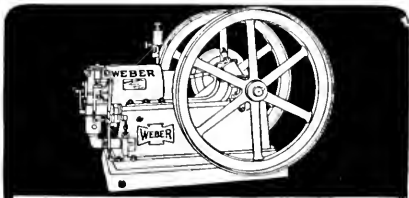
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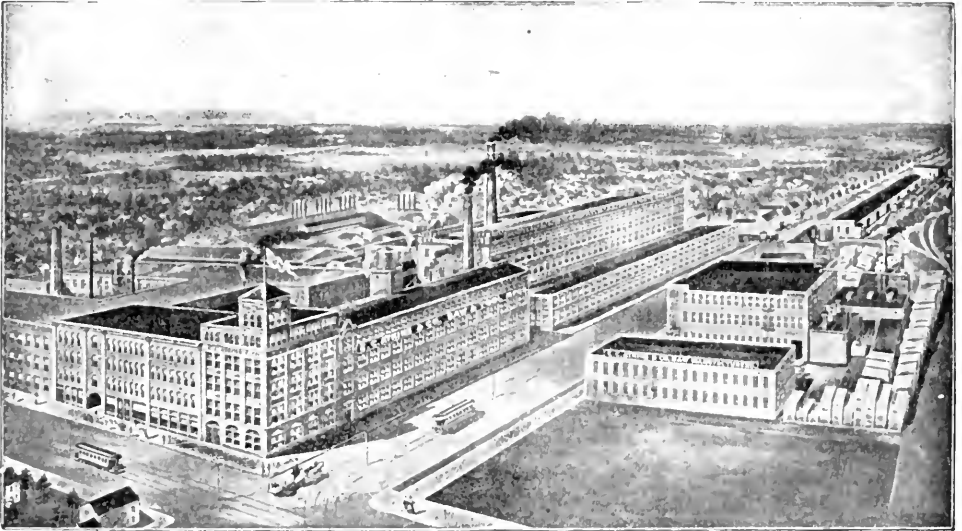
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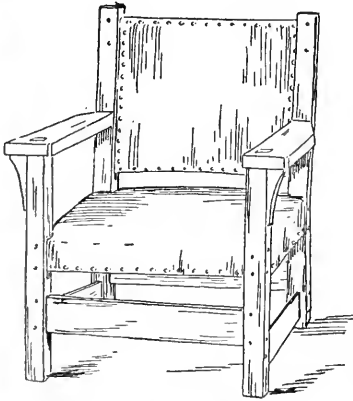
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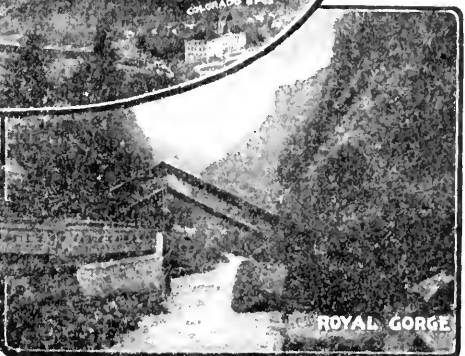
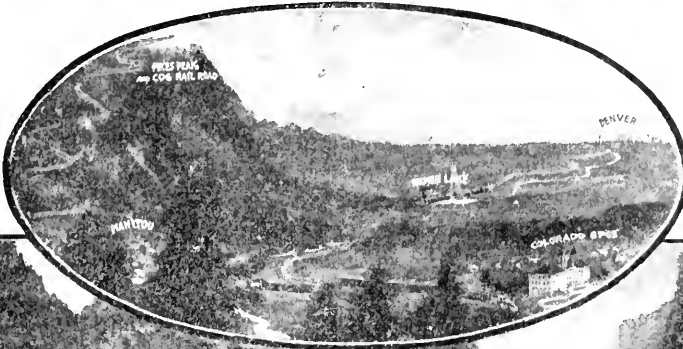
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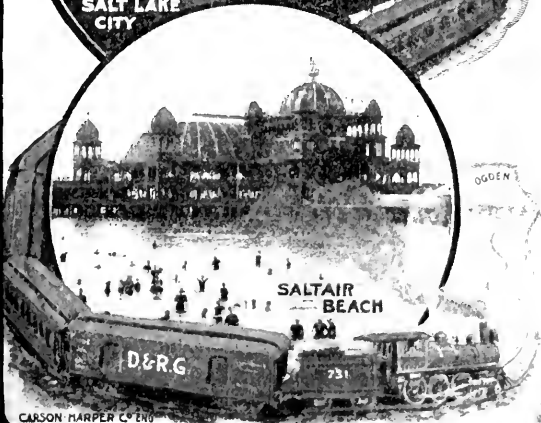
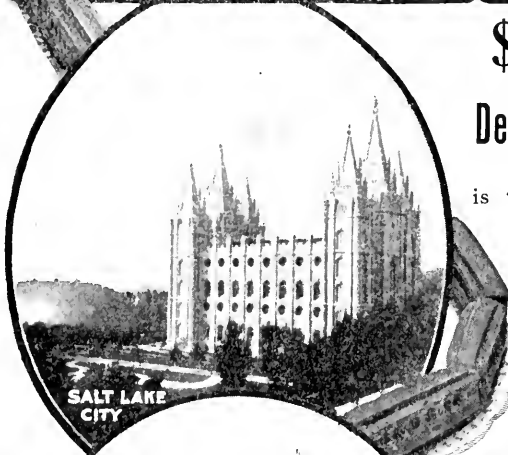
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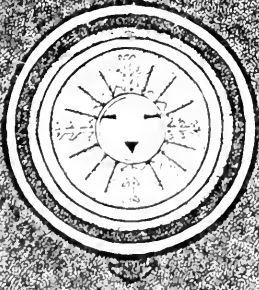
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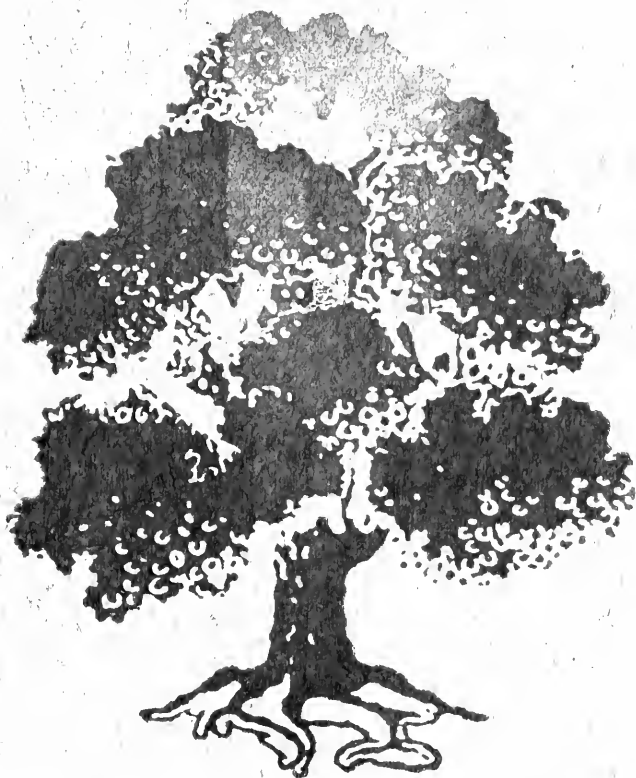
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ARBORICULTURE

VOLUME II.

NUMBER 10.



A Magazine of the International Society
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ARTICLES OF INCORPORATION.

Article I.—Name. The name of this corporation shall be The International Society of Arboriculture.

Article II.—Purpose. The purpose of the Association is to introduce judicious methods in dealing with forests and woodlands; to advance and advocate a public interest in this subject; to promote the afforestation of unproductive lands; to encourage the planting and care of shade trees in parks, public and private grounds, and along streets and highways; to inspire an interest in our remaining native forests, and groves of ancient trees, and to seek their preservation; to supply information to railway officials in regard to timber culture for railway uses, and incite railway and other corporations to plant trees for economic purposes.

Article III.—Membership. Any person may become a member of this Society by the payment in advance of an annual due of two dollars, and on payment of this annual due shall be entitled to receive, regularly, one copy of ARBORICULTURE, the official organ of the society. Any person who may contribute ten dollars toward the support of the society shall become a patron. Honorary members may be chosen by the executive committee.

Article IV.—Officers. The officers of this Association shall be a president, vice-president and secretary-treasurer, who shall be elected at the annual meeting each year by ballot, and shall serve for one year, or until their successors shall have been elected and shall have accepted office, and when elected shall constitute the executive committee.

Article VII.—Executive Committee. The Executive Committee shall have entire control and management of the affairs of the Society.

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DATE PALMS, ZACUALCO, MEXICO.



ELIAM E. BARNEY.

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Topics in Lumberman's Number.

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Eliam E. Barney.

Eliam E. Barney, whose portrait we are enabled to present this month, was a native of Jefferson county, New York, and was born October 14, 1807. In early life he was a school teacher, first in New York State, and afterwards at Granville and Dayton, Ohio, where he made his final home.

In 1845 the railway car works were established which have since become so noted as the Barney & Smith Manufacturing Co. Mr. Barney was interested in many other business enterprises, banks, railways, etc.

In handling vast quantities of fine wood used in car construction and railway operation, Mr. Barney was alert for and wood possessing unusual qualities, in this way learning the value of the catalpa.

He found it to be of extraordinary growth and of remarkable durability;

and thus induced others to consider these important characteristics and cultivate the trees. He wrote many articles for *The Railway Age* and other papers upon this subject, and advocated the planting of catalpa trees by railways. Mr. Barney's experiments to test the strength of catalpa wood are worth much to the corporations which use so much wood for ties and timbers.

The pamphlet published by Mr. Barney in the 70's is still a standard work upon this subject, and has supplied many articles, for which *ARBORICULTURE* has taken extracts freely.

Mr. Barney expended large sums in securing specimens of wood, in collecting and distributing seeds, and in disseminating valuable information upon the subject of catalpa. His death occurred December 17, 1880.

The Timberman's Problems.

The ownership of a tract of timber land carries with it many questions besides the one usually attributed; viz., to clear away the trees, convert them into lumber, and that into cash in the briefest possible time.

There are many owners of timber lands who must have the money which the property represents, and on which they are paying interest. And these men will place their lumber upon the market as quickly as possible, without regard to future results. But the capitalist who has purchased forest property for the purpose of an investment, and who wishes to realize the greatest interest upon the capital involved for a long period of time, finds other problems to wrestle with; and these are of greater importance than the one first named.

The long-headed financier asks himself, "In what manner can I increase my capital more rapidly if I withdrew it from its present employment?"

That is, if the timber is converted into money, to what service can this cash be placed so that it will bring a greater return than in young, growing timber?

Speculation has a fascination for men, and occasionally one gains by some lucky stroke, just as the lottery brings an occasional prize while the vast majority of tickets are blanks.

There is no investment which is so sure of producing a regular and legitimate income as that of well-situated lands. Yet, when to this is added the increment of growing timber trees of proper kind, one need not look for a more profitable or safe means of employing

one's capital. How to realize a safe income and yet not kill the golden-egged goose is an important consideration, and this we purpose discussing.

There are elements of uncertainty in every human calculation. Fire may destroy the entire body of inflammable timber and the land may be left with greatly depreciated valuation; hence, every effort should be made to protect the property from such disaster. This is a duty of the State and National government in return for taxes demanded of the owner, as much so as that a fire department should be maintained in a city.

It is an act of dishonesty for any community to "hold up" the owner of a forest tract for heavy taxes each year and render no equivalent in the protection of such property. Laws should be enacted and officers instructed to enforce such laws as will adequately protect timber from malicious and careless trespassers who leave camp fires burning which the wind may fan into a great conflagration. Severe penalties should be provided by law for causing fires, and carelessness under the guise of accident should be no excuse.

Fire wardens and patrols in large forest districts should be greatly increased. A woolen mill, with oil-saturated rags, may at times cause spontaneous combustion, but there never was an instance of such in a forest. The burning end of a match, cigar or cigarette often causes destructive fires. Fire guards properly arranged will check the advance of a fire, but they must be closely watched during the summer and autumn, as dry

leaves accumulate, and an ample space be kept clear of inflammable debris.

Lumbering.

The usual method of lumbering is first to cut and remove all good trees of sufficient size to make boards. Trees of inferior size are next made into ties, the remainder being cut into cord wood.

In proximity to pulp mills, suitable trees are converted into paper. To facilitate logging operations, teamsters and loggers are permitted to cut away much if not all young growth. In this manner the entire forest is quickly destroyed.

If this should be rich agricultural land it may bring a good price after the timber has been sold; otherwise it may be without material value. Now, this property having been converted into cash, some other investment must be sought in order that the money may continue its earning capacity.

The land has ceased to produce an income. Has it paid the owner for his time, trouble and use of the capital employed?

Rather would it not have been better if only a portion of the timber were removed, leaving the younger trees for a future cutting. If the tract be a large one, a twenty years' rotation would make it a source of perpetual productiveness. There are many tracts of forest land which were cut over twenty years ago, and which are now ready for a second or even third harvest.

Under proper conditions trees continue to grow, adding to their bulk each year, until they are ripe or have become mature. Then they decrease in value annually until they have ceased to exist and become a part of the soil from which they are produced.

To cut a tree in its prime, while in

healthy, growing condition, is waste, and to destroy younger trees which have required from ten to a score of years to develop thus far is a useless sacrifice.

On the other hand, to permit trees to pass their day of greatest usefulness and enter upon a decline is equally unwise. Just when to cut trees requires judgment and careful observation.

Often one mature tree, if left, will prevent the development of many small growths near by. Thrifty trees of greater value should always be preserved, removing those of lesser worth where they interfere with the development of more valuable young timber.

A proper stand of trees on the ground should be maintained. When too thickly growing, all are stunted, as they can not maintain a vigorous existence. On the other hand, land unoccupied is a source of loss which must detract from the value of the whole. Therefore every space should be growing some tree; if they do not exist naturally or have been cut away, other trees should be planted in these vacancies.

It has been the constant practice of many farmers who own wood lots of mixed varieties of timber to cut the choicest for home use or to sell, as these produced the most money at the time. And thus we find, in many localities, only the trees of least value are left. This gives rise to the opinion that timber lands are unprofitable. A mixed forest, while a beautiful object, is not so sure a money-maker as where most of the trees are of one variety.

In the Middle States the forests were of oak, basswood, sycamore, hickory, ash, sugar maple, hackberry, walnut, yellow poplar, beech, elm, etc., with paw paw, haw, willow, and various shrub growths filling in the gaps. In this way all these trees are of value, but the lumberman

will pay cash for the oak and walnut, a lower price for others and totally refuse the great majority of trees. If all were yellow poplar or oak, ash or walnut the demand would be far greater and prices obtained more remunerative. Thus artificial plantations are more profitable when all are of one kind of timber. Every worthless tree or those of little value occupy space which should be producing more important timber.

Taxation of Forests.

The various State governments are largely responsible for the loss of the forests, the value of which, for climatic effect, and for future manufacturing industries, it yet too little understood.

The assessment of forest property, where it is held especially for this purpose, should be upon a very low basis. It is unjust to the people who will come after us, and who must build upon the foundation which this generation is erecting, that the forests are being sacrificed; and to a large extent this is a result of excessive taxation upon forest lands without affording adequate protection to this class of property.

The Indiana law, which provides that forests shall be assessed for taxation at a specific and low valuation, is the true method of taxing timber lands. This law may be found on Page 142, February ARBORICULTURE. By a proper effort, of the lumbermen of any State proper legislation can be secured to encourage and promote forest holdings.

Replanting Forest Lands.

The sandy lands of Florida were but recently covered with a fine body of yellow pine. The practice of the early settlers of burning of the annual vegetation in order to have fresh grass for stock, totally destroyed all young growths; hence new pine forests can not

exist. The boxing for turpentine has not been conducive to forest perpetuation, as the trees are being slowly killed by the process.

The average crops, always certain so long as surrounding forests kept off excessive frosts, and the early market gardens protected by the woodlands have been gradually becoming more precarious as the lands become denuded.

These should be restored wherever the lands are not needed for cultivation. Such lands, if seeded, naturally or planted, will produce pine timber; although possibly some other trees will be more quickly profitable.

The Michigan pine barrens, after removal of the timber, have very little worth. There is ample moisture in Northern Michigan to insure good tree growth, and there are other varieties of timber which will succeed on these lands.

Now that wood pulp is in such demand, extensive tracts of poplars should be planted. If the common cottonwood will not succeed there are many other forms of the populus family which may be grown profitably. The Abele is of quick growth, easily propagated, requires little attention while growing, and makes good paper.

The poor, sandy soils would be greatly enriched, and possibly be made of great value for cultivation in crops by a twenty-year service in growing Abele or other poplars, providing fires were kept out.

Lombardy poplar, Canada balsam, or Balm of Gilead all have fiber suitable for wood pulp. As these are all grown from cuttings, the expense of planting need not be great.

Pine Succeeded by Nut Trees and Hard Woods.

We are frequently asked why these succeed pines and coniferous trees when

the latter have been lumbered; some have asked if this is nature's method of rotation.

When pines are removed, there is no seed left to reproduce these forests, while squirrels and other small animals, birds, the wind and flowing water, at times bring acorns, nuts, fruit of berry trees and light-winged seeds from long distances, and old, decaying stumps make excellent perches and nesting-places for these great tree planters of nature. If frequent seed trees were left when clearing timber nature would reproduce the forest. This should always be done.

Profits in Paper.

Trees suitable for wood pulp need not be so large as for lumber, and a dozen years will produce good returns in the quick-growing soft woods. Yellow poplar, which is not a poplar, but liriodendron, willows, and similar soft woods are suitable for pulp, many of them may be grown from cuttings. All will grow on sandy land if moisture is present, although of course they make more progress in rich land.

Essentially Northern localities are preferable for pulp. With land at low prices, taxation moderate and labor obtainable at fair rates, money will be well invested in growing paper stock.

The Carolina poplar, or cottonwood, Aspen and Abele will grow in ten or twelve years, and may be planted 7x7 feet, or 900 trees per acre.

Black walnut grows rapidly in moderately rich soil. The nuts should be planted in autumn or kept moist until early spring, and planted where the trees are to remain. They may be used to fill in gaps in the wood land, or with system placed in solid forest. Unless grass is abundant no cultivation will be

needed in forest, but young groves should be thoroughly cultivated for several years.

In the South the pecan is destined to become and remain a profitable nut tree, and will always be in demand as timber. Where carriage spokes are to come from in the future is hard to tell. Pecan and other forms of hickory are becoming very scarce. Here, too, the nuts should be planted where they are to remain, at least not attempting to transplant nut trees after the first year.

The chestnut is indigenous to New England, Pennsylvania, New York and the mountains of West Virginia and Tennessee. Here this tree should be extensively grown to replace the forests now so rapidly disappearing.

The chestnut grows from the stump after the tree is cut, reproducing itself perpetually. It is of rapid growth, and useful for lumber, crossties, posts, etc. The young sprouts are used for barrel hoops, where abundant. It might be profitable to plant for this purpose.

NEW BOOK FOR CHILDREN.

Doubleday, Page & Co., New York, have *Two Little Savages*, by Ernest Thompson Seaton, for the holidays. Such a writer as Mr. Seaton, combining the flow of language in entertaining fiction with a thorough knowledge of nature, of beasts and birds, trees and flowers in their wild, native state, can not fail to attract great interest whether on the lecture platform or in his books of woodcraft. The youth who reads this book learns much of nature while being entertained with the story. The profuse illustrations will enable any one to go into the woods and recognize many of the plants, trees, birds and common animals, and this is science, popularized. The book should stimulate children to a further study of nature. It is a good and safe book for parents to give their children. Price \$1.75 net.

Renew Instead of Destroying the Forests.

In 1828 my grandfather, with four brothers, came to Hendricks county, Indiana, from Clark county, Kentucky. At that time this part of Indiana was nut and other hard woods. Destruction of a portion of this timber seemed necessary in order to get open ground for crop purposes. Thirty years later, my father, then twenty-four years old, saw, during a period of ten years, enough prime walnut, oak and poplar rolled up in great log heaps and burned to have made himself immensely wealthy. Neither he nor his parents and neighbors little dreamed of the coming value of this vast amount of native timber. To-day Indiana sees the need of a crop that took in many instances several hundred years to produce.

The early settlers of Indiana were not to blame because they had no idea of the wonderful development of the Middle West and the United States in so short a space of time. What is true of Indiana is true of many portions of the country. There are thousands of men and women not yet seventy years of age who can testify to the above facts.

Lumbering.

Most of the lumbermen of to-day, as well as of the past, only see the present timber value in the standing forests. They do not consider the importance of a new forest to take the place of the one which the unseen power always at work has provided for them. The carelessness in many instances is simply appalling. This negligence causes fire to overrun the cut over land, totally destroying what seed and young seedlings may

have been left. Conservative lumbering is a subject every owner of timber land ought to familiarize himself with.

The Middle West.

I mean by the "Middle West" the vast stretch of rolling and level prairie between the Missouri river and the eastern slope of the Rocky mountains. This land has been treeless for centuries, yet we have many evidences of new forests being established. These not only beautify the landscape, but are a source of great profit to the owner in the way of posts, poles and fuel.

The State of Kansas has many successful plantations of catalpa, locust, walnut, Osage orange and other sorts that have been growing from ten to forty years. They constitute the most valuable part of the farms to which they belong.

Small Timber Lots.

I will cite three small timber lots growing in Shawnee county, Kans. The first one was planted by Mr. M— in the spring of 1884. It consists of about one and one-fourth acres of a prairie hillside slope too steep for general farming. The trees are catalpa speciosa, and stand about 5x12 feet. This lot received fairly good care for the first three or four years, since that time it has been left without care, except the occasional removal of an unsightly limb. The standing timber will net the present owner at least \$225.00, many of the sticks sound and straight to a height of 12 to 15 feet, with a 5-inch top.

The second lot belongs to Mr. L— . It is situated on both sides of a large, open draw running across his farm.

The winding water course made this land worthless for crop purposes on account of constant overflowing during the growing season. This land was plowed out so as to make straight lines for cultivating, and planted to catalpa speciosa and Russian mulberries in alternate rows about eight feet apart. At seventeen years of age the catalpas have almost smothered the mulberries, they having only been useful as nurse trees. The catalpas are tall, smooth and straight, a large portion of the trees making a clean cut for 10 or 14 feet, with a 4 or 5-inch top. Such a stick will easily bring from 4 to 7 cents. Mr. L—— has not only made a good investment, but he has improved the looks of his farm by covering up the unsightly draw.

The third timber lot belongs to a Mr. T——, and is only four or five years old. Mr. T—— owns a sandy river bottom farm. Across the farm is an old river bed, the sides of which are quite steep and have never been used for crops. The scattering willows and cottonwoods were removed, the land plowed the best that could be done, and planted to catalpa speciosa and Osage orange. The wood growth on this land has been wonderful, notwithstanding the terrible drouth of 1901 and the great flood of this valley in 1903.

Mr. T——, in a letter, says: "It will not be long until the two sandy ridges will be the most valuable part of my farm."

These three cases will illustrate what can be done on almost every 160-acre farm in the country.

Location.

One of the most important points about timber growing is the location; it is well to be where the stock will be in the greatest demand when grown. It

would be poor judgment to go to the hills of Arkansas and undertake to grow timber where the population is and always will be small; but on the rich level prairies of Kansas and Nebraska, the situation is entirely different. It must be remembered that Barton county, Kansas, situated in the Arkansas river valley, considerably west of the center of the State, grew over five million bushels of wheat in 1903, to say nothing of the corn, alfalfa, hogs, cattle, etc. In a locality producing such large quantities of cereals and live stock, the present and future demand will always be good for timber.

Freight Rates.

The item of freight enters more largely into the cost of post and pole stock than almost anything else. Posts being bulky, it is impossible to get a large number in a car.

GEORGE W. TINCHER.

THE BILTMORE FOREST SCHOOL.

We take pleasure in calling attention of young men to the Biltmore Forestry School, near Asheville, North Carolina.

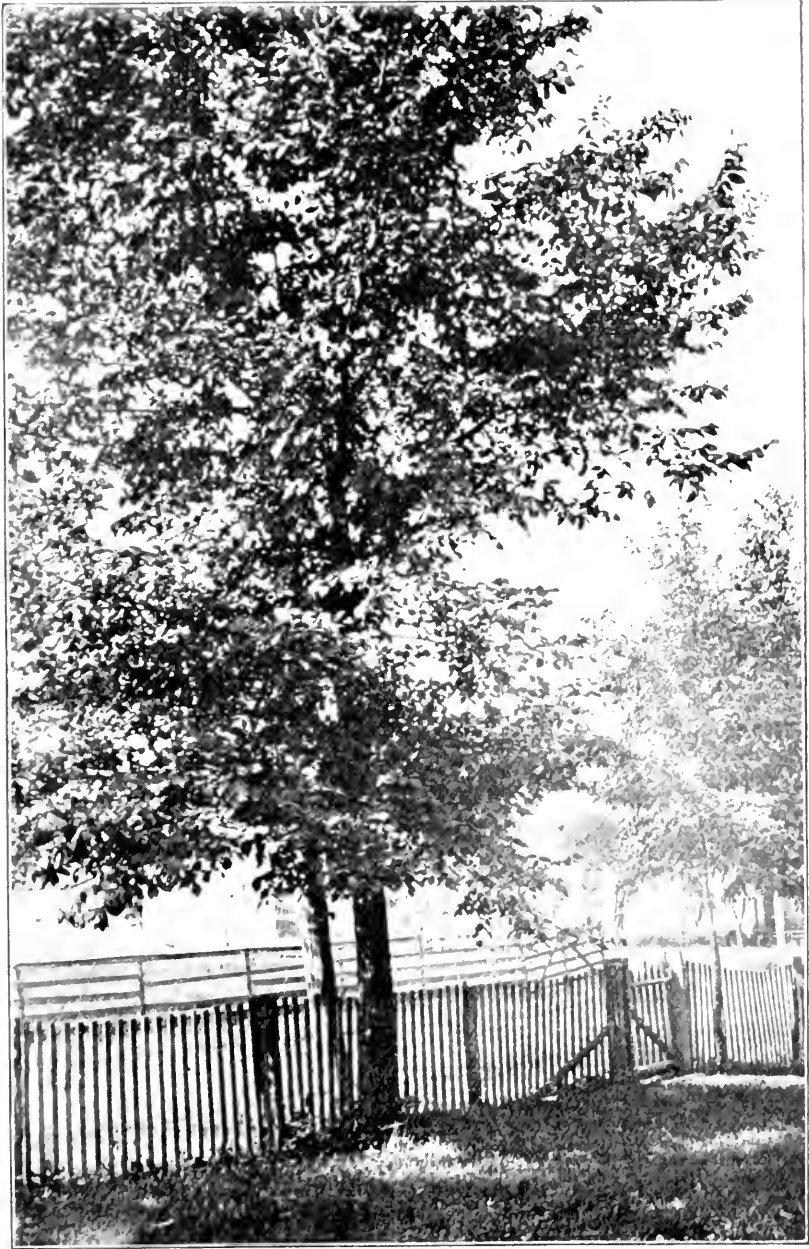
This is eminently a practical school, Dr. C. A. Schenck being director.

Entrance Requirements.

The Biltmore Forest School is open—

1. To college graduates;
2. To applicants of good education and thorough business training, over 20 years old, especially to lumbermen and to the sons of forest owners;
3. To special students, for special lectures, and under special arrangements.

Candidates for admission are required to submit certificates relative to moral character and to previous training. An applicant unable to proffer sufficient certificates of educational standing must prove his qualification by passing an entrance examination to be previously held at Biltmore.



HOME ELM TREE.

Excellent Tree Growth.

On the opposite page is shown a white elm tree planted by the editor of ARBORICULTURE at his home, in 1893. In ten years it has grown from a little switch to be 35 feet high, 30 inches girth 8 feet from the ground, 35 inches at 4 feet high, and 40½ inches a foot from the ground.

Other similar trees planted at the same time and before are now 5 inches in diameter. What makes the difference?

This tree was planted in a hole made large enough to receive the roots without crowding. It is in fairly good clay soil, and has received some water during each summer, and has ample room to expand its roots in good soil.

People who plant street trees in post holes and expect them to make such progress naturally are disappointed at results. Those who plant 4x4 feet in forest never obtained such trees.

Hundreds of elm trees have been transplanted in our cities which at time of removal were as large as this tree now is, and after years of waiting the trees may be alive, but are no larger than when removed.

The roots of this tree now occupy a

surface space of 400 square feet. In a forest plantation where trees are set 4x4 feet each tree must subsist in what water and food it can obtain on 16 square feet surface, 25 trees occupying the same area which this elm demands. Is it hard to understand why the great Farlington plantation after a quarter of a century has never produced a tree large enough for a crosstie? Is it not easy to see that careful planting, good culture, sufficient water, ample room for root growth, will make a slow-growing elm grow into a handsome shade tree in one decade?

Is it not evident that with patience, planting small trees and giving them proper attention will give greater and quicker results than removing a large tree and saving only a few of the roots? Hard by are some maples, one a sugar maple, others the soft or silver maple, which were planted two years later. The sugar tree, 8 years old, is 20 feet high and 13½ inches girth—a far better tree, yet not quite so large a girth—than any of the soft maples. All these have had the same care, and practically the same cultivation.

It pays to do things right.

Plant the Eucalyptus.

It is a mystery why, in this climate and soil, where lands are so cheap, the eucalyptus or Australian blue gum tree is not planted. Conditions are very similar to those in California, where the tree flourishes and where it is grown for wood and timber at a profit. Twenty acres in blue gum would be a little fortune in a few years, just for wood.—Chihuahua (Mex.) *Enterprise*.

Similar conditions exist in Transpecos, Texas, and if the eucalyptus will grow in Chihuahua it ought also to grow here. Besides its economic value, it is a stately tree and would add much to the

beauty of the landscape.—Alpine (Tex.) *Avalanche*.

ARBORICULTURE frequently urged the people of Texas, Mexico, and the Gulf States to plant the eucalyptus, which is of rapid growth and of great value for fuel and lumber. It is easily grown from young, one-year plants, or from seed for that matter, and in a country so destitute of economic woods as the tablelands of Mexico and the western portion of Texas, land owners should be awakening to the necessity and desirability of growing timber. Send to ARBORICULTURE for seed.

TOPEKA STREET TREES.

At Oakland, a suburb of Topeka, Kansas, in 1890, Geo. W. Tinscher planted a large number of catalpa trees for the town company, which was laying out this addition.

The trees were from seed sown in 1882, transplanted in 1883, and grown in a crowded nursery until 1890. The first eight years, therefore, were in a thicket, and little progress was made. The trees were 21½ inches thick when finally set on the street lines. Many of these trees would now, after thirteen years' time, make from one to four railway crossties. The cutting back at transplanting caused a branching habit, with low heads, therefore the trees are not suited for telegraph poles, nor will they make much lumber, but have good bodies eight or nine feet in length to first branches.

We measured some of the trees as follows:

No. 1—Diameter one foot from ground, 22 inches; at eight feet high, 15 inches.

No. 2—Diameter one foot from ground, 24 inches; at eight feet high, 17 inches.

No. 3—Diameter one foot from ground, 28.3 inches; at eight feet high, 18.7 inches.

These trees were green and in full leaf October 20, while cottonwood, box elder and other trees had shed most of their leaves.

That the seed was sown twenty-one years ago is of no consequence, for the loss of time in transplanting, heading back, and dwarfing in crowded nursery was very great. One year trees set at same time are as large. The fact must be remembered that these trees, during the thirteen years past, have had ample room for root expansion, not 4x4 foot planting.

Neglect to sever side branches has caused low growth, yet some are very straight and upright. Sawed into crossties 6½x8 inches 8½ feet long, tree No. 1 would make two acceptable ties. No. 2 will make three crossties, while No. 3 is of sufficient size for five ties, one being from main branch. Here is a fair basis from which to determine timber growth for tie purposes from the catalpa.

RAILWAY ACCIDENTS.

A few days ago a train was wrecked in Colorado and another in the city limits of Indianapolis, both of which were horrible in their results. Once in a long time such accidents occur, and always will there be repetitions so long as fallible human beings forget to perform a duty, or the devil, in human garb, removes the rail fastenings for the purpose of robbery.

One of the roads mentioned sends one hundred and fifty trains on their journey each day, or 54,750 passenger trains during the year. In the United States there of 1,184 railways which start 500 million passengers trains on their missions every year. Once in a while something goes wrong, a train is wrecked, somebody is killed. Out of five hundred millions of passengers carried, one is hurt by an accident.

The editor of ARBORICULTURE has traveled, in the sixty years of his life, five hundred thousand miles, yet has never seen a serious accident. In these times of excitement-loving people, and reporters on the alert for anything which will feed this abnormal desire for sensations of our people, each accident is sent over the wires and published in hundreds of papers, and too often a simple affair is magnified into mammoth proportions.

It is safer to ride upon the railways of the country than to work in any factory or labor upon one's farm.

OLIVER CHANUTE.

We had the pleasure of traveling with Mr. Chanutte through Southern Illinois recently, where, with the officials of the Big Four Railway, he was selecting locations for tie-preserving plants. Now that timber is so rapidly advancing in price, the railways are greatly interested in methods of wood preservation.

ARBORICULTURE is strongly in favor of everything which will make the stock of timber in America last longer, do better service, and prolong the time which our forests may be continued.

While we advocate the extensive planting of economic trees; yet it is quite apparent that, with the rapid decrease in forest areas, it will be impossible to secure the planting of trees in such numbers as will maintain an equilibrium, unless Congress and the various State Legislatures shall become aroused to the necessity of prompt and vigorous measures to check the waste and fires, and insure the planting of greater forest areas, and until the farmers are educated to the profitable character of tree culture.

It thus behooves us to increase the usefulness and durability of common woods. Through the efforts, study and careful experiments of Mr. Chanutte, the durability of beech, elm, maple, gum, and similar woods, is trebled; and thus we are enabled to perpetuate the more valuable woods by substituting those of short duration through methods of wood preservatives. Along in the sixties the writer, then a correspondent of the Lawrence (Kans.) *Journal*, made a visit to the Missouri river bridge at Kansas City, which Mr. Chanutte was then building. This was a wonderful piece of engineering skill.

Another instance of Mr. Chanutte's foresight was the planting of large bodies of catalpa timber on the line of the L. L. & G. Ry., of which he was the president forty years ago.

PROFIT IN PINE TREES.

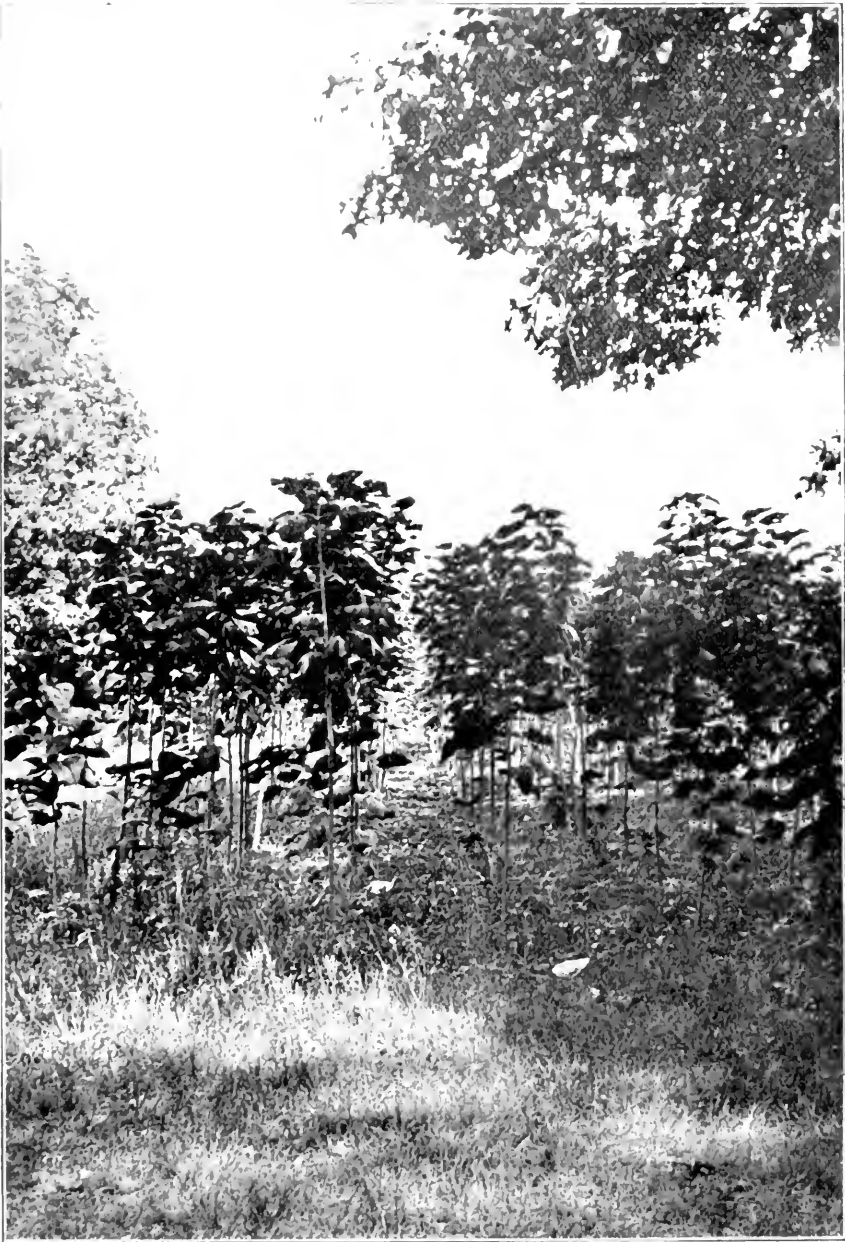
John Murphy, a farmer of Fayette county, Indiana, is now 68 years of age. When he was 18 years old he planted a number of evergreens on the farm which has always been his home. Arbor vita, fir and pine were planted, all of which died except the white pine. The top of this was broken by a cyclone. Then Mr. Murphy cut the tree and had it sawed into lumber.

Only one twelve-foot log was saved from the broken tree, which was 24 inches in diameter at top and 31 at the stump. It made 300 feet of lumber.

Mr. Murphy is the owner of 227 acres, part of which is yet in woodlands; ash, oak, etc., which he does not consider of great profit on account of the inferior character of the wood. Now suppose, that when this pine was planted one hundred acres of his farm had been used for the same purpose, the trees set 20x20 feet, or 100 trees per acre. He would now have for sale three million feet of white pine lumber, which, at \$10 per 1,000 feet, net—a low price, truly, but safe for an estimate—that portion of his farm would now be worth \$30,000, which is equivalent to 6 per cent. interest compounded annually on an investment of \$2,000 for fifty years.

Mr. John Murphy can not turn the wheels of time backwards and begin life anew by planting his farm in white pine. Yet there are a million farmers in the United States who can and should begin now to plant pine, walnut, catalpa and other trees with which to supply the future manufacturers and commerce with lumber, and incidentally to provide an ample income for their old age.

White Pine Seedlings for forest planting may be obtained very cheaply from Thomas Meehan & Sons, Dreshertown, Pa. Write for prices.



OHIO EXPERIMENT STATION.

Ohio Experiment Station, Wooster.

The city of Wooster is a gem, nestling among a forest of shade trees, possibly it may be somewhat old-fashioned, yet comfortable and home-like residences abound. It is strictly an educational city. The university is one of which Ohio as well as Wooster may well be proud.

The experiment station has quite extensive grounds, partly wooded, and a portion in cultivation. Much good taste and excellent judgment has been displayed in the arrangement of the grounds and in the trees which have been planted for ornament and for experimental purposes. The forestry experiments, while not extensive, are enough to show the relative growths and advantages of several varieties of timber.

The first block of catalpa, three years planted, some of which have made phenomenal growth, is shown on opposite page. They are twelve feet high and some are $3\frac{1}{2}$ inches diameter. The distance, 4×4 feet, is much too close. While it is the intention to thin them out to 8×8 feet; yet, as such experiments are for the education of the people and not one planter in ten thousand would ever thin them in time or before they are seriously injured by crowding. It is not a desirable method of instructing farmers.

The next block of catalpas is of the present year's planting, and are 4×6 feet, still too close. The stand is good, and trees healthy and vigorous. All should be cut off at the ground and a new trunk formed. There are a few double trees which are always monstros-

ities. No tree should have two heads; start them right and fine trunks will follow.

The block of Osage oranges has made many vigorous shoots, and demonstrate the futility of securing good trees from the *bow d' arc*. The thorns make it difficult to cultivate, prune and work among, while the extreme hardness of the wood soon dulls edge tools. There are places where the osage may be grown to advantage, but other trees are far more valuable.

The block of black locust is doing finely. For the Ohio river hills there is no better tree, and it should be more extensively planted by farmers.

There is no subject of greater importance to the people of Ohio than the forests, and the experiments might well be extended greatly by planting ash, maple, the oaks, etc., in blocks to show the rapidity of growth and mode of management. As an object lesson, a block of walnut would be worth far more than its cost to the State.

This is one of Ohio's best native trees, and its value and importance is well known. How to make its culture profitable, how to cultivate, how to manage it in plantation, with trial plots, would be of inestimable value to Ohio farmers. There is no farm crop grown in Ohio which has a greater importance to the State, and it would be well to return a share of the worn lands to forest for future manufactories and industries of the State. Wooster is the proper place for such experiments and teachings.

Where our Forests are Going.

In the United States alone some 4,000,000 feet of pine lumber are used every year for matches, or the equivalent of the product of 400 acres of good virgin forest. About 620,000,000 crossties are now laid on American railroads and 90,000,000 new ties are required annually for renewals. The amount of timber used every year for ties alone is equivalent to 3,000,000,000 feet of lumber. There are now standing nearly 7,500,000 telegraph poles. The average life of a telegraph pole is about ten years, so that nearly 750,000 new poles are required every year for renewals. These figures do not include telephone poles and the poles required on new railroad lines. The total annual consumption of timber for ties and poles is equivalent to the amount of timber grown on 100,000 acres of good virgin forest. For making shoe pegs the amount of wood used in a single year is equal to the product of fully 3,000 acres of good second growth hardwood land. Lasts and boot trees require at least 500,000 cords more. Most newspaper and packing paper is made from wood. Although this industry has been developed only within the last forty years, yet the amount of wood consumed for paper during that time has been enormous. The total annual consumption of wood for paper pulp is equivalent to over 800,000,000 board feet of timber, for which it would be necessary, were the trees all growing together, to cut some 80,000 acres of prime woods.—*Christian Work*.

Here is material for a sermon. Matches, a necessity; crossties, essential to modern commerce; telegraph poles, re-

quired to maintain communication between a thousand cities. We doubt if shoe pegs are still used to the extent requiring three thousand acres of timber annually, since the sewing machine, with flax and cotton thread have become so common in shoe manufacture. Undoubtedly a far less quantity of wood pulp could be used with benefit to mankind. The great daily newspapers have reached the limit of expansion; if but half their present size it would be a public benefaction. Yet, our saying so is not by any means reducing the acreage cleared for wood pulp.

How can all these conditions be improved?

The only remedy that is practical is to plant more trees, and plant them abundantly. Yes, and systematically. This continent has ample land better suited for growing timber than for agricultural cropping. In a natural wood trees grow slowly; the excessive number of trees starve each other and prevent rapid development. A century is required for nature to produce a forest. Many thousands of weaker trees must be smothered out by stronger growths before the latter can secure their needed nourishment. On this account systematic planting and thorough cultivation will secure a better forest in thirty years than can be produced by nature in a hundred. Contractors procure ties by cutting scant growth timber on a thousand hills and hauling them over miles of roughest roads to the railway. It requires many square miles of native timber to feed the maw of our great railways, yet a much smaller area of land

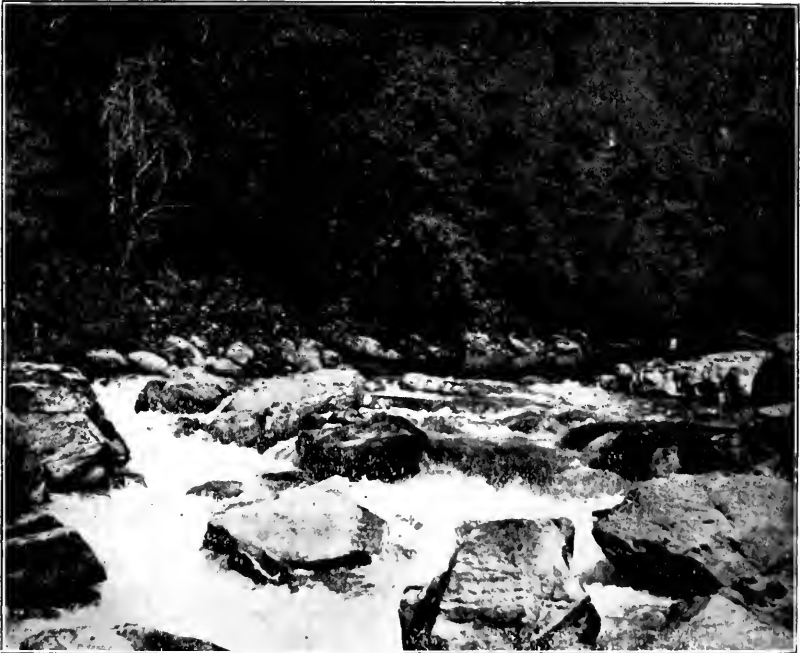
growing with suitable timber will supply the demand and avoid such long, rough hauls.

Quick growing, soft wood trees, on land too moist for farm crops, will furnish paper pulp in all the quantities required, if planted systematically and *at once*.

An army of investigators sent out to determine the possibility of growing trees, may consume a score of years, yet nothing be accomplished, but an equal expenditure of money and labor, in ac-

tual planting of trees, will bring results in less time. Stop considering whether or not trees will grow and begin planting in sober earnest in such magnitude as will keep pace with the consumption. If a tree removed will produce a dollar's worth of lumber, plant a tree costing a dime in its place. Go ahead with the luming, but do it intelligently, without waste. Proceed with the manufactures, but plant enough trees to equal those cut down.

Do things, and quit talking about it.







BIG-PINEY RIVER



OKLAHOMA WHEAT FIELD



OKLAHOMA COTTON FIELD



GASCONADE RIVER

PLACES TO
WORK AND REST

ON THE



FRISCO
SYSTEM

PENNSYLVANIA LETTER AND
REPLY.

EDITOR ARBORICULTURE:

I own fifty acres of wet, marshy land, which grows little or nothing but moss. There are white birch and a few maples scattered over it. I want to plant a lot of forest tree seedlings, and have been thinking of buying cottonwood, ash, elm, willow and black walnut. Location in Pocono mountain, nearly 2,000 feet above sea level.

Please inform me what you believe to be best adapted and most profitable, also where seedlings may be obtained. K.

Reply.

What you should plant may depend upon what you expect in return. Cotton wood will make paper stock; a timber return of comparatively small value for a small farm.

Elm will make barrel hoops, a useful but not very profitable timber growth for a long-time investment.

Willow may be made into gunpowder, but as a forest product is of small value.

Ash is an excellent lumber, and for handles which will always be in demand at remunerative prices.

Walnut has a very high value, and grows much more quickly than is generally supposed. I do not know how it succeeds in your location. Plant the nuts where they are to remain. Do not transplant.

Do not try too many kinds of trees. One tree will only sell for cord wood, while fifty acres in the same kind of timber will bring cash buyers at highest possible prices for lumber.

Aim high; reach for good returns; plant what will bring highest prices in quickest time; do not mix things up; all should be pine, walnut or some good, high-grade timber trees.

Weeds don't pay. Rag weeds and thistles are not the only pests of the farmer, there are others; for instance, in the forest an unprofitable growth occupying space without producing an income, crowding out good trees which possess high value; these are weeds.

Try catalpa speciosa. It succeeds in your State. In Colorado the catalpa thrives at 6,000 feet elevation; you are but 2,000 feet. In Maine it grows at 45 degrees north latitude; yours is but 41 degrees.

The D. L. & W. Ry. will be glad to pay you cash for all the ties and lumber you can raise. Your market is the best; soil and location suit the catalpa, so also the walnut, I think; and probably white pine.

The Forest Nursery Co., Ashland, Ohio, can supply trees of catalpa.

Walter Brown, Connersville, Ind., can send you walnuts if not obtainable nearer home.

Subscribe for ARBORICULTURE. It will keep you informed on all these subjects.

KENTUCKY TIMBER LANDS.

We have just returned from a trip into the mountains of Eastern Kentucky, at the headwaters of the several rivers which rise in the mountains. The demand has been so great for ties, lumber and timbers in recent years that all forest growths are being rapidly consumed. The difference is plainly apparent along the railway lines over which we passed three years ago. All the mountain sides now being bared of valuable trees.

At each station in the white oak belt are huge piles of crossties, awaiting shipment. These have been hauled from fifteen to twenty miles over rough mountain roads.

In a horseback trip of one hundred miles beyond the railway, we failed to find one really good tract of primeval forest, and a remarkably small area of good white and chestnut oak timber.

Very small tributary streams have been utilized to drive logs and ties to the Kentucky, Big Sandy, Licking and other rivers where they could be conveyed to mills and shipping stations on the railways.

Every good yellow poplar tree has been removed except in more remote and inaccessible locations. A score of Northern railways have had their buyers in this district for several years, and immense quantities of ties have been made, but the end is not far distant.

Licking river, now almost dry, in its southernmost arm is in places well filled with logs waiting for water to float them. A majority of these logs are of such inferior character, hollow, knotty and badly decayed they would have been unsaleable three years ago. Everything goes now that will make a few feet of common lumber.

Possibly a dozen walnut logs—not more—were seen on the trip. The steep mountain sides are being plowed, cultivated in-corn, washed into gullies, and in a few years will be worthless from erosion. This mountain land is of low value after removal of the timber, unless minerals are found, and would be the most remunerative portion of the State if they could be reclothed with forests.

Kentucky statesmen would do well to consider this subject.

The Inter-Ocean says it is generally admitted that football is a game that does not result in any particular harm to those who survive it without suffering any internal or external injuries.

SOMEBODY'S HURT: A ROAST FOR ARBORICULTURE.

The Magazine Is Read, If Not Paid For.

Jamaica Plains, Mass., Nov. 2, 1903.

Mr. John P. Brown:

Dear Sir—Your note requesting payment of subscription to ARBORICULTURE has been received. I have to say that I never subscribed for it and have supposed that it was sent out as a sort of advertisement of railroads, etc., which occupy an important part of the journal, as I frequently received so-called magazines and papers which are freely distributed for the advertising.

There is so much in the nature of advertising, so much repetition, and so much that has nothing to do with arboriculture or forestry that the paper is not worth to me the price of subscription.

In the September number, for example, I fail to see what "arboriculture" has to do with "Mexicos Volcanoes," "The Water Supply of an Inland City," "Our Duty to Panama," "Indiana State Fair," "The Philippines," "Minor Industries of Mexico," "Beautiful Gladiola," etc., etc. Worse than all this, however, I regard your article in the same number entitled "A Setback to Scientific Forestry." That you should quote and endorse such an unfair, ignorantly written or prejudiced article, without giving Professor Fernow or those interested in the Cornell Forestry School an opportunity first to explain, shows a very poor judgment to say the least, and I believe such an article has done more harm than many issues of the paper can remedy. I happen to know something of the rotten politics in the Cornell matter, and I have no use for the paper that endorses this sort of thing. Yours truly, J. G. J.



COMMERCE IN MEXICO.
Burro trains leading for the mountains at railway station, Mexico City.

THE CORNELL FORESTRY SCHOOL.

Dear Sir—I have great respect for Mr. Fernow, but everyone sometimes misjudges a situation. There are, roughly speaking, three kinds of forestry:

1. Forestry proper, which aims to get the largest possible timber product from a piece of land, regardless of every other consideration.
2. Protective forestry, which aims rather to secure some benefit apart from mere wood product, like shelter from wind or conservation of water.
3. Landscape forestry, which seeks beauty for the eye and thus satisfaction to the mind, rather than the more material benefits afforded by the two previous types just mentioned.

It seems to me that Mr. Fernow was virtually acting as trustee for the people of New York in handling this great natural domain, yet subject to their pleasure. They trusted him as one who would carefully consider the whole subject and not confine too specifically to the first proposition, or Forestry proper. As a trained forester in the strict sense of the word, he may have acted wisely, but in his enthusiasm to better the stand of timber, he apparently lost sight of the third article of faith, which takes in a vast body of influential men and women who are opposed to any system that advocates the cutting of large trees in such fashion as to sensibly diminish their present limited area.

It was in all probability this widespread, silent disapproval that brought out Governor O'dell's opposition. The people of New York are willing to pay for a great natural reservation of this description, but they are not ready to see so large a space treated as a school for lumbering. They don't care whether

it pays for itself or not, provided they have the trees which they now see, left largely undisturbed, even though they may not represent the best type of possible growth. This mental condition is a conservative and healthy one; not an unusual frame of mind that calls for criticism or discipline.

Let the larger trees stand for the present. If Mr. Fernow had treated a small portion of the property as he wished, and shown and proved to the people that under proper conditions much good could be eventually accomplished by careful treatment, he would thus have gradually taken the public into his confidence.

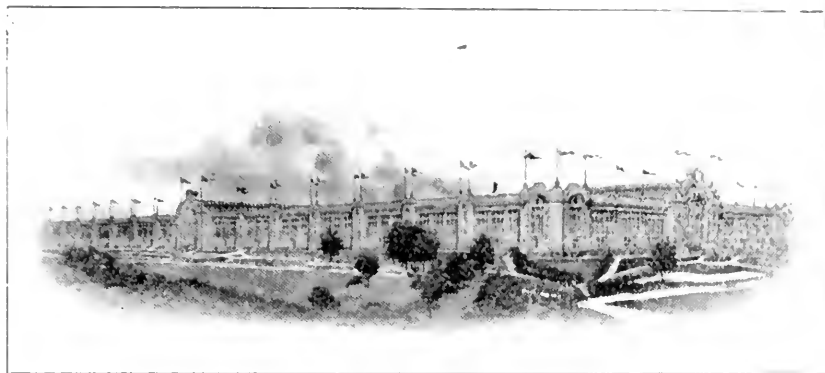
He has simply moved too rapidly for the average outsider to keep pace with him, and the result is that the outsider says, "Stop! I do not like this, you are spoiling my woods, and I would rather that nothing whatever be done than that such devastation take place!" This seems to be the situation to-day.

Mr. Fernow has apparently done no wrong; he has simply erred in judgment—a thing that any one of us might have done in this or some other form if placed in his difficult position. We, therefore, heartily sympathize with him in his disappointment; but the fact remains that the public is a slow and questioning learner, and needs to be led gently in any direction that takes it off on an unusual or scientific basis.

Very truly yours,

JAMES H. BOWDITCH.

Every number of ARBORICULTURE contains some good information to the timber land owner and lumberman. At present all back numbers can be supplied. Price, \$1.00 per volume.



AGRICULTURE BUILDING.

World's Fair Buildings.

AGRICULTURE BUILDING.

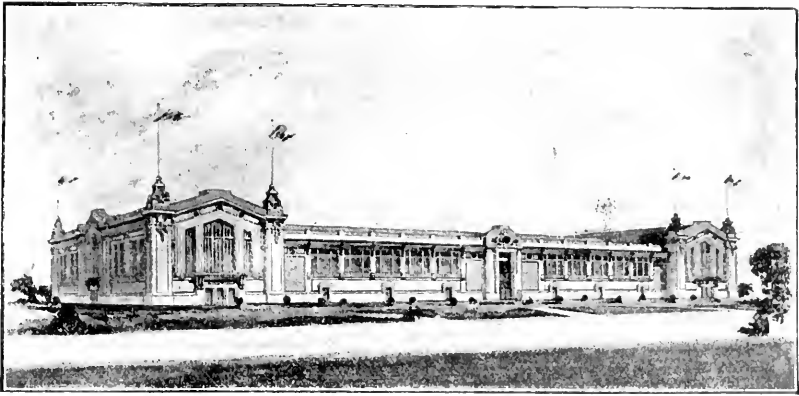
The Agriculture Building will stand on a hill just west of Skinker road and about half a mile south of the Administration Building. Its dimensions will be 500 by 1,600 feet. The long facade will be broken up into bays accentuated by piers, the latter 100 feet from center to center. The ornamentation is to be concentrated in the main entrances, of which there will be five: one in the center of each of the shorter fronts, one in center of the front on Skinker road, and two placed at equal distances on the front toward Arrowhead Lake—the western front. The openings in these entrances will be 52 feet wide and 74 feet high. A massive arch flanked by heavy pylons that rise only a short distance above the cornice make up this entrance composition.

The lighting of the building has received special attention from the architect, and will probably be the best lighted structure of the Fair. The roof will

be carried on nine bays of trusses, those in the center having a span of 106 feet. The building will have little ornamentation, and although the largest structure on the grounds, it will cost less than some of the buildings in the main architectural picture of the Fair. The contract price is \$529,940. The contractors are Caldwell & Drake, who also have the contract for the erection of the Horticulture Building.

PALACE OF FORESTRY AND FISH AND GAME.

The Palace of Forestry and Fish and Game was designed by Mr. E. L. Masqueray, Chief Designer, Division of Works. It is 600 feet by 300 feet in area and covers four acres. It will be completed in December at a cost of about \$175,000. The building is located a short distance south of the Administration Building. It has three principal entrances on the north, and three on the



FORESTRY, FISH AND GAME BUILDING.

south front. The central nave is 85 feet wide and entirely clear of posts. The ends are 85 feet in width, without posts.

Interesting features of the palace are the great aquarium and enclosures which will contain the live fish and game exhibits of many States. In the center of the building is a marine pool, 40 feet in diameter and five feet deep.

The forest resources as well as the fish and game of most of the States and many foreign countries will be exhibited in this palace. The exhibit space will be supplemented by many acres of outdoor area for displays of tree-planting, forest management, live game and other features.

Our Exhibit.

ARBORICULTURE will make an exhibit in the Forestry Building, the materials for which are now being collected. It will consist of catalpa wood in various forms, showing its durability in contact with the ground, fence posts, rails, railway ties, telegraph poles, and other articles which have been long in service.

Then articles of furniture, house-fur-

nishing materials and lumber in numerous shapes, which will show the value of catalpa wood, its handsome grain, high polish and adaptability for all the purposes of the manufacturer and builder.

Articles will be shown to exhibit its strength and tests will be made to determine its resistance. Trees in sections, and those of various ages, will enable the visitors to learn the rate of growth.

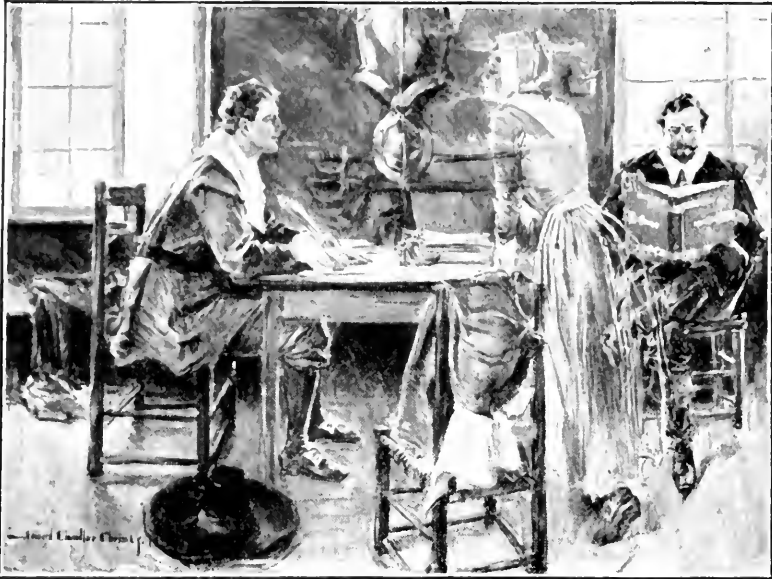
Photographs of trees in their native woods will, it is hoped, convince those who attend the St. Louis World's Fair that we have in America a tree which is destined to play a most important part in the reforestation of our country.

We have secured crossties which were in continuous use for thirty-two years—four times as long as white oak ties will last.

We have posts which almost a century ago were placed in the ground.

Altogether we hope to have an exhibit which will be of interest and can not fail to instruct any who have the subject in view.

BOOK REVIEWS



From the Christy Book for 1903. *The Courtship of Miles Standish*, with forty-two illustrations by Howard Chandler Christy.

New Publications of the Bobbs-Merrill Co., Indianapolis.

THE COURTSHIP OF MILES STANDISH, by HENRY WADSWORTH LONGFELLOW, with fifty full page illustrations by Howard Chandler Christy. Large 8vo. bound in Puritan gray cloth, in a box. Price \$3.00, postpaid.

This superb edition of Longfellow's masterpiece is the most beautiful book published in recent years. Every page of the classic love poem is faced by a full page illustration. The pictures represent Mr. Christy's best and most mature work. Twelve of the pictures are printed in six colors. Miles Standish the gallant captain, his loyal friend John Alden, and the Puritan maid Priscilla assume in these pictures, through

the magic of Mr. Christy's brush and pencil, a flesh and blood reality.

The type pages contain a series of decorations by Earl Stetson Crawford and Ralph Fletcher Seymour. In every way this is a notable book and one that will be in great demand at the holiday season.

HIS PA'S ROMANCE, by JAMES WHITCOMB RILEY. Price \$1.00 net; postage, 10 cents.

This volume contains forty-seven poems, none of which has before appeared in book form. The poems range from grave to gay, and include some of the author's best and most mature work.

The initial poem, "His Pa's Romance," in dialect, and the longest poem in the book, is a most delightful account, told by a small boy, of the courtship of his father and mother.

The volume contains many new poems of childhood and a series of songs of Hoosierdom that will delight every reader who knows and loves good poetry.

The book is fully illustrated by Will Vawter, and contains as a frontispiece a new portrait of Mr. Riley drawn by John Cecil Clay.

The Bobbs-Merrill Company, Indianapolis, have a new book, *THE WAY to the WEST*, by EMERSON HOUGH.

Few persons of our time ever saw the keel-boat which preceded steam navigation. It was a great improvement over

the flat boat, which could only float down stream with the current, for this boat, with a pointed prow, could be propelled up stream by means of poles and by cordeling with a tow line.

The history of navigation as given in the second chapter is of great interest and will be read with much pleasure as the most enticing fiction. The entire book is full of interest.

The lives of Kit Carson, Davy Crockett and Daniel Boone have an interest to everyone. They were the pioneers of our present civilization. All honor to these men. How they lived, traveled, fought wily foes, and prepared for us the homes we now enjoy, all told in pleasant enjoyable manner in "The Way of the West.

A. C. McClury & Co., Chicago, have just issued a holiday book for children, *THE STAR FAIRIES*, by EDITH OGDEN HARRISON.

Tales of fairies always have a fascination for children, and the author, who also gave us recently "Prince Silverwings, has exceeded himself in this new story book, which must greatly interest all of the little folks who may be so fortunate as to receive it as a Christmas present.

Goods books are useful and afford an enduring pleasure, and we commend "The Star Fairies. . . to our friends who are blessed with children.

THE AMERICAN BIRD MAGAZINE, published by Chas. K. Reed, Worcester, Mass., is an excellent educational work. The subjects of birds treated in plain language which any child may comprehend, is of such importance that every school child and teacher should make it a study. Subscription, \$1.00 per year.

The Forest, Fish and Game Commissioner of New York has a most valuable report, *THE ECONOMIC VALUE of BIRDS to the STATE*, by FRANK M. CHAPMAN.

This report should be sent out by the hundred thousand copies, and every school in America, should have a copy to educate farmer's children how great is the importance of our birds.

The United States Government would do well to reprint this report of New York State and distribute it to other locations which, by law, the single State of New York can not be expected to do.

The colored plates are perfect, and of course quite expensive.

ARBORICULTURE has frequently called attention to the valuable labors of the woodpeckers in searching for insects which destroy the pine and other forest trees. Also to the silly enmity which many farmers have toward the hawk family, but both these birds earn their living by preserving to the farmer his trees and his crops of grain.

This book is invaluable, and the regret is so few copies can be circulated.

Ginn & Company, Boston, have published a very excellent little book, *AGRICULTURE for BEGINNERS*, by PROFESSORS BURKETT, STEVENS and HILL, of the North Carolina College of Agriculture.

There are few farmers in North America but would be benefited by reading this book. While intended for students, yet it is a practical explanation of the various farm operations in plain language. There is a great store of information contained in small compass. Any farmer who reads it and will practice even a portion of its teachings, can not fail to improve his farm, and his bank account at the same time.

THE ENGINEERING MAGAZINE, New York and London, contains much of interest to engineers, manufacturers railway officials, as well as general public. The leading articles for October being "The Republic and the Panama Canal," with fine illustrations.

"Electric Trolley Vehicles Without Rails."

"The Steam Turbine."

"Diamond Mining in the Kimberly Field," and various reviews. It is a very interesting and valuable number.

GEOGRAPHICAL INFLUENCES in AMERICAN HISTORY — By PROF. ALBERT PERRY BRIGHAM. Cloth, 366 pages. Price \$1.25, or by mail \$1.40.

Ginn & Company, Boston, have here brought out a work of great interest and of great value to students, and also to the general reader. This work brings out vividly all the geographical features of our country, and shows why great cities have been located and why they control trade of large territories, and thus maintain supremacy. The illustrations are very fine, and descriptions are well written. There is no doubt but that

geographical influences have controlled the settlement of this country, but this work of Prof. Brigham makes it clear how these influences acted, and how, from strategic points, they controlled the movements of armies during our civil war. It is a splendid book for every schoolroom.

The American Book Company, always alert for works of highest merit, supply Dr. Frank Overton's *APPLIED PHYSIOLOGY*, including the effects of alcohol and narcotics.

In glancing through this work we find it to be as free from technical terms as is possible for a book of this character.

The chapter on poisons contains many valuable suggestions which are essential that everyone should know and which should be taught in the public schools.

It is most certain that if the youth are taught the lessons in the chapter on "Effect of Narcotics Upon the Mind," they will avoid the use of intoxicants.

The same publishers have *THE ART OF STUDY*, by DR. B. A. HINSDALE. A perusal of this volume gives the assurance that a great majority of mankind do not know how to apply themselves properly to study or work.

The book is essentially one for teachers, but it is far from being uninteresting to those who wish to form and maintain such discipline as will enable them to accomplish all they are able to do in life.





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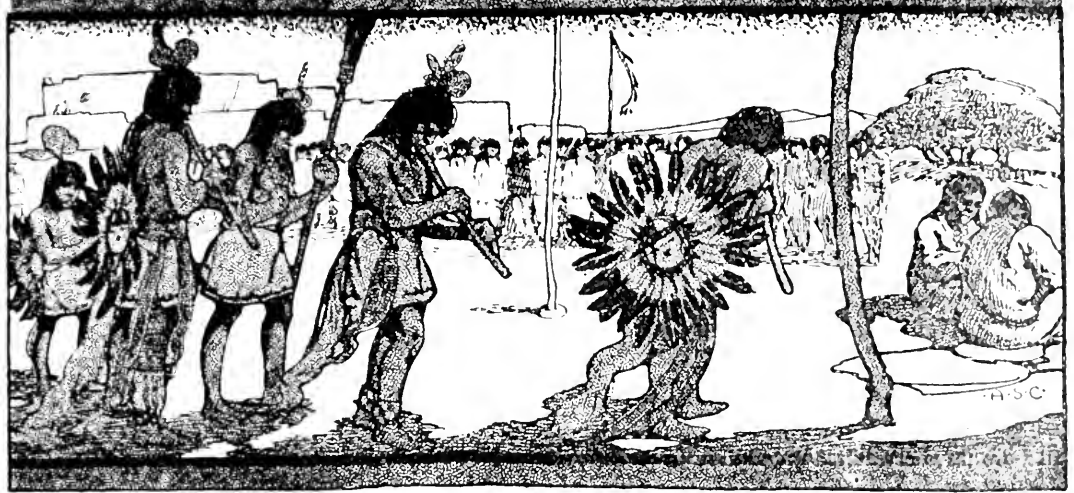
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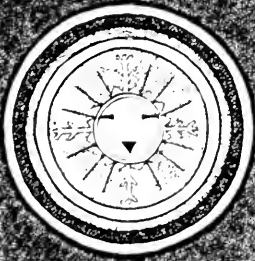
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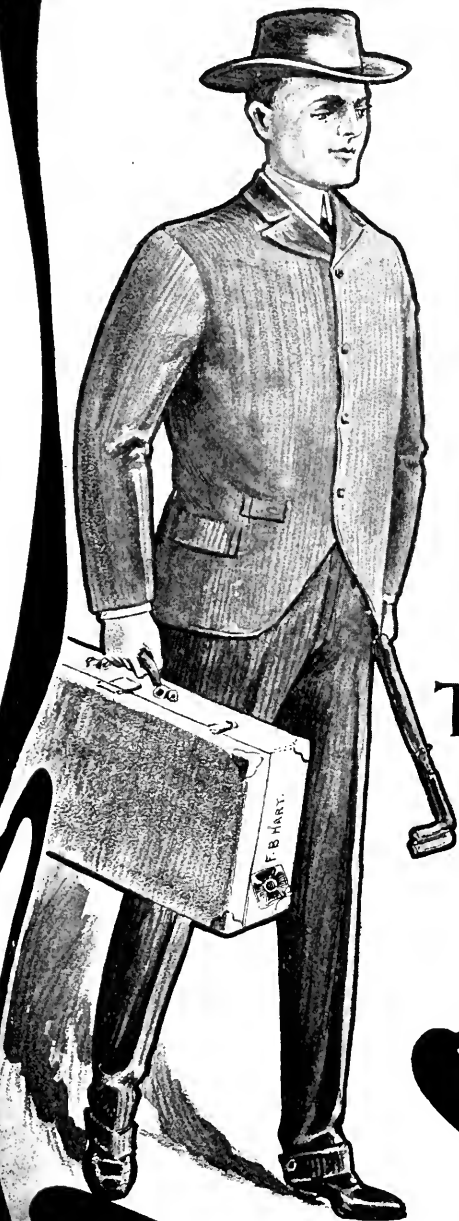
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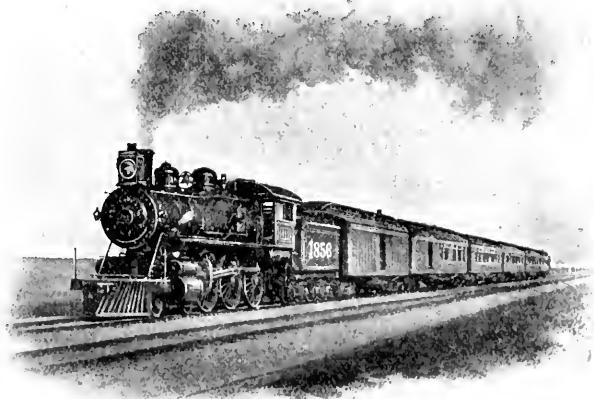
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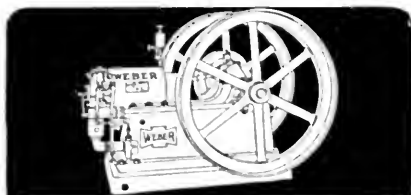
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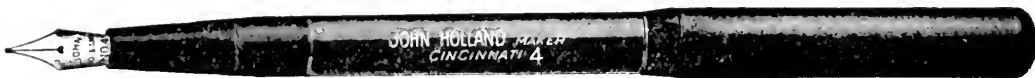
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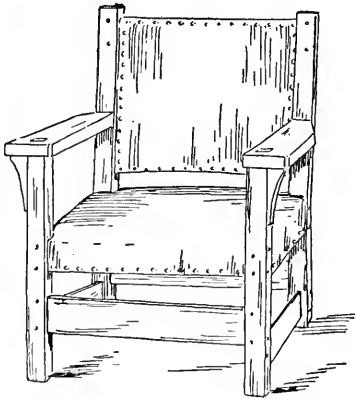
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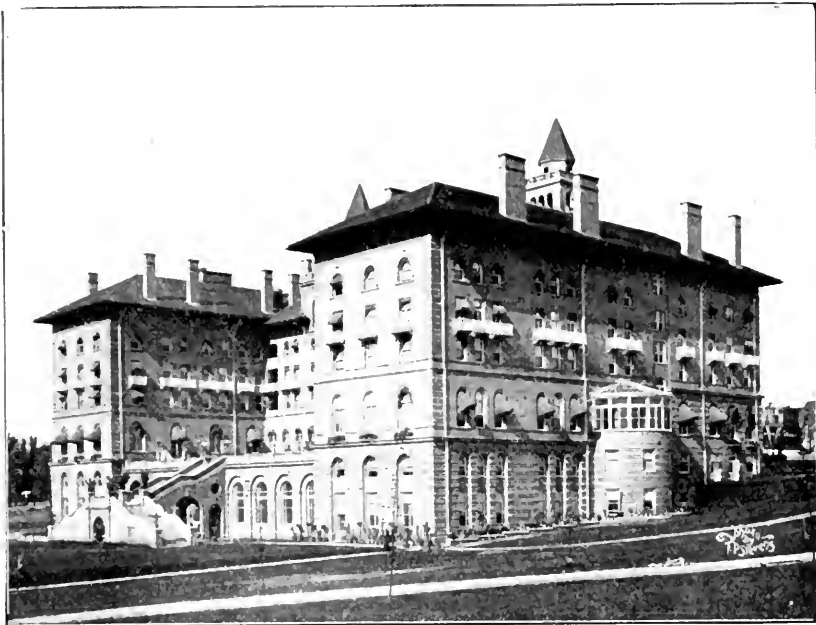
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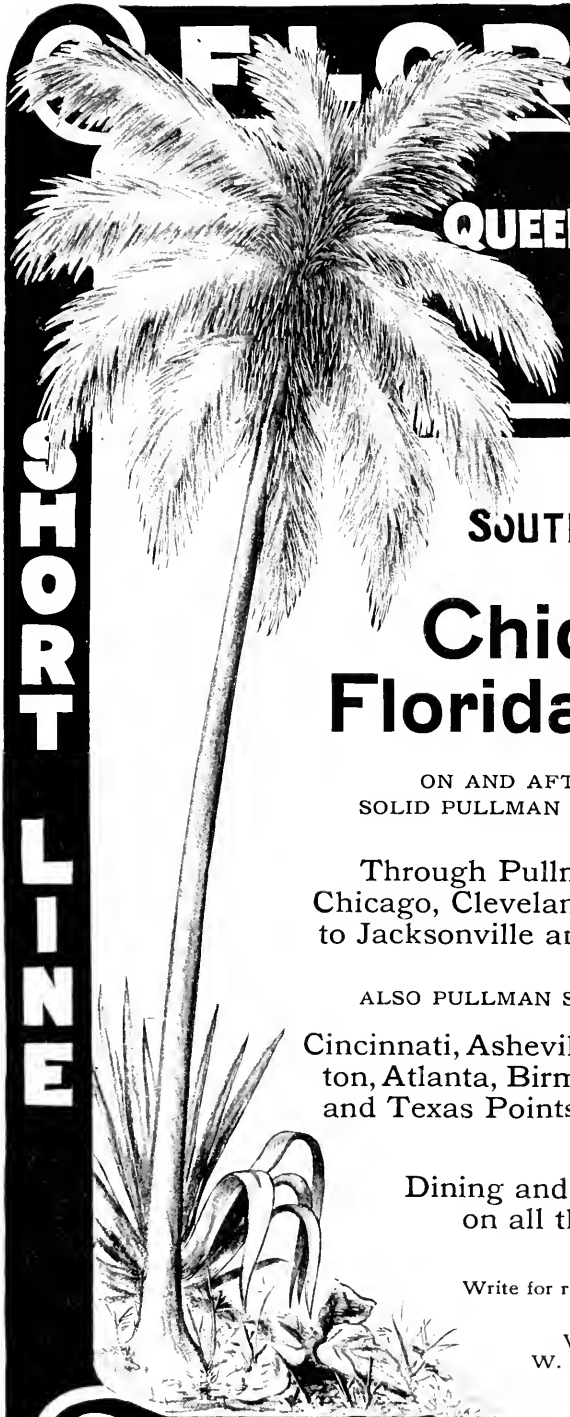
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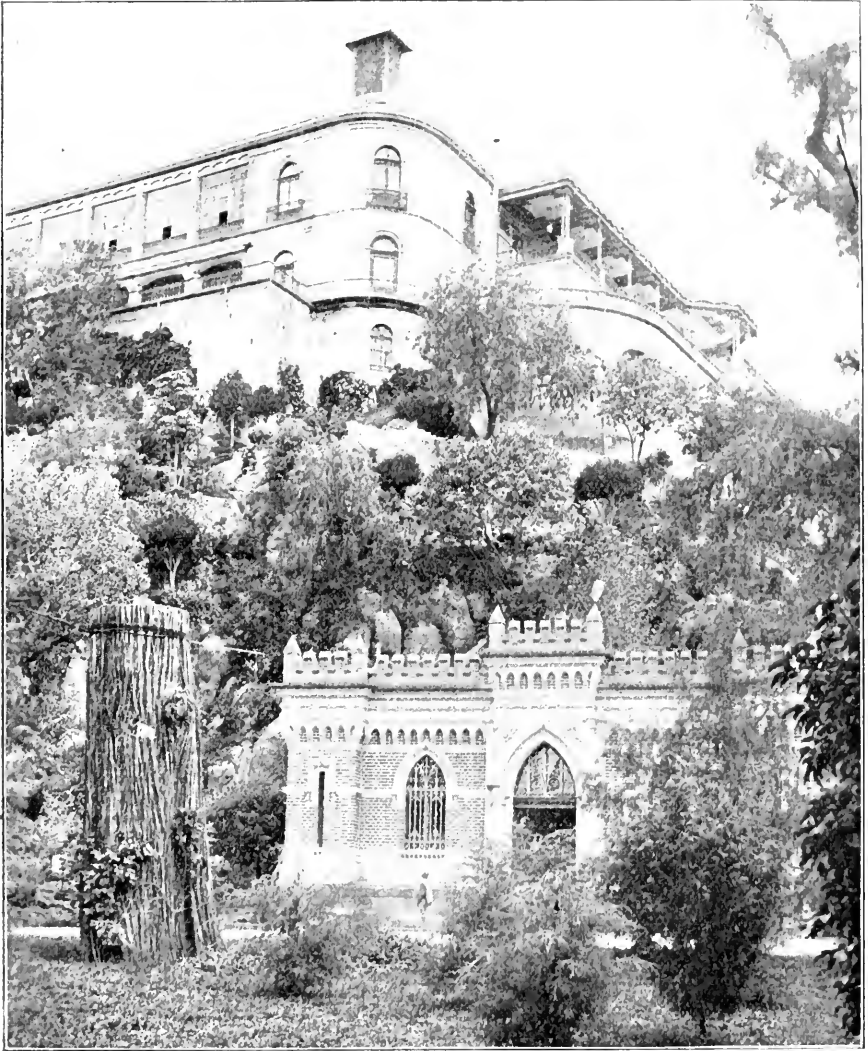
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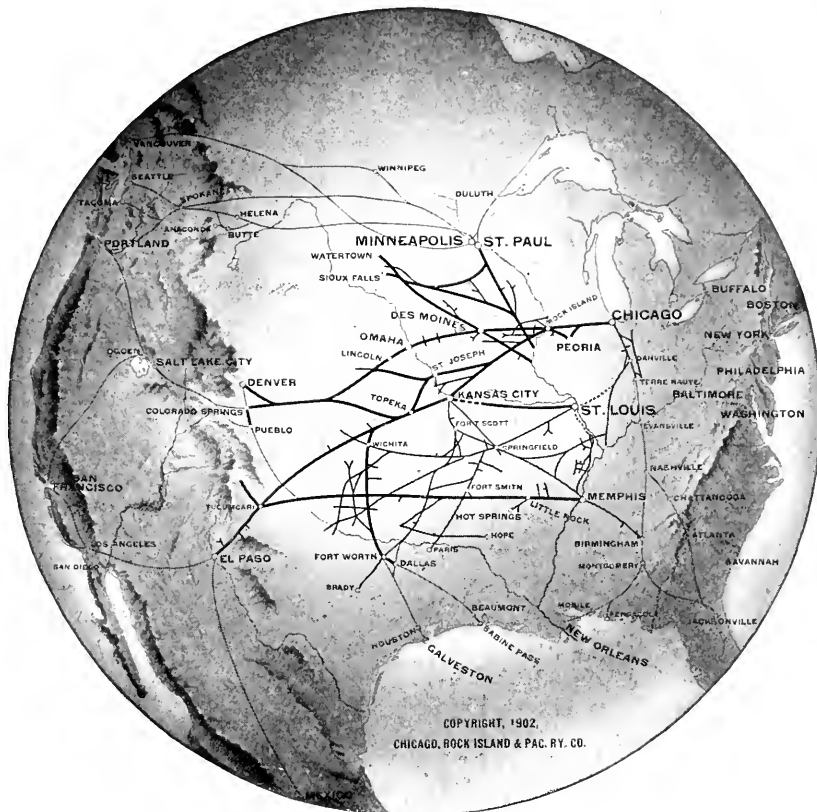
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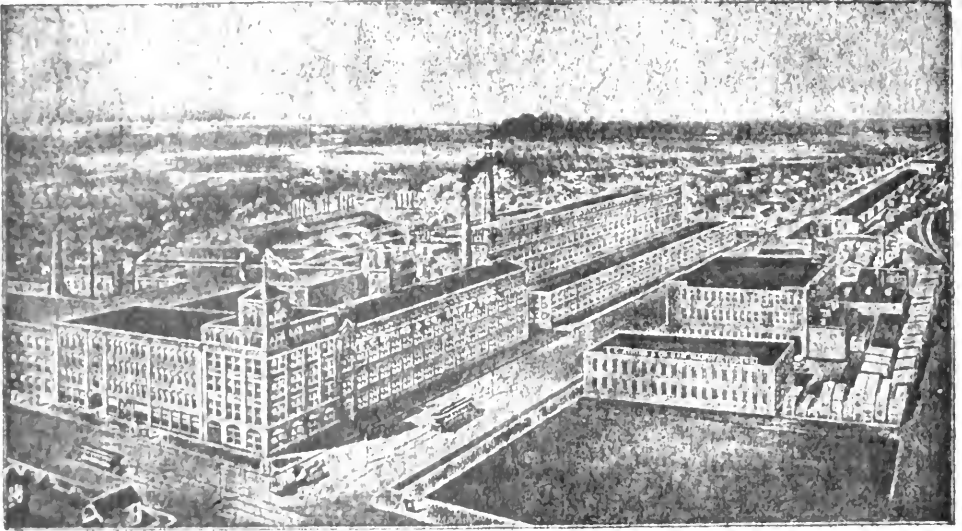
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