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I
Ames

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Edited by

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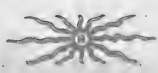
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**EUCALYPTUS
AS A SHADE TREE.**



**REPORT OF
U. S. FORESTER.**

HENRY ROMEIKE,

The Free Enterprise and War Journal
Continued Living Service to the World.

121 FIFTH AVENUE

NEW YORK



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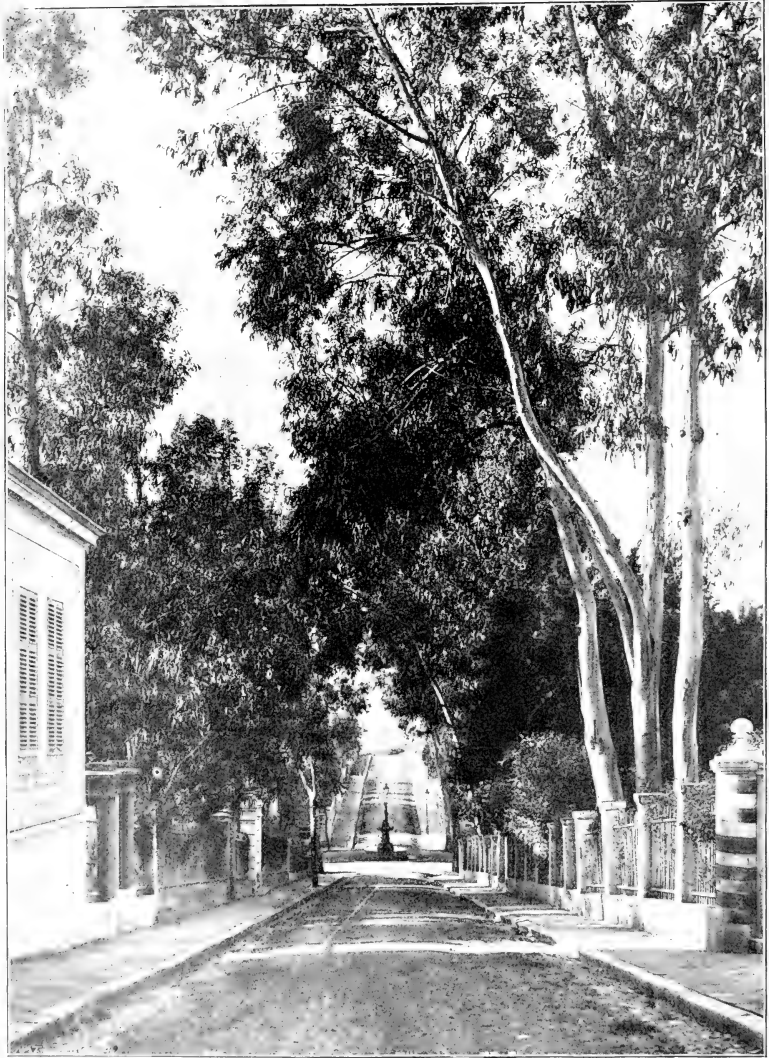


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THE EUCALYPTUS AS A SHADE TREE IN THE STREETS OF SAN RAFAEL.

Throughout the Riviera the Eucalypts are famous shade trees for gardens and streets because of their beauty, their rapid growth and sanitary influence.

THE FORESTER.

VOL. VI.

JANUARY, 1900.

No. 1.

The American Forestry Association.

The Eighteenth Annual Meeting Held at Washington.

FROM THE OFFICIAL NOTES OF THE RECORDING SECRETARY.

In compliance with Article XI. of the Constitution and By-laws, and pursuant to the notice published in the November issue of *THE FORESTER*, the American Forestry Association held its eighteenth annual meeting on December 13, 1899, in the hall of the Cosmos Club, Washington, D. C.

The president of the Association, Hon. James Wilson, Secretary of Agriculture, being unavoidably absent, the chair was occupied by the first vice-president, Dr. B. E. Fernow, Dean of the New York State College of Forestry, who called the meeting to order at ten o'clock.

After the reading and approval of the minutes of the last annual meeting, the report of the Board of Directors was submitted, as hereafter printed in full.

The Chair expressed his pleasure at the progress of the Association during the past year. He noted the change that has taken place in the membership since seventeen years ago. The early members were enthusiasts, he said, and for years the Association went on with no definite policy. After some ten years the object of the work began to be formulated. Now a new generation has arisen, and the character of the Association seems to have changed. The profession of forestry is now coming to the front. The planting of seventeen years has begun to bear fruit. It is pleasant to know that the hard ploughing was not in vain.

In response to a request of the chair, Mr. E. A. Bowers, of New Haven, Conn., sketched briefly his connection with the forest movement. He had felt confident that the reform in the treatment of the national forest lands was bound to come, and he believed that this Association has been the center to which people had turned when they wished to accomplish something in forestry. The present reservation system, he said, was the result of the work of this Association. But there is still work to do, and he thought it wise to keep the Association going. He complimented *THE FORESTER* and thought it would be a fatal mistake to discontinue it. But positive action must be taken on the financial question to provide funds to carry it on energetically. Next in importance to that, he said, is the project to consolidate the forestry efforts of the United States. Congress has at last realized the necessity of a forest policy. Now it must harmonize the work.

Mr. F. H. Newell, Hydrographer of the U. S. Geological Survey, also expressed his belief in the wisdom of publishing a good journal of forestry, and he also hoped that the Association might determine upon some plan for consolidating the Government work in forestry.

The report of the Board of Directors was then approved.

The report of the treasurer was read, as hereafter given.

The Chair named Messrs. George B. Sudworth and E. M. Griffith as an auditing committee, to which the report of the Treasurer was referred.

The Chair also named Mr. F. V. Coville, Botanist of the Department of Agriculture, as chairman of a committee on nominations and resolutions, and at the suggestion of Mr. Coville, the committee was completed by the addition of Messrs. Arnold Hague, F. H. Newell, Gen. C. C. Andrews, of Minnesota, and Prof. T. H. MacBride, of Iowa.

Mr. J. Keim Stauffer, assistant corresponding secretary, reported the present membership lists, there having been an addition of 203 members during the past year. Mr. Stauffer also stated, as manager of THE FORESTER, that he was at present engaged in a systematic endeavor to increase the patronage and influence of the magazine, and detailed to some extent his editorial work.

Mr. Newell, in reply to a question by the Chair, said he thought the time was ripe for a large increase in membership, but that the machinery formerly in use for this purpose had not been running of late; regarding which, in reply to a question by Mr. Coville, Mr. Stauffer stated that a large part of the year's increase in membership had been due to the efforts of Mr. Thoburn, who had done considerable work in this line before he left for the West.

The Chair then called upon Mr. Elihu Stewart, Chief Inspector of Timber and Forestry for the Interior Department of the Dominion of Canada, to speak upon the condition of forestry in Canada.

Mr. Stewart said there was in process of formation in Canada an organization which they hoped would be of great benefit. For several years many had been aware of the enormous destruction taking place by fire. In twenty-five years' experience as a land surveyor he had become impressed with the necessity of doing something. A few years ago he urged upon the Premier the urgent necessity of a system of forestry. Recently he had been put in charge of the organization of such a system. In Canada they have the same difficulty, he said, as in the United States. The ownership of the forest land is divided between the provincial and the general governments. There are immense tracts of Spruce well worthy of preservation. There is, of course, a great amount of prairie land, but even in the prairie land there are large belts of timber. The Premier, he continued, is quite advanced in his ideas about tree-planting on the plains. There are experimental farms on the plains, which have shown conclusively that trees can be grown on arid land. These farms are under the Agricultural Department, but the land is owned by the Interior Department, under which comes also the Geological Survey. He had proposed the establishment of a Bureau of Forestry, one function of which should be to send out experts to lecture at the farmers' institutes which are held all over the Northwest. The Deputy Minister proposes to have them give instruction, also, as to tree-planting. One of the greatest works that can be undertaken is to prevent forest destruction by fire. He thought that for one tree cut by the lumbermen, ten have been burned. His idea is to map out the country that is surveyed, and have exploration surveys of the rest. Some reserves have been made, one extending from the Bow River to the boundary. He hopes to divide the country up into districts, each in charge of a fire warden, who will select assistants to be called out in case of fire.

Gen. C. C. Andrews, Chief Fire Warden of Minnesota, who began forestry agitation ten years before this Association was formed, as the Chair stated, was called upon to explain the workings of the fire warden system of Minnesota.

Gen. Andrews spoke of his having been present at the first meeting of this Association, in 1882, and regretted that he had not been able to attend another annual meeting until the present one. He was still studying forestry, he said, and was glad to see so many young men entering upon the same work. The system in Minnesota is very

similar to that in other states, said General Andrews, but there is some central authority. The pay of the county wardens is not left to the counties, though not a dollar can be paid them without the approval of the County Commissioners. The pay is limited to \$15 per year, at \$2 per day. In the unorganized territory the chief fire warden gets some settler to act as warden. In a dry and dangerous season the State can expend \$5,000 outside of the local expenditures. This is a standing appropriation. The chief fire warden can mass his force anywhere, and send them to any threatened spot. The law is an experiment, he said, but while there have been fires, the fire wardens have succeeded in saving a great deal of property. In Wisconsin and in Michigan there have been very serious fires. Gen. Andrews believed that a fire warden system in those States might have diminished or even prevented them. If a park could be established at the head-waters of the Mississippi he thought it would help forestry. He described the 800,000 acres composing the region which it is proposed to set aside as a park. He urged the friends of forestry to help in getting this park, or at least a reserve.

The Chair called attention to some of the difficulties encountered heretofore in the enforcement of the fire warden system in New York. This year, however, it had become possible to pay the fire wardens directly by the State, and a remarkable change had resulted, he said. He thereupon invited Lieutenant Governor Timothy L. Woodruff, of New York, President of the Forest Preserve Board of that State to define the status of the forestry movement in New York.

Governor Woodruff said that he had attended a meeting of the Forest Preserve Board at Albany just the day before, when Colonel Wm. F. Fox, Superintendent of State Forests, upon learning that he was coming to Washington, exacted a promise that he would drop in at this meeting, and at least express the Colonel's regrets at his enforced absence. The Governor said he had always been much interested in the work of forest preservation and cultivation. For many years he had been a regular habitué of the Adirondacks, and when he first went to Albany officially he found Governor Black an earnest advocate of true forestry. They talked it over, he said, and as the outcome of their enthusiasm evolved the act of 1897, by which three State officials were to be constituted a board of forestry. In that work he had taken more pleasure and satisfaction than in any he had ever done. He called attention to the fine central position of the Adirondack reserve, which he stated contained some five million acres. Another million in that region is in the hands of clubs, and so is safe from denudation. He explained the purpose of the Cornell tract, most of which is primeval forest, and spoke very highly of Dr. Fernow and his work. From that tract he expected great benefit would be derived. Some of the acreage would bring as much as \$10 an acre for timber. New York, he said, will be able to secure a large revenue from the State forests when they are properly taken care of. There will be another constitutional convention in 1915, before which time he hoped Dr. Fernow would have so demonstrated the best methods of scientific forestry for New York that there would be no opposition to legislative measures looking to the practical utilization of these forest lands so as to yield a revenue to the State.

At the conclusion of Governor Woodruff's remarks, which were warmly received, a recess was taken until two o'clock in the afternoon.

Afternoon Session.

At the opening of the afternoon session the Auditing Committee reported that they had examined the treasurer's accounts and found them to be correct.

Mr. Coville, for the Nominating Committee, reported the renomination of all the old officers, with the addition of Mr. Henry Gannett as treasurer, in the place of Mr. George P. Whittlesey, who had requested to be relieved.

On motion of General Andrews, the Secretary was authorized to cast the ballot of the Association for the officers nominated, and they were declared duly elected.

The report of the Committee on Resolutions was then presented by Mr. Coville, and was adopted as read, without discussion. (Hereto attached.)

At the request of the Chair, Mr. Gifford Pinchot, Forester of the Department of Agriculture, explained the work of his Division, mainly by reading extracts from his annual report to the Secretary. He described the reorganization of the Division, and detailed the work which each of the four sections is engaged in. An interesting fact mentioned was that at the request of the Secretary of the Interior, the Division of Forestry will prepare working plans for the forest reserves. He stated that the Geological Survey was in close touch with his Division but that unless the Interior Department makes the first move towards consolidation, he did not see clearly how it could be accomplished.

The Chair said he thought there should be a definite proposition for consolidation submitted to Congress. Little had been accomplished toward getting the reserves until that line of action had been adopted. He thought it was the proper function of this Association to formulate a definite proposition on this new project.

Mr. Coville moved that the Board of Directors make this project a feature of their legislative work, and that the Legislative Committee of the Board be directed to consider the advisability of drafting a bill for consolidation, if after deliberation it should seem advisable.

An interesting discussion followed as to the proper executive department to take charge of such consolidated work. The Chair remarked that the present condition of things had come about from perfectly natural reasons; and he thought it best to establish first an enforced coöperation and division of work between the Division of Forestry, the Geological Survey, and the General Land Office. This would perhaps prepare the way for consolidation. The Interior Department has control of the lands, and it might require too great a change to transfer the work of the General Land Office to another department. For the present, therefore, he favored merely an enforced coöperation.

Mr. Bowers advocated no half-way measures. We should ask for what we think is the right thing, he said. The Land Office is merely a selling office, he continued; it was organized to dispose of the public lands to settlers, and was not meant to be a permanent bureau. But as the reserves are in the hands of the Interior Department, it might be best to make the proposed forestry bureau a part of that Department, though separate from and independent of the Land Office. The Department of Agriculture is an investigating or scientific department rather than an administrative one, he said, and so he favored putting the forestry bureau with the Interior Department, and taking into it the expert force from the Department of Agriculture.

Mr. Coville spoke of the rapid growth of the work in the latter Department and said that there is a general tendency to concentrate in that Department work requiring scientific investigation; and yet it has a large amount of purely administrative work. He cited the Bureau of Animal Industry in which about ninety per cent. of the work is administrative. The Weather Bureau, also, is a great administrative division. He therefore thought that a bureau of forestry might very properly be placed in the Department of Agriculture. It would be a better institution in fifty years from now, if placed there.

Professor Thomas H. MacBride, of Iowa State University, thought that the present situation in forestry calls for investigation as well as administration, and he therefore advocated placing the bureau of forestry in the Department of Agriculture. Forestry is a phase of agriculture, and it would be a mistake, he said, to take it away from that Department. Along these lines, too, he believed we could appeal successfully to the great farming portion of our population.

Mr. Pinchot said that if the Government forestry work is to include tree-planting and working-plans for cultivating the reserves, then it is a serious question whether

that kind of work can be handed over to the Interior Department. These matters are very largely questions of investigation and experiment.

Mr. Bowers remarked that until the lands are all segregated the property will be, at least in part, in the hands of the Interior Department. But he disclaimed any prejudice in the matter.

The Chair added that it took four years to mature the policy of forest reserves, and the probability is that by the time any bill for consolidation can be matured, the boundaries of the reserves will be known. It will be easy then, he thought, to transfer their control to the Department of Agriculture.

Mr. Coville suggested that the new bureau should not undertake the clearing of the titles to the land or the marking of the boundaries of the reservations. But when the Land Office had cleared the titles and the Geological Survey had marked out the lines, those bureaus should have nothing more to do with the reserves. He also pointed out that the work of the Department of Agriculture is now so large that the Secretary is a very busy man, and so there is less likelihood of the integrity of any bureau in that Department being interfered with by any new Secretary. This concluded the discussion.

A vote of thanks was tendered the Cosmos Club for its hospitality in affording the Association the use of the hall, and, on motion of Mr. Coville, the meeting then adjourned.

In the evening those present at the meeting were entertained informally by Mr. Gifford Pinchot at his residence on Rhode Island Avenue.

Report of the Board of Directors.

At the last annual meeting of the American Forestry Association the Executive Committee was dissolved and its duties devolved upon the Board of Directors, which presents the following report on the progress of forestry during the past year.

Advancement is observable both in the direction of depending public sentiment and in that of specific legislation and executive action. We are now entering upon a new era, marked clearly by altered points of view, to which the development of the last twenty-five years has steadily, if not always perceptibly, trended. For the most part, the people have come to see and to appreciate the ends for which the Association has been aiming. Forestry, properly understood, and as distinct from the less commercial interests of arboriculture and landscape work, has emerged conspicuously as a recognized object of state and individual study and effort, and as a promising field both for private enterprise and for thoughtful statesmanship.

It was in May, 1898, that an important increase in the appropriation of Congress for the administration of the Federal Forest Reserves enabled the Secretary of the Interior to place in the field a more nearly adequate Forest Service. The forest ranger system as it now exists may hopefully be regarded, subject, of course, to important elaboration and extension, as the first step towards a scheme of forest protection that promises to be substantially effective. In the suppression and avertance of forest fires the present system has already shown encouraging results.

Since September, 1898, seven new reserves have been added. These are the Trabuco Canyon and the Fish Lake Reserves, the Gallatin Reserves, the Gila River, Lake Tahoe, Santa Inez and Prescott Reserves, with a total acreage of 5,250,136 acres. The Mount Rainier Reserve, originally created by President Cleveland, has been reduced by 207,360 acres, which have been set aside to form the Mount Rainier National Park.

The U. S. Geological Survey is steadily pursuing its all-important work of surveying, describing and mapping the lands included in the reserves. The work of mapping has progressed in the Flathead and Lewis and Clarke Reserves of Montana, the Priest River and Bitter Root Reserves of Idaho, the Cascade Reserve of Washington and the Uintah Reserve of Utah.

The examination of the forests of the reserves and adjacent regions has, during the past season, been completed in the Mount Rainier Reserve of Washington; has been continued in the Olympic Reserve, nearly completing that valuable forest region; has been commenced in the Cascade Reserve of Oregon, and the reserves of the Sierra Nevada of California. The work of estimating the supply of standing timber, which was completed for the State of Washington last year, has been continued into Oregon, and most of the stand of that State has been secured. It has been continued in California, with the prospect of completing that State during the coming year. Similar estimates are being made for the States of the Great Lakes, Michigan, Wisconsin, and Minnesota, the work being carried on jointly by the Department of Agriculture and the Geological Survey.

General public interest in forestry has increased in a remarkable degree, shown by the attitude of the press and the favorable legislative action which has followed agitation among the states; New York, with its College of Forestry and management of the college forest, both now well under way, under the direction of Dr. B. E. Fernow, takes, perhaps, the first rank. This year a further appropriation of \$300,000 was made for additional purchases of forest land in the Adirondacks, bringing the whole amount expended for this purpose since the organization of the Forest Preserve Board in 1897 to a total of \$1,800,000. Though the purchases are not yet completed, the figures contained in the last report of the board show a total area of lands in the Adirondacks reserved to the State amounting to something over 1,100,000 acres. More significant still, as marking the beginning of a distinct movement on the part of private owners of forest lands, is the work in private forestry, also in the Adirondacks, which has been regarded as satisfactory in the main both by the persons interested and by the Division of Forestry under whose guidance it has been carried on.

California, as usual, has been most active in all departments of forest agitation, and although comprehensive legislation failed of the governor's approval at the very close of the last session of the legislature, the intent of the plan was carried into operation by the forest organizations themselves. A noteworthy happening has been the offer of certain Redwood manufacturers to furnish \$1,000 in money, as well as to provide subsistence in their camps and transportation over their lines for the agents of the Division of Forestry, in order to hasten the time by a year when investigations on the growth and reproduction of the Redwood could be begun. At the University of California a school of forestry may be established in the not distant future.

Pennsylvania also has made marked progress. Her forest fire law has received a useful amendment. The Commissioner of Forestry has received added authority, conferring power to purchase lands for creating forest reservations whenever there are available funds in the treasury for that purpose. Under the safeguards provided there is no necessity for delay in awaiting special legislation for each new case of purchase. Finally, the Commission authorized some time since to select three tracts of land of at least 40,000 acres each, is about to take final action, and a recent communication from Dr. Rothrock states that within the next few months probably 200,000 acres of forest land will be reserved to the State of Pennsylvania.

Minnesota has been especially energetic, and has been fortunate in having the efforts of her own citizens ably assisted by enthusiastic friends from other States, in the endeavor to induce Congress to set apart vast timber lands for a National Park and Forest Reserve. A State Board of Forestry has been appointed, whose members have been chosen on a well-considered plan. The special points of this admirable act are its provisions for the acceptance by the Board of lands granted, deeded, or devised to them for the purposes of forest reservations, and for the reinvestment of the moneys to be derived as revenue from the proposed management. Assurances have been given that gifts, under these provisions, amounting to thousands of acres, will very soon be made to the Board. An executive committee has been chosen, composed of Captain Cross,

president of the board, General Andrews, its secretary, and Professor Green. It took action at once to arrange for a visit of inspection of the Minnesota forests by Dr. C. A. Schenck.

Michigan has likewise created a permanent forest commission, with the Commissioner of the State Land Office as ex-officio member. The personnel of the commission, headed by Mr. Arthur Hill, a prominent lumberman, promises most favorably. The main provision of the act is that the governor appoint a State Fire Marshal, for a term of two years. The marshal appoints two deputies, one of whom shall reside in the upper peninsula; and in addition, city and town fire marshals throughout the State are made deputies. A bill to create the office of fire warden, with provisions based on the Massachusetts law of 1894, was introduced but failed of passage. Its supporters, however, have good hope of securing its enactment at the next session of the legislature.

What Minnesota has been attempting for the North and West, North Carolina is urging for the South, and for the seaboard States in general. A great National Park is proposed for the crest of the Alleghenies primarily for timber preservation.

Georgia has passed a significant amendment to her forest fire law by which the setting of fire to woods willfully, carelessly, or negligently is now made a misdemeanor, whereas formerly malicious intent was specified, a provision which made the law inoperative from the difficulty of establishing proof. A number of other States stand in need of similar amendments before their statutes, long dead on the books, can be rendered effective.

Wisconsin has provided that forest wardens, formerly appointed in every organized town, are henceforth to be appointed in certain counties, while in the remaining counties they are to be appointed only on request of the supervisors.

In the matter of tree planting and conservation on a small scale Indiana has passed a law offering partial remission of taxes on definite proportions of holdings covered with a specified number of forest trees per acre, either as virgin forest or as planted or partially planted to that number. Such areas are to be assessed at a valuation of \$1 per acre.

Nebraska and Nevada have repealed their laws providing bounties for forest trees planted and cultivated. Like the bounty law of Pennsylvania, they have had small results because of the trivial inducement offered.

The Legislature of North Dakota recently established a school of forestry, located at the village of Bottineau; and a bill has just been introduced in the United States Senate (Senate Bill 158, December 6), providing for the grant of thirty thousand acres of public land, to be selected by the proper authorities of the State, to aid in the maintenance of the school. The bill has been twice read, and is now referred to the Committee on Public Lands.

Oregon has created the office of game and forest warden.

The meetings of the American Forestry Association during the past year have been indicative of a great advance in forestry. A special summer meeting was held at Los Angeles, California, on July 19 and 20. Prior to the date of the meeting the local press made frequent mention of the coming convention, laying stress on the importance of the subject and the value of an expert discussion of it. This, the first meeting of the Association on the Pacific coast, was very well attended. Papers on "The State and Forestry," by Hon. W. S. Melick, of Los Angeles; "The Bitter Root Forest Reserve," by Mr. J. B. Lippincott; "Some Relations Between Forests, Percolation and Water Supply," by Mr. H. Hawgood, and many others of value were read and discussed, and have since appeared in *THE FORESTER*. The resolutions passed urged Federal action of the broadest and most effective character for the preservation, restoration and utilization of the national timber lands and water supplies; favored the adoption of a system of leasing public grazing lands, under which revenues would be devoted to the development of forest preservation and irrigation, but without any grant in trust or

otherwise of the title of the lands to the States; commended the action of the National Government, especially the Secretaries of the Interior and of Agriculture, for their investigations of forest problems, and the National Irrigation Congress and the National Irrigation Association, and local associations, such as the Forest and Water Society of southern California, for their efforts to awaken and unify public sentiment. Special stress must be laid on further resolutions advocating the consolidation and unification of the national forest work; urging upon the resident the reservation of all public timber lands pending full examination of their character; and endorsing the request of Hon. R. J. Waters to secure the passage of a law making every one responsible for damage done by fires made or used by him on all reserved lands.

A special meeting of the American Forestry Association was held at Columbus, Ohio, on August 22d and 23d, under the auspices of the Columbus Horticultural Society. The enthusiasm shown at this meeting counted for far more than a larger number of less interested members might have done. Much profit was derived from the discussion based on twenty questions which had been printed on the programme. The resolutions presented and passed relative to the collection of international forest statistics merit express emphasis, representing as they do an imminent requirement. They read as follows:

"WHEREAS, The American Forestry Association, at its meeting at Boston in 1898, took action looking to the collection of international forest statistics; and

"WHEREAS, The Exposition of Nineteen Hundred in Paris offers a most favorable opportunity for an International Congress of Foresters to consider and act upon this and other matters of great common interest;

"Therefore, be it *Resolved*, That the American Forestry Association respectfully petitions the Commission Internationale des Congres Agricoles, through its President, Monsieur Méline, to call such a Congress at Paris during the International Exposition; and

"*Resolved*, That the Board of Directors is hereby empowered both to communicate these resolutions to Monsieur Méline and to take such further action as may be required."

Copies of these resolutions have accordingly been communicated to M. Méline, through whose instrumentality the desired Congress will undoubtedly convene. Very valuable results are to be anticipated from its discussions and action.

The following papers were read at the special meeting: "Observations upon Woodlands of Ohio," by Mr. John F. Cunningham; "Natural Regeneration of Forests in Old Fields in Eastern Kentucky," by Professor S. E. Mason, of Kentucky; "Lumbering in Northern Michigan," by Dr. W. J. Beal, of Michigan; "The Rate of Growth and Temperature of Various Varieties of Forest Trees," by Professor W. R. Lazenby, of Ohio; and a "Capitalistic Review of Conservative Lumbering," by Dr. C. A. Schenck, of Biltmore.

The Division of Forestry, a part of whose practical work in coöperating with private owners has been alluded to already, has made another novel beginning for the encouragement of practical effort. It has undertaken coöperation with tree planters, involving inspection of growing plantations and of proposed plantation sites, and the giving of advice and assistance in the selection, planting and subsequent care of economic species. Professor J. W. Toumey, lately appointed Superintendent of Tree Planting, and Mr. Hall, his assistant, are already fully engaged with all the work to which they can attend. Enlargement of the field corps of the Division is becoming absolutely essential to the successful prosecution of these designs. The establishment of the position of Student-Assistant to the Division has been one of the recent changes. The number of applications has far exceeded the positions available. During the past Summer student-assistants to the number of 28 were at work in the field. They were divided into three groups, under expert supervision, one in Washington and

Oregon, one in California and one in the Adirondacks. Those detailed for the West secured data of value on the growth and reproduction of the Red Fir and Redwood, which will be worked up in the form of a preliminary report on those trees. The assistants are taking up their work well and prove an important addition to the working force of the Division. Above all, they are undergoing a preparatory training which will fit them at some future time to meet the call for technically trained men, which the rapid growth of forestry in the country will soon make heard.

THE FORESTER passed, in April, under the charge of Mr. Stauffer, its new editor, who has materially improved the make-up of the paper and won for it a largely increased circulation and appreciation—the latter being shown by frequent letters of approval which the editor has received from members of the association, and the former by the following: In the treasurer's report last year was recorded but one subscription to THE FORESTER, showing the magazine had no circulation outside the association membership. This year the treasurer has received from subscriptions, less agents' discounts, the sum of \$114.87. It is but fair to attribute these individual subscriptions to the improved character of the magazine. During the same time 203 new members have joined the association.

The extent of the improvement can be best understood from the following figures comparing the corresponding periods of 1898 and 1899: May to November, 1898, inclusive, body articles, 34, notes, 37, news items, 3; May to November, 1899, inclusive, body articles, 50, notes, 99, news items, 153.

In 1898 one number consisted of 16 pages, of which but 10 pages were reading matter; during the same period of 1899 every number had at least 32 pages, and several as many as 40 pages complete.

In considering the treasurer's report it is interesting to note that had the annual dues been paid promptly by all the members there would have been no necessity for drawing upon the bonds of the Association for temporary assistance.

Another fact worthy of note is that the expenditures for 1898 included but 11 months' issues of THE FORESTER (January to November, 1898, inclusive). The present report includes not only 12 regular issues, larger in average number of pages as well as in size of edition (the July issue having amounted to 6,500 copies, nearly three times the usual monthly edition of 1898), but in addition thereto there was a reprint of the November, 1898, issue (the original edition having been but 1,500 copies), the additional cost being included in this year's expenditures. These facts seem pertinent to the treasurer's report.

The Resolutions Adopted.

Report of the Committee on Resolutions at the Annual Meeting, 1899.

The American Forestry Association expresses its deep appreciation of the recent legislation and increased appropriations made by the Congress of the United States for the protection of forests and the development of forest management. The active interest of the Secretary of the Interior and the Secretary of Agriculture in devising wise systems of administering these laws is heartily commended.

The popular approval of the action of the President of the United States in creating new forest reserves points to the

desirability of reserving the whole area of public forest lands, a proposition which this association fully endorses.

The Federal laws relating to the public forest lands are now administered by three distinct branches of the government: the General Land Office and the Geological Survey, in the Interior Department, and the Division of Forestry, in the Department of Agriculture. This is a situation which is prejudicial to sound coördination and economic administration of the various branches of the forest service.

The association therefore urges upon Congress the consolidation of this service under one administrative head.

The cordial thanks of the American Forestry Association are extended to the Federation of Women's Clubs for their interest in the forest movement and their active support of forest legislation.

The Association endorses the proposition that a Forest School be established at the University of California and that a

suitable demonstration area be reserved for use in connection therewith.

The Association expresses its appreciation of the work of the American Park and Outdoor Art Association in educating the public to a proper use of our native forests.

The Association hereby expresses its gratification at the prospect of the establishment of National Parks and Forest Reservations in Minnesota and along the crest of the southern Alleghenies.

The Treasurer's Report.

George P. Whittlesey, Treasurer, in account with the American Forestry Association.

DR.	CR.		
To balance, Dec. 1, 1898.....	\$ 640.46	By printing 12 numbers of THE FORESTER	\$1620.91
To annual dues.....	1622.30	By salaries of editors.....	1225.00
To Life Membership fees (3)..	150.00	By clerk for FORESTER office, 13 weeks.....	52.00
To donations.....	333.02	By cuts for THE FORESTER...	87.46
To sale of Proceedings.....	16.07	By sundry expenses of FORESTER office (stationery, postage, printing, rent, etc.).....	184.52
To subscriptions to THE FORESTER.....	114.87	By expenses of corresponding Secretary and Treasurer.....	191.92
To interest on bonds and on bank deposits.....	112.39	By expenses of annual meeting, 1898	11.25
To loan from Washington Loan & Trust Co.....	1000.00	By balance on hand, Dec. 1, '99	616.05
	\$3989.11		\$3989.11

December 1, 1899.

RESPECTFULLY SUBMITTED.

The Scientific Basis.

When George P. Morris begged the woodman to spare the tree, to refrain from touching as much as "a single bough" of it, he was not, the poem proves, animated so much by love of trees in general as by his sentimental attachment to that particular tree which in youth had sheltered him. But to-day all over the United States the woodman is being reasoned with by a large and steadily increasing number of people whose remonstrances have a scientific rather than a

sentimental basis. They have been educated to realize that the reckless cutting down of trees is a serious menace of the country's property. Frank S. Black will always be held in grateful remembrance by his fellow citizens of New York because of the valuable services which he rendered the Adirondacks while he was Governor. He was largely instrumental in procuring the passage of measures which protect the trees of those splendid forests from the axe of the vandals who hold that the best use a tree can be put to is to cut it down.—*N. Y. Mail and Express.*

The Eucalyptus in the Tropics.

Its Rapid Growth and Value as a Sanitary Agent, Acting as a Preventative of Malaria.

BY THE FOUNDER OF THE FORESTER.

The greatest drawback to the exploitation of the rich lowlands of the tropics is and has always been fever. Excepting those diseases due to the negligence and uncleanness of mankind, the most frequent of tropical orders are malarial in nature. Had it not been for the use of quinine and other similar drugs, products of the genus *Cinchona*, a group of magnificent trees, natives of the high altitudes of the Andes between the U. S. of Colombia and Bolivia, even the exploration of a large part of these regions would have been impossible.

Extensive plantations of *Cinchona* trees have been established in the Himalayas, Ceylon, Java and Jamaica. Although these drugs have been indispensable they have in no way affected the source of these diseases. Their nidus is the undrained marshland which fringes the coast, rivers and inland waters of almost every tropical country.

The deforestation and cultivation of this extremely fertile but imperfectly drained land has increased rather than diminished the amount of fever. What is needed therefore most of all is drainage and this can be effected more easily, quickly and economically through the planting of the *Eucalyptus* than in any other way.

The cause of malarial fever is known. It is due to a minute amœboid organism which breeds in warm, stagnant, marshy places. Just how this is communicated to the human body is a question. Some say that the disease lurks in miasmatic vapors and that breathing the night air in certain places is sufficient; others claim that drinking-water is the vehicle, and others that mosquitos carry it from the marshes and inoculate our blood. No matter how it reaches the human body, the indirect cause

remains the same. Once eliminate the marshland and you deprive these pestiferous organisms, including the mosquito, of their breeding place and thus indirectly reduce the amount of fever.

The malarial condition of our South is mainly due to the ill-treatment of forest lands and the formation of stagnant marshes in consequence. It is a noteworthy fact that densely forested swamp



THE FLOWERS OF THE EUCALYPTUS.

Because of their peculiar beauty and fragrance large quantities of these flowers are shipped north from the Riviera in Winter for decorative purposes. They yield an immense amount of honey; many apiaries are located in *Eucalyptus* groves of Australasia.

regions, such as the Dismal Swamp of Virginia and North Carolina, are free from malaria and perfectly healthy, while the adjacent burnt-over pine and Savanna

lands are famous for their unhealthfulness. Just as the sanitary conditions of the Landes of France and the Italian Campagna were rendered healthy by tree growth, so is it possible to improve the sanitary condition of the southern United States and West Indies.

Only reflect that the leaves of a medium aged Beech tree if spread out would cover eight times the area that the growth in question occupied and it will be quite apparent that even in the hardest down-pours almost one-fifth of the water is intercepted by the foliage and thence flows slowly down the trunks or passes off in vapor. Add to this the immense quantities of water transpired by the leaves, often, as with the Eucalyptus, several times the amount which falls on its surface in the form of rain.

That the aromatic fragrance of the Eucalyptus has some mysterious influence in preventing malaria is probably fiction, although the oil has medicinal qualities, but it is true that every Eucalyptus tree is a powerful pump which is constantly at work sucking the water out of the soil in a degree which varies of course with the condition of the atmosphere.

The Eucalyptus is easily propagated and grows under favorable influences with remarkable rapidity. It shoots upward at the rate of ten feet a year and grows higher than any other species of the plant world. In half an ordinary lifetime it reaches colossal dimensions and in the short space of ten years it grows larger than the ordinary timber trees of the temperate zone.

It must not be supposed, however, that the wood is soft and worthless. The fact that a tree grows rapidly is no indication whatever of the quality of its wood. The Yarrah (*Eucalyptus marginata*), in fact, is almost indestructible and is perhaps unequalled for ships, underground and underwater works, railroad sleepers, pilings, etc.

Crops may be raised between the rows of trees. According to the Italian method the leaves are edge to the sun so that the small amount of shade it throws is rather a benefit than a drawback. In this way marshy regions are rendered not only healthy, but tillable.

The whole aspect of the landscape has been changed in California and the Riviera by the Eucalyptus. In fact no species of trees is capable of exerting a more beneficial influence, scenic, industrial and hygienic than those of the genus *Eucalyptus*. It belongs to the famous myrtle family and has for its relatives the guava, allspice, clove and Brazil-nut. The time is now opportune to plant this tree in the neighborhood of Cuban and Porto Rican seaports.

Eucalyptus plants have been extensively distributed gratis to the people of the Island of Jamaica by the Department of Gardens and Plantations. A paper describing the most interesting plants in Castleton Gardens, in the Jamaica *Bulletin*, 1894, says: "Mr. Bosisto, whose extensive works for the manufacture of Eucalyptus oil in Australia are famous, wrote on the subject nearly twenty years ago, giving results which he had obtained by experiment, not in a chemical laboratory only, but by dealing with four tons of material daily for about twenty years. He showed not only in what way the leaves acted, but pointed also to the very powerful root action which absorbs immense quantities of water from swampy soils. The roots thereby, to a great extent, drain swampy land and their absorbent powers are assisted by the very abundant leaf-surface which enables the tree to send off waters into the atmosphere as healthy vapor. This draining action is in itself of immense service in preventing the possibility of the malarial germs finding a suitable soil. Australia possesses, in a very high degree, an immunity from fever maladies, the fevers of the large towns being due to unsanitary conditions."

The improvement in the health conditions of the Campagna near Rome by the planting of Eucalyptus has been disputed by Tommasi Condeli, but his assertions are contradicted by Torelli and Baccelli and by the monks who live in the convent of Three Fountains and who are well able to judge in the matter. Mr. Fawcett, of Jamaica, ascertained on the spot from the monks the beneficial effects of the Eucalyptus plantation. This point has also

been touched upon in a paper on "Experimental Plantation of the Eucalyptus, near Rome," by Franklin B. Hough, first chief of the Division of Forestry at Washington.

Baron Sir F. von Mueller, Government Botanist in Melbourne, who died a short

time ago, should be called the "Father of Eucalyptology." By his writings and by the distribution of seeds of various species of Eucalyptus over the globe, he has done great service to mankind.

JOHN GIFFORD, D. CEC.,
Ithaca, N. Y.

A Year's Work in Forestry.

Annual Report to the Secretary of Agriculture on the Work of the Division of Forestry.

BY THE FORESTER OF THE DEPARTMENT OF AGRICULTURE.

During the year the work of the Division has been reorganized throughout. The changes entailed, together with the introduction in the United States of practical and paying forestry among lumbermen, on a large scale, the progress of extensive investigations in tree planting, as a preparation for practical work with tree planters, and the very marked manifestation of public coöperation and interest in the work of the Division, especially among lumbermen, are the salient facts of the year. The extent of the coöperation is well indicated by the action of the Redwood lumbermen of San Francisco, who have voted to subscribe \$1000, of which \$550 is already in hand, and have offered free transportation over their roads and free subsistence in their camps to the agents of the Division, for the sake of advancing by a year the time when the Division, otherwise hindered by lack of funds, could begin work on the growth and reproduction of the Redwood.

In spite of the increase in its resources made by the last Congress, the Division finds itself wholly unable to cover the field of necessary work which lies before it. Public demands upon it for work of the first importance to the preservation and right use of forests in the United States remain unanswered for lack of means. It is earnestly hoped that the Division may be enabled adequately to take and use

during the next fiscal year the unprecedented opportunities created by the rapid awakening of the public mind to the meaning and value of practical forestry.

In accordance with the plans set forth in the last annual report, the work of the Division has been very largely field work. Since two weeks after the beginning of the fiscal year there has been no time, except during the Christmas holidays, when there have not been from one to seven parties in the field. Practical and paying forestry has been successfully introduced on two tracts of a total area of 108,000 acres, and has now entered its second year under greatly improved circumstances, while the preparation of working plans for conservative lumbering has been in progress on more than twice that acreage. Important modifications in practical methods of lumbering have been suggested by the Division and introduced by private owners on a large scale with marked success. Altogether more than 400,000 acres have come under the care or scrutiny of agents of the Division with a view to the practical introduction of improved methods, while the total requests for such work to date have exceeded 1,600,000 acres. The Division is totally unable to meet the public demand upon it in this direction. The necessary preparations have been completed for an offer, similar in its conditions to that which gave rise to these re-

quests, for the assistance of tree planters throughout the treeless regions of the country, and extensive preparatory studies are under way to discover the results of the immense amount of planting already done, very largely with poor results. The circular which makes this offer public has just appeared.

Forest fires have been studied both historically among newspapers and other records, and at some length in eight States in the field, and results of importance have been reached and will be published within the year. Studies of the growth and reproduction of five important timber trees have been begun with the idea of determining whether it will pay to hold timber land bearing these trees for a second crop and pay taxes. It is expected that the results for one species at least will be ready for publication during the present year. A series of careful historical studies of lumbering, and of the progress of forestry in the different States and in the country at large, has been undertaken. The forest history of one State is practically completed, and much additional material has been gathered. A plan for systematic contributions to the knowledge of North American forests has been devised, and has already yielded very valuable results. The Division has been thoroughly equipped with instruments for field work. A system for a photographic forest description of the United States has been worked out, and the collection is well under way. The mailing list has been carefully revised and increased from 1200 to 6000 names, including about 2000 newspapers, while the personnel of the Division at its highest was more than five times the total membership at the beginning of the last fiscal year. Throughout the year the Division has been in close, and to it most fruitful, coöperation with the forest work of the United States Geological Survey.

ORGANIZATION.

In view of the radical changes which have been made, a word on the organization of the Division is required. At present all its work is assigned to four sections,

each with a man of special knowledge and qualifications at its head. These are the Section of Working Plans (in charge of Henry S. Graves, Superintendent of Working Plans), to which all practical work in the woods is assigned; that of Economic Tree Planting (in charge of James W. Toumey, Superintendent of Tree Planting), whose function is sufficiently indicated by its name; that of Special Investigations (in charge of George B. Sudworth, Dendrologist) dealing with the habits and characteristics of trees which affect their use in practical forestry, and that of Office Work (in charge of Otto J. J. Luebker, Head Clerk). Because of the absence of the dendrologist in the field for several months on work of importance in connection with the United States Geological Survey, the Section of Special Investigations has been for the year in the immediate charge of the forester. The technical assistants, under the supervision of the heads of sections are of various grades, of which two only need be mentioned here.

The first grade, that of collaborator, is filled by experts of established reputation in forestry, lumbering, or tree planting, not otherwise connected with the Division who have knowledge of special value to it. They are not residents of Washington, but scattered throughout the country, and their function is to prepare and forward for publication treatises on subjects previously agreed upon. The result of the association of these gentlemen with the Division, of whom there are now eight, will be the preparation of authoritative statements of great value at a moderate cost. The pay of a collaborator is \$300 per annum.

The grade of student-assistant was created for two reasons: First, to provide trained men for the future needs of the Division, and second, to supply it at once with assistants of high intelligence at a small cost. The great majority of student-assistants are college or university men. Only those who have declared their desire to adopt forestry as their profession are received, and among these a rigid selection is possible because the demand for places very largely exceeds the

number of positions. In the field, the student-assistants work under the supervision of trained foresters, with results of marked value to the Division, chiefly in the preparation of working plans and the study of commercial trees. Living usually at lumber camps, they keep the same hours as the men, and often, on the testimony of the latter, do the harder work. The practical experience they gain is in no sense intended to replace thorough training at a forest school. The pay of a student-assistant is \$25 per month. About twenty-eight student-assistants have been on the rolls of the Division since July 1.

The expenditures for salaries of all kinds during the year reached 62.2 per cent. of the total appropriation. This proportion would have been somewhat reduced had the field expenses borne by private owners been paid by the Division. A larger proportionate amount of field work during the present year will, it is hoped, tend to lower the present figure, which, under the circumstances, is not unsatisfactory. Last October, through the medium of Circular No. 21, an offer of practical advice and assistance was made to farmers, lumbermen and others in handling their forest lands, with a view of bringing about the substitution of conservative for destructive methods. The offer provided for the preparation of working plans with full directions for work, as well as for practical assistance on the ground, without cost to the owner of wood-lots, but in the case of larger tracts at the cost to the owner of traveling expenses and subsistence, together with the necessary helpers, for the agents of the Division while in the field.

In response to the circular there were received during the year applications from 123 owners in thirty-five States for assistance in the management of 1,513,592 acres. Of these applications 48 were for large tracts covering together 1,506,215 acres, and the remainder were for farm wood-lots. Personal attention on the ground was given to 41 tracts covering about 400,000 acres in nineteen States. On the majority of these tracts it was found possible for the owners to carry out the working plans without personal as-

sistance, but on 15 of them the participation of the Division is required for the execution of the plans. On two of the latter, with a joint area of 108,000 acres, the working plans were put in execution early in the year, and at the present writing the first year's work has been successfully completed, and the second year's work is well advanced under very favorable conditions. A calculation based on exact measurements of the amount of lumber wasted by the prevailing practice of cutting high Spruce stumps in the Adirondacks led to a decided change for the better on the tracts just mentioned, and at the same time a marked reduction in the amount of young Spruce cut for road building was brought about. These are influential changes. A detailed account of the work on these two tracts, entitled "Practical Forestry in the Adirondacks," by Henry S. Graves, Superintendent of Working Plans, is now in press.

The total expense during the year under the ledger head "Working plans" was \$4,133.35, or 14.5 per cent. of the total appropriation. The expenditures of private owners, under the terms of Circular 21, amounted to 8 per cent. of the same sum, or \$2,239.23.

The work between July 1 and August 31 of the present year consisted in the preparation of working plans upon two large tracts in the Adirondacks, comprising an area of about 100,000 acres, in making preliminary examinations of seven additional tracts, and in the continuation of the work already in hand. In connection with the first a special study was made of the growth and production of Spruce on the eastern side of the Adirondacks and of Birch and Maple on the western slope. Additional application has been made for about 100,000 acres.

Studies have been in progress during the year on five species of commercially valuable trees to determine their rate of growth and to ascertain their special qualities in forestry. The more important of these studies deal with the Loblolly Pine in North Carolina, a tree of the first economic importance, and the Red Fir in Washington, also called Douglas Fir,

Yellow Fir, Oregon Pine, etc., one of the most valuable and widely distributed trees of the world. These studies have met with the most cordial reception from lumbermen, and have led to the expression of much friendly feeling and the rendering of much practical assistance, in addition to the contribution of the Redwood men of San Francisco, already mentioned.

The total lack of field instruments at the beginning of the year made necessary a very large expenditure for that account. At present the Division is well equipped with the indispensable material for effective field work, but at a cost for the year of \$1,766.48, or 6.2 per cent. of the total appropriation.

ECONOMIC TREE PLANTING.

In accordance with the recommendation made in the last annual report, the planting of experimental plats in coöperation with State agricultural experiment stations has been entirely discontinued, and arrangements have been made whereby the stations have taken over the plantations, together with the responsibility for them. This step was taken after a thorough study of the old plan, after careful examination on the ground of the plantations at nine of the eleven stations, and with the acquiescence of the authorities of every station. After considerable difficulty this matter has been entirely disposed of, with the exception of delayed settlements with two of the nurserymen who were under contract to raise seedlings for the use of the cooperative experiments. It has been replaced by two lines of activity: One, a careful study of the results of planting already done, in which all the species used in the coöperative plantations are represented, and from which practically all the results to be expected from them after many years may be obtained without delay and far more cheaply; and the other, the giving of practical advice and assistance to tree planters under the terms of an offer similar to that made to forest owners in Circular 21. The work involved in disposing of the coöperative experiments has delayed the publication of this offer (in Circular No. 22, recently issued) until the

present fiscal year, but the preliminary work was accomplished before it began.

Close relations have been established through correspondence and by personal contact, between the Division and five of the most competent men in the treeless regions, and these gentlemen are now preparing, from the results of their past experience, supplemented where necessary by further investigations, reports on subjects of direct interest to the tree planter. It is believed that these reports will be of capital importance to this branch of the Division's work.

The expenditure of this section for the year was \$3,901.98, or 13.7 per cent. of the total appropriation. A very considerable part of this sum was expended under contracts connected with the coöperative plan now laid aside. From July 1 to August 31, 1899, the studies and the preparatory work of the section have been continued, and the offer above referred to has been made known through the publication of Circular 22.

SPECIAL INVESTIGATIONS.

Field work on forest fires was carried on in Wisconsin through the courtesy of the geological survey of that State, in Colorado (two parties) and Montana through coöperation with the United States Geological Survey, and by members of the Division in the States of Washington, Florida, Georgia and New York.

A historical study of forest fires, with the purpose of ascertaining the amount of damage and the true place of fires in the economy of the forest, was begun in the latter part of July. The number of records obtained was 4,327, beginning in the year 1754. One thousand one hundred and fifty-five volumes of newspapers have been examined, and in addition about 500 other volumes. The available files of the best newspapers of seventeen States have been searched. Besides that made in the Library of Congress, extensive research has been carried on in New York, Boston and Madison, Wis. About 1,200 records have been briefed and transferred to a classified card index.

The expenditure under the ledger head

"Forest fires" was \$4,306.09, or 15.1 per cent. of the total appropriation. During July and August, 1899, about 1000 additional records have been obtained, so that the total is now considerably more than 5000. Field work was in progress in four States. A special study of reforestation on burnt land is in progress in the Medicine Bow Mountains of Colorado, and promises most interesting results.

A series of studies of North American forests by experts, with special knowledge of definite localities, has been undertaken during the year, and it is expected that three of them will be ready for the printer during the coming winter. Part of this work is in coöperation with the United States Geological Survey. From the character of the contributors to this series results of permanent value are confidently expected.

Historical studies of progress in forestry were begun for New Jersey, Massachusetts and other States, and practically completed for New York. During July and August, 1899, much material was collected for a general account of the progress of forestry in the United States, and of the practical application of conservative forest treatment in this country until now, which is much more frequent than is usually supposed. In photographic forest description of the United States noteworthy progress has been made during the year, although far less than is hoped for in the present twelve months. The collection is now in a position to grow rapidly and systematically. It has absorbed 1.4 per cent. of the total appropriation, or about the same amount as sundries and contingent expenses. Altogether the Section of Special Investigations has consumed 21 per cent. of the total appropriation.

No further readjustment of the work of the Division, and but slight addition to its personnel, will be required during the ensuing year. All the lines of work it is proposed to follow during 1899-1900, except the watershed investigation, were either fully organized or well begun in 1898-99.

Of the total amount of land submitted to the Division for working plans, about

1,200,000 acres have not been examined. During the ensuing year these tracts will be considered as fast as the force of the Division will permit, and working plans will be made for a selected number. One or more of the working plans already in preparation will be printed.

In addition to the completion of the work on the Loblolly Pine and the Spruce of the eastern Adirondacks and the continuation of work on the other trees already undertaken, the intention is to begin the study of the Coast Redwood in California without delay, and later, if money enough can be saved for that purpose, to take up the White Oak and the Hickories.

In addition to the studies now under way in economic tree planting, the work for the present year will consist largely, first, in giving practical assistance to tree planters in the selection of the right trees to plant and in planting them rightly, and, second, in an attempt to determine in definite figures the true effect of bare and wooded or brush-covered slopes on the run-off of streams. This problem is a difficult one, but it is believed that facts of real value may be brought to light. The vastness of the interests affected by the solution will justify the most persistent and careful work.

The field work and other lines of effort already begun are to be continued. Further results from the studies of North American forests and of forest history are expected during the year.

The extension of the historical work on forest fires to States not yet reached is urgently required, and field work will be carried on in the States where it is already in progress, and in special localities in the Southeastern United States. The collection of photographs will receive much attention during the winter.

GIFFORD PINCHOT.

The financial benefits of forestry are evidently understood by the railroad company which, in Indiana, has set out a whole trainload of selected Catalpa trees, from which at maturity to cut ties.

Studying the American Forests.

Forest Development.

The offer made by the Division of Forestry, as outlined in Circular 21, to assist owners of timberland in handling their property to the best advantage by making working plans for them, has met with a most hearty response from all sections of the country, showing how strong was the feeling that the present methods of lumbering were not the best, either for the land or the owner.

More timberland (excluding the Government Reserves and State holdings) is under some form of forest management in New Hampshire than in any other State of the Union. Maine comes next, and the chief credit, in the writer's opinion, in both States, is due to E. S. Coe, of Bangor, who has had the foresight for years to limit the cutting of timber on the immense tracts owned by him to 10, 12, or 14 inches on the stump, as the conditions and rate of growth determined. The result is that Spruce, by far the most valuable species, is still dominant and the land is rapidly increasing in value.

Mr. Coe is a very practical and successful business man and his example is extremely convincing to others, especially when he can get from \$3.00 to \$4.00 per M., stumpage, for his Spruce and Fir, limiting the diameter on the stump as he does.

The International Paper Company and the Berlin Mills Co., together controlling more than half a million acres of woodland in New Hampshire and Maine, limit their cut in the same way in some sections, (unfortunately, not in all), save the young growth wherever possible, guard against fire and waste in high stumps and long tops left in the woods, and also market as much of the hardwood as possible. These methods are a big step in advance but they cannot rightfully be classed under the name of working plans.

In a tract which is managed under a working plan, there is known very nearly the exact stand in broad feet, the rate of

growth of the various species, and the amount which may be cut annually without diminishing the working capital. In most cases the timber which is to be cut should be marked, and if the work is done by a jobber, which is usually the case, contract should be drawn up which shall protect the owner against unnecessary waste and damage.

Large tracts of land in northern New York State are being managed under working plans made by the Division of Forestry, but applications have also been made for small holdings. Major W. A. Wadsworth, of Genesee, N. Y., has several small tracts, belonging to separate farms, which aggregate 3000 acres.

Here the question is one which every farmer with a wood-lot should ask himself: viz: How can I handle this lot so as to get a constant supply of lumber and wood, reproduce the most valuable species, and secure the largest possible money return? The principal timber on these farms in Genesee is Oak, for which there is a fair good local demand for lumber and firewood.

First must be determined what the capital is in saw logs, cordwood, railroads, fences, fence rails, posts, sills, etc. Next the rate of growth and capacity of reproduction of the different species, also the market, capital invested, taxes, etc.

When the annual yield has been determined, the timber must be cut to the best advantage, looking both to the future of the lot and the dividend. Sometimes it is found that the proceeds of the annual cut will not pay a fair interest on the money invested; then if the lot is good farm land it should certainly be cleared and on the other hand, in all parts of the country a great deal of very poor farm land should be under timber.

The writer has just been in Westmoreland, Vermont, to make a working plan for an exceedingly interesting lot there. It is called the "minister lot," as it was set off by the State for the support of the minister, as was also the case in many other towns

This lot contains 300 acres, the principal species being Spruce, Fir, Birch and Maple. Here Spruce and Fir are by far the most valuable species, the stumpage being worth from \$3.00 to \$4.00 per M., while the hardwoods will not average over \$1.00 per M. So of course it is best to cut to reproduce Spruce and Fir, and especially Spruce, as we do not want over 30 per cent. of Fir as compared with Spruce, for the paper mills cannot well use more than this.

Such a tract handled in a systematic way will be a material help and a constant source of revenue to the minister and the church.

E. M. GRIFFITH,
Washington, D. C.

Studying the Adirondack Forest.

The collection of the data necessary to a working plan for the tract of the St. Regis Paper Company, situated in Franklin County, New York, occupied a party of student-assistants during July and August of the past summer. These were Messrs. J. V. Doniphan, E. C. Lewis, Charles Jones, Kinsley Twining, C. F. H. Westfeldt, W. P. Haines and Henry Grinnell, who was in charge of the party during my absences.

The 80,000 acres of cut-over lands included in the tract of the company contained much of both silvicultural and economic interest, although the state of affairs is not yet such as to permit of the application of those alluring forms of intensive forest management, which must necessarily remain peculiarly German, until local conditions are such as to render their use financially advisable. The spectacular effect of cutting series, plantations, fire lines and a permanent road system would doubtless lend marked improvement to the appearance of the tract of the Company; they could, with the same degree of certainty, lend proportionate disfigurement to the annual balance sheet; and forestry must prove a source of revenue to private owners or it will meet the fate of any other unsuccessful business enterprise.

To this Company, the question whether systematic forest management should be adopted was in substance the same question that the private owner naturally asks: Given, a certain capital invested in forest lands, and such conditions of market and of transport as to produce a certain net profit per cord of pulp wood and per thousand feet B. M., of hardwood timber: Will the sale of the "sanctioned yield" of these forest lands, or the cords of pulp wood and the feet B. M. of hardwood timber, which can be utilized annually or periodically for ever, yield a fair interest on the capital which the forest lands themselves represent?

Such a query does not incline one to fix a site for a forest nursery. It points rather to valuation surveys and stem analyses—the one to determine the amount of marketable material upon the ground, the other to calculate the rate at which it is produced. These were the problems to be considered first, and it was towards their solution that the work of the student-assistants was directed.

Valuation surveys were run upon the strip method to the amount of one thousand acres. These followed compass courses, the character of the forest being such that more accurate results were obtainable by radiating the surveys from several common centers, than by following the course of streams, ridges and hillsides, as is preferable where wide variation in elevation and topography renders the types of forest growth more distinct.

The stem analyses, the total of which somewhat exceeded 1000, and which were the first complete analyses to be made of the Adirondack hardwoods, included Birch, Hard Maple, Soft Maple, Ash, Cherry and Basswood—a sufficient number of Birch, Hard Maple and Beech from which to compile full tables for rate of growth, and of the other kinds to furnish a fair beginning for further investigation.

Among the more striking points illustrated by the stem analyses was the remarkable longevity and late culmination of the diameter growth, of the Hard Maple. Several specimens analyzed

showed, with an age of over 300 years, a rate of growth in diameter for the last 10 years exceeding that of any previous decade in the life of the tree.

OVERTON W. PRICE.

Forest Work on the Pacific Slope.

During the months July to October the Division of Forestry of the Department of Agriculture had a large force of men at work in the States of Washington and California investigating the rate of growth of the Red Fir and Redwood forests.

Gifford Pinchot, Chief of the Division, personally superintended the beginning of the field work on the Red Fir at the logging camp of the St. Paul and Tacoma Lumber Company in the Puyallup River Valley, about twenty miles southeast of Tacoma.

On the first of August the party was divided. Alfred Gaskill, Agent of the Division, who had previously located the field work, took a party to the foot-hills of the eastern slope of the Olympic Mountains, with headquarters at Shelton. Another detachment, under Thomas Sherrard, Agent of the Division, worked in the White River Valley, and later, in the young forests of pure Red Fir which have sprung up on the extensive "burns" in the Nesqually River Valley in the Mt. Rainier Forest Reserve.

The field work included valuable surveys and stem analyses. The diameters of all trees down to 4 inches at breast height were calipered on over 1000 acres, scattered through the regions indicated. About 1000 felled trees were analyzed in detail, in order to determine their contents and rate of growth. Data relating to the silvicultural character of the species was collected along with the survey.

In accordance with an agreement between the Division of Forestry and the Redwood lumber manufacturers, at the close of the work in Washington early in September, Mr. Sherrard took a new party into California, to work on the coast Redwood in Humboldt and Mendocina counties. The object and character of the

work were much the same as in the case of the Red Fir.

Some difficulty was experienced with the material on account of the great age of the Redwood and the wasteful method of lumbering. It is common for over a hundred feet of top length to be burned in the firing of the cut, which is made to facilitate the working up of such portions of the trees as are merchantable under present conditions of market and transportation.

The field parties lived under canvas and were maintained partly in the lumber camps, and partly with cooks and camp outfits. The field work was largely restricted to localities where lumbering operations were in progress so that the use of pack trains was unnecessary for the summer's study.

The corps of assistants was recruited about equally from the East and West. The names of those holding the appointment of Student-Assistant in the Division of Forestry were: R. T. Fisher, E. J. Moore, E. Koch, Frazier Curtis, E. T. Allen, Wm. F. Wight, H. James, Wm. Wm. James, Jr., Wm. C. Hodge, Jr., T. C. Carson, Wm. Maule, Stuart Hotchkiss, F. A. Spragg.

T. H. SHERRARD,
Washington, D. C.

Investigations in North Carolina.

Field work by student-assistants was carried on in North Carolina under the direction of W. Willard Ashe, the members of the party being J. A. Caldwell, Jr., A. E. Ames, A. E. Cahoon and H. M. Curran. The work consisted of stem analyses and valuation surveys on Loblolly Pine. During June and July Mr. Curran also made some investigations in the saw mills to determine the proportionate grad yield of different sizes of logs of Loblolly Pine.

A lumberman of Hillsdale, Mich., has purchased the entire timber limits of Morgan county, Ontario, thirty-nine and one-fourth square miles, for its White Pine.

THE FORESTER.

A MONTHLY MAGAZINE

DEVOTED TO ARBORICULTURE AND FORESTRY, THE CARE AND USE OF FORESTS
AND FOREST TREES, AND RELATED SUBJECTS.

THE OFFICIAL ORGAN OF

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JOHN KEIM STAUFFER, EDITOR.

The work of the American Forestry Association as an organization is described so fully in the account of the eighteenth annual meeting that any comment further on that line would be superfluous. But in connection with the general review of the forest movement, historically considered, several items of interest which have come to the desk of the editor suggest themselves in passing.

As every one knows, promoters of ideas at variance with generally accepted views have the dubious satisfaction of realizing a certain public appreciation of their individuality of thought, yet not without the occasional accompaniment of purely gratuitous personalities. The advocates of forestry have survived the ignominy of being termed "unhappy theorists" and being the recipients of similar pleasantries from those whose interest in the subject was that of to-day only; but it remained for one of our lumber contemporaries to reprove an advanced thinker within their own fold by creating a new word of opprobrium for the new 'craze.'

Now that the leading lumber journals have professed their belief in the necessity of some form of forest preservation, the reproof administered then seems worthy of note. Regarding the matter, the editor of the paper writes:

"This journal was the first of the lumber trade papers to advocate forest protection and to declaim against the wanton destruction of timber, and we were denounced fifteen years ago, by an esteemed Chicago contemporary, as a 'denudatic' on that account. Most of our patrons make their money by cutting down trees and converting them into merchantable forms of wood goods, and you can readily realize that our pleas for forest protection, preservation, renewal, etc., reached a very unsympathetic clientele.

"However, we are glad to know the subject of practical forestry is rapidly gaining importance in public estimation. Fifteen years ago it was considered a mere 'fad' in the South; now it is regarded by all intelligent people as a very serious problem."

The lumberman's view is also the view of the water conservator, as the "Irrigation Age" says briefly, but to the point:

"The question of forest preservation directly interests every irrigable section. Water for irrigation has its source, in almost every case, in forested regions, and if these areas are destroyed by reckless cutting, or firing, the water supply will fail in time of need as surely as the forests are destroyed."

CURRENT COMMENT.

Tree Protection for the Suez Canal.

Favorable progress is being made in planting trees and shrubs along the Suez Canal, to protect it from drifting sand. Reeds have been placed along the water line of the canal proper for a distance of nearly nine miles. Excellent results are expected.

A Momentous Purchase.

“The Weyerhaeuser syndicate’s purchase of the timberlands of the Northern Pacific Railway still is unsettled, though it is generally believed that it will be consummated. The best posted timbermen hold that the Northern Pacific is making a serious mistake in disposing of its vast heritage of forest wealth.” To which comment of a lumber contemporary might be added that the same advice applies equally to the American people.

A Few Congratulations.

Greylock mountain, the most famous peak in Massachusetts, located in the Berkshire hills, has been taken by the Metropolitan Park Commission and \$20,000 has been appropriated as an initial expenditure for improving the property, laying out rough walks, drives, etc. Forestry enthusiasts have been making a special effort to get this property beyond the reach of the lumbermen, and at last they have carried their point.—*Lumberman’s Review*.

Amazonian Rubber Trees.

The enormous increase in the use of rubber for vehicle tires, etc., leads a traveler to remark: “But the sources of supply are still vast, especially in the Amazon district of South America. The difficulty is that trees conveniently located near the banks of the rivers are naturally the first to be worked, and in consequence are becoming exhausted from constant tapping; the milk extracted being weaker each year; hence the shrinkage in such rubber is very

great. In the second place the rivers have all been worked inland for a distance of about three miles from their banks, and in order to reach the so-called unexploited rubber forests, still further inland, it will require much more time and necessitate more workers while the trees so long tapped are given rest.”

American Lumber in Paris.

The American lumber to be used in the construction of the Forestry building at the Paris Exposition has been taken abroad by the United States auxiliary cruiser “Prairie,” which has been placed at the service of the American Commissioners. The “Prairie” left New York on December 2, with a partial cargo, and completed it at Baltimore and Norfolk. The cruiser sailed December 11, direct for Havre.

What Substitute For The Forest?

Science and invention are moving too swift a pace for nature. It has not been in comparatively recent years, less than a generation, that the use of wood pulp came into general use in the manufacture of paper. But the rapid and increased demand for news paper is exhausting the supplies of wood necessary for its production, and now the inventive genius of man is being taxed to find a substitute for the wood which took the place of rags and other materials in paper manufacture but a few years ago.—*Philadelphia Press*.

A Pertinent Question.

Undoubtedly it is true that public interest in the preservation of the forests of Pennsylvania is increasing. Arbor Day alone would seem to indicate that. But in this, as in all others, the *Inquirer* believes in being practical, and therefore it would like to ask a straightforward question.

No man could conscientiously read the newspapers of the State without bei-

struck with the fact that the timber rights on enormous tracts of land are being acquired weekly, if not daily, in the counties where the finest trees still stand. The prices which the purchasers of such rights are compelled to pay vary, but the indubitable fact that the rights are being acquired remains. In the regions where the purchases are made notice of the transaction is gladly hailed, for the reason that the opening of the tracts to the woodman's ax means the employment of resident labor. It is not that those regions are not to be censured. Every community wants to have its labor employed.

But now as to the question. So long as the contractor can offset the work of five or ten annual Arbor Days, can "the increase of public interest in forestry in this State" be said to be accomplishing any substantial results? The remedy lies in the acquisition of additional forests by the State itself, the method by which New York is preserving the far-famed Adirondacks.—*Philadelphia Inquirer*.

The Christmas Tree.

Christmas trees are a product of the forest, though lumbermen pay but little attention to, and know but little about, the market for these little evergreens. A lumberman from the "North Woods" who has for some years taken a hand in supplying the coast markets with the little tree around which centers so much of joy and mirth on Christmas Day, says that Boston is by all odds the most unsatisfactory market for the shipper to be found anywhere on the coast. This is due to the fact that a large portion of the supply of trees is hauled into the city by the farmers located within forty miles of Boston. These trees are sold at from fifteen to fifty cents and are supplied by the markets to their regular customers. New York is the great center of consumption for trees shipped by rail, though Philadelphia is a liberal buyer. In an average season New York calls for about 200 car-loads and the shipper realizes from seventy-five cents to \$2 per tree, less commission.—*Lumberman's Review*.

Volumes have been written and published in the lumber trade papers of the merits, demerits, and good and bad qualities of every tree known to the lumber and timber trade; but if a vote were taken now among all Christian people as to which is the most popular tree and the right of franchise granted to all, from the little tots to the grandsires and dames, to both sexes and to all conditions of wealth, from the cabin dwellers to the owners of palatial mansions, the majority for the Christmas tree, says the *Southern Lumberman*, would astonish the most sanguine office seeker. No other tree bears such wonderful and unexpected fruits; no other tree, in its season, brings so much of joy and happiness.

If anything could excuse the cutting down of young trees, it is the purpose of converting them into Christmas trees; but even this, from a business point of view, is of doubtful justification, for the joys the Christmas tree may bring to the present generation may be the harbinger of sadness to future generations. It might be better for Santa Claus to find a substitute and let the young trees grow where they stand, to be a joy every day in the year and at maturity serve useful purposes. The following utterance from the *Conservative* is unsympathetic, but it is suggestive:

"Mutilation and destruction of the young pine forests growing up in various sections of the republic for the purpose of getting Christmas trees will soon open a new campaign in favor of droughts, blizzards, and infertility. Millions upon millions of the straightest, most symmetrical, and vigorous hemlocks, spruces, pines, and balsams will soon be aboard freight cars and going towards cities to be put into homes for Christmas trees, which shall bear tin bells, dolls, bonbons, glass bulbs, and all sorts of gimcracks for the amusement of children. The generation following will want for lumber which these Christmas trees would have made. The birth of Christ could be celebrated with more common sense than by depriving the human families which will follow us of the material out of which to construct and embellish their homes."

Sounding the Tocsin.

"In the history of the world there has never been such reckless and criminal wastefulness as the American people have displayed in dealing with their forests. The early settlers, of course, found it necessary to clear the ground in order to carry on the work of farming; but they often proceeded in the most thoughtless and extravagant manner imaginable. Whatever excuse there may have been for the policy which they adopted, there certainly can be none for men of the present generation, who, in their mad rush to make money, have absolutely desolated vast tracts of land, not only cutting down the merchantable timber, but burning and destroying all the younger growth.

"Within twenty-five years Walnut and Cherry, once so abundant, have become exceedingly scarce. The best grades of Poplar are difficult to obtain; in whole districts the Pine is exhausted; Oak is be-

ing used up at an amazing rate. All this would not be so bad if any effort were making to provide for a future supply. Tennessee has millions of acres of mountain lands that can never be cultivated. If they are stripped of their primitive growth, the danger is that they will become as barren as the mountains of Palestine. Why should not our Legislature have the wisdom to see these things and act with reference to them?

"If some steps are not speedily taken our descendants of the second generation will be fully entitled to charge us with having robbed them of their natural heritage. Some of the States, notably New York and Pennsylvania, are already showing a disposition to repair past ravages as far as possible. Let all the rest follow the good example they have set. In the meantime let every American count it a duty to set out a tree somewhere every year."—*Nashville (Tenn.) Advocate.*

Recent Publications.

"The Trees of Vermont," by Anna M. Clark (Bulletin 73, Vermont Agricultural Experiment Station), is a pamphlet of 52 pages describing and figuring seventy known indigenous species and twenty-seven introduced and cultivated species in that State.

The general character and importance of the families represented are briefly given. The species are distinguished by means of keys, short descriptions, and reduced original drawings. The conception of this work is highly commendable, and its execution is sufficiently comprehensive and detailed to give the casual reader or layman student definite knowledge of the trees considered. An admirable departure of the author from the beaten track of botanical writers is the presentation of the subject in intelligent untechnical terms. There is no doubt but that the local need of such treatises is great; for few people have time or opportunity to become familiar with plants through technical books. The illustrations are for the most part well chosen, clear and truthful. If space could have been given, it is believed the characters of the Ashes, some of the Maples, Elms, Oaks, some of the Birches and Hickories would have appeared still more clearly, if the fruits had been illustrated natural size. To many students of Vermont trees, this little treatise may be the

only authority, and the characters of the fruit named are perplexing to beginners. It is believed also that the author should have given uniformly the general distribution of families and species, adding for the latter available critical notes on exact range in Vermont. The local range of some species is excellently defined, and if all could have been treated alike a great value would have been added to the work. Accurate broad treatises on plant distribution are made possible only through critical notes of local investigators. Uniformity in the following general statements seems desirable. Under "The Pines" we are told there are nine species in the "eastern United States" while under "The Spruces" we learn there are seven species in "North America." (If "eastern United States" the author means states east of the Mississippi, it may be remarked that there are thirteen Pines.) On page 47 we find the "Hickories are quite generally distributed throughout the United States." So far we know the Hickories are indigenous only east of the Rocky Mountains. Certainly the author did not mean to infer that our western friends are not in the United States. As previously suggested, uniformity of description would increase the general value of the pamphlet very much.

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RELATION OF MINING
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STATE ASSOCIATIONS.
THE TRANSVAAL

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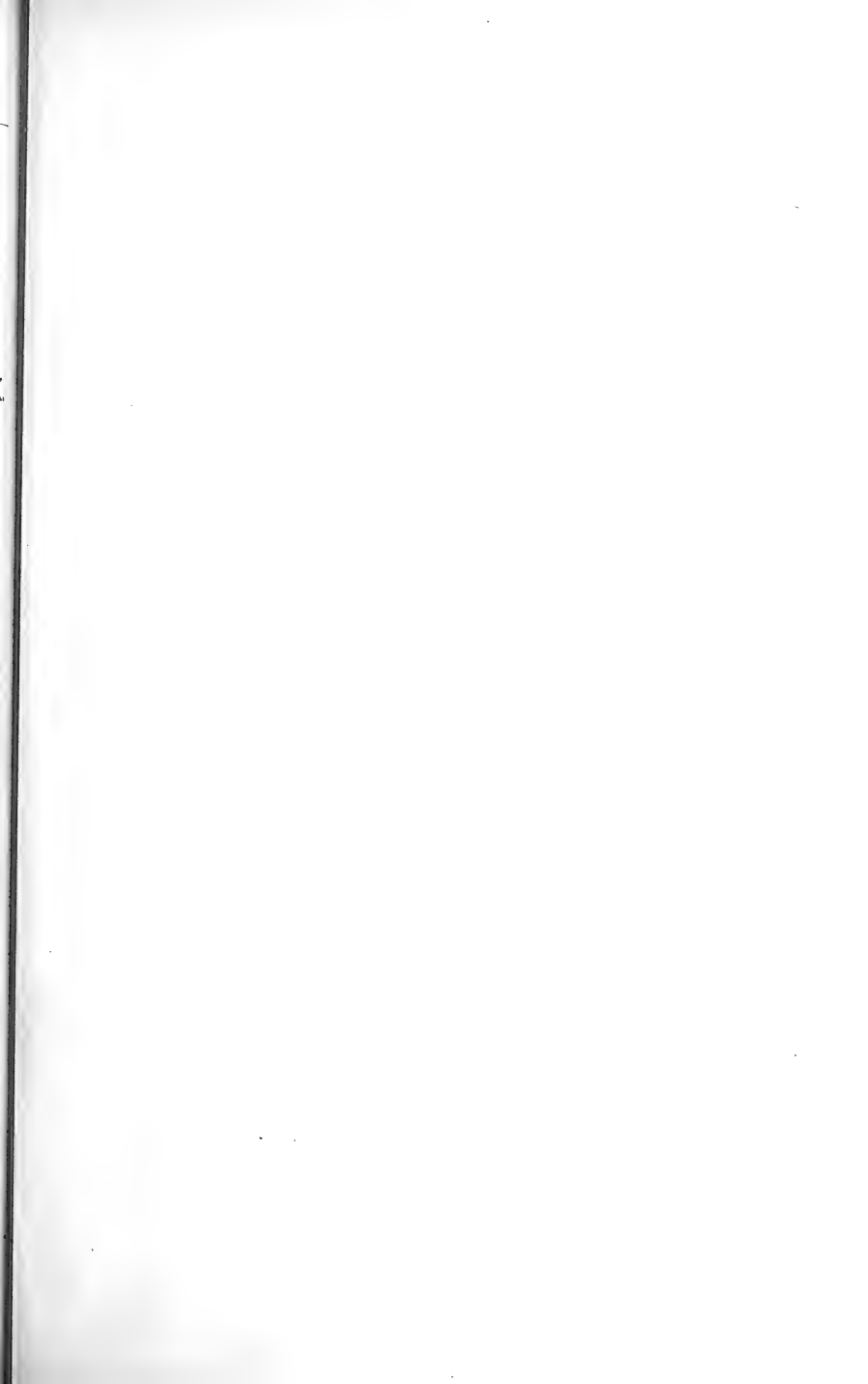


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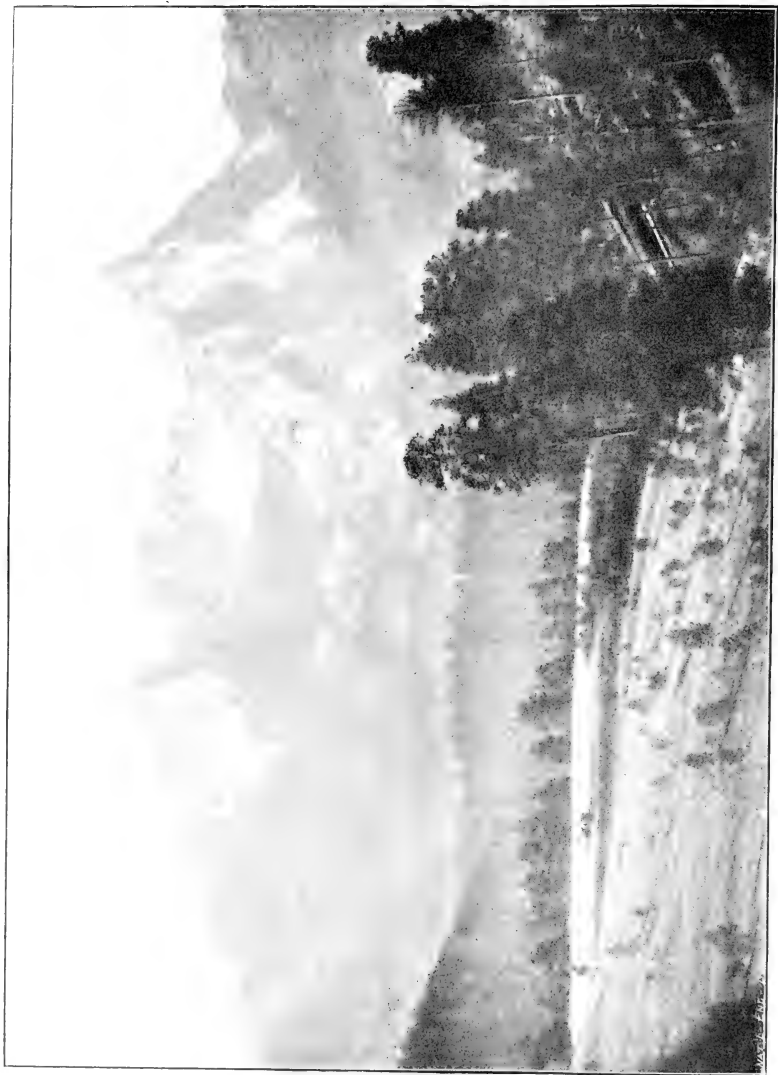


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A MAJESTIC MOUNTAIN.

THE FORESTER.

VOL. VI.

FEBRUARY, 1900.

No. 2.

Grandeur in an American Forest.

**Four Million Acres of Mountain Forest, Forming the Bitter Root Reserve,
a Region of Lofty Peaks and Deep Canyons.**

It is customary to regard the United States as a country entirely and well explored, but this is a somewhat popular fallacy, for in central eastern Idaho is a district of fully ten thousand square miles that has remained practically an unknown country even to the present time.

In 1877, at the invitation of the Nez Perces Indians under Chief Joseph, Gen. Howard visited this unexplored country with his hardy little army of campaigners. It has been said that the wildness of the country necessitated spending six days in trying to catch up with the Indians, and that, whenever this was accomplished, the seventh day was spent in prayer for their escape. At any rate, like the Missouri explorator, they were willing that the country should remain a "howling wilderness," in which policy it has quietly acquiesced since.

Nearly six thousand square miles of this wilderness is now included in the Bitter Root Forest Reserve, which, according to official figures, is exceeded in area by but one other reserve in the United States. It was created on February 22, 1897, when the general desire to save the American forests from their greedy, destroying enemies—the fire and the ax—crystallized in an executive order by President Cleveland, creating thirteen new forest reserves, covering over twenty-one million acres of land—a most appropriate commemoration of the one hundred and sixty-fifth anniver-

sary of the birth of the "Father of His Country."

There are none of the highways of civilization in any part of this wild domain. Two or three widely separated trails penetrate the shades of its dense woods and climb its rugged mountain passes. The Nez Perces Indians still claim it as their hunting grounds and the last of our fur-trappers are to be found within its confines. It is the land of the singing Pine, the home of the elk and trout, a vast mountainous timbered country, a place for rest and adventure, where Cooper's heroes could live again in their happy hunting grounds.

During the summer of 1897, a reconnaissance of this district was made by the United States Geological Survey, the writer having been in charge of the party. Seventeen of the highest peaks in the reserve were climbed and from their summits, save the Bitter Root Valley on its eastern edge, naught but mountains could be seen within its boundaries. The elevation, except in the bottom of some of the deepest canyons, does not fall below 4000 feet, insuring in these latitudes frost in every month of the year. The horizontal area of the reserve is 5924 square miles, which is greater than that of Rhode Island and Connecticut combined, and after travelling through its mountains for four months one is led to believe that if it were rolled out into Kansas prairies it would

cover the greater portion of the United States.

The reserve lies mostly in eastern central Idaho and laps over for 1000 square miles into Montana. Its western limit is the fertile Bitter Root Valley, the home of the famous Montana horses. The Salmon River, in its canyon of from 4000 to 6000 feet deep, is a natural boundary and fire-break on the south. Beyond its western edge is the Big Kamas Valley, while to the north it is simply mountains, range upon range, as far as the eye can reach. The main crest of the Bitter Root Mountains, forming the boundary between Idaho and Montana, cuts it north and south.

The imposing grandeur of this range, in its vast extent and ruggedness, is rarely excelled. The Sierra Nevadas, near Mt. Whitney, are, perhaps, its only superior in this country. For a distance of sixty miles the main range rises in a series of lofty spires and domes bare of soil or vegetation, snow-clad for nine months of the year and glistening with glaciated granite sides, its lofty peaks mingling with the clouds to the confusion of the eye. Except by the Lost Horse trail they are impassable to animals, and are difficult of ascent to the mountaineer. Banks of perpetual snow abound and lakes of striking beauty lie under each peak. It is pre-eminently a land of lakes and streams, a paradise for the trout fisher, a most delightful place to visit.

The traveller should take with him abundant supplies, for his appetite will be his constant companion. The outfit should include two heavy pairs of shoes to hunt deer and goats and a pair of running shoes for bear. It is a fact not very well known, that the best footwear for use in these mountains is woolen socks and rubber-soled tennis shoes. These shoes wear only fairly well but they do not slip on the rocks, no matter how smooth they may be, and they are noiseless for hunting purposes.

The pack-train is also a matter of serious interest. The one used on this expedition consisted of eight mules and two horses. The guiding star of the band was the instrument pack-mule Moses, so named for his ability to climb mountains, his

wisdom and his apparent meekness. He had carried the instrument pack for many trips that when he was started up a mountain he assumed that it was his duty to lead the band to the top, where he would stop and proclaim his song to the world. On one such occasion he was leading through a small meadow where he stirred up a nest of hornets and was stung. Each mule as he came up was convinced to the point of the joke. Returning next day, Moses was again in the lead. He came to this meadow, stopped, looked around, remembered the hornets and then picked out a circuitous route while the rest of the band followed in the old trail. Moses, from the other side, watched the mules pass each in turn being stung and then started peding. The tourists said there was a smile on the face of Moses when he again took up his pilgrimage.

To the west of the Bitter Root crests streams in deep canyons have divided the mountains forming east and west secondary ranges, less rugged but capped by frequent groups of bare crags, difficult access and carrying banks of perpetual snow. The only exceptions to this extent of mountains are the high alpine meadows that furnish delightful camping grounds and pasture for the pack train.

Originally at least ninety per cent. of this reserve was timbered. The forest is composed entirely of conifers, the Spruce predominating, with many stately Cedars in the bottom-lands and some Tamaracs on the hillsides. Yellow Pine is the principal wood on the Montana slope. The Lodgepole, or Black, Pine, is very abundant and constitutes in large part the new growth following burns. The great bulk of the timber is undersized and not of commercial value. The Balsam Firs have softwood and rot quickly, and the Lodgepole seldom exceeds eight inches in diameter. While the ax has made serious inroads into the Montana woods it has never been used in Idaho except to blaze widely separated trails through the forest. From careful notes of surveys during the Summer of 1897 it was estimated that ninety per cent. of the entire area of 5924 square miles of this reserve had been timbered.

Of this vast forest thirty-one per cent. had been destroyed by fire.

This is ominous in view of the fact that this stretch of country, prior to this survey, was practically unexplored; none of its timber, relatively, had been put to any useful purpose; and with the exception of Elk City Shoupe mining camps not thirty persons live within its confines. In many other districts the forest fires are started by sheep men, who want less forest and more pasture, but here the destruction comes certainly from the mining prospectors, who set the forest on in order to expose the rocks to view. Near a new gold find in the northwestern part of the reserve as many as twenty incipient fires were counted from one peak, August 10, 1897. Some of the fires were visited and showed plainly that they had been started purposely. In the basin of the Cœur d'Alene, which adjoins this reserve on the north, and which has been partly developed from a mining standpoint, one-half of the original forest has been destroyed in this manner.

In the basin of the Bitter Root River the destroying agent has been the sawmills. The reckless liberality of the timber laws is only exceeded by the laxity, if not rascality, in the enforcement of their regulations. Such generosity has probably been equalled only by the last Mexican Governor, of California, who, during the last few days of his administration, endeavored to grant away the better portion of the State to his own countrymen before the transfer of power was made.

In Colorado, Utah, New Mexico, Arizona, Montana, Idaho and North and South Dakota, individuals or corporations are permitted to cut timber for building, agricultural, mining and other domestic use from all mineral lands, the only restraint being that timber under eight inches in diameter must not be cut nor can the timber be shipped from the state. A subsequent act authorizes the Secretary of the Interior to give without compensation to the government the right to cut timber on non-mineral lands under regulation from the Interior Department. The timber and stone acts and the right of way grants have all served in the same general way

to destroy our forests. The following quotation is taken from a report of the Forestry Commission selected by the National Academy of Sciences:

"Individual avarice and corporate greed have vied in accepting this bounty offered by the Government and the most valuable timber accessible to the railroads has been cut from all reputed mineral lands."

Until within the past ten years game was extremely plentiful in this reserve. Moose, elk, bear and deer abounded. During the summer could be seen bands of from twelve to twenty elk, which congregated into much larger herds during the winter months in the cañons. Moose and bear could be found on every stream. In 1886, one trapper at Missoula, Montana, sought contracts to deliver two hundred bear skins in one season. W. E. Carlin, of New York, an enthusiastic sportsman, who has known this forest for a number of years, testifies to the abundance of game in the past. W. H. Wright, of Spokane, sportsman and guide, took in a hunting party that killed six bear in one day in 1890. Both these gentlemen are emphatic in their statements that game was very abundant but that it is fast disappearing. In the reconnaissance trip of 876 miles made through these woods the writer saw but one elk and two deer. No time was taken for hunting, however. During this journey but three hunting parties were met—one a Nez Perces' Indian camp, Mr. Carlin's party and an outfit from Elk City, Idaho.

As this forest covers nearly six thousand square miles within the reserve alone and many more square miles of adjoining mountains it is evident that the game has not been exterminated by pleasure or food-hunting parties. The guilty one in this destruction is the fur trapper. He receives from \$2.50 for a martin skin to \$35 for a prime bear skin. All the traps have to be baited with fresh meat. Every large creek visited had a trapper on it and each trapper had a run or circuit of traps of about 100 miles. On Moose and Bear Creeks, in Idaho, during the season of 1896-97, one hundred and twenty bear were caught by two trappers. The trapper kills his bait in the winter and then

drags it to the trap. The warm spring days waken the bear from his sleep and begin the decomposition of the meat, making the desired attracting odor. Often two or three elk and deer are stacked up around the trap at one time. It is considered a conservative estimate that for each bear trapped about 1000 pounds of fresh meat have to be provided, or say, one elk and five deer. The two trappers referred to would, therefore, have killed for their bear traps 720 game-food animals. It is safe to say that there are twenty trappers doing this work of extermination in this reserve, so that each winter there are several thousand elk and deer killed for this purpose.

That the moose are practically gone is proven by the fact that an unmounted moose head with good antlers is now worth \$100. The head of a bull elk is worth \$25. It is easy to kill the game during the deep snows of winter when they congregate in the canyons to browse on the brush. The trapper on snow shoes has them at a great disadvantage. One instance is known where a trapper with a sightless gun found a band of three hundred elk in a narrow canyon. He fired twenty-eight shots into the herd, killed seven and did not trouble about the wounded ones. A rancher in the mountains, south of the Salmon River points with pride to a fence about his cabin made of elk horns. In one canyon on Moose Creek some early hunters in the spring of 1897 found one hundred putrefying deer carcasses. The moose is particularly easy to kill during the winter, as he travels very little.

The game destruction in this district was presented to the Idaho authorities but it seems nothing was done by them to prevent it. The laws are satisfactory, but there is either a lack of desire or ability to enforce them and this negligence forms another argument for the control of the reserve by national authority. This is one of our last hunting grounds. The true sportsman will not kill wantonly nor materially decrease the game. The destruction is wrought by those who seek to make a few dollars by killing in a wholesale way against all laws of humanity and the State. The well-worn and deserted trail

of the buffalo across the plains is now being continued by as sad a cortège of deer, elk and moose over the last divide. If a specific remedy is not soon applied we will have to send our children to the museum rather than to the invigorating forest to see the noble animals that are their just heritage.

The baneful effects of forest destruction have been written of by many able specialists. But one verdict has been rendered by those countries that have destroyed these friends of civilization. The denudation of the hills causes floods and summer droughts; it fills up the navigable streams with silt and destroys the water supply, and hence the crops of the irrigator.

The laws and regulations of the reserves are not intended to impede mining, agriculture or any other development. It is desired that forest reserves should continue to furnish lumber, not only to ourselves but to future generations, and under just regulations to preserve the continuity of the forests. Fire is the enemy to be resisted with greatest energy. In the Northwest there has developed decided opposition to these reserves principally on the part of those who wish to get public pasture or timber. Many oppose the movement because of lack of information concerning its purposes. An editor in Idaho, during the past summer, told the writer that the reserves were created at the request of eastern gold interests to prevent the development of western gold mines.

The essential need is a Forestry Bureau, under Civil Service rules, with life work at good compensation. Transient service has been weighed in the balance and found wanting. Every European country has adopted such a policy for forest preservation and extension. In British India, France and Germany the forests are a source of substantial revenue as well as physical benefit. It is to be hoped that so worthy a cause, which has been auspiciously favored by the two preceding administrations, as well as by the present, will be promptly developed as it justly deserves, and as the necessities of this country earnestly require.

JOSEPH BARLOW LIPPINCOTT,
Los Angeles, Cal.

Relation of Mining to Forestry.

The Importance of Forest Protection to Insure a Profitable Development of Mining Interests.

The question of Forestry has an important bearing upon the mining interests of any mineral-bearing country; but especially is this the case where by far the largest part of the mining area is either destitute or timber has a very limited supply, and where, as in the case of desert mines, the water required for mining and kindred purposes has to be derived from the higher and timbered regions. Large quantities of timber are required in the timbering of mines, as the ore is being extracted; for other important uses, in conducting mining operations; and also for fuel in the reduction of ores. Water is absolutely indispensable in the treatment of any and all kinds of ores.

Many an experienced prospector has staked a valuable claim on the desert and regretfully turned his back upon it, because of the absence of these indispensables to profitable exploitation—*timber and water*. And deposits in such claims will only become available and profitable when water and timber are available, either through better means of transportation or through the growth and preservation of forests and the conservation of the water supply. The latter is indisputably conceded to be directly dependent upon the former—the more forest the more water, and vice versa.

The mining industry, therefore, has a deep and permanent interest in Forestry. The mining interests of the mountains and the deserts, and the farming interests in the valleys, demand alike that the annual rainfall be stored for future use.

The timbered forests subsolve this purpose better than any other means. It is a well-known fact that by the planting of forests the rainfall has been materially increased in sections of desert country.

Of the forest reservations in California, nearly one-half are in the southern part of the State, the other half being in the cen-

tral. The San Gabriel, San Bernardino, Trabuca, San Jacinto and the Pine Mountain and Zaca Lake Reservations, containing 3,781,794 acres, are all in southern California, while the Stanislaus, Sierra and Tahoe Reservations, comprising 5,155,840 acres, are located in the central part of the state, making a total of 8,937,634 acres in California.

On March 1, 1898, the lands embraced in the Stanislaus and San Jacinto Forest Reservations, which were suspended by act of June 4, 1897, again became subject to the operation of the proclamation of February 22, 1897, creating them, which added an estimate amount of 1,428,480 acres to the area embraced in the previously created government forest reservations of California. In addition to this, the Pine Mountain and Zaca Lake Reserve, containing 1,644,594 acres, was also created, and an addition of nearly 57,200 acres was made to the Trabuca Reserve.

The efforts of the government the past year and a half have been primarily directed to putting in operation the act passed June 4, 1897, providing for the administration and regulation of forest reservations, but the necessary funds were not appropriated by the government to put the system in operation till July, 1898, since which time a force of graded officers has been placed in control of the reserves.

Through the patrolling of the forests, it has been found that forest fires constitute the paramount danger to which the reserves are exposed. During the month of October, 1898, an extensive forest fire raged in that part of Los Angeles county reservation situated between Strawberry Mountain on the west, and Barley Flats on the east, along the southern slope of the Big Tejunga watershed, resulting in the destruction of many square miles of valuable Pine timber. Fires originate chiefly by campers lighting fires for cook-

ing purposes and neglecting to extinguish them. Subsequently a wind arises, wafts the smouldering embers into a blazing and devastating fire, and a loss occurs that cannot be repaired except after a long term of years. When funds have been needed for a more thorough patrolling, for the prosecution of sheep herders and other trespassers, and for other like purposes, the government inspector has found himself powerless to act for want of funds.

Numerous provisions and regulations are necessary in the proper maintenance of reserves, and the subject has been treated upon on different occasions, but from the standpoint of the miner, little has been done. It is true, certain regulations have been passed permitting the miners to enter upon these reserves, prospect for, and locate minerals; but nothing has been done to encourage mining upon them. The construction of mountain trails would open up a large territory to the tourist and health seeker, in the heart of our grand mountain and forest scenery, in parts now known only to the venturesome hunter and hardy prospector, who have heretofore been the pioneers in this work.

The opening up of new territory to the efforts of the miner and the prospector is the most desirable end to be accomplished. The efforts of the forest rangers would be best aided in protecting such reserves from destruction by fire by the extensive construction of trails through the mountains to enable them to get to the scene of labor, and facilitate the work of bringing in their supplies.

To further protect the forest, the entrance to such trails could be guarded by the forest ranger stationed there, whose duty it would be to grant a permit to all parties entering the reserve for prospecting, mining, hunting or health, as the case might be. By making it compulsory on all entering the reserve to obtain first a permit from the forest ranger, and making all persons found without it liable to prosecution and fine, a check would be kept, so that the origin of the forest fire could be traced to its beginning when the forest ranger knows the parties who were camped in that part of the reserve.

Some suggestions are conveyed by the following editorial published in the *Mining and Metallurgical Journal*:

"The natural subdivision of the land of any civilized country is best classified under the headings of agricultural, timber and mining rights. Until very recent years the government of the United States has left the care of the timber and mining resources to the destructive and improvident trust of individual ownership. The result is that on account of the perishable nature of the timber supply and its slow rate of reproduction the required amount has rapidly vanished and in many sections is gone altogether. The effect of this has been felt on the climate of the country in diminishing the rainfall and making the amount of it that did come find its way to the rivers and streams in a shorter space of time. In consequence, the moisture which falls has not been as well retained in the soil and rocks, and has rendered some sections, such as the southwestern States, more arid than formerly.

"For these reasons the timber area of the country has an important bearing on the development of the mining resources of any district. There are large sections of the Southwest which at one time were covered with timber which was destroyed by cattlemen and sheepmen and at times by the miners, as the Government took no interest in forestry in those days. This destruction took place both in the mountains and what is now called the desert. Forest reserves have been fortunately set apart on the mountain sections, but that act does not now prohibit prospecting or mining within the limits of such reserves.

"The restoration or reforestation of the burned forest areas in mountain and desert sections has an important bearing on the water supply and aids mining in such sections. In the desert country there have been valuable groves of mesquite timber which have been destroyed as above stated, and efforts should be made by each county to reforest or replant such places. The mesquite timber has several varieties and grows on the desert in Arizona and California from the sea level along the valleys of the Colorado, Salt and Gila

Rivers to an elevation of 2900 feet, as at Newberry, Cal., on the A. & P. railroad, Santa Fe Route, where there was at one time a large grove which was cut down to supply fuel for the silver mines in Calico, when our laws permitted miners to indulge in the luxury of mining silver ore. So far as known, no effort has been made by our experimental stations to grow this valuable cattle food and fuel-producing tree. The pods of this tree have a taste similar to sweet corn and seem to ripen at almost all seasons of the year, and furnish food in the Arizona and California desert valley sections for the Indians as well as for cattle and horses.

"The presence of excessive alkali does not apparently kill the tree, and it seems to flourish where there would grow nothing else that cattle would subsist on and get fat. Professor Wickson, of Berkeley,

is authority for the statement that the Date Palm will subsist on moist alkali soil, and that salt is the proper fertilizer for this tree. If this statement is true there are large areas in the desert where the alkali and salt water and moist land are found, and where experimental trials could be made with these two representatives of native and foreign desert trees. To increase the areas of forests would make such sections fit for habitation, and open up settlements in the districts where minerals could be made available. The addition of any valuable tree from the interior or inland sections of Australia might have as good results to our desert sections as the introduction of the Eucalyptus family has been to the coast districts of California."

O. S. BREESE,
Los Angeles, Cal.

A Proposed National Arboretum.

Offer of Three Thousand Acres of Land in California Suitable for an Economic Plant Station.

The study of botany has come to be universally recognized as of great value to a nation, and botanical gardens are supported by nearly every country in the world. It is peculiarly appropriate, at a time when the City of Los Angeles is offering to the Department of Agriculture a magnificent tract of land of over three thousand acres in extent, suitable in every respect for the establishment of a national arboretum, that the matter should be discussed, and the advisability of such action demonstrated.

It is hard, perhaps, for the residents of Eastern States to realize of what vital importance the preservation of our forests is to the farmers and dwellers in this southwest region of America. Each winter day the sky and rain conditions are carefully observed, and perhaps nothing will so impress the eastern tourist as the uni-

versal thankfulness and contentment brought about by a hard day's rainfall.

It is, therefore, no wonder that Los Angeles, the largest city in the Southwest, has become the center of forest work and interest—the question so vital to the prosperity of our city—the preservation of the winter rainfall for use during our long, dry summers by protecting the forest cover of our mountains and foothills, and the replanting of areas devastated by fire has become a problem of absorbing interest, not only to our farmers and scientific bodies, but to the departments at Washington. Skilled agents are now investigating these peculiar conditions, but the question can never be satisfactorily answered until practical trial is made of trees and shrubs growing under similar climatic conditions.

Other countries of the world—Algeria

and lands surrounding the Mediterranean Sea, parts of Asia Minor and Austria—offer a most inviting region for research. This is true not only from a forest standpoint. Many trees are cultivated chiefly for their economic value, as may be illustrated by a few examples. The Cork Oak (*Quercus suber*), for instance, is one of the most important forest trees in southern Europe and Algeria, from the bark of which cork, so universally used, is manufactured.

The culture of Oak forests is very profitable in spite of their yielding a crop only about every eight years, but its especial value arises from its thick bark, making it impervious to fire, which so often destroys the Pine forests of the south of Europe; and the plantation of belts of these trees is recommended by French authorities as an almost complete protection against the spread of fire. I quote from Chas. Naudin's description: "The Cork Oak is found in rocky ground, and it succeeds even in the poorest and most arid land, resisting long droughts and the extreme heat of southern climates."

Another tree suitable for covering our foothills, and one likely to produce good results and be of great economic value, is the Saint John's bread (*Ceratonia siliqua*), also native of Algeria and neighboring countries. Dr. Masters states that England alone imports annually one hundred and eighty thousand tons of the pods from the island of Crete. The pulp of the pods is the chief ingredient probably of much of the chocolate sold in America. It is used there chiefly as cattle food. It has been introduced into Spain and many other countries. It grows in arid regions with but little care, providing not only food for the cattle, but shelter from the extreme heat of the sun.

The introduction of the Eucalyptus, I may also mention, has done much in supplying a cheap fuel for the farmers of these regions. Many species are admirably adapted for covering our foothills. Many Pines would probably succeed, especially the *Pinus tuberculata*, native of the neighboring mountains and alleged to withstand fire. Pines, however, from

their resinous nature, are probably ill-adapted to regions exposed to forest fires, unless divided by belts of fireproof timber.

Our higher mountains, if carefully protected from cattle and fire, could probably be left for many years to reforest themselves. But it is peculiarly the arid belt of foothills—extending to about 3000 feet—covered in many places with Grease Wood, and so peculiarly exposed to fire from campers, hunters and small farmers, that would be benefited by an arboretum. With regard to an economic plant station for the building up of new industries by the introduction of new fruits and plants suitable for culture under our climatic conditions, the Department of Agriculture is indeed doing much; but in preference to reading through long bulletins or inaugurating experiments which may prove costly failures, the farmers and others interested wish to see these trees and fruits growing, and to be able to obtain plants or seeds of them, for experiments.

For this purpose the Department of Agriculture should be provided with a testing ground. An economic plant station would furnish the opportunity for securing such information as is desired. Coffee trees grow in a few well sheltered, protected districts. No doubt, in many places in our State, tea plants would flourish, probably here on north exposures protected from wind. We need a berry to take the place of gooseberries, etc., for culture in semi-arid regions. Some species of *Guava* or *Eugenia* would undoubtedly answer this purpose. From the various species of *Anona* some peculiarly hardy variety could be selected, and the industry of shipping East this delicious fruit might be inaugurated. The Soapberry (*Sapindus utilis*), which is now attracting considerable attention for culture in Algeria, might also prove profitable here. But it is unnecessary to continue the long list of economic plants which are capable of being cultivated in these regions and which would so help build up the agricultural possibilities of this magnificent portion of America.

The public have not the time or the knowledge to hunt out individual trees

growing in gardens. They want a botanical dictionary with colored plates, accurate, because Nature would provide them, and properly named with their uses, all of which an economic plant station alone can give.

As every public body in Los Angeles, feeling the importance of building up the agricultural regions extending to Arizona and New Mexico, of which, from her geographic position, she will become the gateway for the exchange of these prod-

ucts with the Oriental markets of the world, and believing that the agricultural prosperity of this vast region will help much to build up the greater prosperity of the United States, has endorsed the proposed plan, we earnestly urge the Department of Agriculture to accept and maintain this national arboretum and economic plant station.

A. CAMPBELL-JOHNSON,
 "Garvanza,"
 Los Angeles, Cal.

The Value of Lodgepole Pine.

To one accustomed to logging in big timber only the mention of Lodgepole Pine (*Pinus murrayana*), or of its eastern relative, the Jack Pine (*Pinus divaricata*), as valuable trees may be amusing, for these trees are despised and usually considered a nuisance. It is therefore a pleasure to help them to their proper place in forest economy.

It is not generally known that these Pines have a place in the lumber market. Although they are not quoted they are sawed and sold under other names. The Jack Pine of the lake region goes for "Norway," the Lodgepole of the mountains going as "White Pine." Both are extensively used for fuel and both command, where accessible, a stumpage of twenty-five cents per cord.

Ties are made in large quantities from both and bring a stumpage price of three to five cents. The straight, slender, smooth trunks of the smaller sizes make excellent fence poles, or, sawed without edging, boards. As material for the pioneer its very extensive use for house and barn, corral and fuel bears modest evidence that it is very often overlooked.

In addition to the uses made of the Lodgepole Pine at present, some of its qualities promise to increase the demand for it in the future. A large proportion of it has a pitted grain that gives a beautiful surface when polished and may have much value for ornamental work.

In silviculture its value is remarkable. No other species is so ready to occupy the ground after a fire. No other, when young, can endure the sun and the drought of newly-burned land as this can. During the very dry time of 1889 and 1890 fire swept large areas along the continental divide between the Great Northern and the Northern Pacific railways in Montana, and now wherever that fire was not so severe as to destroy the seed and was not followed by a second fire, the burned ground is densely restocked with seedlings of this species, many of them five feet high. Areas are frequently found that have 4000 seedlings to the acre. The species has great value as a mountain cover. After the first five years the seedlings grow rapidly and soon form a dense shade to retard the melting of snow and an obstruction to delay the run-off of water.

It has been said the Lodgepole Pine is a nuisance, that were it not for its persistent occupancy of the land more valuable species would come in. Many places can be found where such is the case, but this is not the average effect. In the broad economy of nature this humble species is doing its work and doing it well. In general it covers land no other species wants and most faithfully keeps doing something and producing something on land that would otherwise be waste.

As aids or nurses to other species, also, Lodgepole has an unappreciated value. It

is a pioneer and prepares the conditions under which other species may thrive. Such work is very noticeable where enough Spruce or Larch are in the vicinity to furnish seed. Where they are, after the Pines have grown up enough, and have cleared themselves of branches enough to let the air in under them, Spruce, Larch and even White Pine seedlings are often found starting underneath in the needed shade and shelter of the Pines. Such standard trees ultimately overtop and subdue the Lodgepole and occupy the land almost entirely, leaving little evidence of the kindly work of the nurses through whose aid they were established.

Where Larch has come in among the Lodgepole and has reached a foot or more in diameter and formed its usual thick and protecting bark a light fire may run through and kill the Lodgepole, thinning the forest and leaving the Larch in possession to grow more rapidly than before and form clearest trunks of greatest sizes possible by any method of silviculture.

The policy of aiding and diverting and not antagonizing, Nature's forces, is the best with Lodgepole Pine as with other natural products.

H. B. AYRES,
Carleton, Minn.

Field Agent U. S. Geological Survey.

Forest Planting in Indiana.

John P. Brown, President of the Indiana Forestry Association, has recently communicated an interesting query to the Division of Forestry, as to the desirability of using principally Carolina Poplar in forest plantations of the Middle West. Mr. Brown especially asks if this should be done in Indiana, where he states the tendency is to use Carolina Poplar to the exclusion of other trees. He further states that there has been great destruction and waste of natural forests in Indiana and that as a result there is now a growing earnestness to know "what to plant."

The question is a complex one. For the timberless prairie region of the Middle West, it is "what may be grown." The needs of settlers in this region are for trees that will grow under the most trying conditions—uncertainty of rain and exposure to prolonged drought and hot winds.

There is need first of all that the trees used here should produce fuel and good fence posts in as short a time as possible. Plantings of slower growing and more valuable timber trees, if they can be undertaken in conjunction, must require two to three times as long to produce useful timber. For the most part the latter class of trees (Oaks, Pines, Spruces, Cedars, etc.) has been neglected in the plains re-

gion. The rapid growing Cottonwood (essentially the same as the Carolina Poplar), and the equally rapid Hardy Catalpa are the trees planted by most prairie farmers; and often only the Cottonwood is planted. It is generally well known that these species can be depended on. Boxelder, Silver Maple, Green Ash, American Elm, Honey Locust and Osage Orange have been used less generally.

For Indiana and adjacent States of the Middle West, the question of "what to plant" is quite different. Rain is abundant throughout the growing season, and, as a result, any of the fifty or more important eastern and northern timber trees can be successfully grown. Most farmers of this region know that denuded forest land will in time be reforested, if exempted from fire. It is, however, of the greatest importance that this regeneration be directed to the end that only useful timber be produced at as early a date as possible. It is believed that this can be accomplished best by planting.*

The selection of proper kinds for this

* The Division of Forestry has in preparation a bulletin entitled "Collecting Tree Seeds and Raising Forest Tree Seedlings." This bulletin will soon be available for distribution.

region may include three classes of trees: (1) species of very rapid growth, giving useful timber in 10 to 25 years (such as Hardy Catalpa, Black Locust, Cottonwood, Largetooth Aspen, Silver Maple, etc.); (2) trees of moderately rapid growth, producing useful timber in 30 to 50 years (Red Oak, Yellow Oak, White Ash, Beech, Kentucky Coffee-tree, American Elm, Rock Elm, Basswood, Shell-bark Hickory, Bitternut Hickory, Sycamore, Arbor-vitæ, Larch, etc.); (3) trees of slower growth, producing useful timber in 60 to 100 years (White Oak, Bur Oak, Swamp White Oak, Sugar Maple, Black Walnut, Butternut, Black

Cherry, Tulip-tree, White Pine, Red Spruce, Red Cedar, etc.).

In all cases, however, the economic purposes of the planter must largely determine the selection, since forest planting is mainly a matter of business rather than of sentiment. It may, therefore, suit best the purpose of one to plant only the first class of trees suggested, from which quick, continuous cuttings for fuel, fence posts, poles, etc., can be made. For another planter's purposes a combination of the first and second, or all three classes of trees may be desirable.

GEORGE B. SUBWORTH,
Dendrologist, Division of Forestry.

Forestry in the Transvaal.

BY THE CURATOR, JOUBERT PARK, JOHANNESBURG, SOUTH AFRICA.

Looking at any good map of the Transvaal, we find a tract of flat, treeless tableland, between 5000 and 6000 feet above sea level; and roughly speaking, 150 miles in extent from east to west, with a breadth of 100 miles from north to south. From this collecting ground, which has an average annual rainfall of about 27 inches, all the large rivers of South Africa may be said to take their rise. The Vaal, Crocodile, Olifants, Tugela, Sabie, Umfelozi and Maputa Rivers, which water the Cape Colony, Transvaal, Free State, Natal, Zululand and Swaziland, all have their beginnings on the high Veld. This tableland is almost destitute of trees, except in sheltered valleys; and in a word I have proposed to clothe this tract of land with trees, and the certain, though distant, result will be that the whole of South Africa will reap the benefit.

At present we have a vast arid plain covered with short grass over which heavy thunder showers rush to find the shortest way to the sea. The radiation of moisture is excessive during the cloudless day, and the cold is biting at night. Cover the ground with trees, and you arrest the

storm water to a great extent and replenish the springs. The country is as bare of clothing as the natives; such a project, if carried out, means employment and a living to thousands of people, and a settled industry for all time.

To set such a gigantic business going, the government alone is able and long-lived enough; for as M. Bagneris remarks, in his Elements of Silviculture: "The state, which is, so to speak, imperishable, is the only body which is able to produce the most useful timber, for private companies are obliged to guard against the accumulation of a large capital in the shape of standing timber."

I confess I have brought these facts before the government, but hitherto without the smallest effect. All the timber used for the mines, and for building and general purposes, is imported at vast expense. Even fencing poles of *Acacia mollissima* must be largely imported from Natal. Some time ago it was proposed to import blocks of *Eucalyptus diversicolor* from Western Australia for paving the streets of Johannesburg, but the cost was prohibitive.—R. W. Adlam, *Gard. Chronicle*.

Studying the American Forests

In The Empire State.

The applications for advice as to the best treatment for woodlands have come from owners all over the country, for tracts ranging in size from the small farm woodlot of a few acres to the large tracts of forest land held by the commercial companies. During the early summer, in answer to an application on land of the latter class a party from the Division of Forestry spent two and a-half months on the lands of the Mac Intyre Iron Company in Essex County, New York, gathering data from which to prepare a working plan.

On a tract of some 70,000 acres over 1000 acres of valuation surveys were taken. These were made on the strip method and consisted in the measurement of all soft wood trees two inches and over at breast height and all hard woods over ten inches. The surveys were run through the various forest types and in different parts of the tract, so that the results give a much more correct estimate of the stand of timber than is obtained by using other methods.

These figures of the present stand were supplemented by studies in the rate of growth of Spruce on cut-over land, by means of analyses of felled trees. The party was made up of student-assistants and woodmen engaged locally. The student-assistants were Messrs. Henry Grinnell, Smith Riley, M. De Turk High, E. T. Grandlienard and G. F. Peabody, who was in charge of the work for a time during my absence.

Under instructions from Mr. Henry S. Graves, Superintendent of Working Plans, twenty-three lots were visited by the writer during the late summer and autumn. Preliminary examinations were also made on nine larger tracts on which more study will be required.

The woodlots ranged in size from 10 to 200 acres, the limit of the woodlot agreement, and aggregated 2000 acres. The preliminary examinations covered over 90,000 acres. The woodlots were distributed as follows: 3 in New York,

4 in Massachusetts, 5 in New Hampshire, 1 in Rhode Island, 2 in Connecticut, 1 in Pennsylvania, 1 in Delaware, 1 in Virginia, 2 in Illinois, 1 in Missouri and 2 in Iowa.

Each woodlot presents a new point to be considered and some individual problem to be solved; on one lot the question of stump sprouts plays an important part, on another a rocky hillside is to be planted and brought from a waste place into a useful part of the farm, again there is erosion to be checked before the fertile fields beyond are washed away, while on another farm a wind-break is desired. These questions make the work intensely interesting.

On many of the small tracts the visit of the assistant, followed by a careful letter of advice and suggestion, is sufficient to enable the owner to carry out the treatment recommended by the Division. Many questions can be answered while going over the ground with the owner, and helpful suggestions given. Sometimes all that is needed, for the present, is to assure a man that he is proceeding in the right way with his woods and to give official commendation to the plan which he has come to adopt as the result of his own experience and foresight. Very often in visiting a locality the assistant has an opportunity to talk with other owners of woodland and thus arouse further interest.

In the Eastern States the influence of the State Forestry Associations is distinctly seen in the applications coming from city men for their country places. In some instances the landscape gardener rather than the forester should be consulted, but even on such estates, while confining himself to the commercial side of the question, the forester is often able, while on the ground, to show the owner how to treat his woods, so that both profit and pleasure may be derived from them, making them yield the desired crop without injuring the æsthetic effect.

RALPH S. HOSMER,
Washington, D. C.

In the Middle-West.

W. L. Hall, assistant superintendent of Tree Planting, returned the last week of the year from a trip of two and a-half months' duration through the states of North Dakota, Minnesota, Iowa, Nebraska, Kansas, Oklahoma, and Texas. Mr. Hall made a study of the forest plantations of forty owners, the work consisting of an examination of soil and sub-soil in relation to fertility and moisture conditions, the general forest conditions being studied as well as those of the particular plantations visited. A rough sketch was in each case made of the original tract, upon the basis of which will be made another giving instructions for guidance in planting in the spring. This advice is furnished free by the Division. Mr. Hall will make an official report on his trip which will detail the value of practical work in tree planting, in which he found a very general increase of interest throughout his entire trip.

In California.

George B. Sudworth, Dendrologist of the Division of Forestry, acting also in behalf of the U. S. Geological Survey, made a trip with a pack train through the Sierra Nevada Mountains, Cal., from August 1st to November 1st, making studies of the forest tree species of the region in respect to their areal and altitudinal distribution. The intention is to map the distribution and determine the relative importance and the local and general use of the timber, including manufactured and domestic use.

Mr. Sudworth's work included also a study of prices of timber and its general consumption, a careful consideration of the principal commercial timbers, the areas which contain timber which could be worked up by a sawmill, and the mapping of cut-over areas in the latter regions.

A special study was made of forest fires in this region, both in reference to the destruction of valuable commercial timber and the effect of fires on reproduction.

Pennsylvania Forestry Commission.

A special meeting of the Forestry Commission was held in the Executive Chamber, Harrisburg, at 4 o'clock P. M., January 23d. There were present Governor Stone, Messrs. Albert Lewis, of Luzerne county, John Fulton, of Cambria county, Hon. A. C. Hopkins, of Lock Haven, Maj. Isaac B. Brown, Deputy Secretary of Internal Affairs, and Dr. J. T. Rothrock, Commissioner of Forestry. By invitation, Prof. John Hamilton, Secretary of Agriculture, was also present.

Hon. Monroe H. Kulp, Hon. S. P. Wolverton, Mr. J. B. Quigley, representing Mr. Barton Pardee, Torrence C. Hipple, Esq., and Mr. Barton, were also present, with maps, explaining the location of the lands and their relations to the water-sheds of the State. There was a full discussion and a very careful consideration of the lands presented for purchase.

Of the lands purchased about 20,000 acres are on the headwaters of the Dela-

ware river. The remainder, about 39,000 acres, are on the Susquehanna water-shed. There are also in sight now, with the prospect of a speedy purchase, about 40,000 acres more, providing terms and conditions can be agreed upon. The lowest price paid was 50 cents per acre; the highest price, for some specially desirable lands, which contain considerable mature timber, with a good crop of young timber coming on, was \$2.00 per acre, which is probably the highest figure that the Commission will agree to consider, and then only when the land is very desirable for the purposes of the State.

This is the culmination of many years' agitation of the forestry question. All political parties have joined in this movement, which is rather one of self-protection to the State than of political nature. Governor Stone tersely stated that these reservations are to be the parks and the outing grounds of the people forever.

Some Opinions on American Forestry.

Of the Utmost Importance.

Governor Roosevelt of New York, in his annual message, took occasion to devote considerable attention to forestry. It is not to be wondered at that one who has hunted and toured through the depths of the forest should see the necessity for preventing forest denudation in the great Empire State. The Governor says:

"The subject of forest preservation is of the utmost importance to the State. The Adirondacks and Catskills should be great parks kept in perpetuity for the benefit and enjoyment of our people. Much has been done of late years towards their preservation, but very much remains to be done. The provisions of law in reference to sawmills and wood-pulp mills are defective and should be changed so as to prohibit dumping dye-stuffs, saw-dust or tan bark in any amount whatsoever into the streams. Reservoirs should be made; but not where they will tend to destroy large sections of the forest, and only after a careful and scientific study of the water resources of the region. The people of the forest regions are themselves growing more to realize the necessity of preserving both the trees and the game.

"Hardy outdoor sports, like hunting, are in themselves of no small value to the national character and should be encouraged in every way. Men who go into the wilderness, indeed, men who take part in any field sports with horse or rifle receive a benefit which can hardly be given by even the most vigorous athletic games.

"There is a further and more immediate and practical end in view. A primeval forest is a great sponge which absorbs and distills the rainwater; and when it is destroyed the result is apt to be an alternation of flood and drought. Forest fires ultimately make the land a desert, and are a detriment to all that portion of the State tributary to the streams through the woods where they occur. Every effort should be made to minimize their destructive influence. We need to have our system of

forestry gradually developed and conducted along scientific principles. When this has been done it will be possible to allow marketable lumber to be cut everywhere without damage to the forests—indeed, with positive advantage to them; but until lumbering is thus conducted, on strictly scientific principles no less than upon principles of the strictest honesty toward the State, we cannot afford to suffer it at all in the State forests. Unrestrained greed means the ruin of the great woods and the drying up of the sources of the rivers."

Yale and Forestry.

President Hadley, of Yale, always progressive and quick to interpret the signs of the times, has declared in favor of forestry on broad patriotic grounds. In an address before the Yale Alumni Association of Cleveland, Ohio, as given in the *Yale Alumni Weekly*, Dr. Hadley said:

"Of all the needs at present, the thing we feel the need of most is the intelligent teaching of forestry, which stands out prominent. We need it for the sake of the rainfall of the country, for the health of the country, for the future life of the country. I hope I shall see established at Yale in the not distant future a school of forestry, which shall be not a school of a kind of botany as are some of the schools at present in the country; not modeled on German fashions, as is the case with the remainder; but as a school adapted to the needs of America, teaching in the studio and in the laboratory the principles of botany and surveying, the law of economics necessary to the understanding of the subject, and giving the men a chance to go out into the fields and do practical field work, and work into positions with the United States government; work into positions of private influence also, which are bound in the immediate future to increase very greatly in importance. Such a school of forestry I believe we have at hand and before us."

State Forestry Associations.

Energetic Efforts of Representative Organizations.

Minnesota.

Minnesota has the oldest Forestry Association in this country. Though the State has expended nothing for planting trees in the forest regions, it expends \$20,000 annually in bounties for tree planting on the prairies, and in all has expended for that purpose over half a million dollars.

At the annual meeting, at Minneapolis, a short time ago, General C. C. Andrews read a very complete paper on "The Progress of Forestry in this Country." He spoke of the advance made by individual States, a brief review of a few of them being as follows:

The State Geologist of New Jersey remarks that "the question of forest protection in New Jersey is really included in the greater problem of the State's water supply and its conservation." He is of the opinion that the forested regions in the Highlands should be reserved and held in forest to maintain water supply. "Their value," he says, "as great gathering grounds for the unfailing supply of pure water to the many seashore towns and settlements and the cities in the valley of the Delaware, is such as to make the reservation of these tracts for this use a question of public importance." The investigations of the forested lands of New Jersey by the State Geologist are still in progress.

New York has a most efficient forestry staff and is expending more money in the work than all the other States combined. Within about a couple of years the Legislature has appropriated \$1,800,000 to buy land, for park and forestry purposes, in the Adirondacks. About one million acres are now held there by the State, another million acres are held for purposes of recreation by clubs and individuals, and still another million acres are owned by private parties for ordinary purposes. The Catskills having grander scenery and being much nearer to the great metropolis, a

movement is on foot to increase the State's holdings in that beautiful region.

More than a year ago the Wisconsin Forestry Commission made a valuable report to the State Legislature accompanied by a bill "To establish a system of state forests and provide for the management of the same." Though discussed in the legislature, the bill was not enacted, but will probably come up at the next session. The arguments in the report fully sustain the conclusions that "the establishment of a system of state forests is a necessity, not only for the protection of the climate and water flow of the State, but for the purpose of providing a sufficient supply of raw material to the various lumber and wood industries of the State"; that the money expended to establish the system "will, after a reasonable time, return into the State Treasury, and the system once fairly established will yield a large annual income that will, to a proportionate extent, do away with the necessity of taxation."

In Minnesota there are probably about three million acres, in detached localities, of idle non-agricultural land which would begin to earn a good revenue as soon as it could become forested. Our soil and climate being so favorable to the growth of the White Pine, the most valuable of all trees, a wise and courageous forest policy would be of immense benefit. Our state can well be in the front rank on this important question if it will but improve its opportunities. In this as in many other States it is to be noticed that the press is doing valuable service towards instructing the public mind on the needs of better forestry methods. Women's clubs are also interesting themselves in the question.

On the whole it would seem that more has been accomplished for forestry in this country in the last five years than had been accomplished for a long time before and the prospects for the cause are certainly very encouraging.

Massachusetts.

The Legislature has lately convened and the Massachusetts Forestry Association is considering several measures which it has been urged to present on Beacon Hill. It has already presented a report on the work of the State's gypsy-moth force, this being the work of a special committee which has been in the field observing the pest throughout the past season. This report, signed by the eleven active members of the committee, is in the main favorable to a continuation of the State's work against this enemy of the trees.

The compulsory Tree Warden Law passed by the Legislature last year becomes operative with this year's town elections. By virtue of this law every town in the Commonwealth is obliged to elect a warden annually. The act specifies very definitely the duties of this officer, to whom is entrusted all public shade trees. Heretofore towns were permitted to elect such an officer if they desired to do so. Quite a number of the more progressive towns in the State adopted this law and it was owing to the success of the system in these cases that the Forestry Association sought last year to have every town obliged to put it in operation. Having secured the passage of the law, the Association feels a keen paternal interest in the subject and is making every effort to arouse interest in the 320 towns of the State so that the most competent men may be chosen for the position. Circular letters and copies of the law have been sent to town clerks and to public-spirited societies or individuals in every town in the State.

As the law does not apply to cities, the Association is considering a bill providing for the care of city trees. The cities in central and western Massachusetts take considerable pride in their trees and care for them, but the eastern cities have been less energetic. Springfield, for example, has a competent man in charge of her trees and for the past two years he has been given some \$20,000 to expend upon them. Boston last year, after much pressure had been brought to bear by interested citizens and societies, appropriated \$5,000 for the care of street trees.

During the past spring, summer and autumn the Association has had a special committee hard at work preparing a stereopticon lecture. A competent landscape photographer was employed and pictures were taken in many parts of the State, the subjects being chosen by the committee. In this way about 250 pictures were secured representing local conditions in woodlands and in street shade trees.

The Association has shown its public spiritedness by offering to give the lecture before any local organization that will supply a suitable hall and pay the expenses of transportation and entertainment. The first lecture was given by the Forestry Association for its own members and the members of the Legislature, at Horticultural Hall, Boston, on January 25th. It will be given at the same place on February 24th, under the auspices of the Massachusetts Horticultural Society. In addition to the above the Forestry Association has engaged Miss Mira Lloyd Dock, of Pennsylvania, to give one of her lectures, "Forestry at Home and Abroad," at Horticultural Hall on January 29th.

Nebraska.

The Nebraska Park and Forest Association completed its organization at Lincoln on January 10th. Some of the most prominent men of the State, among them former Governor Furnas, J. Sterling Morton, Professor C. E. Bessey, Professors Borning, Hunter and Emerson, of the University, G. A. Marshall, and E. R. Stephens, are among the leading members. C. S. Harrison, of York, is president.

During the past year an immense amount of work has been accomplished. Notes bearing on various phases of the subject have been sent to the press; over half a million have been issued in various papers. A pamphlet on "Shelter Belts and Evergreen Barns," prepared after much research, has had a wide circulation throughout the State.

The Association now plans to publish its history and objects in pamphlet form, in order to interest more of the leading men of the State, and to send also to all

the candidates for the Legislature next Fall, before the election. The State will be asked to make an appropriation for tree planting, to be expended under the care of the Association, the State to own the plantations.

Indiana.

The Indiana Forestry Association held its annual meeting in Indianapolis, January 13th. John P. Brown, President of the Association and author of the State Forestry Act, delivered an address in which he said in part:

"On March 8, 1899, the forestry act became a law, and it was considered advisable to organize an association to assist in arousing interest in forestry throughout the State and Nation. The Indiana Forestry Association was organized on March 30th with thirty members. The constitu-

tion adopted followed the general plan of the Massachusetts Forestry Association. We found some features in this which our Society could not carry out, our members being so separated that frequent meetings are impossible. Most of the work will of necessity devolve upon the secretary and a few officers, correspondence taking the place of frequent meetings.

"During the past season a large number of letters have been prepared and printed in many newspapers throughout the State, which have created some interest, but lack of funds has prevented systematic work."

Amended articles of association were adopted and, Mr. Brown declining a reelection as president, officers were elected as follows: President, Albert Lieber; vice-president, General John Coburn; secretary and treasurer, John P. Brown.

Forestry History.

The United States Civil Service Commission announces that on February 15 and 16, 1900, an examination may be taken, in any city where the Commission has a board of examiners, for the position of assistant and expert in forestry history, Department of Agriculture. The examination will consist of the following subjects, which will be weighted as follows: Essay, 15; forestry, 30; forest history, 30; French or German, 10; training and experience, 15; total, 100. Two days, of six hours each, will be allowed for the examination, the first two subjects coming on the first day and the remaining ones on the second. From the eligibles resulting from this examination certification will be made to fill the position at a salary of \$1000 per annum.

This examination is open to all citizens of the United States who comply with the requirements stated in the application blanks. Applicants will be examined, graded and certified with entire impartiality and wholly without regard to any consideration save their ability, as shown by the grade attained in the competitive examination.

Official Timber Investigation.

The investigation of American timber through scientific tests has been made the subject of a bill recently introduced in Congress by Senator McBride, of Oregon. This bill provides:

"That the sum of forty thousand dollars is hereby appropriated, out of the funds now in the treasury of the United States not otherwise appropriated, for investigations and tests of American timber, this sum to be applicable also to the purchase of the necessary equipment and for the speedy publication of results, to be expended under the direction of the Secretary of Agriculture, through the forestry division: and, furthermore, that not less than 30 per centum of the amount appropriated be devoted to the investigation of timbers of the Pacific coast: *Provided*, That State institutions or private citizens of any of the Pacific Coast States agree to furnish the land and building for a testing laboratory satisfactory to the Secretary of Agriculture and subject to his control for the time of such testing. Such appropriation, or so much of it as the Secretary of Agriculture shall decide to be necessary, to be immediately available."

The True Forestry.

Not many years ago the people in this country who were interested in forestry were few in number and were more or less discouraged. Looking further ahead into the future than their fellows and foreseeing the grave dangers and difficulties which threatened North America from the destruction of the forests, they were yet unable to impart their enthusiasm to others, or even to make them see the dangers that were ahead.

Nowadays things are very different. The number of people interested in forestry is large, the number of trained foresters in the country is considerable. Work is being done on every hand to demonstrate to the public that forestry is something practical; a means of investing property so that an adequate return shall be had for the investment. It is but a few years since it was first definitely explained to the American people that the chief purpose of protecting and cultivating the forests is that the crops which they produce may be harvested and sold, but when this statement came to be believed, and when what it meant came to be understood by the public, it was seen that land owners, lumbermen and foresters were all working for a common end, and it became evident that they ought all to work together. The business of the forester is to manage the forest so that the land owner and the lumberman can get out of it as much as possible.

Before that the lumbermen had been bitterly opposed to the forester because they supposed that he wanted to keep the lumbermen out of the forest; that he wished to prevent the cutting down of the trees; that he desired to keep them—perhaps to look at. In other words, that the forester had some incomprehensible sentiment which led him to go about constantly singing “Woodman, spare that tree.”

We all know a little better than that now, and are rather disposed to laugh at the ideas which perhaps we ourselves cherished not long ago. And at the same time, the notions of many people who are

really interested in forestry are still sufficiently vague as to what forestry means, and they know little more than that it means in general the protection of the forests, which many of them have seen ruthlessly destroyed by the lumbermen or by fire.

In a Primer of Forestry recently published by the Department of Agriculture as one of its bulletins, Mr. Gifford Pinchot tells us something about forestry which, we take it, will be news to 90 per cent. of the people into whose hands the book comes. * * *

We are told first what a tree is; its parts, its food, what wood is composed of, how the tree breathes, how it grows and of the structure of wood, including the annual rings and the heart wood and sap wood. The second chapter teaches what are the various requirements of trees as to heat, moisture and light; it shows that some are tolerant and others intolerant of shade, while some tolerate shade at one period of life which yet cannot bear it at another. Rate of growth, reproductive power and succession of forest trees are treated, as well as pure and mixed forests and reproduction by sprouts.

Then comes the treatment of the forest as a community. The life of a forest crop, the seven ages of the trees, the struggle among the trees for existence, the growth of those which survive, the culmination of the tree in size, the end of the struggle and finally the death of the tree from old age.

So long as the forest was left to nature it did very well, but man interferes with nature and trouble follows to all natural things.

Since Mr. Pinchot returned to this country and took up the practice of forestry as a profession, he has done a great deal of good in many ways and in many places. It may perhaps be doubted, however, whether he ever did any one thing so useful in spreading a comprehension of what forestry really means, as the writing of this little book.—*Forest and Stream*, N. Y. City.

THE FORESTER.

A MONTHLY MAGAZINE

DEVOTED TO ARBORICULTURE AND FORESTRY, THE CARE AND USE OF FORESTS
AND FOREST TREES, AND RELATED SUBJECTS.

THE OFFICIAL ORGAN OF

The American Forestry Association,

President, Hon. JAMES WILSON,

Secretary of Agriculture.

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JOHN KEIM STAUFFER, EDITOR.

It is with some considerable satisfaction and pride,—pardonable we hope—that THE FORESTER points, in this issue, to the views of forestry of two representative Americans—busy men-of-affairs, and leaders of thought, whose words command attention wherever spoken—Theodore Roosevelt and Arthur T. Hadley.

At the mere mention of their names a willing audience is assured, for it is not called to stand before a sphinx. Their words on forestry, as given on a preceding page, carry conviction in every sentence. They are the words of men who, having sought a complete understanding of the subject as it exists to-day, can see the logical sequence of tomorrow before tomorrow comes and has gone.

As the busy man is usually the man who finds time most readily for everything in its place, so these men, in the multiplicity of detail of more pressing needs, have found time to call attention to the emphatic necessity of forestry, scientifically and ably directed, in America. The "war spirit" is more easily aroused, but the civic spirit is as strongly invoked *now* as an equal duty of patriotism—"love of one's country."

The American Forestry Association does not aim to be a "close corporation" but a patriotic body, extending into every State of the Union and *doing* something by energy and coöperation. The present year has opened auspiciously for forestry in every section of the country and affords an unprecedented opportunity for a successful campaign for forest conservation.

Realizing the importance of forestry to the entire mass of citizens, in one way or another, a leading citizen of one of the Eastern States has offered to the American Forestry Association the sum of one hundred dollars, provided that nine others will do likewise to aid in carrying its work enthusiastically into new fields.

THE FORESTER takes pleasure in announcing to the members of the Association this generous and unsolicited offer, and trusts that it may become operative by the assistance of other contributors. A "campaign of education" is a necessity in every new enterprise. If those who know about forestry will suggest the theme to those who do not, there will be a considerable response without a doubt. If you cannot be one of the nine, won't you aid in *securing* one of the nine to further the plan?

Forestry has become a subject of national importance. Is there is a single reader of THE FORESTER who will scan Governor Roosevelt's and President Hadley's patriotic and urgent words and say: "I am too busy to say a word for forestry now"?

CHIPS AND CLIPS.

In Australia there is said to be a Gum tree which is 415 feet in height.

English dealers have placed in New York an order for five million feet of White Oak in the log.

The Pan-American Exposition at Buffalo, N. Y., is about contracting for 10,000,000 feet of Yellow Pine.

Puerto Rico and the Isle of Pines, Cuba, are the prospective field of a lumber company incorporated in New Jersey.

A deed to 6000 acres of Pine land, bought at \$2.50 an acre, has been filed in the County Clerk's office at Nacogdoches, Texas.

The great advance in lumber prices is said to have increased the cost of building an ordinary wooden freight car from \$800 to over \$1000.

Press reports say many lumbermen are beginning to worry because snow has not fallen in sufficient quantity to expedite their operations in the woods.

A firm of Mississippi lumbermen lately sold the right to turpentine their Pine timber to a Savannah (Ga.) firm for \$30,000 cash and one-fourth of the profits.

The cut of the Minneapolis sawmills for 1899 reached a total of 550 million feet, or one-sixth greater than the preceding year, though the cut of that year was also a record-breaker.

The cargo of shingles from the lost Canadian steamer *Niagara*, which went down about sixty miles from Buffalo last December, is still scattered along the Canadian shore where they were carried by the waves.

The recently sold timber lands of the Alcorn Agricultural and Mechanical Col-

lege in Mississippi, have been divided among six lumber firms for utilizing the timber resources.

The lumber trade of the Pacific Coast from British Columbia to Mexico, during the past year, has been summed up as "the best one in the history of the lumber trade of the coast."

The cutting of two of Pennsylvania's largest Pine trees recently turned out from one tree seven 16-foot and one 10-foot log, which scaled 6528 feet, B. M., and from the other eight 16-foot logs scaling 7642 feet.

Timber tracts in Potter county, Pennsylvania, which could have been bought five years ago for from two to five dollars per acre have been sold during the past six months at prices from four to five times the previous figures.

If printing paper of all kinds should be put on the free list, advises a contemporary doubtless a large area of Spruce forests would be preserved for future use and bring to the present owners a handsome profit in the years to come.

Great Britain is not showing any great degree of enthusiasm, it is said, in preparing a timber exhibit for the Paris Exposition. This is hardly to be marveled at, however, when the anti-English attitude of France is considered.

A million and a half Yellow Willow cuttings have been purchased by the Santa Fé Railroad Company to be planted on both sides of an embankment west of Stockton, Cal., for a distance of eight miles, to protect the embankment from damage by floods.

A large Sugar Pine tree has been felled in the McCloud river district in California, from which a plank 3 ft. thick, 12 ft. wide and 30 ft. long will be cut for the

Southern Pacific Railway forestry exhibit at the Paris Exposition. This plank will be exhibited with two sections of the tree 12 ft. in diameter and 4 ft. long.

The purchase of 900,000 acres of timberland from the Northern Pacific Railway by the Weyerhaeuser syndicate has finally been consummated, says a report from Tacoma. There is no question but that the transfer of this large block of timber

has had the effect of advancing timberlands and stimulating buying by others.

The North Carolina Pine Association has voted to accept the invitation to make an exhibit in the Forestry Department of the United States at the Paris Exposition. The exhibition will include hundreds of specimens of dressed and undressed short-leaf Pine lumber, and will be forwarded on a special ship about February 1st.

CURRENT COMMENT.

The Christmas Tree Custom.

The serious effect of the annual sweep of the forests to supply Christmas trees is attracting more attention this year than ever before. The article in the January *Forester*, in which a lumber contemporary spoke of the supply gathered within forty miles of Boston and brought to the "Hub" by farmers, has called forth the protest of a Massachusetts reader who says the whole available supply within such a radius would not supply a single ward of the "city of culture." The optimistic view of the lumber paper is obviously not the basis of the work being done by the Massachusetts Forestry Association.

A correspondent writing to *Forest and Stream* speaks of "carloads after carloads of young Spruce, Pine and Hemlock" which passed by his country home before Christmas, en route to New York markets. Though realizing the pleasure of the children (including his own), in his celebration of the holiday season, the writer adds:

"On the other hand, certain lumber has been advanced from \$18 to \$26 per thousand this year, with the promise of like advance next year. Is this not a terrible destruction of trees? The sentiment is fine, but can our forests stand this drain? Forty years from now these trees would have been far enough advanced in growth to be of use for building purposes. Why not take up this matter before it

reaches the possibility of being the cause of a famine in lumber?"

When one has read Mr. Gifford Pinchot's "Primer of Forestry," describing the "life of the forest," the comment of the *New York Evening Post* appeals most strongly in these words:

Five hundred thousand symmetrical straight-limbed young trees, from three to twenty feet tall, a vast incipient forest, were chopped down to supply the Christmas trade of New York.

Of this number, seventy-two carloads, with an average of 1500 trees to the car, came from the Adirondacks, an aggregate of 108,000 trees. Over four-fifths of the trees used, however, came by boat from Maine, New Jersey and Connecticut. The dealers are naturally jubilant over the trade they have had: "The largest business in trees and greens in their history," they say. But one among them said:

"I could not help but feel sorry at the ruthless slaughter made on our forests to give a single day's joy. The sight of so many tender, beautifully formed trees reminded me of so many youths, whose value lay only in their maturity, being mown down to gratify children under the age of reason."

To Preserve Cuban Forests.

General Ruis Rivera, Secretary of Agriculture, Industry and Commerce, has addressed a communication to General

Wood advising that steps be taken immediately to protect Cuban forests belonging to the public domain. He urges that he be empowered to appoint six inspectors, at a salary of \$2000 each, with instructions to locate public property and to consult with the officers of the rural guard in the various provinces as to the best methods of preserving the trees, which are now being used at the pleasure of the first person who desires to cut them, the result being, in many parts of the island, a wholesale destruction of young trees.

A Question of Foresight.

Owing to the lack of transportation the forests of interior Cuba have been left almost untouched, but the syndicates that are buying up forest lands show so much determination to cut and market all the valuable timber in sight that the question of forest preservation has already come up. Cuba now has the opportunity presented to her of putting a big padlock upon the barn door and locking it securely before the horse is stolen.—Troy (N. Y.) *Times*.

Damages For Forest Fires.

A jury in the county court at May's Landing, N. J., on January 13th rendered a verdict against the Reading Railroad Company for \$10,500 damages for losses caused by forest fires. The suit was brought by the heirs of the Estella estate, who asked \$40,000 for damage done their property by forest fires, claiming that sparks from the locomotives of the defendant company started the fires.

A Ban on Our Timber.

Canadian discrimination against the United States is expected to manifest itself in the shape of a law forbidding the export of Spruce timber for the manufacture of pulp.

Gunstocks for Oom Paul.

Walnut and Cherry lumber has had a boom in the press report that an Indiana firm had received a rush order from the

Transvaal for 125,000 gunstocks. The gunstocks are to be shipped to an arms firm in New York, where they will be fitted to rifles and then shipped to South Africa.

An Irrigation Expert.

The Vice-President for Wyoming of the American Forestry Association is thus spoken of in the *Saturday Evening Post* (Philadelphia) in a recent issue:

"Among the distinguished officials who will represent this country at the Paris Exposition next May is Professor Mead, the State Engineer of Wyoming, and an irrigation expert of the Department of Agriculture. Mr. Mead has already made his mark in the Western States. To his exertions is largely due the success of the many irrigation congresses which have been held in his part of the country, and the better knowledge of fluvial conditions and water rights now possessed by the reading public. He was probably the first to make maps that were truly hydrographic rather than cartographic in character. By charting the water-supply, water-flow, and water-shed he proved that the problem of irrigation upon a large scale was far simpler than had been believed by preceding experts."

The *Post* accompanies the article with an excellent likeness of Professor Mead, and tells an interesting story of one of his experiences.

The Growth of Forestry Sentiment.

"There is no doubt but that public sentiment in favor of forest protection and renewal is growing rapidly," says the *Southern Lumberman*, "and some time in the not very distant future it will make itself felt in legislation. Nearly all of the lumber trade papers have from time to time published favorable articles on the subject, but trade papers do not have, nor seek to have, any political influence. One of the principal sources of wealth of the State of Tennessee is its forests, and yet one might search all the Acts of its Legislature for a century past and find no mention of trees except such as are used as

landmarks, and a few Acts giving road overseers power to take such timber as may be necessary to repair roads, culverts, et cetera.

"All the articles on forestry that have appeared in the trade papers would have no effect upon that honorable body; but when the secular press—the newspapers that concern themselves with controlling nominating conventions—begin to urge the importance of maintaining the timber supply, the lawmakers will wake up to the importance of the subject; and that is just what the newspapers are beginning to do."

"With population and production of all kinds fast increasing and the country gradually filling up, the demand for timber and wood of all kinds will naturally increase. That means heavier drafts upon the forests, and the best possible care of our remaining sources of supply can hardly make lumber cheap and plentiful, in the old sense. Under such conditions it is the imperative duty of all governmental and educational authorities to do what they can to guard against the threatened lack of timber in the United States. There is no plainer responsibility."—Cleveland (Ohio) Leader.

THE EVENING STAR.
WASHINGTON.
WEDNESDAY, December 13, 1899.
AMERICAN FORESTRY.

The Times
DISCUSSIONS ON FORESTRY.

The Washington Post.
PRACTICAL FORESTRY DISCUSSED.

Eighteenth Annual Meeting of the American Forestry Association Today.
The eighteenth annual meeting of the American Forestry Association was held at the Cosmos Club today. The Secretary of the Association, Mr. Wilson, president of the

FOREST PRESERVATION.
The American Association Holds a Meeting at Washington.
Special Debate to "The Press."

Washington, Dec. 12.—The annual meeting of the American Forestry Association, held in this city to-day, was attended by a number of distinguished men from different States in the Union interested in the preservation of forests and the sources of water supply. In the absence of Secretary Wilson, the cultural Department, the president of the Association, Dr. E. B. Fernow, dean of the New York State College of Forestry, Lieutenant Governor Woodruff, of New York, president of the Forest Reserve Board of that State, delivered an address on forest preservation. He has made a study of lands now owned by the State and he declared that the care and proper use of lands now owned by the State would yield a revenue of millions of dollars through scientific handling. He expressed the belief that experiments in forest management officially would lead the present convention of 1915 to modify State forest laws so as to increase revenue.

Gen. C. C. Andrews, Chief Forest Warden of that State, spoke of the system of forest protection in that State, especially regarding forest fires and their prevention. He also described the proposed new national park and forest reserve for Minnesota, in which Col. John S. Cooper, Governor of that State, and many other prominent citizens are interested.

At the afternoon session a resolution was adopted expressing approval of recent legislation on forestry, and of the increased appropriations made by Congress to carry on the work. Another resolution was adopted urging the consolidation of all forest work under the supervision of one bureau, instead of three, as at present. A third resolution was adopted, extending thanks to the Federation of Women's Clubs for their agitation of the subject, and pledging support to the project of creating a national park and forest reserve both in Minnesota and in North Carolina. Secretary Wilson and the other officers were re-elected, with the addition of Henry Ganett as treasurer in place of George P. Whitelsey, who declined to continue, though still acting as recording secretary.

Many Addresses Made at the American Forestry Association Meeting.
The eighteenth annual meeting of the American Forestry Association, held at the Cosmos Club yesterday, brought out strongly the importance of the development of scientific forestry to the United States. Secretary of Agriculture Wilson, President of the association, was unable to attend on account of official business, but his place was taken by the first vice president, Dr. U. B. Fernow, dean of the New York State College of Forestry.

Lieut. Gov. Timothy Woodruff, of New York, President of the Forest Reserve Board of that State, delivered an address on forest preservation. He has made a study of lands now owned by the State and he declared that the care and proper use of lands now owned by the State would yield a revenue of millions of dollars through scientific handling. He expressed the belief that experiments in forest management officially would lead the present convention of 1915 to modify State forest laws so as to increase revenue.

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American Association Recommends Extension of System and Elects Officers.
The subject of practical forestry in its application to the welfare of this country was emphasized at the eighteenth annual meeting of the American Forestry Association, which was held at the Cosmos Club yesterday. Secretary Wilson, who is president of the association, was unable to attend on account of official business, but his place was taken by the first vice president, Dr. U. B. Fernow, dean of the New York State College of Forestry, acted in his stead.
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CONTEMPORARY COMMENT ON FORESTRY.

The annual meeting of the American Forestry Association—Clippings from all the Washington papers and a leading Philadelphia journal.

Many attendees were entertained at the banquet on Thursday.

"The high price of lumber has not failed to impress itself on the public mind," says the Nashville *American* in an editorial. "At this market alone, where hardwoods are almost exclusively dealt in, the price has in a year advanced from 25 to 33 $\frac{1}{3}$ per cent. It is very likely that

the demand for lumber of all kinds, both in this country and Europe, is largely responsible for this increase in price; but the high price, whether temporary or permanent, may well lead to the inquiry: 'How is our supply of timber holding out, and how long will it last?'"

Recent Publications.

"Natural and Forest Reservoirs of the State of New York," by G. W. Rafter, consulting engineer, and included in the annual report of the Commissioners of Fisheries, Game, and Forests, is a very valuable article.

The first part, which deals with the possibilities for the development of water power, shows the reasons why New York has hitherto been unduly backward in this regard. With the best natural facilities in the country, her total horse-power utilization is still disproportionately small. The hindrance has lain in the inconsistency and insecurity of riparian legislation, which has not encouraged owners to invest in improvements. New York has nothing parallel to the Mill Act of Massachusetts, whereby manufacturers may exercise the right of eminent domain and so possess the title to the waters they might thus venture to conserve.

The opportunities and necessities for such conservation are then clearly shown. The purpose being to equalize as far as possible the flow of mill streams, from one month to another, storage reservoirs at the head waters become the natural means. Mr. Rafter explains that those hitherto projected have failed through the ignorance of the builders in regard to rainfall and run-off in the catchment basin, which to be of any real service must have been determined for a considerable period of years.

There is then given in the most substantial calculations, exactly the conditions necessary for the establishment of successful reservoirs, the volume of water that can be counted upon for power from a stream having a known discharge, and the cost per million cubic feet of stored-up water for the needed operations. A careful description follows of the method and problems in the construction of the Indian Lake Reservoir, the clearing of timber up to the flood level, the making of the dam, everything down to the estimate of costs.

Besides this most instructive discussion of water power and water storage, there is a section on "Why Forests Conserve Stream Flow." This is a real help to American study of the subject. Its main value, perhaps, consists in its sane and scientific manner—no vague assertions, no general opinions, but everything convincing.

The author does not attempt to settle the controversy once and for all.

On the contrary he takes pains to state that the observations and experiments necessary for its settlement must extend over a number of years. Meteorological data, as he points out, are very dangerous evidence to trust, and, to be of any use at all must have been collected and averaged through a long series of seasons. This, as yet, has not been accomplished (at least not under the proper conditions); and rainfall, temperature, evaporation, and all the other phenomena of the weather, in their relations to forest cover, remain ungauged.

As an example of the problems included in such research may be mentioned Mr. Rafter's remarks on evaporation. From water to air, as well as from any surface kept constantly wet, the process is measured by a definite law and formula. "The main difficulty, therefore," he says, "in reducing evaporation from the ground to a simple formula is largely due to uncertainty of the water supply. The demands of evaporation from the surface of the ground are continuous, the same as from other surfaces, but constant interruption, by either complete or partial exhaustion of the available supply, complicates the action so much that it renders expression by formula apparently impossible. This sounds like a sensible reason for discounting any sweeping statement about the relative evaporations of forests and farms, or cleared land.

After similar evidence against the authority of data about dew point, humidity, vapor pressure, what the author calls a "tentative proposition" is particularly taking and suggestive. It is *** "that the real reason why forested areas furnish more water in the streams for a given rainfall than do deforested areas, is because forests, on the whole, consume less water than do deforested and cultivated areas." Following this are a dozen pages of most interesting and unanimous data on the use of water by vegetation.

The final inference is "that highly cultivated farming areas will consume in surface evaporation and plant transpiration from two to three times as much water as average deciduous forests, and from three to five times as much as average evergreen forests."

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INCORPORATED, JANUARY, 1897.

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To the Assistant Secretary,

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1. A wiser and more conservative treatment of the forest resources of this continent.
2. The advancement of educational, legislative and other measures to that end.
3. The diffusion of knowledge regarding the conservation, management and renewal of forests, the methods of reforestation of waste lands, the proper utilization of forest products, the planting of trees for ornament, and cognate subjects of arboriculture.

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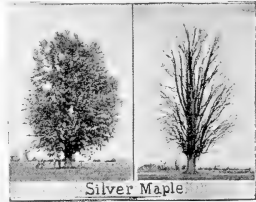
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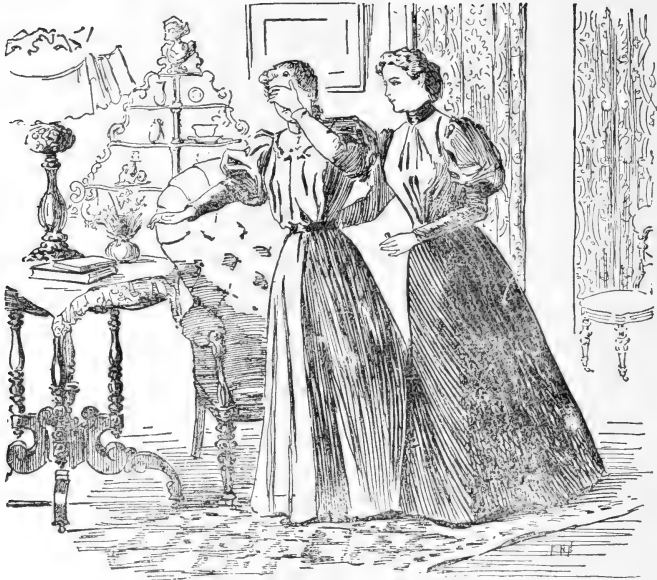
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A MONTHLY MAGAZINE

devoted to the care and use of
forests and forest trees and
to related subjects.



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**INSECT DAMAGE
TO SPRUCE TIMBER.**



**IMPORTANCE OF
FOREST TREE GROWING.**

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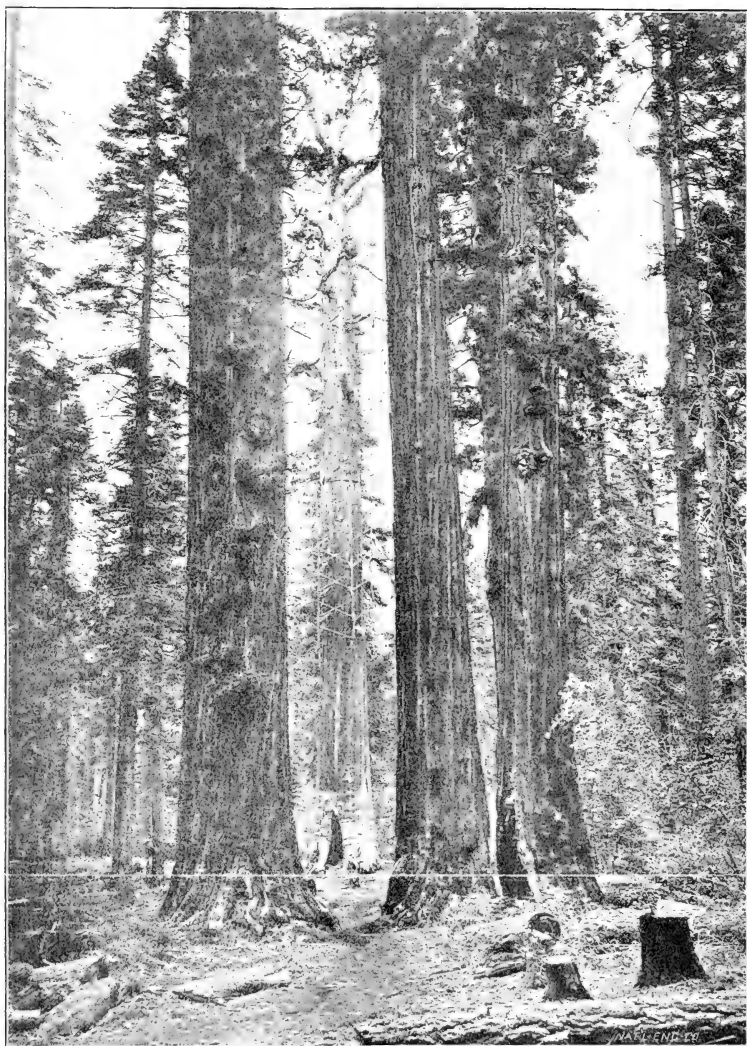
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BIG TREES OF CALIFORNIA.

As they now exist in the Sierra Nevadas. Lumbermen are trying to secure the Calaveras Grove for its timber. A single tree, known as "The Mother of the Forest," has been estimated to contain 537,000 feet of lumber.

THE FORESTER.

Vol. VI.

MARCH, 1900.

No. 3.

Forest Planting in Norway.

Extract from a lecture by Professor Deinboll, of Bergen, Norway.

BY COURTESY OF THE U. S. DEPARTMENT OF STATE.

During these later years the question of our forests has been largely agitated, and seems to have awakened great interest in this country. We can now read long articles in the daily papers in aid of the forests, but if this cause, which is of priceless value to us, is to succeed, we must all join hands and work together.

For the last fifty years leading and skillful men have been appealing to the people to protect the valuable property they have in the forests, unless they want the country to go to ruin. We have all been brought up in the belief that Norway was rich in forests, and so it was, one-fifth of the country being covered with trees, but they have been very badly destroyed in several places, many hundred million trees being cut down every year. But the country must take more care of this costly treasure.

Such a large number of trees are consumed that, should it continue, we will soon reach the end. The forests have been used badly and for a long time have been ravaged in a most careless way. A large part of the country now lies almost bare, where once it was clothed in green from mountain to fiord. Once forests covered the entire landscape, but so much has been cut away, that one-half of the country has not enough timber for building purposes, and one-fourth not even enough for burning. The increasing demand for timber makes the forests more

scattered every year, and more trees have been taken than the forests can replace. Twenty years ago a committee of inquiry found that we used two million gross more of trees every year than the forests could grow. To-day the circumstances are worse. Both the export and the inland consumption has increased, large quantities being used in our blossoming industry, wood-pulp factories being established all over and the product sold amounts to twenty million Kroner (\$5,360,000) a year.

According to the last account received 400,000 gross of great logs were sent down the river Drammen in 1897, and 100,000 more the year before in Glommen. By these numbers we see that every tree, whether in seed or not, was cut down. If the forests are robbed in this way, it will not be long before all the hills will be barren, and we will realize that while every one thought of cutting down the trees, no one thought of replanting them. If this system continues, it will not be long before Norway will be stripped of her forests, which will be an irreparable loss both to country and people.

Once our forests were of great value. Now thousands of busy hands are employed, and the wood sold amounts to 60 million Kroner (\$16,080,000), more than one-third of our total export, every year, besides the inland consumption, which is

four times as large. The forests have a large share in the economy of the country, and, if we destroy them, a large part of Norway will become uninhabited, showing that it is nearly as bad to destroy forests as it would be to kill the population.

History shows us that the destruction of the forests was the death of the people, anyhow of agricultural life. Look at the countries on the Mediterranean and in the East, now burning deserts. The Jordan is a wild stream flowing through a wilderness, and where Jerico once stood, surrounded by palm trees, there are now only a few shabby mud huts—the country that was once flowing in milk and honey is now a desert.

Where there is no water, Nature has no life, and as the forests are the guardians of the water, wherever they are destroyed, the water is either dried up or is gathered into wild streams that cause floods and destroy man's industry. The forests regulate the rainfall, divide the water into small streams during fine weather. Before a rain the leaves absorb all the dampness in the air. This is why it always commences to rain so fine and dew-like in the forest districts, for when the rain drops fall the leaves absorb a part of the water. In places where the forests have been cut down and there are no trees to absorb the moisture the rain falls in torrents without any benefit to the ground, as the water rushes immediately away toward the sea, carrying the earth with it. Our coast is now nearly bare of earth and on the farms round the fiords the rocks protrude from the sides of the mountains.

Once there were beautiful forests here, as the trees regulated the streams and the streams regulated the heat. We all know how cool and pleasant it is in the forests, and that the temperature is more nearly equal in forest covered countries. There are the greatest changes in temperature on the prairies of America and the steppes of Asia and Africa. In Sahara we can fry eggs in the sun during the day, but must wear an ulster at night.

The forests also do good work in preparing the land for cultivation. Every tree

brings rich nourishment from the depths of the earth, the roots reaching down to the most nourishing places after mineral salts and bringing them to the surface of the earth.

As the forests have such a great value, it is clear that it is of great importance to care for them, and what we must do now is to try to win back what we have lost.

The forests can be raised again, and the country once more made as beautiful as of old, if the people will only attend to this important matter. We must plant and care for our forests, the same as we do for our fields and pastures. It is done in other countries, and we are about the only nation to leave the forests to look after themselves. Germany does the largest amount of forest planting, but it has also been done successfully in Norway. The government has bought fields for school forest planting, established planting schools and made laws for the care and protection of forests. Private societies have also taken up this matter. In this town (Bergen) we have a beautiful view and good evidence of what can be done if we only stand together and try. In 1869 Bergen's Society commenced planting trees. The spade was then used for the first time in furtherance of this object. Now the mountains round this city are partly clothed in green. The trees soon began to grow—in spite of the strong northwest wind—and are now a good example and the pride of the city. The men who were the prime leaders in this work have raised for themselves a memorial which will be blessed by coming generations, not only here, but everywhere, where forest-planting has been tried. These trees are thriving well, and the time has come for us to work with greater energy, since what has already been done is as but a drop in the ocean.

The government has six large and some smaller planting schools, which now plant about two and a-half million trees a year, and during the last thirty years twenty million trees have been planted, but what is that when we use as much and more every year than nature can replace in thirty years. The only thing to do is to save

what we have left and clothe our country anew. Unfortunately we cannot replace everything, but it is our duty to try to make good what has been destroyed in the past. Thousands of people could be employed in this way, as there is plenty of ground ready for seed, and there are large stretches of land that cannot be used for fields and pastures but where forests would grow. The orator himself has clothed the bare rocks by fastening trees on to the rocks and putting earth round it. In this way we could double our present national income, besides opening up a new branch of industry. They call Norway a poor country, but it could become a rich one. Her sons and daughters need not cross the ocean—there is earth, seed and summer sun enough at home, and we have a duty to attend to, which is to renew our forests. Everyone must help. We must gather a company of forest friends in this country and, in spite of all opposition, make the forest cause a national one.

What can be done by united labor is shown in our neighboring countries. When, after the last unhappy war, Denmark was torn asunder and bleeding, good-hearted men went to work to form new lands to replace the lost provinces. In our childhood days we read that the Heaths of Jylland were uninhabited, except by winds and heather broom. But a Danish Heath Society was formed and after thirty years one-half of the heather is under cultivation and there is a growing community there. Now they talk of exporting wood to England from the forests of Denmark. Here we have to take coal and coke to Gudbrandsdalen (Norway).

The planting of the Danish heaths is a good example of this work, and it now seems as if this cause will be taken up warmly in this country as well.

It has been carried on in Sweden. Encouraged by the example of Denmark, the Swedish people commenced this work and there are planted in Bohuslän, where the circumstances are similar to those on our west coast, about the same number of trees as have been planted by the Norwegian planting schools.

The interest in forestry is now increas-

ing, and we must begin to work, but before anything else something must be done by the government. The government should buy more land for planting and establish more planting schools, besides having skilful men travel throughout the country. A law should be passed to make people plant two trees for every one they cut down. Of course it would be the country people that would profit by this, but through many hidden channels this income would flow back to the town, and the money, that is spent in this cause, will come back with large profits.

This cause should be placed before the young people, because it is a future one, and the young people own the future. In young people's meetings the forest cause must be brought to the front, in such an inspiring way, that we should see them come to these meetings with hoes on their back and raise for themselves a sprouting memorial. The cause must also be taken into school. If all the school children were sent out once a year to plant trees, then Mother Earth would soon be clothed, and if we thus formed a working society, it would be a long time before the country was again uncovered, for we should have brought up a nation who would carry out into the world with them a veneration for everything that grows. Last year hundreds of schools had planting days, and it has been seen that planting awakens the children's greatest interest. In Söndmøre they had planted half a million trees in four years; but the interest has increased lately so that half a million were planted this year alone.

The greatest number of planting days is held in America. In 1872 the Governor of one of the Prairie States issued orders, that on a certain day all the men and women in the state should plant a tree. Now each state has its "Arbor day," in some cases fixed by law. They have sheltering trees all over the prairies, and the country roads are sometimes lined with avenues of them. We must also have a day fixed by law, when everyone has to go out and capture new land. In America "Arbor day" is a holiday and in some places a "holy" day.

In Christiania a Norwegian Forest Society, which is to be the central force, was formed this winter. A fund was started. Every day the society obtained new members, who were to assist the yearly contribution. This money is to be divided all over the country, and the Forest Society

will stir up interest in the cause by speaking, writing, offering prizes and in contributing towards local societies. A fund was also started in Bergen, which soon amounted to 30,000 Kroner (\$8,040).

VICTOR E. NELSON, *Consul*,
Bergen, March 18, 1899.

Insect Damage to Spruce Timber in Maine and New Hampshire.

Investigations of Maine Lumberman, Covering a Period of Nearly Three Years.

While on an extended timber exploration in northern New Hampshire and Vermont in the summer of 1897 the writer met with a good deal of dead Spruce which had been killed by beetles. The trouble as first encountered was not severe—that is to say not much timber was dead in any one place—but in the course of the season it was found that in the aggregate a large amount had been killed and that the beetles were at work over a very large territory. It was also ascertained that in previous years great damage had been suffered in the same general region.

Brief note of a few cases of depredation known to have occurred in our Spruce woods may be of interest to readers of THE FORESTER. Old lumbermen tell of a great loss of Spruce timber in northern Vermont and New Hampshire, extending into neighboring lands in Canada, which occurred some thirty years ago. The drives of the Connecticut are said to have been made up for some years thereafter largely of dead timber. The same region suffered again between ten and fifteen years ago. On some considerable areas the greater part of the Spruce died. Here again timely cutting served to save a portion of the dead timber.

In Maine several cases of very thoroughgoing destruction have been known. Beginning about fifteen years ago a township on the Androscoggin, which, at the time, was called the best Spruce tract on the

river, had a large part of its value destroyed in the course of three or four years. No attempt was made to save the dead timber. It stood there till it rotted down. The ground is now covered with dense thickets of Fir and other young growth. On the Allegash river in northern Maine there are several adjacent townships which about 1883 were greatly damaged. In some places ninety per cent. of the Spruce is said to have been killed—in fact, all the grown timber. In this last case the cause of the destruction is known, for specimens of bark beetles collected at the time resemble at least, if they are not identical with, those with which we now have to deal. In connection with the other cases there is, so far as I have ascertained, no similar record. We can only judge of the cause from the effects and the circumstances.

The beetle now at work in our timber has been identified as *Dendroctonus polygraphus rufipennis*. It does its damage by boring in the cambium and soft inner bark. The adult beetle is about as big as an apple seed; one sex is black, the other bronze in color. The beetles when moving would appear to swarm somewhat after the manner of bees, for a tree that is infected at all almost always has them in great numbers; indeed in one case a colony was found just beginning its attack, hundreds upon one tree, on the outside of the bark or just boring their way in.

The form of their burrows is quite characteristic. They first bore a round hole through the bark to the surface of the wood, then cut a burrow three or four inches long up and down the tree, in which the sexes mate and in the edges of which the eggs are laid. The borings meanwhile are thrown out of the burrow, and pitchy as they are often form a tube, which marks the infected tree. The larvæ when hatched bore out laterally in the soft tissue between the solid wood and bark, eating out a channel which increases in dimensions as the insect grows. Finally the grub pupates and after reaching the adult form works its way free. The winter is passed in all three stages. The indications are that more than one generation is passed in a year.*

Ordinarily, as noted above, great numbers of beetles attack a tree together and, when the colonies of larvæ are well grown, their work completely girdles it. The leaves then drop off, leaving the tree conspicuous by its red appearance. Year by year after that the twigs and limbs drop off. The trunk of the tree also shows quick depreciation. Ordinarily the sap wood begins to show signs of decay within a few months. The heart wood is much slower to follow, but from all that has been seen it appears probable that there is in the run a lessening of something like fifty per cent. in available lumber within two years after the death of the timber. Wood boring insects assist decay in the process of destruction. On the other hand, woodpeckers often considerably postpone it by loosening the bark so that water does not stand under it.

As to choice of trees and of stands the following can be said. The beetle with us is working on apparently vigorous, though large and old, timber. It attacks both black and white Spruce, but so far as noted no other species. Its choice is the very largest and finest timber, not necessarily the thickest. Stands of smaller sized Spruce, cut-over lands, and trees below twelve or fourteen inches in breast diameter, are usually exempt. The free-

dom of the younger Spruce is in accordance with general principles relating to such things, but the exact cause for it is not so evident. In this connection it has been suggested by things seen that the flow of pitch perhaps was too strong for the beetles in the younger timber. Beetles that have apparently been drowned by the flow of pitch into their burrows are sometimes found, and examples are not absent of trees which have resisted attack and are now covering over the scars then made.

A pamphlet of great interest in this connection is Bulletin 56 of the West Virginia Experiment Station, containing the results of Professor A. D. Hopkins' study of insect depredations on the Spruce and Pine forests of that state within the last eighteen years. This work, dealing as it does not only with the cause of the trouble but with secondary problems also, and suggesting means of alleviation as well, will be an aid to clear thinking on any similar problem. It is a mark of progress that one such problem in the United States has at length received something like the attention which its importance deserves.

When the loss we are suffering in Maine was first discovered, when the cause of it was identified and found to be one capable of further extensive destruction, when alongside the freshness of the work of the beetles it was found by a season's cruising that they were distributed throughout the Androscoggin drainage and at work further east than Moosehead Lake in central Maine, the suggestion at once arose that we might have in this insect a serious threat to the welfare of our Spruce forests, forests of vast importance to the business interests of the New England States. The idea was very stimulative of effort. For two and a-half years the matter has been watched as closely as it could be watched by one not an entomologist and with many other duties to perform. Other men have been put on their guard, and the regulation of cutting, so as to offset the damage done, has been suggested to those with whom the writer has had influence. A constant source of regret has been that no entomologist could be induced to give the matter careful and continued attention.

*Mr. W. F. Fiske, of the Experiment Station at Dunham, N. H., is entitled to the credit of working out some of these points.

As to the likelihood of an overwhelming swarm of beetles, with consequent destruction of large proportions, the writer is not inclined, from present lights, to feel alarmed. The reasons for this are: First, the slowness on the average with which the work of destruction for the last two years has progressed; and secondly, the check which the insects in some localities appear already to have received. There are indeed some localities within the area of their distribution where as much as a quarter or half the timber has been killed by the beetles, and where they are now multiplying very rapidly. In other localities the insect has apparently been holding its own, doing some, but not great, damage each year. Other regions again there are where with ample field for it and but a small amount as yet killed, the work of destruction appears to have nearly or quite ceased. It would appear probable, therefore, that some secondary agent, the nature of which we do not know, is at work checking the progress of the destructive agent.

There need not be under present conditions any comparatively great loss. Extensive lumbering is being carried on through the region in which the insect is known to exist. The bodies of uncut timber are nearly all accessible. Cutting can be turned in the direction of the damaged or endangered localities, and cutting serves not merely to save the dead timber to use, but also, it would appear to carry away much of the source of infection. The bunchy way in which the dead timber stands is also in our favor. Evidently the normal flight of the beetles is short, for the dead trees, as a rule, stand in groups; those killed one, two or three years ago together with the insect colony working, perhaps, in green timber close beside them. This trouble, indeed, may also be regarded, in one way, as a benefit to our forests. So far as it may determine a policy of thinning rather than stripping the land, it will exert a favorable action which will never be entirely lost on the reproduction of Spruce.

The favorable forecast made above, however, rests on no certain basis. That could be reached only by long and minute

study. Knowledge is required of the secondary as well as the primary elements in the case, particularly as to insect enemies and fungoid disease. These facts have a practical as well as theoretical bearing, for just as it has aided in offsetting the damage to know the cause of it, with its marks and the method of its working, so will knowledge of the secondary elements aid in the contest and serve the more firmly either to forewarn or reassure us.

The whole field of the relation of insects to timber seems to have been very lightly worked as yet in this country, though it is a field that promises to yield very substantial rewards to investigators. Numerous matters can be suggested on which practical men could utilize information, and doubtless every want satisfied will create a dozen which are now unknown. The important point, it would seem, is the utility of the work, yet the men who can hold firmly to that idea through prolonged and intricate investigation would appear to be rare. Prof. Hokkins has shown us how, and it is reasonable to believe that his example will be followed. Certain it is that entomologists who will undertake this work in the right spirit, not despising the practical wants of their countrymen, but retaining through their study a desire to be useful, have before them a very promising field.

AUSTIN CARY, Forester,
Brunswick, Maine.

ADDENDA

E. S. Coe, of Bangor, Me., who died some time ago at the age of nearly ninety years, owned and controlled many hundred thousands of acres of timber land in Maine and New Hampshire. He was a civil engineer by profession, and was very popular among his many employees. He was a sound, conservative business man and managed his lands conservatively, permitting as a rule only the grown timber to be cut. He devoted intelligence and study to his holdings. Only his advanced age prevented him from making still further progress in the line of actual forestry. The management of the lands he controlled so long devolves upon J. W. Sewall.

The Forests of the United States.

A notable advance in our knowledge of the forest resources of the country is marked by the appearance of the first volume on the subject issued by the United States Geological Survey. This is Part V. of the Nineteenth Annual Report of that organization, and is devoted mainly to the work accomplished in the forest reserves in the western part of the country. These descriptions are preceded by a paper by Mr. Henry Gannett, who has been in charge of this work, entitled, "Forests of the United States." This is an excellent introduction to the other volumes which are to follow, since it gives in a concise, striking manner a review of what is known concerning the forests of our country.

Mr. Gannett, as chief Geographer of the United States Geological Survey, and also of the Eleventh and Twelfth censuses, has brought to the study of the forest conditions a training and experience unequalled for a broad, comprehensive work of this character. As an explorer and originator of methods of rapid map production, Mr. Gannett has had extraordinary advantages and has acquired a breadth of conception and ability to grasp the larger salient facts and eliminate them from minor obscuring detail. This experience he has used in his geographic and statistical work and by simple diagrams has been able to present important facts heretofore obscured by unnecessary elaboration. In his discussion of the forests of the country and his management of forest surveys he has pursued the same direct, effective treatment, grasping the larger, more important facts, and presenting them clearly to public view.

In the introduction to his paper on the forests, Mr. Gannett shows that up to the present the study of these has been carried on almost entirely from the botanical side and that the geographic and economic aspect has received little attention except for purely commercial purposes. Even such an elementary fact as the extent of

woodland we know only in an indefinite way, and of standing timber available for use we know almost nothing. He adds that: "In view of the agitation for the protection of our forests which has been going on for at least a generation, and which has reached such intensity that it has become with many persons almost a religion, it is strange that there should be practically no knowledge to serve as a basis for such a cult."

He then proceeds to discuss by states the area of woodland, noting the source of the information, and shows that the percentage of land area wooded in the states along the Atlantic border varies from about 40 to 80; in Ohio it is 23 and in Illinois 18; sinking to 7 per cent. in Kansas and 1 per cent. in North Dakota; continuing westward the percentage increases to 32 in Colorado; 22 in California; and 71 in Washington. Taking the United States as a whole, exclusive of Alaska, 37 per cent. of the area of the country is wooded.

The next, and most important fact beyond extent of woodland is the amount of merchantable timber; and here it is shown that most of the estimates which have found their way into print are the merest guesses and not worthy of the paper on which they are printed.

A summary of the information available has been brought together, giving in each state the estimated merchantable timber of various species in millions of feet board measure.

The consumption of timber in the United States is briefly discussed from the statistics obtained by the Census Office and particularly that of the Rocky Mountain region and Pacific States. The forests of the West are noted as being characterized by an almost entire absence of deciduous trees, the growth available for lumber being composed of Pines, Firs, Spruces, Hemlocks, Cedars and Larches.

Particular attention has been given to the forest conditions and standing timber of the State of Washington, this being,

with the exception of the Redwoods of California, the densest and most continuous in the United States. The trees are large, reaching from 12 to 15 feet in diameter and 250 feet in height, with clear trunks for 100 feet or more. Mr. Gannett estimates that the total amount of standing timber is nearly 115,000 million feet, board measure, and of this the greater part is west of the Cascade Range.

The available facts concerning the forests of Oregon have also been brought together, showing that in this state the merchantable timber is a little less than 235,000 million feet, board measure, most of this being along and west of the Cascade Range, about 7 per cent. being in eastern Oregon.

The illustrations which accompany this report are particularly notable both for excellence of the views and the clearness of the maps. A number of these latter show the distribution of woodland throughout the western part of the United States in general and in specific localities, the latter containing some of the first attempts at

land classification made on the contoured maps of the Geological Survey. In examining these the most striking fact is the enormous extent of the burnt area, testifying to the reckless waste of valuable timber.

The reserves upon which separate reports have been made, as published in this volume, are:

Black Hills Forest Reserve, by H. S. Graves; Bighorn Forest Reserve, by F. E. Town; Teton Forest Reserve, from notes by T. S. Brandegee; Yellowstone Park Forest Reserve, southern part, by same author; Priest River Forest Reserve, by J. B. Leiberger; Bitterroot Forest Reserve, by same author; Washington Forest Reserve, by H. B. Ayres; Eastern part of Washington Forest Reserve, by M. W. Gorman; San Jacinto Forest Reserve, by J. B. Leiberger; San Bernardino Forest Reserve, by same author; San Gabriel Forest Reserve, by same author; Forest Conditions of Northern Idaho, by same author; Pine Ridge Timber, Nebraska by N. H. Darton.

Minnesota's Popular Demand for a National Park

The establishment of a Minnesota National Park by Congress not having yet been consummated, public feeling in that State is being aroused lest the present opportunity for action should be lost.

Congressman Stevens, of Minnesota, has received a letter from a constituent who protests against the enactment of any legislation granting to lumbermen the privilege of removing timber from the government land in northern Minnesota which it is proposed to constitute as a national park. The writer says:

"This beautiful tract of timber land, with all its natural scenic grandeur should be preserved without further molestation, that the people of the state and nation may enjoy it in its primitive beauty or with such improvements as the government shall wisely have added.

"By reason of the rapid extension of the settlement of the country it will be but a

short time until such places as these will be forever things of the past, unless they are set apart and provided for by the government. And this should be done, and at once.

"As is well known the "Father of Waters" has his source in the thousands of beautiful lakes and streams of northern Minnesota. To permit the tearing away of a large portion of the dense timber of this region cannot fail to result in the drying up of these streams and lakes, which will, of course, dry up the river, and lessen the amount of annual water-fall.

"It is said the physicians of the state stand united in their proposition to this proposed measure, considering it as they do from a sanitary point of view. I believe the people of Minnesota, so far as their interest has been aroused on the question, are united in their desire to see this northern district preserved unscarred."

Importance of Forest Tree Growing.

Excerpts From a Paper Read at the Thirty-Third Annual Meeting of the Kansas State Horticultural Society—An Evidence of Increasing Public Interest.

A summary view of the condition of our native forests, the rapidity with which they are disappearing, and the vast extent of our woodworking industry, attracts immediate attention to the financial side of forest tree growing. Yet we concede that it will be a rather difficult matter to fully convince gray-haired veterans of the forest that the logs they started rolling upon the typical log-heap are to-day rolling upon the lumberman's saw-mill at the rate of 500 per minute, and that he can see over 5000 feet of valuable lumber dropping from the mill at every pulsation of the heart; an annual cut of 50,000,000,000 feet. Every year nearly 10,000,000 acres of these once despised forests are being denuded of every available timber tree.

The query at once arises in the mind of those unfamiliar with the lumber trade, "What becomes of this vast amount of lumber?" A partial answer to this question can be found by simply casting the eye around us. Houses, barns and railroads are the leading consumers. We learn that there are over 250,000,000 railroad ties in use in the United States, which if placed end to end, would span the earth fifteen times at the equator. And as the average life of a tie is only about six years, it requires over 40,000,000 annually to keep the roads in proper repair. Fourteen million were used the past year on new railroads. The car- and depot-building will doubtless consume more lumber than the track. Taking all these demands in connection, including the telegraph poles, we can safely say that the railroads are responsible for the cutting off of at least 500,000 acres annually.

Without going into the details of various lumber industries, we will call attention to one new industry which is to-day making great inroads into our native forests, and

is increasing every year; we refer to the manufacture of wood-pulp, which has 300 mills in active operation, consuming over \$20,000,000 worth of native lumber annually, denuding millions of acres of our virgin forests. The manufacture of this commodity is opening up a new and extensive field of industry. When we pick up a newspaper we do not realize perhaps that it is printed upon tree chips.

Besides the newspaper men and book makers, the car-wheel maker, the water-pipe maker, the bath-tub maker, and many other similar industries have largely discarded the mineral kingdom, and are now using wood to procure a lighter and more convenient material for their handiwork. For the United States navy stately oaks are being felled for conversion into cellulose to be applied to vessels as armor protection. Our fine chairs and couches are upholstered with wooden leather, and to "cap the climax" of progressive enterprise, we see the lady of fashion sweeping the drawing-room floor with a silk train chopped from an old Pine tree.

Thus we see, instead of a diminution in tree-cutting, that these new industries are opening new commercial channels which encourage the woodman's ax to greater activity, and consequently the timber famine which has been predicted in the dim distant future, draws nearer and nearer; in fact, according to the most accurate information obtainable from the Division of Forestry at Washington, we will begin to realize the scarcity of timber within the next ten years, and before thirty years have rolled by all the available lumber-timber between the Atlantic Ocean and the Rocky Mountains will be cut off. It will be then, and not until then, that we will be able to comprehend what is meant by a "timber famine."

But the scarcity of lumber will be an

unimportant factor in comparison to the physical condition in which our country will be left when our forests have all disappeared. Our timber states are already feeling the effects of indiscriminate clearing of hillsides and water courses. To show the physical effect produced by cutting off large forests in the Old World, Professor Marsh says: "The country along the Mediterranean, from Greece to Gibraltar, was once the paradise of the East. It was covered with luxuriant vegetation in such abundance that it maintained, in bygone centuries, a population scarcely inferior to the whole Christian world; but the forests have all been cut down, causing thousands of square miles of vegetation to disappear. Where once were sparkling streams are now sterile ravines; what was once great upland lakes, surrounded by luxuriance and verdure, are but little more than dead seas, bordered by sand-hills and sun-parched rocks. Today this once lovely country is entirely withdrawn from human use, and is reduced to a desolation almost as complete as that of the moon." (The North American continent is rapidly approaching a similar physical condition.)

Having now briefly called attention to the conditions of our native forests, the rapidity with which they are disappearing, the increasing lumber industries, and the physical condition of denuded forests, we will now look upon the other side of the picture. National and State Governments have made feeble efforts to protect the old forests and plant new, and "climatic amelioration" has been preached from the Atlantic to the Pacific without converting a single wood-chopper to a tree-planter. Experience has been teaching us new lessons. There is virtually no necessity for staying the woodman's ax. New wood-consuming industries should be encouraged. A timber famine can be indefinitely postponed; floods can be checked and droughts can be averted; and by so doing capital will be multiplying "an hundred-fold." Here comes an answer to Mr. Conant's question asked a few weeks ago, "Can new openings be made for capital?" Mr. Conant says: "The United States

has reached a state of excessive capitalization, unable to find productive investments at home in new enterprises."

Forest-tree growing is a new enterprise, in which at least \$500,000,000 can be invested annually with large and sure returns. The 10,000,000 acres of our virgin forests that are being denuded annually should be replaced, not only to preserve a physical equilibrium, but to keep the cogs of commerce turning. And yet as new industries multiply in which wood is the principal factor, billions, instead of millions, may find profitable investment in the growing of forest-trees. This is a financial proposition in every sense of the word; but to make it a success the same business judgment must be applied as to any other successful enterprise. The selection of soil, the choice of trees, the planting, the cultivating and general care, all require judgment, skill, and close attention. There are a large variety of valuable forest-trees that can be propagated and grown in cultivated plantations with profit, but we will not stop to discuss their various values and virtues in order to reach a conclusion as to which is the most profitable or money-making tree to plant, for it has been fully and practically demonstrated, not only in this but other states that the *Catalpa speciosa*, or Western Hardy, is the most profitable tree to grow of the entire American sylvia. It is easily propagated, tenacious of life, grows rapidly, comes into value young, and for posts, poles, ties, and inside finish it is second to none.

Besides the direct financial return from products of a *Catalpa* plantation, there is still another important value connected with the growing of this tree, namely, its power for reproducing. In reality, it becomes a perpetual timber plantation. When a *Catalpa* is cut down, sprouts start on the stump. If one is permitted to remain it produces another tree in a remarkably short time, making the grove as everlasting as a *Catalpa* post. This one feature will almost double the value of the plantation.

D. C. BURSON,
Topeka, Kansas.

Forestry in Western Australia.

Like the United States, Australia has come to realize the necessity for preserving an area of forest land sufficient to insure a large and permanent revenue to the Government and to place its lumber industry on a sure and lasting footing. So far, no forest reserves have been created, but steps in that direction have been taken. Absolute reservation would probably have come about before were it not for the fact that the Government does not sell all of its land; some of it is merely leased.

The "Crown Lands" of the British Colonies correspond to our "Public Lands," and in Western Australia the Department of Woods and Forests decides upon the acceptance or refusal of applications for the alienation of timbered areas. A great deal of the land is unfit for agriculture, timber being the only crop possible on it. As the Government has not set aside any of this land for its own use, systematic forest management has not yet been introduced. Instead of being permitted to lie idle, however, this land is leased in grants of not more than 75,000 acres, and for not more than 25 years. These "timber leases" accord their owners the exclusive right to cut the timber upon the lands covered by them. About a million acres are lumbered by such lessees, and 447,000 acres are operated under what are known as "special timber concessions." When the value of Australian timbers for constructive purposes became known, and an outside trade began to develop, the English Government, with a view to encouraging the growth of the industry, granted certain timbered lands for terms of years, at a nominal rent, with the sole right to remove the timber from them. The existence of these rights and privileges at present gives their owners great advantage over those taking up timber areas to-day, because the areas are so much greater and the rental so much lower than those given now. Upon the expiration of these special timber concessions, timber leases will be issued in their stead. Justifi-

cation for the granting of the concessions at that time is found in the fact that it has led to the development of the lumber resources of the country.

The "Department of Woods and Forests," not having any Government forests to manage as such, devotes itself to seeing that the holders of the special timber concessions and timber leases do not unfit the forest for future wood production. Lessees are required to limit their cuttings to trees above certain diameters for each species. Care must be taken to protect seedlings and saplings. Licenses must be procured by every one working in the woods. Sawmills of a specified capacity must be erected and kept in good working order. The cutting of piles and poles is allowed only as necessary thinning of the forest, and an officer points out how this thinning should be done. Failure to adhere to these directions forfeits the lease. After the removal of the mature timber the Government takes possession of the land for conservation purposes. Persons appointed by the Minister may go upon the portions of a lease which are being lumbered for the purpose of replanting them. No cultivation, other than gardens for the lessee or his employees, is permitted.

In "The Forests of Western Australia and Their Development," Mr. J. Ednie-Brown, Conservator of Forests for that colony, tells of the great growth in western Australia's timber trade, and expresses the hope that the matter of forest reservation will be taken up immediately. He gives a list of the principal members of the forest flora of the colony, with a descriptive reference to each tree, showing its uses and possibilities. Species of *Eucalyptus* predominate, and three of the four most important commercial trees belong to this family. A large export trade in Sandalwood makes this small tree an important factor in lumbering. Estimates of the present and future value of the forests are made, and they are very encouraging.

The Jarrah (*Eucalyptus marginata*)

is the principal timber tree of western Australia, judging by its extensive distribution, varied use, large sale, and the good opinion held of it. The Jarrah averages 100 feet in height and 3 feet in diameter, these dimensions being reached at about 50 years of age. For constructive works, particularly where immersion in water is necessary, this timber seems to be especially well adapted on account of its great durability. Sixty-year-old piles show no sign of decay. This quality makes it desirable for fence posts and railway ties.

Growing with the Jarrah is another of the same species, the Karri (*Eucalyptus diversicolor*). This is the giant tree of western Australia. It averages 200 feet in height and 4 feet in diameter. While its lasting qualities are not as great as those of Jarrah, the timber of Karri is much preferred for superstructural works, on account of its great strength.

Another Eucalypt (*E. gomphocephala*), known as Tuart, is mentioned as the next best commercial tree of western Australia. It does not reach as large dimensions as Jarrah or Karri, but it excels them in toughness of wood, which makes it preferable where hardness is desired.

The trade in Sandalwood (*Santalum cygnorum*) has reached such proportions that the Government found it necessary to set apart a considerable area of cut-over Sandalwood country and prohibit lumbering thereon for two years. Should this not be time enough to permit the young trees to reach maturity, the restriction will be continued until such time as the trees are considered ripe for the axe.

Owing to the hardness and weight of its native timbers western Australia has had to import most of the wood used in everyday work. Conservator Brown believes that most of the trees which produce this timber can be grown at home, and it is hoped a fair trial will be given them. Many species of our native trees are recommended. The list includes Maple, Hickory, Pine, the Red Fir, Black Walnut, Catalpa and White Oak.

Considerable space is devoted to descriptions of the operations upon each lease. A score of pictures at the end of the report illustrate the forests described and the methods of transporting the logs and lumber.

JOHN FOLEY,
Washington, D. C.

Recent Legislation.

Forest Management in New York.

Albany, March 1st.—Governor Roosevelt to-day appointed a new Forest, Fish and Game Commission as follows:

W. Austin Wadsworth, of Geneseo; Percy Lansdowne, of Buffalo; Frank Woods, of Jamaica; Dewitt C. Middleton, of Watertown; Delos H. Mackey, of Delaware County.

Mr. Wadsworth is to be the president of the new Commission. This is the culmination of the fight in which it was contended that the state forests have suffered from political domination.

In the New York State assembly a bill has been introduced by Mr. Wheeler, and referred to the committee on fisheries and game, to amend the fisheries, game and forest law, relative to additional protection of the forest preserve. The bill proposes the following amendments to the existing laws:

Superintendent of forest and other officials.—The engineer of the commission shall act as superintendent of forests and shall perform the duties pertaining to that office as hereinafter described. The commission shall appoint an assistant superintendent of forests, a chief firewarden, thirty-five forest rangers, a land clerk and such clerical assistance as may be actually

necessary. The chief firewarden shall give a bond to the commission in the sum of one thousand dollars and each forest ranger shall give a bond in the sum of five hundred dollars, said bonds to be with two sureties and to be approved by the commission, and conditioned for the faithful performance of the duties of said officers respectively. The commission may appoint expert foresters, not exceeding five in number, who shall be employed in the work of reforesting the burned, barren or denuded lands in the forest preserve, and in such other work as may tend to the improvement and increased value of the state forest. They shall receive for their services such compensation as may be fixed by the commission.

“Duties of superintendent of forests and his assistants.—The superintendent of forests, under the direction of the commission, shall have charge of all work connected with the care and custody of the forest preserve, the prevention of forest fires, and the general supervision of the forest interests of the state. He shall report annually to the commission, showing the annual timber product of the Adirondack and Catskill forests and also the extent of the forest fires and losses therefrom. He shall make such other reports from time to time as may be required by the commission, or may be necessary for their information. The assistant superintendent of forests shall render such assistance as the superintendent may require, see that the rangers patrol their respective districts diligently, make frequent examinations of the lots of the forest preserve not in the patrolled districts, and submit written reports of the character and condition of such lands.

“Duties of the chief firewarden.—The chief firewarden, under the direction of the commission, shall have supervision of the town firewardens, visit each town as often as practicable and fully acquaint each firewarden with his duties, notify the commission of all vacancies on the roll of firewardens as soon as they occur, see that the towns are divided into districts of suitable size and proper location and that district firewardens are appointed as provided

by law, have charge of the firewardens' reports, and when the cause of a fire is not reported ascertain its origin; under authority of the commission, institute prosecutions for violations of the law regulating forest fires, and have supervision of all bills against the state rendered by the various towns for fighting forest fires.

“Duties of forest rangers.—The rangers shall reside on the districts to be patrolled by them respectively, said districts to be designated by the commission. The rangers must report to the nearest protector immediately any violations of the fisheries, game and forest law which they discover and to the nearest firewarden or district firewarden, of the starting of fires, if unable to extinguish same. Each ranger must patrol his district daily, for the prevention of fires, trespasses and violations of the fish and game law.

“Duties of land clerk.—The land clerk shall have charge of the assessment rolls of the forest preserve and shall report any discriminations against the state, in the assessment of taxes; have charge of the land records, and prepare statistics giving information as to the acreage of the various kinds of land.

“Compensation of forest officials.—The assistant superintendent of forests shall receive fifteen hundred dollars annually, the chief firewarden shall receive fifteen hundred dollars annually, and each of the said officials shall receive his actual and necessary travelling expenses. The forest rangers shall each receive five hundred dollars annually, and the land clerk shall receive eighteen hundred dollars annually.

“This act shall take effect immediately.”

To Prevent Forest Fires in New York.

Two bills to prevent the spread of forest fires in the Adirondacks have been favorably reported to the Senate by the Forest, Fish and Game Committee. The first is making railroad companies liable for all damage done by fire due to the railroad's property or employes. The other provides for the employment of men to fight fires in case of danger to forest preserve lands. The enforcement of such laws would doubtless have a very salutary effect.

Studying the American Forests.

Forestry and Water Storage.

The famous Johnstown flood of May 31, 1889, will probably soon be recalled to the public by an attempt to reforest a large portion of the Conemaugh watershed to prevent further damage from freshets. The Johnstown Water Company, which controls 5000 acres of mountain land, has asked the Division of Forestry to devise a plan by which the area can be re-covered with timber and the too rapid run-off of the rainfall prevented.

The region is peculiarly liable to freshets, owing to its geological character and the removal of its timber. The now historic catastrophe, which swept away \$10,000,000 in property and half as many lives as the battle of Gettysburg, was but an exaggerated instance of many similar floods. This tendency has been increased by logging off the timber and clearing numerous farms, so that the rainfall flows quickly from the surface, causing high water at one time and the drying up of springs later.

The Johnstown Water Company has bought up many of these farms and torn down their buildings, and now wishes to expedite their return to the forest. The tract is in a sandstone region, much broken, with valleys averaging 350 feet in depth. The timber consists of Hemlock, Oak, Locust and Ash, with some Beech and Poplar. The openings are from twenty to fifty acres.

As soon as the weather permits, J. W. Toumey, Superintendent of Tree Planting, and another working-plan expert of the Division of Forestry, will examine the region and decide on a plan of reforestation. In the clearings, tree planting will be required. An attempt will probably be made to increase the stand over the whole area by skillfully assisting natural reproduction. Protection from fire and cattle will also be required. The expense will be shared by the Government and the Water Company, the former furnishing the expert work and, possibly, some of the material for planting.

Pacific Coast Timber.

The investigation of the timber resources of the Pacific coast, begun last summer by the Division of Forestry, as described in the *JANUARY FORESTER*, will be continued during the coming season of field-work. The Redwood belt of California and the Red Fir forest of Washington will be visited by several parties which will start about June 1st, and will be composed principally of young college men working under the direction of the Government experts. In each state there will be from fifteen to twenty-five men at work.

Under the system adopted, the rate of growth and general life history of an existing forest will be ascertained to foretell the behavior of a future one growing under like conditions. Measurements will be made and the age found of several thousand trees in the logging districts, and large tracts will be cruised and surveyed to find the stand of timber in varying situations. By measuring and counting the annual rings of a tree at several sections, an expert can determine not only its age but at what stage it grew fastest, when it reached maturity, and the exact amount of wood added during any period. By obtaining these figures for large areas it will be possible to compute the time necessary to raise successive crops in the Pacific timber regions. This work will be especially valuable to owners of timber lands who are in doubt as to the profit of paying taxes on their property after it has been logged.

Remunerative Tree Planting.

The Division of Forestry is in consultation with three important railway companies over a contemplated innovation in American railway methods. These roads—the Atchison, Topeka & Santa Fe, the Chicago, Milwaukee & St. Paul, and the Zanesville & Ohio—are considering raising tie and pole timber on a large scale on their non-utilized right-of-way lands. Other large western roads are interested.

This action is due chiefly to the failing of the natural supply of this material in all but the newer portions of the United States. About one million acres of timber are consumed annually by railroads in building and repairing, and, at the present rate of timber depletion, the increased cost of such material will soon be a serious factor in railroad economy. The Santa Fe line has already done some experimental planting, and the results have done much to stimulate interest. This road planted 1280 acres in Catalpas fifteen years ago. The total expense was \$128,000; but it is estimated by the railroad officials that in ten years more the tract will have produced \$2,560,000 worth of poles, ties and posts.

Having become convinced of the necessity of growing their own timber, the railroads naturally wish to take advantage of the assistance offered by the government to tree planters, which consists of expert advice, and of the working plans for planting, based on personal examination. The object of the government is to demonstrate the value of tree plantations to land owners, especially those in the treeless regions of the West.

Wooded Area of the United States.

The former official estimate of the wooded area of the United States, placed at 26 per cent., has been raised to 37 per cent. by the latest computations of the Division of Geography and Forestry of the U. S. Geological Survey. That office has issued a bulletin containing new figures on American forests, some of which tend to prove the national timber resources greater than is supposed.

The two latest states to be examined are Oregon and Washington. The former is estimated to contain 234,653 million feet, B.M., in standing timber; the latter, 114,778 million feet. Destruction by fire has been exceedingly serious in Washington. On the assumption that the burned areas contained on an average as much timber as the untouched portion, 40,000 million feet have been destroyed since lumbering began. This amount would supply all the sawmills of the United States for two

years, and, at a value of only 75 cents a thousand, means a dead loss in the State of \$30,000,000. The amount actually logged in the same period has been 36,000 million feet, making the estimate by the same comparison of areas. Oregon has suffered less from both fire and lumbering, owing to the smaller facilities for marketing the product.

A Study of Forest Fires.

Investigation of the causes, effects and means of prevention of forest fires in the West, will be carried on this summer in Washington, Oregon, California, Arizona, New Mexico, Utah, Colorado, Wyoming, Montana, Idaho, South Dakota. Besides field study, designed chiefly to discover means of preventing the evil, the Division is making a historic record of all important fires which have occurred in the United States since 1754. Although incomplete as yet, this indicates that the annual recorded loss by forest burnings in the United States is, at the very lowest, \$20,000,000. It will probably run far above this sum, as the Pacific coast states have been only partially examined.

Accounts of over 5500 disastrous fires have been obtained in the seventeen states already examined. Michigan, Minnesota, and Wisconsin have suffered the most severely. These records are taken chiefly from newspapers, and where it has been possible to compare them with the figures of practical lumbermen, it has been found that the tendency of the press is to underestimate the damage.

Coöperation in Scientific Research.

A system of coöperation for the coming summer has been arranged between the Division of Forestry and the forest reserve work of the U. S. Geological Survey, of the Department of the Interior. Field parties of each division will collect information desired by the other division, and, in some instances, exchange of men may be made. This system marks a distinct change from conditions of a few years ago, when there was sharp rivalry between the scientific branches of the Government service.

To Study European Forests.

Dr. C. A. Schenck, Forester to the Biltmore Estate and Principal of the Biltmore School of Forestry, has decided to take the students of the school to Europe early in April, with the view of having them spend three months in Germany, Switzerland, Austria and France, engaged in the study of European silviculture. Obviously as long as European economic conditions cannot be imported into this country, European forestry is a Utopia for the United States. One thing, however, the forester can learn in Europe and in Europe only: silviculture, the art of raising and tending woods. It will take a few decades to allow America to give such object lessons on silviculture as Germany, France, and other countries abroad can afford to offer.

It is Dr. Schenck's idea to have the students distributed in various ranges in the Grand Duchy of Hesse-Darmstadt, of which Dr. Schenck is Forest Assessor on leave of absence, during the months of April and May. *During the month of June, Dr. Schenck and his students will take a flying trip through the most interesting forest districts of Europe.

Sir Dietrich Brandis, late Inspector-general of the forests to the Government of India, who knows European forests better probably than any other European forester, has kindly promised to accompany Mr. Schenck on the tour. Whoever has traveled under Sir Dietrich's guidance knows what a treat is in store for the students of the Biltmore School of Forestry.

Tree Protection in Massachusetts.

Town officers and citizens generally in the southeastern part of Massachusetts have been much interested of late in a suit for damages, brought by W. A. Mackie, of New Bedford, against a street railway company, for cutting four trees in front of his summer place at Freetown, Mass. The case was tried in the Superior Court at Taunton and a verdict of \$1200 was given Mr. Mackie. The actual damage was found to be \$400, but the statutes provide that the damage in such cases may be multiplied by three, hence the \$1200. As was to be expected the corporation appealed and the case will be retried at Boston.

The trees in question were about eight inches through at the butt and they were destroyed by the construction gang of the railway. Mr. Mackie had given land on one side of the street to permit the railway to pass his place without endangering trees, but the construction gang notwithstanding cut the trees on the side next the house.

One of the most remarkable facts brought out at the trial was that a member of the board of selectmen of the town entered the employ of the railway during the construction of the road and while acting in this double capacity gave permission and orders to cut the trees in question. This worthy town officer admitted in court that he was aware at the time he was working for the railway that the board of selectmen, himself included, were liable to have to sit in adjudication on disputed right of way.

Approval of the Proposed Arboretum.

In support of the plan for a National Arboretum in California as outlined in the February FORESTER, the Los Angeles Chamber of Commerce has passed the following resolutions:

Whereas, the inauguration of a Forest System especially adapted for the southwestern regions of America, under its peculiar climatic conditions and limited

rainfall, demands a station for the study of native and foreign forest trees and plants, for the purpose of covering our mountains and foothills to preserve our water for the irrigation of our lands; and

Whereas, the necessity of a Forest School demands the establishment of an Arboretum of Forest Trees for the purpose of testing and improving by selection of

individual types those most suitable for Sylvan culture—a system now adopted by France, Switzerland and other countries where new plantations are made from these improved types; and

Whereas, the proper selection and introduction of tropical fruits and economic plants for culture under our climatic conditions demands a station for testing the plants procured from various regions of the world by the Department of Agriculture; and

Whereas, the study of Botany by means of botanical gardens maintained by the government is universally recognized by all countries as the duty of those governments; and

Whereas, both the agricultural and forest work of the United States requires an outdoor winter station for work and training of the service, for plant and tree propagation, and

Whereas, no other district in the United States is as well suited to these objects and

to all of these objects as is this fine and ample territory :

We therefore urge the Department of Agriculture to accept and maintain that tract of land tendered by the Mayor and City of Los Angeles, as donated by one of our public spirited citizens, G. J. Griffith, comprising over three thousand acres, for the purposes mentioned. We believe that no more suitable location can be found, comprising in its borders a mountain of over 1600 feet giving north and east slopes for forest plantations, while there exist on its southern aspects valleys surrounded and protected by hills, having a tropical climate suitable for the culture of tropical and semi-tropical plants. We would earnestly urge the necessity of such a station as a point for propagating and distributing plants suitable for culture in the United States, and by so doing to build up our agricultural possibilities so necessary for the support and maintenance of a great nation.

Unextinguished Camp Fires

BY A COLLABORATOR OF THE DIVISION OF FORESTRY.

It has been my belief that the forest fires of northern Colorado which in recent years have denuded extensive areas were largely the result of carelessness on the part of hunters and campers. During a recent trip through the mountains this belief was greatly strengthened by finding three unextinguished camp fires, and by tracing two small burns with reasonable certainty to an origin in camp fires thus left.

The two burned areas examined were much alike; one covered possibly one hundred acres, the other three times as many. Both were on steep, rocky, timbered slopes that terminated below in open, grassy glades bordering streams. They were of long triangular shape, the apices at the edge of the timber on the glade, the bases high up the slopes and

running squarely across them. The points in both cases came down to small collections of boulders about which were abundant evidences of camp fires. The forms of the areas burned seemed easily accounted for by the surroundings. The upward spread would naturally be the most rapid, and the lateral spread would widen as the dryer ground above was reached.

Of the three unextinguished fires, one was on a tributary of the Laramie River near an old and deserted tie camp cabin. The surrounding country for miles had been burned over again and again, and while some new coniferous growth was beginning to come in, there was nothing to feed an extensive fire, and hence no impending danger from this particular fire. Possibly the campers who left it burning were actuated by consideration of the sur-

roundings, but more likely it would have been left in any situation regardless of possible consequences.

The second fire was by the roadside, well up on the slope of a spur of the range, in untouched forest. I saw it early in the morning and judged it to have been started twenty-four hours previously. It was smouldering in a slowly increasing circle about a stump against which the fire had been kindled; the circle was then about twelve feet in diameter. A few hours more and it would have reached some fallen trees and found food for starting a grand conflagration.

In this forest there was practically no undergrowth. The thin soil was covered with a thick layer of pine needles with imbedded dead branches and the accumulated debris of many years, all in various stages of decomposition. The surface had a crisp dryness, very apparent as we tramped over it, but just below, the mass was somewhat moist. The condition of this surface covering was well suited for holding fire. Once started it could easily burn for an indefinite time until it reached some tangle of windfalls, and there become actively destructive.

The third fire had been kindled on the edge of a sawdust pile near an abandoned mill. On one side of the road stood the mill building, stable, and several smaller structures that had been occupied by the mill hands. On the other side and crossing the road to the mill was the sawdust in which were imbedded old logs, slabs and edgings. Adjoining the sawdust and extending some distance beyond it was a narrow belt of timber that had been felled, partly by the ax and partly by wind; the whole formed a tangled mass. Just beyond and all about the mill stood green timber, and among the trees were the abundant remains of destructive lumbering. Outside this invaded belt the virgin forest extended for miles without a break.

The fire at the time of our arrival had not spread far, but may have been burning for three or four days. It had attacked an old half-rotten log which was deeply imbedded, and along this it had penetrated several feet beneath the surface. There

was some evidence of an attempt to extinguish the fire by water, whether by the persons who started it or by others passing before us, we could not tell. But it still burned slowly and needed only sun and wind to dry out the path and hasten the progress of the fire toward the mass of dead trees which would furnish all the fuel. It would be necessary to start a destructive conflagration. An hour and a half was spent in shoveling out the burning sawdust, cutting off the log below the ignited portion, and in carrying water to entire the fire.

To build a fire at all in such a situation was nothing less than gross carelessness, but to depart and leave it burning may well be called criminal. Two warning notices were posted in conspicuous places within plain sight of the point where the fire was left. These notices were as provided by the State Legislature, in section one of an act entitled "An act directing the erection of notices to extinguish camp fires." Approved March 28, 1885. The read as follows:

"Camp fires must be totally extinguished before breaking camp, under penalty of not to exceed one month's imprisonment, or one hundred dollars fine, or both, as provided by law.—County Commissioners."

The problem of how to guard the mountain forests from the possible result of such acts of carelessness as I have mentioned is a difficult one. The best tracts of timber are remote from settlements. They are traversed frequently by hunting and pleasure parties which often consist of thoughtless young people who, with no intention of being malicious, may by carelessness start fires that work destruction to much valuable forest.

The great need of protection for the remaining forests is forcibly impressed on any one who rides over the burned region and the manner of affording this protection is a subject well worthy of serious consideration, and one that must soon force itself upon the people for some decided action.

C. S. CRANDALL.
Fort Collins, Colo.

THE FORESTER.

A MONTHLY MAGAZINE

DEVOTED TO ARBORICULTURE AND FORESTRY, THE CARE AND USE OF FORESTS AND FOREST TREES, AND RELATED SUBJECTS.

THE OFFICIAL ORGAN OF

The American Forestry Association,

President, Hon. JAMES WILSON,

Secretary of Agriculture.

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JOHN KEIM STAUFFER, EDITOR.

THE FORESTER takes pleasure in announcing this month a partial response to the offer mentioned in the last issue, for extending the work of The American Forestry Association. The magazine had hardly been sent through the mails before the first response was received, enclosing cheque for one hundred dollars. The generous giver declared his belief in the value of forest lands as an investment, if properly handled, and a source of certain and continuous returns. Other aids also have come to the Association during the past month in the shape of several new life members and a considerable number of new annual members.

Evidences of this new appreciation of forestry are evident quite particularly in the daily press throughout the country. Newspapers from ocean to ocean give to forestry larger space and more prominent position in their columns than ever before—and any newspaper-maker will not hesitate to declare that the daily paper prints what the people want.

With the newspaper as the mirror of public sentiment, and the progressive element of different localities brought together for active coöperation, the advance which forestry *can* make will be undoubted; how much it *will* advance depends entirely upon the energy which its friends will give to the "campaign of education."

"Once interested is always interested," is applicable always to forestry. Tell a friend of a few of the things you read in THE FORESTER, and the response will invariably be—"I had no idea this forestry was a matter of such importance." It is as the discovery of a new world of interest. The "enthusiasm of conviction" is a powerful argument, and one which THE FORESTER asks its readers to evince in behalf of forestry and THE FORESTER.

In each issue for a number of months past there has been printed opposite the last reading page a form of application for membership in The American Forestry Association. Every reader of THE FORESTER, therefore, has received perhaps a half dozen of these mute appeals for advancing the cause. Won't you make them live exponents of forestry by having them signed and sent in by prospective new members?

"He gives twice who gives quickly" is equally applicable in the case of those whose influence is given unreservedly in favor of forestry—those who realize, as President Hadley of Yale has said: "We need it for the sake of the rainfall of the country, for the health of the country, for the future life of the country."

Will The American Forestry Association have further evidence of your interest in the work by the return of these application blanks, duly signed?

CHIPS AND CLIPS.

In Cuba there are seventeen million acres of virgin forest.

An ancient tree, of great local reputation, stands near the old ruined Abbey of Alnwick, in England. Tradition says that "under it the gallant Hotspur once drew up his men."

J. B. Thoburn, formerly connected with the editorial management of THE FORESTER, is now associate editor of the *Home, Field and Forum*, published in Oklahoma City, Oklahoma.

One of the largest sawing contracts ever made is announced from Wisconsin, where a firm has contracted to saw three hundred million feet of Pine. It is estimated that ten years will be necessary to complete the work.

A lot of very choice Poplar sawed in West Virginia, in 1880, when a portable saw-mill was at hand, and stored away since then, was brought into the market lately with other stocks which had been hauled 35 miles for shipment.

Governor Roosevelt has appointed the following commissioners for the Watkins Glen reservation in New York State: William B. Osborne, of Victoria; William H. Wait, of Watkins; Jonas Vanduser, of Horseheads; John Allen Clute, of Watkins, and James B. Rathbone, of Elmira.

The Jack-pine of Wisconsin, which has been looked upon as practically worthless, is now being cut in large quantities and manufactured in lath, for which there is a big demand at all Western points. The increasing value of this species was spoken of in an article in the last issue of THE FORESTER.

The California Water and Forest Association has decided to raise \$10,000 by subscription to make available a similar amount of the funds of the U. S. Geolog-

ical Survey for hydrographic work in California. It will also cooperate with the U. S. Department of Agriculture in its investigations of irrigation.

A reviewer of last year's lumber trade calls attention to the fact that the extraordinary demand caused the seeking out of many sources of supply hitherto considered unavailable because of the expense of taking out the timber, while last year's prices caused the sale of groves and shade trees that had been held and guarded for over a century.

In order to prevent American competition, the lumber and shingle men of British Columbia have sent a memorial to the Canadian Government asking that a heavy duty be placed on American lumber. The present import duty is \$2 per thousand on lumber and thirty cents per thousand on shingles. The effect of the new duty would be felt mostly in Minnesota and Wisconsin, Washington and Oregon being affected but slightly.

An American firm has received an order from Graham & Co., of Stockholm, for a 500-horse-power compound Westinghouse engine, which will be utilized to drive a sawmill plant in the northern woods of Sweden. On account of the poor transportation facilities the various parts of the engine will be carried on sleighs by reindeer over 500 miles to the north of Stockholm, and then erected permanently.

In the bill recently introduced in the United States Senate to establish a territorial government for Hawaii, provision is made for the creation, among other executive offices, of a Commissionership of Agriculture and Forestry.

Georgia is trying to care for its timber resources by legal measures. To this end attention has been called to the bill passed by the last Legislature forbidding the cut-

ting of timber by any one upon any uninclosed lot of land without first placing upon record in the Clerk's office the title under which the land is held or without written consent from the party from whom the timber is leased.

The Commissioner of the Department of Lands, Forests and Fisheries of the Province of Quebec, Canada, has been made president of an international organization entitled "The North American Fish and Game Protective Association." The officers elected February 3d are: President, Hon. S. N. Parent, Montreal, Canada; first vice-president, John W. Titcomb, Vermont; second vice-president, S. T. Bastedo, Ontario; third vice-president, John Fottler, Jr., Massachusetts;

fourth vice-president, Hon. A. T. Dunn, New Brunswick; fifth vice-president, Charles E. Oak, Maine; sixth vice-president, W. H. Wilson, New York; joint secretaries, L. Z. Joncas and Rene Dupont, Quebec, and D. J. Smith, New Brunswick.

An extraordinary floor, in the London Coal Exchange, is constructed of inlaid wood, with the pieces so arranged as to represent the mariner's compass. Some of the wooden pieces, of which there are altogether four thousand, have interesting historical associations. The piece forming the haft of the dagger in the city corporation arms is a portion of a tree planted by Peter the Great when he worked as a shipwright at Deptford.

CURRENT COMMENT.

It is exceedingly gratifying to observe that several newspapers are giving some slight attention to forest fires, a calamity which has robbed New Jersey of millions of dollars, made vast areas of great natural wealth a desert waste, destroyed timber, game and rich soil, dried up streams and caused damage which a century can hardly repair and which no politician imagining himself a statesman has attempted to prevent. Forest fires in New Jersey are mostly preventable. Carelessness of the most inexcusable kind causes the greater part of them. A very little legislation and a very trifling appropriation or expenditure would effect a cure.

Certain counties should have the option of appropriating a small sum to defray the expense of township fire wardens in warning the bush burners and prosecuting people who are careless with fires. It is vastly to the benefit of men, women and school children to prevent forest fires, and the assistance and coöperation of all can in time be secured. For New Jersey to sit down in despair and allow large areas to be annually swept by flames when New York and Pennsylvania are accomplishing

so much is certainly not very much to the credit of New Jersey. In some of the state departments thousands of dollars are spent every year for items of much less consequence than forest preservation.—*Atlantic City Daily Union.*

Not many years ago Black Walnut had so little value that it was used for fuel in various parts of the country. As its value has increased in recent years so rapidly, many land owners are now planting Black Walnut as an investment, as has been urged for years by former Secretary of Agriculture J. Sterling Morton of Nebraska. Commenting upon the present value of the wood the Lancaster (Pa.) *New Era* says:

"Agents for European firms are still making their annual rounds through this and neighboring counties buying the trunks of Walnut trees. We see sales have been made running from \$50 to \$125 for single trees. It is a very profitable business for the seller, and the wonder is that every farmer in the state does not set out as many trees as he can find room for. The

Black Walnut is a rapid grower, will always be in demand and is a better investment than the land itself."

A lumber contemporary takes note of the following item of the growth of public interest in forestry:

"The citizens of Walker, Minn., in their efforts to protect the standing Pine near that village, recently displayed firearms and drove away the contractors to whom the timber had been sold. The owner, T. B. Walker, of Minneapolis, has offered to sell the forest to the state for a park, or to the citizens of Walker, but nothing definite having been done he let a contract to have it cut. Mr. Walker's agents have, however, granted more time and it is expected that the town will take measures to buy the tract."

A Washington mill has taken an order from the U. S. Government for 500,000 feet of Cedar for use at Manila. The first government buildings were built of Fir, but the white ants which infest that country ate it with apparent relish, and with so disastrous effects to the buildings that Cedar will be substituted, it being claimed that the ants will not attack Cedar. It is also claimed by some that Hemlock is ant-proof. Should this fact be proved, the question of a market for Hemlock has been solved.—*Miss Val. Lumberman.*

No Timber in South Africa.

The vast veldts and kopjes of South Africa, where the Boers and Britons are fighting, are almost destitute of trees. In fact, the only trees of any size in all that country are the Blue Gums, which are not native to South Africa, the original stock having been imported from Australia many years ago. In Australia the Blue Gum tree often grows to a height of 300 feet, though away from its native haunts it rarely reaches such a growth. The Blue Gum yields the eucalyptus oil, one of the most valuable of antiseptics, while it is claimed that its leaves, rolled into the shape of cigars and smoked, will cure asthma.—*Lumber Trade Journal.*

Lumber for Gold Seekers.

One of the largest lumber mills on the Pacific coast is planning to send all its lumber to Cape Nome during the coming season. The boom for the Alaska gold fields is expected to be as great as the Klondike demand at its height. Cape Nome is the objective point for crowds of emigrants who are wintering in the coast cities awaiting transportation.

If and Provided.

Forest investigation is a matter of special interest in view of the inroads which loggers are making in our Redwood forests. If the cutting of the Redwoods could be reduced to a system having in view the maintenance of the forests while permitting them to be judiciously thinned, it would insure not only a supply of that useful timber for all time but also permanent watersheds. Our Government and people are at length awakened to the necessity of forest preservation, and some day our forests may be as carefully cherished as in the older countries of Europe, provided they are not all destroyed before we get down to the real work of preservation.—San Jose (Cal.) *Herald.*

Trade Prosperity.

The Oriental and coast lumber trade out of Tacoma, Washington, during the past year showed the following interesting cargoes: To China and Japan, more than seven million feet valued at \$55,000; Hawaii twelve million feet; Manila, half million; Alaska, two million; South America and Mexico, an aggregate of six million feet, distributed among the ports of Iquique, Valparaiso and Guaymas and valued at \$66,000; Delagoa Bay, South Africa, two cargoes, aggregating nearly four and a-half million feet, valued at \$70,000.

A Noteworthy Recommendation.

The National Board of Trade did a wise thing in asking Congress to do something looking to the preservation of American forests. The subject is more distinctly a commercial than an agricul-

tural one, and just at present it is of supreme importance. History teaches that no graver mistake can be made by any community than that which results in the destruction of natural windbreaks and forest shelters. Secretary of Agriculture Wilson has done much already to create a sentiment in favor of forestry, but the question is a scientific rather than a political one. Congressmen have shown little disposition to take action.—*Commercial*, New York City.

Yale Forestry School.

Yale University has received from donors who wish the amount and their names withheld, a substantial gift, sufficient to enable the college authorities to establish a School of Forestry according to plans which have been outlined heretofore by President Hadley in various speeches before alumni associations. The gift will be utilized in connection with the handsome residential property on Prospect Hill left by the late Professor O. C. Marsh for the establishment of a School of Botany.

To Expedite Timber Cutting.

A bill amendatory of the law governing the disposition of timber on forest reserves for building and fuel purposes is being prepared by Representative Gamble of South Dakota for legislative action. The proposed law is general in terms, but is meant to apply particularly to the Black Hills country whence there have come complaints regarding the delay in action in applications for permission to remove timber.

This is caused by the regulations which provide that sixty days' notice shall be given. The new measure proposes to reduce the time of notice to thirty days.

The Vanishing Pine Forests.

In northern Minnesota an army of 15,000 men will attack the standing Pine this winter, assisted by thousands of horses and oxen. The men will receive an aggregate monthly wage of about \$400,000, and they will be employed until the Spring break-up.—*Cleveland Plain Dealer*.

Forest Utilization.

William Rockefeller, of New York City, who owns a tract of 60,000 acres at Bay Pond, Franklin County, New York, on which he has built a hunting and fishing lodge, has applied to the Division of Forestry for a working-plan for the entire tract. Much of the land has been logged over, but there is a large tract of virgin timber which has passed the stages of greatest production in a natural state and is lying idle. A plan is desired by which the mature timber can be turned into revenue without injury to the forest as a game preserve.

National Forest Administration.

The Department of the Interior has recently applied to the Department of Agriculture for complete working plans, to be prepared by the Division of Forestry, for all of the National forest reservations in the West. This is one of the most important steps taken in the administration of these reserves since their creation by the President and will, eventually, transform them into a revenue-producing part of the national economy. Several years will be required to execute the project.

To Encourage Tree Planting.

W. L. Hall, assistant superintendent of tree planting, of the Division of Forestry, will leave shortly for the Middle West and Southwest, where he will be occupied during March, April, May and June in the preparation of planting plans for lands in New Mexico, Texas, Oklahoma and Kansas. This is in connection with the division's offer to furnish assistance to land owners. At a number of places meetings will be held to further popular interest in tree-planting. Mr. Hall will illustrate with stereopticon views some interesting phases of forestry as pertaining to the Middle West.

An Eastern View.

The "eternal vigilance" which often times seems a characteristic of "Yankee" success is brought to notice prominently by the following comment of the *New*

England Farmer (Boston) under the heading of "Obnoxious Legislation":

"The attention of New England farmers is called to several bills now before Congress which are more or less objectionable, especially to eastern farmers, or, in fact, ought to be to all good citizens. The worst bill of all is H. R. 5290. This bill is "to provide free homes on lands purchased from Indian tribes," and may involve the giving away of land that has cost millions of dollars. These lands belong to the whole people of the United States, and ought to be disposed of for their advantage, and not given away to individuals or sold for a song.

"H. R. 5047 provides for the relief of the wool-growers and stockmen of New Mexico, by providing that they shall not

be prohibited from grazing in the forest reserves. This is a direct attack on the forest interests of the country, inasmuch as the sheep (hoof locusts), travelling they do in flocks of thousands, destroy vegetation within reach. The forest reserves also belong to the people of the United States, and not to the sheep owners.

"The farmers and others ought to appeal to their senators and representatives in Congress to vote against these obnoxious bills. The agricultural colleges and experiment stations are largely dependent on the sale of the public lands for their support. The disposal of public lands for anything less than real value is a severe blow to them and deprives them of a portion of their revenue."

Recent Publications.

North American Forests and Forestry. By Ernest Bruncken.

"Timely" is the word we have heard applied to this book of Mr. Bruncken's, and timely it certainly is. Just when the American public is beginning to learn of the great importance of forestry in this country, and to wonder what it is all about, there has appeared this book which goes far toward supplying their lack of information. Before proceeding to the commendation which, in general, the volume deserves, we cannot forbear expressing regret that it should be so indistinctly written and composed. The matter which the author has to present really covers about everything people would like to know, the descriptions, in the main, being accurate, and the chapters on forestry particularly sound and restrained. But the presentation is diffuse, and has the air of haste, so that the reader ends in some confusion.

Again, in certain statements the view may be advanced that Mr. Bruncken should be taken cautiously. His remarks on the North American forest, especially the silvicultural characters of several trees, are somewhat misleading. Small defects these may be called, and as one may willingly admit they are far from fatal; but considering how sorely the cause of forestry stands in need of popular and effective exponents, such failings cannot help but be considered unfortunate.

And yet, in spite of this disparagement, the book (so far as we know) is first on the ground and virtually alone in its field; and from it

people may learn that forestry is neither landscape gardening nor the sequestration of woodland, but "simply the art of managing forests and utilizing them for the benefit of the owners."

The reader may learn, besides, a great deal about the nature and scope of the forest problem in the United States; of the "North American Forest," its history and distribution, its habits and behavior of its component species; of the "Forest and Man," how man and the forest influenced one another; of the "Forest industries," especially lumbering; of how forests deteriorate under human and other agencies, and, in the last half of the volume, of forestry itself—what it is and is not, the kind of management it contemplates, its relation to government, fires, thieves, taxation, the reforms necessary in its methods; and, at the end, of forestry as a profession—the whole pleasantly and untechnically set forth. And these matters which it is particularly desirable that the public should know, for misconception of forestry and its affairs are in no way rare even nowadays. Consequently, whatever its minor shortcomings, a book of such character deserves to be read and recommended.

THE FORESTER is in receipt of "Beginning Professional Forestry in the Adirondacks," being the First and Second Annual Reports of the Director of the New York State College of Forestry—which, having arrived too late for the present issue, will be considered in a later number.

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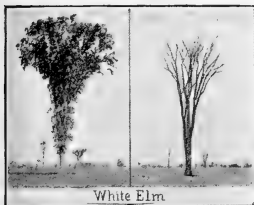
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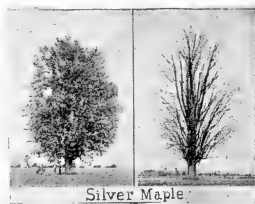
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in March 17th number of

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A MONTHLY MAGAZINE

devoted to the care and use of
forests and forest trees and
to related subjects.



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THE WAY TO
ESTIMATE CORDWOOD.



BIG TREES
OF CALIFORNIA.

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The Forester

All the back files of THE FORESTER have now been disposed of with the exception of those enumerated below. Reading matter is perfect in all (some have damaged covers) no hindrance in binding. Having secured all the back numbers belonging to Dr. John Gifford, founder of THE FORESTER, there are no other files extant. These will be sold at practically half price *during the next two weeks*. Immediate application will be necessary. An unusual library opportunity.

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¹ GENERAL.

² FOR LUMBERMEN.

³ IRRIGATION.

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THE FOREST OF RAVENNA.

"Avenue di Byron"—Stately trees which stood near the entrance to the forest—showing historic specimens of the Stone-Pine.

THE FORESTER.

VOL. VI.

APRIL, 1900.

No. 4.

The Pine Forest of Ravenna.

Passing of the Historic Forest in the Delta of the River Po, Italy.

BY THE FOUNDER OF THE FORESTER.

La Pineta or the Pine Forest of Ravenna is perhaps the most famous forest of all the world. This is due more to its historic associations than to its beauty. It was mentioned fourteen centuries ago in the time of Odoacer and Theodoric. It was extolled by Dante, Boccaccio, Dryden and Byron. In Don Juan, Canto III., Stanza CV., Lord Byron speaks of it as follows:

"Sweet hour of twilight! in the solitude
Of the pine forest, and the silent shore
Which bounds Ravenna's immortal wood,
Rooted where once the Adrian wave flow'd o'er,
To where the last Cæsarean fortress stood,
Evergreen forest! which Boccaccio's lore
And Dryden's lay made haunted ground to me
How have I loved the twilight hour and thee!"

Ravenna was once, it is said, located on the sea. Now it is several miles inland. The forest is located on a spit of sandy land along the Adriatic. The soil on which this forest is located was, no doubt, once an island or beach similar to the Lido in front of Venice. Ravenna is in the Delta of the Po, and the sediment filled the lagoon between the sandspit and the mainland. Now the city is connected with the sea by means of canals which drain the rice-fields between the city and the forest.

The forest as shown in the illustration by the bridge will never be seen again in such form. The severe winter of 1880-81 and conflagrations have destroyed most of

it. The forest consists of *Pinus pinca* (literally "Pine of Pines"). This tree is a native of the Mediterranean region and cannot endure much cold, although in sunny Italy it is often freezing, and in April of last year in Venice the black gondolas were white with snow.

This suggests an interesting question. Pines are usually regarded as trees of the temperate zone, but there is a species which cannot endure a slight freeze. The same is true, to a certain extent, of *Pinus maritima* and *Pinus heterophylla*. The latter grows only along our Gulf Coast, in Cuba and Honduras. The Island of New Providence, on which Nassau, the capital of the Bahamas, is located is covered with *Pinus Bahamensis*. In this region frost never occurs. Perhaps many species of Pines will grow well in tropical regions, but owing to the richness of the soil are soon crowded out by the luxuriant growth of broad-leaved species.

Just north of Ravenna is the great delta of the Po, in the center of which is the famous "Lago di Comacchio," a lagoon 30,000 hectares in extent where pisciculture has been successfully practised for many centuries.

Ravenna is easily reached by rail from Ferrara—the latter city is now but a shadow of its former self. When I visited there, men and women were busy pulling out the grass which persisted in

growing between the cobble-stones of its streets. En route to Ravenna the train passed through a region of heavy alluvial soil. Peasants were ploughing in the fields with teams of four and six large, white oxen. At certain times this region is infested with fever.

The town of Ravenna is attractive to those persons who are interested in old cathedrals and church relics, but to others is dull. We hunted in vain for an attractive hotel and were haunted by the valuable caution of Baedecker that the hotel-keepers of Ravenna bear considerable watching.

After a great deal of bargaining we were able to secure a wagon drawn by two ponies which were not overfed and were fit only for a very short journey. The road was good and on both sides were rice fields. The natives were working knee-deep in the mud. This is a region of great fertility, but of course, at times visited by fever. After a short drive we crossed the bridge shown in the frontispiece. The driver pointed out in the distance to the south of us, on the top of a hill, San Marino, the smallest republic in the world.

At the entrance to the forest there were many donkeys and women loaded with wood. They were waiting their turns to have their burdens weighed. This wood consisted mostly of small limbs and twigs, split stumps and roots.

Upon entering the forest a short distance we struck a sandy road over which a pair of good horses could have sped at a ten-mile gait but our team was stalled, so we alighted and walked.

The Stone-pine (*Pinus pinca*) is a tall, picturesque tree with a large parasol-like head. It was planted in very early times in gardens and is always given a very prominent place by artists in classic pictures. It is associated with porticoes, pillars, fragments of old temples and other historic objects of the Italian landscape.

The trees are often far apart in this forest and there are many bare places. Many ponies were browsing on the herbage. Few forests of the world have had as many ups and downs. It is now owned

by the city of Ravenna and shows the effects of the many vicissitudes through which it has passed. The oldest Pine are probably about two hundred years of age. Although of great value in Italy the wood of this Pine is only of a medium quality. In 1836 Pope Gregory sold this forest "in a way" to the brotherhood of St. Peter in Rome for 186,170 francs and a yearly donation of three pounds of wax and thirty-two loads of wood, reserving the privilege of using eighteen trees per annum for building purposes. This was really however only a sale of privilege which allowed the collection of Pine cones for the utilization of dying trees, windfall and the fisheries. It was forbidden to cut a sound tree and it was further specified that the wood should be improved owing to its importance as a windbreak against the Sirocco and Bora, and as a safeguard against the fevers of the flats near Comacchio. The Bora is a blustering dry wind from the Julian Alps blowing across the Adriatic Sea. The brotherhood of St. Peter farmed out the woods for 957 francs, eight loads of wood and thirty-five kilograms of hulled Pine seed per annum. In addition to this the natives of Ravenna had the continuous right to gather small twigs, etc., and to use the woodland for pasturage.

The seeds of the Stone-pine are edible and have the flavor of almonds. The cones are the largest of native European conifers and have always been much prized for fuel. The collection of the seeds is an important industry. Women and children pick the cones from the ground while the men, called "pinajuoli," armed with a hatchet fastened to a long willow pole climb the trees. The hatchet is hooked over a lower limb and then, with hands on the pole and feet on the trunk, they clamber hand over hand into the tree. After cutting the cones from the tree they descend in the same fashion.

The cones are piled in heaps near the dwellings of the wood-guards, where they remain until spring time. Then they are spread on a stone threshing-floor and turned often until the heat of the sun opens the cones and the seeds drop out.

The few attempts which have been instituted for the improvement and protection of this forest have been offset by the peasant rights to pasturage. This forest is but a shadow of its former self, and the

time is not far distant when it will be a thing of the past unless there is soon a change in the form of management.

JOHN GIFFORD,
Ithaca, N. Y.



A CANAL, THROUGH THE FOREST.

Waterway draining ricefields and forest, and connecting Ravenna with the Adriatic Sea.

The Way to Estimate Cordwood: A Suggestion.

Timber estimating has always been an important question both to the lumberman and to the scientific forester. Comparing our own methods in this branch of forest work with those of Europe we find that, while the former are unusually quick and practical, the latter are apt to be much more accurate. We ought to be able to profit from both sources; to combine what is best in each, or modify it to suit our needs and conditions.

It is my purpose here to explain a system of measurement known in Europe as the method by the "absolute factor of shape." Though little used, except in Denmark, it appears to be well suited to many of our hardwood forests for determining their cubic contents or cordwood; and, with the help of the existing log-rules, to the more uniform softwood forests for determining their contents in board feet.

One or more sample plots within the forest, representing as nearly as possible the average conditions, are selected and the area of each determined. They may constitute together from one-half per cent. to five per cent. of the total area, according to the uniformity of the forest and the degree of accuracy required. On these sample areas the data are first obtained for calculating their own volume in wood, and from the latter the total volume of the forest or woodland may be readily ascertained by the proportion of the respective areas.

The preliminary measurements on the sample area or areas are the following:

1. The diameters at breast height of all the trees on the selected area, except the very smallest—let us say those below three inches.

2. The heights of a sufficient number of average representative trees of each species to determine the general height-growth conditions of the forest. These trees may be selected while taking the diameters and should include small, intermediate, and large trees of each kind, if present. The respective diameters should be noted in

connection with the heights. By pointing off the heights on cross-section paper in conjunction with the corresponding diameters and drawing a graduated curve through these points, the relation existing between heights and diameters for every size of tree may be quickly found.

3. The volume of the stem above breast height in several average representative trees for each species. The method by sections is the best, as it is accurate and easy, and generally familiar. The full height of the tree and its diameter at breast-height should be noted in connection with the stem volume in each case.

In deciding what constitutes the stem of the tree, something must be left to the judgment of the estimator. In conifer the solution of this question is generally easy. In them the upper portions of the tops may sometimes have to be discarded while, on the other hand, the stems of hardwoods usually do not extend far into the crowns of the trees. The measurement should not extend beyond the needs of the case and should conform to the actual available use of the wood.

These trees, of course, will have to be felled; but since an estimate of the timber is usually followed by a cutting or is contemporaneous with it, this circumstance should not be objectionable, especially as the trees may often be selected so as to improve the silvicultural conditions of the forest.

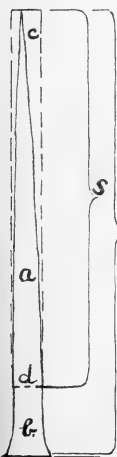
The measurements under 3 are taken in order to determine the "absolute factor of shape" for each species. This "factor" is simply the proportion between the volume of the stem obtained as already explained and the volume of an imaginary cylinder having the same basal area as the stem and extending in length from the same level at breast-height vertically to the tip of the tree. Thus, in a tree whose basal area at the level of breast height is 1.2 square feet, whose height from the same level to the tip of the tree is 65 feet and whose stem volume between, as ascer-

ained by measurement, is 35.1 cubic feet, the "absolute factor of shape" would be: $\frac{35.1}{78.1}$, or .45.

Where the forest growth is somewhat uniform the factors of shape of the trees felled for each species may be averaged separately for that species to obtain its factor of shape. Where there is a wider range in the sizes of the trees, however, the factors of shape for these may be found by interpolation on cross-section paper as in the case of the height-curves.

4. Whenever the branches of trees are of value their volume should be ascertained. The trees taken for the stem volume measurements can be utilized as sample trees for this purpose, their branches being stacked in cords, separately for each species, and the results reduced to solid cubic contents, .7 being the reducing factor.

The following example will show how the measurements may be tabulated and the volume computed:—



d = diameter of tree at breast-height. a = stem above breast-height. c = the corresponding cylinder. b = stem below breast-height. s = portion of the stem included in the "factor of shape." $\frac{a}{c}$ = "absolute factor of shape." H = total height of tree.

Computation for Beech.— a , for the stem portion above breast-height. (See a in the diagram.)

Sample tract of 3.8 acres, being 1 per cent., in a Beech and Oak forest at x .

Number of trees. ^a	Diam. at breast-height. Inches.	Sums of the areas at breast-height for every inch class. Sq. Feet.	Height of trees from breast-height to top. Feet.	Absolute Factors of Shape.	Cubic contents of the stems above breast height. ^b Cu. Feet.
121	3	5.94	22.5	.50	66.8
27	4	2.36	25.5	.50	30.1
19	5	2.59	29.5	.50	38.2
15	6	2.94	37.5	.49	54.
13	7	3.47	42.5	.49	72.3
14	8	4.89	45.5	.48	106.8
8	9	3.53	48.5	.48	82.2
9	10	4.91	51.5	.48	121.4
9	11	5.94	55.5	.47	154.9
11	12	8.64	57.5	.47	234.
13	13	11.98	59.5	.47	335.
17	14	18.17	64.5	.47	550.8
14	15	17.18	69.5	.46	549.2
12	16	16.76	73.5	.46	566.7
12	17	18.92	76.5	.46	665.5
10	18	17.67	79.5	.46	646.2
9	19	17.72	81.5	.45	649.9
7	20	15.27	83.5	.45	578.3
6	21	14.43	86.5	.45	561.7
5	22	13.20	88.5	.44	514.
4	23	11.54	89.5	.44	454.4
2	24	6.28	91.5	.44	255.6
1	25	3.41	92.5	.43	135.6
2	26	7.37	93.5	.43	296.3
1	27	3.98	94.5	.42	158.
2	28	8.55	94.5	.42	339.3
1	29	4.59	95.5	.42	184.1
1	30	4.91	97.5	.42	201.1
Total, 257.14		Total,	Total,		8602.4

b .—For the stem portion below breast-height, excluding the stump left on the ground. (See b in the diagram.)

Breast height, 4 ft. 3 in.
 Less height of stump, 1 " 3 "
 Length of b , excluding stump, 3 " 0 "

Total basal area (column 3 in the table), 257.14 sq. ft.
 Product (equals volume), 771.4 cu. ft.†

* The figures in column six were obtained by the multiplication of those in the three columns preceding; or, in other words, by reducing with the aid of the factors of shape the contents of the imaginary cylinders represented by the figures in columns three and four.

† It will be noticed that no allowance is made for the flare of the roots, or the tapering at the butt end of the stem. The difference would be slight and may be allowed to cover part of the breakage and waste.

c.—For the branches.

Since the solid cubic contents of the branches were found in connection with the sample trees felled for obtaining the factors of shape, the percentage which the former bear to the stem volume of those trees, within each species, can be readily found. The butt end stem contents should, of course, be added to those of the upper portion before determining the percentage. The percentage having thus, in the present instance, been ascertained to be fifteen, the total for Beech is as follows:

For the parts <i>a</i>	8602.4	cubic feet.
For the parts <i>b</i>	771.4	“ “
For the entire stems	9373.8	cubic feet.
For branches, 15 %	1406.0	“ “
Total	10779.8	cubic feet.

By dividing by 128, and then by the reducing factor .7, the cords may be obtained. Thus 10779.8 cubic feet equal 120.3 cords.

HOW TO SHORTEN THE WORK.

As a rule, more or less of the detail necessarily included in the explanation of the method can be dispensed with in practice. The forest may be so regular as to have the sizes nearly consecutive and in approximately equal proportions, in which case they may be combined into classes with average heights, or even a general height average may be taken. In the latter case the factors of shape would be likely to show a normal and gradual transition, and could then also be averaged. It may even happen that several species are so nearly alike in their rates of growth that they may be treated as one in the finding of the heights and factors of shape. Moreover, since the “absolute factor of shape” refers merely to the stem above breast-height and not, as ordinarily, to the whole tree, the estimator, after a little practice, is able to judge pretty accurately of its value. Sometimes it is no great risk to estimate the factor of shape of a tree outright, without felling it. Ordinarily, the “absolute factor of shape” tends to lie between .4 and .5, except for very small trees.

ADVANTAGES OF THE METHOD.

Its principal merit lies in its adaptability to the varying conditions of American forests.

The lower lengths, for instance, can be corrected in accordance with the size of stump customarily left in this, that, or the other, section of the country. The factor of shape, being confined within comparatively narrow limits, may be readily altered to coincide with changing conditions of growth. Moreover, the several parts of the tree can be so separated in measurement and computation as to meet the special needs of the case. Finally, there is no reason why the board feet contents should not be noted in connection with the stem volume measurements of the sample trees, thus enabling the estimator to present figures showing both the board foot supply and the cubic contents to constitute the basis for production in the forest. The results in board measure cannot, of course, be expected to be any more accurate by being merely joined to the new method than they would be under ordinary circumstances.

There are two other methods of forest mensuration which could be compared with that under consideration. The one based on the so-called “artificial” factors of shape would be invaluable to us were it not that European forests are entirely different in type as well as in composition of species, while the method known as Draudt’s necessitates the felling of a great number of sample trees, and is much less elastic than the one described.

The method by the “absolute factor of shape” is a conservative one. In Denmark it has been used extensively and has given entire satisfaction. In the German Beech and Oak forest that supplied the example for this article it proved more accurate than the measurements by “artificial” factors, which were used to arrive at a comparison. To my knowledge it has been tested but twice in America. In both instances the results were fairly satisfactory.

G. FRED SCHWARZ,
Washington, D. C.

The Bigtrees of California.

Description of the Groves which Congress has been Asked to Preserve from the Energy of Lumbermen.

Before the glacial period, the genus of big trees called *Sequoia* flourished widely in the temperate zones of three continents. There were many species, and Europe, Asia and America each had their share. But when the ice-fields moved down out of the north, the luxuriant vegetation of the age declined, and with it these multitudes of trees. One after another the different kinds gave way, their relics became buried, and when the ice receded, there were left in all the world, just two species of the genus. Both grew in California, each separate from the other, and each occupying, in comparison with its former territory, a mere island of space. As we know them now, the Redwood (*Sequoia sempervirens*) lives only in the Coast ranges and the region of the sea fogs, along a narrow strip, ten to thirty miles wide, from the Oregon line to the Bay of Monterey; the Bigtree (*Sequoia washingtoniana*) lives only on the west slope of the Sierra Nevada, in small groves scattered over a length of two hundred and fifty miles. The utmost search reveals but ten main groups; it is hardly extravagant to limit the total number of sizeable trees to figures in the thousands; and it is the plain truth that all the specimens put together which are famous for their size, they do not exceed five hundred.

The Bigtrees are unique in the world—the grandest, the largest, the most graceful of trees; and if it were not enough to be all these, they are among the scarcest of known species, and have the extreme scientific value of being the best living representative of a previous geologic age. The tree has come down to us through the vicissitudes of many centuries because it has had superb qualifications. Its bark is often two feet thick and almost non-combustible; the oldest specimens that have been felled were still sound at the heart; and fungus is an enemy unknown to it.

Yet with all these means of maintenance, the Bigtrees have apparently not increased their range since the glacial epoch. On their own little strip of country, where the climate was locally favorable, they have just managed to hold their own.

As the situation stands to-day, the only grove of consequence, which is absolutely safe from destruction, the Mariposa, is far from being the most interesting. Most of the others are either in process, or in danger, of being logged. The very finest of all, the Calaveras, with the biggest and tallest trees, the most uncontaminated surroundings, and practically all the literary and scientific associations of the species connected with it, is bonded to a lumberman who came into full possession on the first of April, 1900; the Sequoia and General Grant national parks, which are supposed to embrace and secure a large part of the remaining Bigtrees, are eaten into with a saw-mill each, and valid private timber claims amounting to a total of 1172.87 acres; and for the rest of the scanty patches, they are in a fair way to disappear—in Calaveras, Tuolumne, Fresno and Tulare counties they are disappearing—by the axe. In brief, the majority of the Bigtrees of California, certainly the best of them, are owned by people who have every right, and in many cases, every intention, to cut them up into boards.

These are the main facts of the case. To realize more fully the loss we are likely to suffer is a matter for imagination. One must remember the history of these trees, their individual age, their size, their fame, their beauty. A notion of their wonders may be got from John Muir's Mountains of California. No one describes the Sequoias more vividly than he:

“So exquisitely harmonious and finely balanced are even the mightiest of these

monarchs of the woods in all their proportions and circumstances, there is never anything overgrown or monstrous-looking about them. On coming in sight of them for the first time, you are likely to say 'Oh see what beautiful, noble-looking trees are towering there among the firs and pines!' their grandeur being in the meantime in great part invisible, but to the living eye it will be manifested sooner or later, stealing slowly on the senses, like the grandeur of Niagara, or the lofty Yosemite domes. Their great size is hidden from the inexperienced observer as long as they are seen at a distance in one harmonious view. When, however, you approach them and walk round them, you begin to wonder at their colossal size and seek a measuring-rod. These giants bulge considerably at the base, but not more than is required for beauty and safety; and the only reason that this bulging seems in some cases excessive is that only a comparatively small section of the shaft is seen at once in near views. One that I measured in the King's Rivers forest was 25 feet in diameter at the ground and 10 feet in diameter 200 feet above the ground, showing that the taper of the trunk as a whole, is charmingly fine. And when you stand back far enough to see the massive columns from the swelling instep to the lofty summit dissolving in a dome of verdure, you rejoice on the unrivaled display of combined grandeur and beauty. About a hundred feet or more of the trunk is usually branchless, but its massive simplicity is relieved by the bark furrows, which instead of making an irregular network, run evenly parallel, like the fluting of an architectural column, and to some extent by tufts of slender sprays that wave lightly in the winds and cast flecks of shade, seeming to have been pinned on here and there for the sake of beauty only. The young trees have slender, simple branches down to the ground, put on with strict regularity, sharply aspiring at the top, horizontal about half-way down, and drooping in handsome curves at the base. By the time the sapling is five or six hundred years old this spiry, feathery, juvenile

habit merges into the firm, rounded dome form of middle age, which in turn takes on the eccentric picturesqueness of old age. No other tree in the Sierra forest has foliage so densely massed or presents outlines so firmly drawn and so steadily subordinate to a special type. A knotty ungovernable-looking branch five to eight feet thick may be seen pushing out abruptly from the smooth trunk, as if sure to throw the regular curves into confusion, but as soon as the general outline is reached it stop short and dissolves in spreading bosses of law-abiding sprays, just as if every tree were growing beneath some huge invisible bell-glass, against whose sides every branch was being pressed and molded, yet somehow indulging in so many small departures from the regular form that there is still an appearance of freedom. The foliage of the saplings is dark bluish-green in color, while the older trees ripen to a warm brownish-yellow tint like *Libocedrus*. The bark is the rich cinnamon brown, purplish in young trees and in shady portions of the old, while the ground is covered with brown leaves and burs forming color-masses of extraordinary richness, not to mention the flowers and underbrush that rejoice about them in their seasons. Walk the Sequoia woods at any time of the year and you will say they are the most beautiful and majestic on earth. Beautiful and impressive contrasts meet you everywhere: the color of tree and flower, rock and sky, light and shade, strength and frailty, endurance and evanescence, tangles of supple hazel-bushes, tree-pillar about as rigid as granite domes, roses and violets, the smallest of their kind, blooming around the feet of the giants, and rugs of the chamcæbatia where the sunbeams fall. Then in winter the trees themselves break forth in bloom, myriads of small four-sided staminate cones crowd the ends of the slender sprays, coloring the whole tree, and when ripe dusting the air and the ground with golden pollen. The fertile cones are bright grass-green, measuring about two inches in length by one and a-half in thickness, and are made up of about forty firm, rhomboidal scales densely packed, with from five to eight seeds at the base of each,

a single one, therefore, contains from two to three hundred seeds, which are about a fourth of an inch long by three sixteenths wide, including a thin, flat margin that makes them go glancing and wavering in their fall like a boy's kite. The fruitfulness of Sequoia may be illustrated by two specimen branches, one and a half and two inches in diameter, on which I counted 480 cones. No other Sierra conifer produces nearly so many seeds. Millions are ripened annually by a single tree, and in a fruitful year the product of one of the northern groves would be enough to plant all the mountain ranges of the world. Nature takes care however, that one seed in a million shall germinate at all, and of those that do perhaps not one in ten thousand is suffered to live through the many vicissitudes of storm, drought, fire, and snow-crushing that beset their youth."

Of their age Mr. Muir says:

"Under the most favorable conditions these giants probably live 5000 years or more, though few of even the larger trees are more than half as old. I never saw a Big Tree that had died a natural death; barring accidents they seem to be immortal, being exempt from all the diseases that afflict and kill other trees unless destroyed by man, they live on indefinitely until burned, smashed by lightning, or cast down by storm, or by the giving way of the ground on which they stand. The age of one that was felled in the Calaveras Grove, for the sake of having its stump for a dancing-floor was about 1300 years, and its diameter, measured across the stump, 24 feet inside the bark. Another that was cut down in the King's River forest was about the same size, but nearly a thousand years older (2000 years), though not a very old-looking tree. It was felled to procure a section for exhibition, and thus an opportunity was given to count its annual rings of growth. The colossal scarred monument in the King's River forest mentioned above is burned half way through, and I spent a day in making an estimate of its age, clearing away the charred surface with an axe and carefully counting the annual rings with the aid of a pocket-lens. The wood-rings in the

section I laid bare were so involved and contorted in some places that I was not able to determine its age exactly, but I counted over 4000 rings, which showed that this tree was in its prime, swaying in the Sierra winds, when Christ walked the earth. No tree in the world, as far as I know, has looked down on so many centuries as the Sequoia, or opens such impressive and suggestive views into history."

Professor Brewer writes of the Calaveras Grove:

"The Calaveras Grove' is the one nearest San Francisco. It was the first one discovered and has been more visited than any of the other groves, and all in all, is the best preserved and the most interesting of those left. There has been so much written about it, and so many have seen it, and it has become so well known to the world, that a special description is unnecessary here. It became private property almost immediately after its discovery, almost fifty years ago, and for some years it has belonged, it is understood, to Mr. James L. Sperry, of Stockton. He has long wished that it might become public property and several attempts have been made, both to the state and the general government, to have the property become a public park."

"About eight years ago when the United States set aside the Yosemite Park, an effort was made to persuade the officials at Washington to extend the boundaries of the reservation so as to include the Calaveras Grove. The title of the intervening land was then in the government, and there were no difficulties in the way of such an extension of boundaries, except that the national authorities were not awake to its importance, and the public was indifferent as to who owned the grove so long as it could be seen and visited by any one."

These extracts represent a few of the claims which the Bigtrees have already made upon the world's interest. They could be extended almost indefinitely. Just now it is more important that people should know what threatens the trees as a species, and what has and may be done for their protection.

It has been said the majority of the Sequoias were in process or in danger of being logged. This is based on the facts that nine tenths of the known tracts are privately owned, and that, taking all the counties together which contain Sequoias, forty mills are at work upon the timber: more specifically, there are in the Calaveras county seven, in Tuolumne county seven, in Fresno county eighteen, in Tulare county eight saw-mills. Not all of these cut Bigtrees exclusively, but each cuts some, and a few cut nothing else. Just how many of these owners are also loggers cannot be stated without actually going over the ground, but from the number and distribution of the mills, it is safe to say that a very large part of the ownership is as good as controlled by lumbermen. To offset this it may be stated that the Mariposa, General Grant, and Sequoia Parks will preserve a great body of Bigtrees. Taken all together these offer but indifferent consolation.

The Mariposa is safe, being owned and protected by the state of California; and it is fairly accessible. But the Mariposa has nothing like the advantages, either in situation or natural beauties, of the Calaveras grove, whose trees are in many ways unrivalled. As for the other parks—the Sequoia and General Grant—they are merely nominal. It is true each contains a body of Bigtrees which probably never will be cut, but each is being constantly depleted by a saw-mill which has bona fide timber claims within its limits. Besides this, the Sequoia Park is likely to lose at any time whatever Bigtrees there may be on certain good, private claims amounting to 1012.87 acres; the General Grant may suffer a like loss of 160 acres. Furthermore, neither park is accessible without more time and money than the ordinary person has to spend; so that, as national parks and conservatories of natural curiosities, they are failures.

Up to the recent sale of the Calaveras Grove these matters gave the country very little concern, that grove having seemed so entirely satisfactory for the purposes of a park. But now that these, the best trees, are on the point of destruction,

such facts have some pertinence. California in particular, is roused to action. Petitions and memorials have been sent out from clubs, newspapers and private individuals; and some weeks ago, a California Congressman, Mr. De Vries, introduced a bill in the House touching the Calaveras Grove. Contrary to the general impression this bill does not secure the ownership of the grove to the government. It merely authorizes the Secretary of the Interior to "open negotiations for, and if possible, secure a bond upon," the said grove of Bigtrees. Its result will be a report to Congress by the Secretary, on the strength of which further proceedings may be instituted. If, in the meantime, Congress is sufficiently impressed by popular interest in the trees, money may be appropriated for their purchase. This there is good reason to believe, will be the fortunate outcome.

ADDENDA.

Since the above article was written Mr. R. B. Whiteside has completed his purchase of the Calaveras Grove, and Secretary Hitchcock has asked him to name the price at which he will sell it to the United States government. Mr. Whiteside has replied that he is ready to consider any offer based on a fair valuation of the property, and that he wishes to have this officially examined, in order that negotiations may proceed understandingly.

R. T. FISHER,
Washington, D. C.

The largest wood pulp mill in the world is at Saulte Ste Marie. Twenty-two acres of the best spruce land is cleared and converted by this mill into 250 tons of pulp in a single day. This is consumed by a great newspaper in two days. But the rapid cutting of the forests in the Upper Lake regions has stopped their supply of wood and a serious famine threatens this industry. Canada demands an export duty on wood of \$1.90 per cord, in order to protect the forests from annihilation. The flower of the forest, the young, thrifty trees are taken for pulp, entirely preventing the maturing of any trees for future lumber

Yale Forest School.

At the meeting of the Yale Corporation held at New Haven, Conn., March 16th, President Hadley formally announced the gift of \$150,000 to Yale University from Mr. and Mrs. James W. Pinchot, of New York, and their sons, Gifford Pinchot and Amos R. Eno Pinchot, both graduates of Yale, for the foundation of a school of forestry as a department of the University.

Upon the acceptance of the gift by the Corporation, Mr. Henry S. Graves, Yale '02, was appointed professor of forestry. The regular work of the forest school will begin with the opening of the University in the Fall.

The general interest which forestry has aroused in late years has been very evident among young college men, and especially so at Yale University. The lecture delivered in New Haven last spring by Mr. Gifford Pinchot, on "The Profession of Forestry," developed such enthusiasm among the undergraduates that many announced a desire to make it their life-work. Since the installation of President Hadley the necessity for such a school has been more than ever apparent, as has been emphasized by him in numerous public utterances during the past half year. The organization of the Yale Forest School at this time is a marked indication, therefore, of the economic importance attached to forestry both by the donors themselves and by such a master of public questions as President Hadley.

The plans for the beginning of "instruction and research in forestry," for which the school has been founded, are being arranged and will be announced in detail in the next issue of THE FORESTER.

The school is designed primarily for graduate students and will be under the direction of a governing board consisting of the President of the University, ex-officio; Henry S. Graves, B.A., Pinchot Professor of Forestry; William H. Brewer, Ph.D., Professor of Agriculture; Gifford Pinchot, B.A., Special Lecturer on State and National Forestry.

Of the heads of the new school, Mr. Pinchot and his work as United States Forester, need no introduction. Mr. Graves has been his assistant and the superintendent of working-plans of the Division of Forestry. Prof. Brewer's

connection with the school will also be of the greatest advantage, because of an intimate knowledge of the West through his work for the United States Geological Survey and as a member of the Forest Commission of the National Academy of Sciences (1896).

The technical forest subjects will be taught by the Professor of Forestry, the Assistant Professor of Forestry, Professor Brewer, and special lecturers. Instruction in the auxiliary subjects will be given in connection with the regular courses in other departments of the University.

Short courses of lectures will be given during the first year on State and National Forestry by Mr. Pinchot and on Forest Hydrography by Mr. F. H. Newell, chief of the Division of Hydrography, U. S. Geological Survey. A special lecturer will be engaged for the course in Forest Law, and, in connection with the course in Lumbering, it is expected that lectures will be given by men from different parts of the country who are actively engaged in various branches of the lumber business. It is further expected that arrangements will be made for special lectures, on subjects relating to forestry, by scientific experts.

For the present the house of the late Professor O. C. Marsh, Prospect Street, will be used for the Forest School. In addition to lecture rooms, there will be a library, a laboratory and a museum. The library will be ready for use at the opening of the School. Material for the thorough equipment of the museum will be acquired as rapidly as the funds of the School will permit.

Through coöperation with the Sheffield Scientific School and the Peabody Museum, the use of the extensive botanical, mineralogical and zoölogical collections of these departments will be extended to the Forest School.

Provision is also made in the gift for a Summer School of Forestry at Grey Towers, Milford, Pike County, Pa., the estate of Mr. James W. Pinchot, a portion of which has been placed at the disposal of the Forest School for 21 years. The estate contains a tract of woodland for practical forest instruction, with open ground for planting, and the donors have offered to furnish such equipment as may be necessary for the school. Mr. J. W. Pinchot has further generously agreed to place in the public library in the village of Milford, for the use of the school, a large collection of books relating to Forestry.

It is the intention of the governing board to select considerable areas of forest land near New Haven where the students will be given practical forest work throughout the first year and first half of the second year. The courses have been so arranged that the entire spring of the second year will be spent in the field in Pennsylvania and in the Adirondack Mountains of New York. The tract of land at Milford, Pa., will also be used for practical field work during the first part of the spring term of the second year. The land is admirably adapted to forest instruction, since it represents the average conditions prevailing in the eastern hardwood region. Several owners of large tracts in the Adirondacks have offered the use of their land for the practical forest work of the school, and have expressed their willingness to construct and equip camps for the accommodation of the students.

The requirements of the course will be strict in order to ensure the highest standard, and a degree will probably be granted by the university, though this has not been definitely settled. Though primarily for graduate students, it has been decided that under exceptional circumstances students who are not candidates for a degree, but who can show their fitness to pursue the courses given in the

Forest School, may be admitted without examination. It will be the policy of the governing board, however, to encourage the students to take the full course at the Forest School, rather than a special or partial course; and those students who wish to take a short course in forestry and are unable to pass the entrance examinations to the Yale Forest School, will be advised to avail themselves of the privileges offered by the Summer School at Milford, which is intended to meet their special requirements.

Graduates of colleges or scientific schools of high standing will be admitted without examination provided they can show the requisite knowledge of botany, geology and inorganic chemistry. Candidates who are not graduates from collegiate institutions of high standing will be required to pass an examination in the various branches of mathematics, botany, geology, chemistry, physics, German or French, English and political economy. Examinations for entrance may be taken in June, in any of the cities from Maine to California, where the tests are held for admission to other departments of Yale.

The regular course covers a period of two years. The subjects have been so arranged that nearly all the preliminary work is completed in the first year. Enough technical forestry is, however, given during the first year to enable the students to make silvicultural studies, to investigate the growth and production of trees and forests, to establish forest plantations, and to make thinnings and other classes of cuttings. The second year is devoted to advanced technical work, in the class room and in the field.

The purpose of the Summer School at Milford is primarily to provide instruction for those who can not attend the Forest School at New Haven. The latter is a graduate school and the strict requirements for admission will probably exclude many who have not had the requisite training, but who may wish to take a general course in forestry. Such students may be classified as follows: 1. Owners of woodlands. 2. Forest rangers. 3. Teachers and others who wish to acquire a general

knowledge of forestry. 4. Students of forestry who wish to occupy their vacation in practical forest work. 5. Students of forestry who are deficient in certain subjects. 6. Graduate students desirous of pursuing advanced forest work. 7. Possible students of forestry who desire to investigate the subject.

The Summer School will be opened in July, 1901. The regular course of instruction will cover, in general, the technical work given the first year at the Yale

School of Forestry. Informal lectures will be given upon the nature and scope of forestry, upon silviculture, forest measurements and forest botany. Practical instruction will be given in the woods in marking thinnings and other cuttings, in establishing plantations, taking forest measurements, and in other forest work useful to those taking the courses. The professor in charge of the school will direct the studies of those who may wish to carry on special forest work.

Grazing in the Western Forest Reserves.

An Official Investigation of the Facts to be Made by the Division of Forestry, Upon Request of the Secretary of the Interior to the Secretary of Agriculture.

The question of grazing in the Western forest reserves has been taken up by the Department of the Interior for a complete investigation of the claims advanced by the advocates and opponents of the opening of the reserves to sheep-grazing. Secretary Hitchcock has lately written Secretary Wilson, of the Department of Agriculture, asking that the Division of Forestry investigate the effect of sheep-grazing on the forests, and an inquiry will be begun at once. As no general rule can be applied, each reserve will be studied separately.

This work will be conducted by the Division of Forestry, which has prepared a comprehensive plan for securing information.

As it is desired to collect impartially the testimony of both sides, lists of questions will be sent to the thousands of sheep-grazers and their opponents for the expression of individual opinions concerning the effect of grazing. This information will be used later in connection with the official examination of the reserves, which will begin July 1, in which botanists, irrigation experts and other scientific men from all parts of the United States and also all will be engaged for several months in the field.

In the letter referred to above, Secretary Hitchcock enumerates the points upon which he desires to lay special emphasis, as follows:

"Grazing in the national forest reserves, being one of the most important of all the questions which relate to them, will naturally form a chief subject of the reports. In the necessary investigations and in preparing these reports, I have the honor to request that special attention be given to the following phases of the subject:

"1. The grazing industry in the forest reserves in relation to taxation and the general prosperity of specified localities.

"2. The relation of grazing to forest fires.

"3. The relation of grazing to the preservation and reproduction of forests.

"4. The relation of grazing to irrigation and water supply.

"5. The relative effect of grazing by various kinds of stock.

"6. Moderate grazing and over-grazing in forest reserves."

The present investigation has been brought about largely by the controversy which has raged for many years in the West, involving cattlemen, wool-growers and farmers throughout that entire section.

The recent increase of irrigation has added to the bitterness. Government action in the matter has been hastened by the establishment of forest reserves. In view of the injury to the forests in many sections from over-grazing, all reserves except those in Washington and Oregon, and the Black Mesa Reserve, in Arizona, which is to be opened to 300,000 sheep at 3 cents a head, are closed to sheep by an order issued last May. This step has raised a storm of protest from wool-growers, who claim that no harm is done by grazing under proper restrictions. Many are reported to have driven their herds into the mountains last summer in defiance of the law.

Against the sheep owners are arrayed the cattlemen and farmers, and especially

the irrigators, who claim the practice means disaster to agriculture in the lowlands. These argue that sheep destroy the forest cover in the mountains and thus diminish the water supply. They are said not only to eat the young growth which is to perpetuate the forest, but to trample innumerable seedlings and destroy the layer of leaves necessary to keep the soil in good condition. Sheep herders are accused of burning large areas in order to secure a growth of grass. While the government will decide the matter only in the case of the forest reserves, these include a large part of all the summer ranges of the western sheep-raising states, and the results will be of great importance to the American wool-growing industry.

Canadian Forestry Association.

A New Organization of Prominent Men to Advance the Principles of Scientific Forestry.

The Canadian Forestry Association was organized March 8th at the House of Commons, Ottawa. An interesting comment upon the new organization, in which the influence of the American Forestry Association, and one of its members, Hon. Elihu Stewart, is mentioned, is thus spoken of in the Ottawa *Citizen* of the following day:

"So imperative had it become that steps should be at once taken to protect Canada's forest resources that Mr. E. Stewart, chief inspector of timber and forestry sent out invitations to those interested in forest matters to attend a meeting to organize a Canadian Forestry Association. The idea found favor and a large and representative number of those interested met yesterday at the House of Commons and organized the association, which will be conducted along the same lines as is the American Forestry Association, which has already achieved such satisfactory results in the United States."

The Governor-General of Canada, Lord Minto, is to be invited to act as honorary president. The officers, nearly all of whom are prominent members of the American Forestry Association, are:

President, Sir Henry Joly de Lotbiniere; vice-president, Wm. Little; secretary, Elihu Stewart, chief inspector of timber and forestry for the Dominion; treasurer, C. J. Booth; a board of seven directors, and vice-presidents for each of the provinces and territories.

Approval of Minnesota Park Project.

At a meeting of the Board of Directors of the American Forestry Association, at the office of the Secretary of Agriculture, Washington, D. C., on Saturday, March 24th, official action was taken endorsing the proposed national park in Minnesota, of which project frequent mention has been made in *THE FORESTER*.

Pennsylvania's Interest in Forestry.

The active efforts of the Pennsylvania State Forest Commission for the preservation and restoration of forests on the watersheds of the State have made a most favorable impression on the general public, so that the following proclamation of Governor Stone, appointing "Arbor Days," has been received with universal interest and approbation:

In the name and by authority of the Commonwealth of Pennsylvania.—Executive Department.

Proclamation.

It is my pleasant duty to again call the attention of the citizens of this Commonwealth to the time-honored custom of systematically planting trees and shrubs and thus in a measure repairing the injury caused by a too rapid destruction of our forests. The inestimable benefits of this custom are evidenced not only by the increasing beauty of our parks and avenues, but by the interest which our people are taking in the necessity and benefits of larger wooded areas. Through the efforts of scientific wood culture, young forests are springing up in different parts of the State, and it will not be long before an appreciable change will be noticed in the flow of the waters of our State.

Especially should Arbor Day be observed in view of the fact that the State, in compliance with several Acts of Assembly creating forest reserves, is now purchasing forest lands. This has greatly increased the market value of similar wooded tracts, and a larger revenue should come to the counties from taxes levied upon them. The results in other countries show that there will soon be a considerable revenue to the State from the sale of merchantable timber taken from its reserves, but the immediate benefit is to the people, who will have the right to go upon these lands for fishing, hunting, outing and camping without feeling themselves liable as trespassers. Our cities have their parks maintained at great expense. These forest reserves will be the people's parks, free to all who comply with the laws for their preservation. In calling the attention of those observing Arbor Day to the purchase of forest lands by the State, it is with the hope that the action of the State officials in putting in force the laws creating forest reserves may meet with public approval and that the sentiment favorable thereto may be strengthened.

In order that our citizens, both young and old, may continue to contribute their share in this great movement

I, William A. Stone, Governor of the Commonwealth of Pennsylvania, in accordance with law, do hereby designate and proclaim Friday, the Sixth day of April, and Friday, the Twentieth day of April, A. D. 1900, to be observed as Arbor Days throughout the Commonwealth.

Two days are set apart for the observance of Arbor Day. Inasmuch as the climatic conditions may render one of these days more favorable for the purpose intended than the other, the selection is left with the citizens of the various sections of the Commonwealth.

Given under my hand and the Great Seal of the State at the City of Harrisburg, this Ninth day of March in the year of our Lord one thousand nine hundred, and of the Commonwealth the one hundred and twenty-fourth.

WILLIAM A. STONE.

By the Governor
W. W. GRIEST,
Secretary of the Commonwealth.

Studying American Forests.

Field Investigations.

E. M. Griffith, field-assistant of the Division of Forestry, who left Washington a month ago to make field investigations, has already examined a number of large tracts in Missouri and Arkansas. One of these is a tract in Dunklin County, in the southeastern part of Missouri consisting of about 54,000 acres in one solid body. The timber is largely Ash, Hickory, and Oak, with some Honey-locust and Persimmon; in one or two sections Cypress is found in considerable quantity. The timber is estimated to cut 12,000 feet per acre, and is very tall, clean, and free from decay. Taken all together, it is a remarkably fine body of hardwood.

As a result of this examination, the owners—the Deering Harvester Company—have made definite application for a complete working plan for the property, with the view of managing it on the lines of conservative forestry.

Mr. Griffith has made the preliminary examination of two tracts in Arkansas, but as yet the owners have not taken action upon the reports made. The timber lands examined near Malvern and Perla, Ark., consist of 15,000 acres of Pine, most of which has been cut-over once, and in some cases twice. About 20,000 acres additional, which were examined in the same localities, are mainly virgin forest, lying for the most part in the Pine flats. The timber lands at Pine Bluff, Ark., consist of 85,000 acres in Grant, Jefferson and Saline counties, the main timber being Short-leaf Pine (*Pinus echinata*), with a considerable amount of Oak, Hickory and Gum.

Mr. Griffith has now proceeded to the Black Hills Forest Reserve, where he is making a detailed working-plan. This is the beginning of the work on the Forest Reserves by the Division of Forestry. Later assistants will join in the work which will be continued throughout the entire summer.

Timber Measurements.

A single acre of Washington timber, recently measured by the Division of Forestry, contained 218,690 feet B. M. of Red Fir, 11,000 feet of Hemlock, and 6000 feet of Cedar; making a total stand of 236,690 feet. The smallest Fir on the acre was 3 feet in diameter and the largest 8 feet. The height of the forest approximated 300 feet. The Hemlock was scaled down to 20 inches in diameter and had it been scaled to 12 or 14 inches, as customary in the East, the stand would have been several thousand feet greater. This acre was measured near Wilkeson, Washington, about 30 miles from Tacoma.

The average stand per acre for 131 acres measured by the same party near Buckley, in the same county, was 74,402 feet of Red Fir, 30,105 feet of Hemlock, 5000 feet of Cedar, 2175 feet of Spruce and 593 feet of White Fir; a total stand of 112,276 feet. In these measurements no trees less than 2 feet in diameter were scaled. No allowance, however, was made in the above calculation for cull. The 131 acres were taken in various parts of a township and represents with fair accuracy the stand throughout that township. The significance of these figures is apparent when it is remembered that 10,000 feet per acre is considered a heavy stand in all lumber regions east of the Mississippi.

Forest Valuation.

In connection with the investigations of commercial trees by the Division a set of tables has been prepared for the Adirondack hardwoods, by which various financial calculations can be made accurately and easily if the approximate number of trees on a given area and average diameter are known. The most important tables show: The value of mature trees at different stumpage rates; value of immature trees of all ages at different stumpage rates; interest represented by annual growth on

the capital represented by the trees; and interest represented by annual growth in board feet on capital represented by land.

From these tables the timber owner can find the exact financial gain in waiting for his timber to grow to any given diameter, the interest his forest is earning on its cost, and similar valuable information. The tables are now complete for the so-called Adirondack hardwoods, including Yellow Birch, Sugar Maple, Beech, Basswood and Cherry.

These hardwood tables are based upon analyses of 1000 felled trees and upon actual measurement of the merchantable timber upon 1000 acres.

A Study of Hemlock.

The western Hemlock is to be the subject of a special investigation this summer by the Division of Forestry and a party of experts will spend several months in the Puget Sound region making observations and measurements of that species of Hemlock.

Although one of the largest and most widely distributed trees in the Pacific Northwest, it suffers from the prejudice against the eastern Hemlock, a closely allied, but much inferior species, and for this reason has almost no commercial value. It grows at its best on the cool damp slopes of the Washington and Oregon mountains, where it is frequently 200 feet high and 10 feet in diameter, or even larger in favorable situations. It occasionally forms a dense, pure forest, but is more often mixed with Red Fir, the most important timber tree of the Northwest, and is usually left standing by the lumbermen because there is no sale for the lumber.

The wood of the western Hemlock is less apt to be shaky, is stronger, more durable, and more easily worked than that of the eastern species. The bark is said to contain much more tannin.

By the present method of lumbering, immense quantities of Hemlock are destroyed annually, for it is left to be burned by the fires which frequently follow the removal of the Fir. It is believed that if this Hemlock can be given

its true value before the public, logging methods may be modified, and even if the market develops slowly, there will be a greater effort to prevent waste.

An important feature of this investigation will be to ascertain the rate of growth and the time required to produce a merchantable stand. The western Hemlock possesses remarkable powers of reproduction and may be counted on to reforest logged-off areas.

Tree Planting Plans.

A plan has been arranged by which the section of Tree Planting of the Division of Forestry will combine lecturing with its practical field work for the purpose of interesting the public in the subject. When an official of this section of the Division is called to any portion of the United States where planting is especially desirable, he will arrange for a series of meetings of land-owners, to whom he will explain the objects of the Division and the free assistance offered to those desirous of making a trial of planting.

The Forest Exhibit at Paris.

The exhibit of the Division of Forestry for the Paris Exposition is now complete and on the way to Paris. It will be one of the most novel of the Government exhibits and will be wholly distinct from the commercial features of lumbering to be shown in another department.

The display will be in the form of an angled corridor, the walls of which consist of large transparencies illustrating American forest conditions. These walls will be double and illuminated by interior electric lights. The pictures range in size from 3 by 5 feet to 4 by 6 feet. There will be two transparencies 6 by 10 feet, portraying groves of Red Fir and California Bigtrees, two of the most impressive American trees.

A point will be made of the relation of forestry to agriculture, and such subjects as protective forests, the use of trees in preserving water supply, the management of woodlands, etc., are fully illustrated. Many photographs and maps will be shown.

Along the Smoky Range.

The wildest and most naturally beautiful part of this country east of the Rocky Mountains is that region where North Carolina, Tennessee, Virginia, South Carolina and Georgia approach each other. It is a mountain country with an average elevation of 4000 feet, and peaks running up thousands of feet higher. The tallest mountain east of the Rockies is in North Carolina.

This wild region abounds in timber and is still a natural and unbroken wilderness except as the lumbermen invade its quiet. They have come. Already traffic in forest land is active and the railroads of the vicinity are loaded with lumber for market. Let the American people sit by with their accustomed optimistic apathy, and before long the forests will be gone, the water courses left to dry up, the bears, deer and other wild animals killed off, and nothing but a fading memory remain of what is now a great natural park.

The general government ought to step in before it is too late and take possession of the whole region. Leading citizens of North Carolina and other States adjoining have recently held a meeting and formed themselves into the Appalachian National

Park Association, to push the park project. It ought to go without much pushing. All that is needed is to set people thinking about it.

Look at what the government might do, and at what, on the contrary, will be done if the national government does not come in and protect nature there. Once done, the mischief could never be undone. The loss would not be local but national. Everybody who fails to see the North Carolina mountains suffers a direct loss, whether he knows it or not. Open the region to the whole country and let these sights be assured and available at all times, and the park would be one of the most popular resorts of the United States.

Congress ought to jump at the chance to get possession of the great tract—at least 500,000 acres said to be purchasable now at hardly more than nominal figures. The cost of a single battleship would give us this park, available for future generations as well as for ourselves. It is to be hoped the committee will set the work going early and carry it to the success that the American people will wish for it and for themselves.—Hartford *Courant*.

Recent Legislation.

The joint resolution of Congress for the acquisition of the "Mammoth Tree Grove" and "South Park Grove of Big Trees" in Calaveras County, Cal., was introduced in the Senate by Mr. Perkins of that State. The bill recited the fact that "the trees *Sequoia gigantea* of these groves constitute the largest collection and probably the finest specimens of the same in the world;" and "the destruction of these trees would be an irredeemable loss to science, and the loss of one of the marked wonders of the world." The progress of the negotiations begun under direction of Congress is appended to the article in this issue on "The Big Trees."

The leasing of the arid public lands of the United States is the subject matter of bills introduced in the Senate by Mr. Foster, of Washington, and in the House by Mr. Stephens, of Texas, by request, declaring that the grazing lands instead of being open to public use, shall be leased. In the Senate bill, one-half of the revenue derived is to be given to the general government and the other half to the State in which the lands are situated. In the House bill, one-half is to be used for surveys and irrigation works, and the other half is to be equally divided between the State, or Territory, and the county in which the land is situated.

Beyond the question of revenue, the advocates of the measure urge the advisability of preventing over-grazing, the leasing system inducing provision for future grazing. The objections raised are the tendency to create a monopoly of grazers dominating the public lands, thus preventing settlers from taking up lands as readily as at the present time.

A report was presented in the House by Mr. Moody, of Oregon, from the Committee on Public Lands recommending the passage of the bill providing for the reservation of certain public lands in the Cascade Mountain Range, in Oregon, as a public park and timber preserve. The proposed park will include Crater Lake, the crater of an extinct volcano a thousand feet deep, with sides so precipitous that approach to the lake can be made only on one side. This is regarded as one of the scenic wonders of the world.

By joint resolution of the Senate and House of Representatives an extra edition of 35,000 copies has been ordered printed of the "Primer of Forestry, Part I," by Mr. Gifford Pinchot.

The sale of timber on the public lands is the subject-matter of an important bill introduced in the U. S. House of Representatives lately by the Public Lands Committee. The bill is designed to meet the necessity created by a recent decision of the assistant attorney-general for the Department of the Interior, declaring that existing laws do not authorize the sale of timber on public lands.

The bill permits the sale of "so much of the timber growing upon the public lands as may be necessary to supply in a legitimate manner the necessities of those depending upon public timber in settling country, developing and maintaining its resources, industries and public improvements and in providing means of transportation." Penalties are provided for violations of the laws, and "the Secretary of the Interior is authorized to make all proper rules and regulations for carrying the provisions of the act into effect."

This bill by collecting the various statutes, and relieving them of their present ambiguity and uncertainty, will doubtless

prove of great benefit to the Western timber states.

The United States Senate has passed the bill introduced by Senator Hansbrough granting to the State of North Dakota 30,000 acres of land to aid in the maintenance of a school of forestry.

The House of Representatives Committee on Public Lands, on March 10th, adopted the following resolution offered by Mr. Mondell, of Wyoming:

"Resolved, That, in order to dispose of legislative suggestions which, at the present time the committee or the Congress is not prepared to act upon, and to facilitate the consideration of other important matters before the committee, all bills having for their object the general cession of the public domain to the states and territories, or the general leasing of the public grazing lands, be disposed of by laying same upon the table."

Representative Lacey introduced in the House of Representatives a bill to set apart certain lands in Arizona, under the title of the Petrified Forest National Park. The bill provides that the park shall be under the exclusive control of the Secretary of the Interior, who shall prescribe such rules and regulations, and establish such service as he may deem necessary for the care and management of the same. Such regulations shall provide specially for the preservation from injury or spoliation of the mineralized or fossilized formations or deposits, natural curiosities, and wonders within the park.

Among other bills introduced in the House recently have been the following relating to forestry and the public lands: A bill to amend Chapter 313, of the United States Statutes at Large, entitled "An Act to Prevent Forest Fires on the Public Domain," providing that any person willfully or maliciously setting on fire any timber, underbrush or grass upon the public domain, or allowing fire to burn unattended near timber or inflammable material, shall be deemed guilty of a misdemeanor. The maximum penalty attached is five thousand dollars fine and two years imprisonment. Failure to totally extinguish a fire started makes the

offender liable to a penalty of one thousand dollars fine, or one year's imprisonment, or both.

A resolution by Mr. Wilson, of Idaho, inquiring of the Secretary of the Interior as to "the number of acres now included within forest reserves belonging to land-grant railroad companies, the amount of forest-reserve scrip issued therefor, the market value of said scrip and the estimated value of the land in lieu of which said scrip was issued, together with a statement showing whether the request for the creation of said forest reserves came from the people residing within the State where said reserves are created or from the land-grant railroad companies who have thus been enabled to exchange land of little value for forest-reserve scrip worth many times the value of the land in lieu of which it is issued."

A bill, by Mr. Lacey, to authorize forest officers to make arrests, "without process in hand, for the violation of the laws or rules and regulations relating to the forest reserves or other forest lands of the United States; and any person so arrested shall be taken for trial before the nearest United States commissioner within whose jurisdiction the reservation or forest land is located." Mr. Lacey also introduced a bill to extend the timber and stone acts to Alaska.

A bill to recover to the United States the title to private holdings within forest reservations and certain national parks by exchange of lands, of area not larger and of value approximately the same. The national parks named are the Sequoia, General Grant, Yosemite, and Mount Rainier. The bill was presented in the Senate by Mr. Perkins.

A bill, by Mr. Wilson, of Idaho, prohibiting the establishment or extension of forest reserves in Idaho except by Act of Congress.

New York.

State Senator Krum has introduced a bill to provide for the appointment of a supervisor of taxes within the State forest preserve. Owing to careless assessments, the towns within the prescribed limits

have had charged back upon them thousands of dollars in taxes illegally levied. The remedy proposed is to have such assessments examined, when levied, by a competent attorney, and, in case of error, corrected immediately. The bill was drawn at the suggestion of Comptroller Morgan, who assisted in its preparation.

The special committee appointed by the State Assembly last April to investigate the subject of State forest lands, has sent in a report recommending the increase of the Adirondack Preserve by the purchase of all suitable lands within the limits of that park and also the acquisition of forest lands in other parts of the State near the headwaters of streams.

Michigan.

In order to arouse public interest and determine upon a definite forest policy for the State, the Michigan Forestry Commission has issued a circular asking the aid of public-spirited citizens in the prosecution of its work. The Commission is desirous of securing suggestions from all who are acquainted with the forest conditions and needs of Michigan, in order to formulate a plan to be submitted to the next legislature.

Indiana.

Twenty-eight land-owners in a single county in Indiana have taken advantage of the law passed at the last session of the State Legislature offering inducements toward starting and maintaining private woodlands as a forest reservation, such lands being appraised for taxation at one dollar per acre.

To secure the benefit of the exemption, the forest must contain not less than 170 trees in each acre; a description of the lands must be filed with the County Auditor for record, and examination made by him before appraisal; no horses, cattle, sheep, hogs or goats are to be pastured until the trees are four inches in diameter.

The reservations so far made are for tracts of from three to eighty acres. The benefit of the law cannot be claimed until the trees are three years old, but the ultimate advantage to the land owners has caused the law to be regarded with favor.

THE FORESTER.

A MONTHLY MAGAZINE

DEVOTED TO ARBORICULTURE AND FORESTRY, THE CARE AND USE OF FORESTS
AND FOREST TREES, AND RELATED SUBJECTS.

THE OFFICIAL ORGAN OF

The American Forestry Association,

President, Hon. JAMES WILSON,

Secretary of Agriculture.

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JOHN KEIM STAUFFER, EDITOR.

The founding of a school of forestry at Yale University by Mr. and Mrs. James W. Pinchot and the Messrs. Pinchot seems to mark the beginning of a very desirable end—which is nothing more nor less than the establishment of forest schools in connection with every educational institution of importance in the United States. Until very recently the somewhat prevalent idea that forestry was less useful than ornamental detracted from the consideration it rightly deserved. Lately, however, the insistent utterances of those who are in a position to know the actual facts have reached the general public with such success that forestry has taken a long stride forward as a matter for public consideration.

This more general appreciation of forestry is noticeable in many parts of the country. With the announcement of the Yale Forest School comes news of some latent efforts among three colleges in Pennsylvania, each of which wishes to outstrip its competitors in offering courses in forestry; of legislative provision being made for affording the use of government land in California for demonstration purposes and in North Dakota for assistance in establishing a school of forestry—as reviewed in the present and preceding issues of THE FORESTER. The great efforts being made by Dr. Fernow at the New York State College of Forestry; Commissioner Rothrock's work in establishing reserves in Pennsylvania; Chief Warden Andrews' agitation for the Minnesota National Park; and the united efforts of public-spirited citizens in the South for an Appalachian National Park along the Smoky Range in North Carolina—all augur well for a better and more general understanding of what forestry means, and what it seeks to accomplish.

Under such auspicious circumstances an immediate and considerable increase in the membership of The American Forestry Association ought to be insured. On this point THE FORESTER takes pleasure in announcing the election during the past month of two new life members—Hon. Cornelius N. Bliss, former Secretary of the Interior, and Hon. Warren Delano, Jr., of New York City; and also more than one hundred and forty annual members in the last six weeks. Among the latter are Hon. Carl Schurz, President D. C. Gilman, of Johns Hopkins University, Governor Voorhees of New Jersey, Hon. C. C. Beaman, of New York City, and many other prominent men throughout the country.

As The American Forestry Association is not a commercial "business," but an organization of, by, and *for* its members, THE FORESTER feels no hesitancy in asking the assistance of those members in increasing the efficiency and possibilities both of the association and its magazine by drawing to its support many new members. A few words from a member to a personal acquaintance will often carry more weight than all the printed circulars which the Association might send out. There is a blank form of application in every issue. By having this filled in and returned by a prospective new member every reader of THE FORESTER will not only help the cause of forestry; but will just as surely subserve his own best interests—for with increased funds will come new opportunities for making THE FORESTER better in every succeeding month than it was in any month past. THE FORESTER asks your cordial co-operation for the expansion of *your* association and its magazine.

CURRENT COMMENT.

Reforestation in Hawaii.

Reforesting cut-over land or naturally denuded areas is attracting considerable attention all over the Union, but one of the best examples of this class of work is to be seen in the Hawaiian Islands, more particularly on the hills back of Honolulu. The Island Legislature, previous to annexation, appropriated a sum of money for the purpose of trying experiments in reforestation. The latter were most successful, and to-day, when approaching Honolulu, the view embraces the hills, formerly uncovered, now clothed in groves of sturdy trees. This is or should be a strong object lesson to the localities on the Pacific Coast which are in need of forest coverings. It can be, should be and will be done if the general public will only encourage the proper amount of interest and spirit.—*Pacific Coast Wood and Iron.*

College Men and Forestry.

Gifford Pinchot, Forester of the Department of Agriculture, delivered a lecture before the students of Harvard University, in the Fogg Art Museum, Cambridge, on March 2d. The main points of the lecture were those embodied in Mr. Pinchot's lecture at Yale last spring on "Profession of Forestry," as printed in the July FORESTER. The recent advance in forest work and interest was also touched upon forcibly.

Utilizing Forest Reserves.

The effort being made to give to the University of California the care and control of the Lake Tahoe Forest Reserve in that State, is thus commented upon by the New York *Tribune*:

"This will form the nucleus of the new College of Forestry at Berkeley. In the bill which is now before Congress the university is permitted to dispose of timber and water rights and lease pasturage lands, and from these sources sufficient revenue for maintaining a College of Forestry ought to be derived. There is much work

for well-trained forestry experts in California, and the planting of timber in stated sections of the Sierras would have marked effect on the rainfall and the amount of water for irrigation."

Restraining Sheep Grazing.

Secretary Hitchcock, of the interior department, recently issued an order cancelling 68 permits that were granted sheepmen to graze their flocks in the Mount Rainier forest reserve, and hereafter all sheep will be excluded from that reservation. This is as it should be. If forests are to be preserved, the sheep industry must pass from the hands of a few, who depend on public lands for grazing, to the many small dealers, who depend on their own lands and resources. It is not the sheep industry that is threatened, but merely a change in its management, from a few wealthy men to the middle classes.—*Oregon Native Son.*

For State Instruction.

The Wisconsin State Forestry Association, an organization whose object is to conserve the timber interests of the State, has asked the State University to establish a division of forestry, under the charge of a special professor, where may be trained men competent to care for timber with a degree of knowledge equal to that required for the cultivation of any other crop. The association sets forth the fact that forests are being depleted far more rapidly than they can be replenished by nature, which is a lamentable fact.—*Living Church*, Chicago.

Unanimous Public Opinion.

Referring to the vandalism which would fell the magnificent giants of the Yosemite, the Omaha *World-Herald* says:

"This is exactly what it is—a sacrilege. In no city in the world can be found such architecture as may be seen in the Sequoia groves, and the destruction of a single tree is equivalent to the demolition of the finest temple."

That hits the nail on the head. We have so few things in this country which call for reverence on account of their age that it seems a pity to lessen the number. Those trees came out of the ground when Noah's ark rested on Ararat, or about that time, and they are likely to last, if let alone, until Gabriel sounds his trumpet. The man who would cut one of them down and convert it into cash has no more appreciation of the proprieties than a rhinoceros has of music.—*New York Herald*.

Save the Forests.

The bill introduced into Congress to remove the duty on pulp wood and paper should become a law as soon as it possibly may. Aside from the fact that there is little foreign competition in the manufacture of wood pulp paper, it should be recognized as a necessity for the preservation of our already sadly decreasing forests that the duty be removed. American paper is exported in large quantities to foreign countries and the result of the tariff on the wood pulp of which it is manufactured simply operates to raise the price of paper, while at the same time it is producing the certain destruction of our forests, enormous inroads being made into them each year, in order that the pulp wood may be supplied to the paper factories. It is well known that the safety of our water-supply depends upon the preservation of the forests, and could the vast resources of the unexplored Canadian woods be thrown open to our paper manufacturers by the abolition of the tariff on wood pulp, the American forests would be saved from a seriously threatened destruction, while the price of all paper manufactured from the pulp would be correspondingly reduced.—*Times-Union*, Albany, N. Y.

From Different Standpoints.

The æsthetic members of the forestry associations are jubilant. A man in Greenwich, Conn., recently tore down a twenty-five-thousand-dollar-house in order to save some Maple and Elm trees that

would have been sacrificed had the structure been moved away bodily; and the *Boston Transcript* rises to remark that "if all citizens were like him the forestry problem could be quickly settled."—*Lumberman's Review*.

Ingenuity in Woodwork.

The most artistic and attractive of all the beautiful specimens of the California exhibit at Paris will be a table top, inlaid with a mosaic of fifty-seven woods, the cabinet work alone having cost \$1500. It is a veritable painting, this table top, and the designs are akin to those of the wonderful Persian rugs of the past. No expense or degree of ingenuity has been spared to make the woods of California impress the Paris visitors with the magnitude of this State's forest capabilities.—*Wood and Iron*.

Forest Destruction.

The reckless destruction of our forests is a national scandal and it is full time that measures be taken, not only to preserve what is left, but also to replace much that has been destroyed. The experience of other countries, particularly Germany, has proved that a forest is not like a mine, but rather like a farm. Yet Americans have hitherto treated their forests almost entirely upon the mining basis, assuming that all that could be done was to cut down the trees and then use the land for something else than growing trees.—*Denver Field and Farm*.

Experience as a Teacher.

All in all, it appears that forest culture has taken hold of the people in places where it will do the most good, and that even the lumbermen are taking a great interest in it. There is, therefore, good reason for the hope that forest denudation on a large scale has come to an end here, and that fields which have been swept as by the besom of destruction will by and by be made once more to "blossom as the rose," so to speak.—*Brooklyn (N. Y.) Citizen*.

Checking Forest Denudation.

The increased demand for structural steel in building operations is noted by the New York *World* as being, aside from its industrial significance, a hopeful sign for forest protection.

"It means also, and not less importantly, the salvation of our forests. For not only is wood now largely excluded from the structural parts of buildings, but even as trimming it is rapidly falling into disfavor. Window-frames, window-sashes and even doors and door-casings of steel are now so perfectly made and so cheaply that they are rapidly replacing wood, as wire and tile have replaced lath, and marble and

mosaics have taken their ancient place as flooring. With a little further development in this direction we shall be able to check the denudation of forests and protect our rivers from flood on the one hand and drought on the other, and these are the noblest uses of forests."

A Lumber Advocate.

The administration is beginning to take steps for the preservation of some of the big tree groves of California. It is time such a step was taken if we wish our grandchildren to see anything more than the decaying stumps of one of the world's seven wonders.—*Miss. Vall. Lumberman*

Recent Publications.

Beginnings of Professional Forestry in the Adirondacks: First and Second Annual Reports of the Director of the New York State College of Forestry. Pp. 56.

For the purpose of "placing within reach of a larger number" of people the forest work under his direction, Dr. Fernow has incorporated into a neat pamphlet his first and second annual reports to the New York Legislature, and has prefaced them with an introductory chapter containing much information of interest regarding the aims and objects of his work.

Dr. Fernow says: "By way of accentuating some of the contents of these reports, it appears desirable to preface the same by a discussion of three essential points, which have been merely alluded to in the body of the reports, namely: 1. *That applied forestry is a business for the purpose of producing values for the future rather than the present:* 2. *That forestry, therefore, and for other reasons, is peculiarly a business for the State, and does not usually recommend itself to private enterprise, except under special conditions:* 3. *That forestry is based upon the recognition and application of natural and economic principles and laws, which are applicable in all parts of the world alike, with such modifications as the different economic conditions necessitate."*

Regarding forestry as a business, Dr. Fernow says: "Forestry is not only an art, but a business. The art consists in growing the crop, the business consists in growing the crop most economically and in finding a market for it, where it can be sold with profit: As in all other producing business, the market question is, therefore, the first and foremost one to be settled.

For, if the crop cannot be marketed, it is useless to grow it, and we may leave it to nature to provide the forest cover—and finally it must bring a profit, be it large or small, direct or indirect but a profit, or else the object of forestry is not attained."

On the question of the relation between forestry and lumbering, Dr. Fernow says: "The forester must finally be a lumberman. The difference between the lumberman and the forester is like that between the berry picker in the wild woods and the market gardener who grows his berries with skill. The essential difference between the logger's practice and the forester's practice in utilizing the crop which nature in the virgin woods has grown without regard to man's particular needs, is that the former culls the virgin woods of the valuable portion, without regard to the replacement of the old by the young crop, while the latter's business is to perform his logging so as to secure not only a new crop, but a better crop of the usual species and thus leave his property in better condition for the future."

The portion of the pamphlet devoted to the second annual report comments upon the successful carrying on of the school during the past year, the practical instruction in the forest, the need of more suitable accommodations, the acquisition of the college forest at Axtan, the general policy to be pursued, business considerations involved, organization of administrative forces, the work performed (under seven heads), and expenditures and income. The courses of instruction offered are given in detail at the end of the pamphlet, making a very complete and instructive review of the work being done in New York State.

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ORGANIZED APRIL, 1882.

INCORPORATED, JANUARY, 1897.

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The object of **The American Forestry Association** is to promote:

1. A wiser and more conservative treatment of the forest resources of this continent.
2. The advancement of educational, legislative and other measures to that end.
3. The diffusion of knowledge regarding the conservation, management and renewal of forests, the methods of reforestation of waste lands, the proper utilization of forest products, the planting of trees for ornament, and cognate subjects of arboriculture.

Owners of timber and woodlands are particularly invited to join the Association, as are all persons who are in sympathy with the objects herein set forth. Fill in the blank application on the preceding page, and address only

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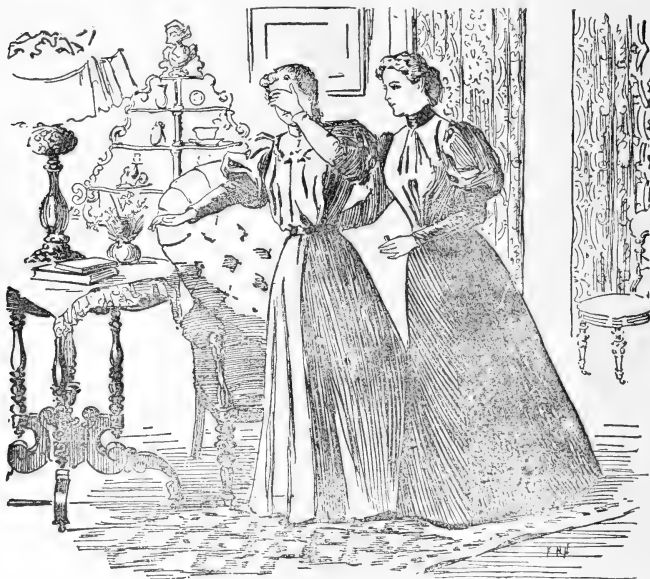
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The Forester

A MONTHLY MAGAZINE

devoted to the care and use of
forests and forest trees and
to related subjects



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The Forester

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No. 6

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The Forester

All the back files of THE FORESTER have now been disposed of with the exception of those enumerated below. Reading matter is perfect in all (some have damaged covers) no hindrance in binding. As all the back numbers of THE FORESTER which belonged to Dr. John Gifford, who founded THE FORESTER and edited it until 1898, have been secured, no other files are now to be had. These will be sold at practically half price. Immediate application will be necessary. An unusual library opportunity.

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²FOR LUMBERMEN.

³IRRIGATION.

¹What Forestry Means to the United States; by the Secretary of Agriculture—²The Practical in Forestry—³Effect of Forests on Water Supply (continued, 2 numbers)—¹In the Southern Alleghenies—³Influence of Forests upon Storage Reservoirs—²Natural Reproduction of Forests—²Second Growth Pine vs. Agriculture—³Sheep Grazing in Arizona (continued, 2 numbers)—¹In the Woods of Minnesota—¹Massachusetts Forestry Association—²Reclamation of Drifting Sand Dunes—²Minnesota's Park for the People—¹Forest Conditions of Puerto Rico (continued, 2 numbers)—²The Prevention of Forest Fires—¹The United States Forest Reserve System—¹The Forest Problem in the West—¹Minnesota's Proposed Park (with map)—¹The State Forestry—³Water Conservation in Soils—³Nature's Storage Reservoirs—¹A Forest Experimental Station—²Natural Reforestation in the Southwest—¹Redwood Forest of California—¹Restoration of Mountain Conifers—¹The Profession of Forestry—¹The Famed Forest of Vallombrosa—¹Fishermen for the Forests—¹Recreation of Forest Preservation to the Public Welfare—¹What Shall We do for the Forest (symposium)—²Propagation of Forest Trees—²The Lumberman's View of the Forest—¹Mount Rainier National Park—¹The Training of Professional Foresters in America (symposium)—¹Tree Planting in Kansas—¹False Mahogany of South America—³Water Supply and Forestry—²Mining and Forestry—²Government Forests and their Preservation—²Indiana Forest Tax Legislation—²Lumbermen and Forestry—²The Douglas Spruce (Red Fir) of North Oregon—³Irrigation and Forestry—³Grazing—²New Growth on Burned Areas—³Forests in their Relation to Irrigation.

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From the Yearbook of the
U. S. Dept. of Agriculture for 1899.

By Courtesy of the
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THE EFFECTS OF FIRE AFTER LUMBERING IN NORTHERN MINNESOTA.



From the Yearbook of the
U. S. Dept. of Agriculture for 1899.

By Courtesy of the
Division of Forestry.

FOREST LAND IN MINNESOTA DEVASTATED BY FIRE.

THE FORESTER.

VOL. VI.

JUNE, 1900.

No. 6.

THE PAPER INDUSTRY AND FORESTS.

The paper industry is based upon the vegetable kingdom, the materials used in paper-making being almost exclusively of vegetable origin. That portion of the vegetable growth which is essential for paper-making is the cellulose ($C_6H_{10}O_5$) which forms an important part of the structure of all plants.

All vegetable matter which is treated chemically to prepare it for paper-making, is reduced to the form of almost pure cellulose. When prepared mechanically a large part of the lignin and other intercellular matter also remains. It is the cellulose of which the fiber consists. The proportion of cellulose fiber in different vegetable growths varies greatly, and with it their availability for paper-making. It may be said that almost the whole vegetable kingdom is available for paper-making, and that the use of one species or another is a matter of selection, based on the cost of the various processes of treatment and other commercial factors.

Those fibers which are commonly used in paper-making, may be divided into four classes:*

1. Seedhairs—such as cotton, which is the only representative of the class.
2. Bast fibers—as linen, jute, manila and arsonia.
3. Those derived from whole stems, or leaves, and associated with various vessels or cells not properly fibrous—as straw, esparto, sorghum and bamboo.
4. Those derived from wood.

For the purposes of this article, it is un-

*This classification is taken from A. D. Little's "Chemistry of Paper Making," from which much of the information of a chemical nature has also been derived.

necessary to treat of the first three classes, except to say that a very considerable part of the paper manufactured, is made from the fibers which they comprise.

The principal woods which are used for making paper are Spruce and Poplar; but a large number of other woods are used more or less, according as the factors of price, length of fiber, ease of reduction, and relation of the mill to the source of supply vary in particular cases.

TREES USED FOR PULP.

Professor Sargent, in his report on Forest Trees, in the Tenth United States Census, gives a list of the most available species with the localities in which they occur, the substance of which I reproduce in this article, using the scientific names given by him. This list is by no means exhaustive, but simply typical of the different sorts of wood that may be utilized. For instance, there are thirty-five species of *Pinus* in the original report.

BLACK SPRUCE (*Picea nigra*). Newfoundland, northern Labrador to Ungava Bay, Nastapokee Sound, Cape Churchill, Hudson Bay, and northwest to the mouth of the Mackenzie River and the eastern slope of the Rocky Mountains; south through the Northern States to Pennsylvania, central Michigan, Wisconsin and Minnesota, and along the Alleghany Mountains to the high peaks of North Carolina.

Easily reduced to a strong, long-fibered pulp by the sulphite process; with somewhat more difficulty by the soda process. Pulp made by the latter process is bleached with difficulty.

GRAY PINE (*Pinus Banksiana*). Bay of Chaleur, New Brunswick to the southern slopes of Hudson Bay, northwest to the Great Bear Lake, the valley of the Mackenzie River, and the eastern slope of the Rocky Mountains between the fifty-second and sixty-fifth degrees of north latitude; south to northern Maine, Ferrisburg, Vermont (R. E. Robinson) and the southern shore of Lake Michigan, and central Minnesota.

Reduced to pulp with somewhat more difficulty than Spruce; the fibers are long as in Spruce.

WHITE PINE, Weymouth Pine (*Pinus Strobus*). Newfoundland, northern shores of the Gulf of St. Lawrence to Lake Nipigon and the valley of the Winnipeg River, south through the Northern States to Pennsylvania, the southern shores of Lake Michigan, "Starving Rock" near La Salle, Illinois, near Davenport, Iowa (Parry) and along the Allegheny Mountains to northern Georgia.

Requires more severe treatment than Spruce, but yields a very long, strong fiber.

WHITE FIR (*Abies grandis*). Vancouver Island, south to Mendocino County, California, near the coast, interior valleys of western Washington and Oregon, south to the Umpqua River, Cascade Mountains below 4,000 feet elevation, through the Blue Mountains of Oregon (Curick) to the eastern slope of the Cœur d'Alene Mountains (Cooper), the Bitter Root Mountains, Idaho (Watson) and the western slope of the Rocky Mountains of northern Montana (Flathead region, Canby and Sargent).

Requires somewhat more severe treatment than Spruce, but yields a very long, strong fiber.

BALSAM (*Abies Fraseri*). High mountains of North Carolina and Tennessee.

Occasionally reduced by the sulphite process; unbleached fiber carries considerable pitchy material, which is likely to cause trouble in the mill, and which interferes with bleaching. General character of fiber similar to that of Spruce.

HEMLOCK (*Tsuga Canadensis*). Nova Scotia, southern New Brunswick, valley of the St. Lawrence River to the shores of Lake Temiscaming, and southwest to

the western borders of northern Wisconsin; south through the Northern States to New Castle County, Delaware, southeastern Michigan, central Wisconsin, and along the Allegheny Mountains to Clear Creek Falls, Winston Co., Alabama (Mohr).

General character of pulp similar to that of Spruce, but wood is reduced with more difficulty, and is likely to cause chips if mixed with Spruce.

LARCH, Tamarack, Hackmatack (*Larix Americana*). Northern Newfoundland and Labrador to the eastern shores of Hudson Bay; Cape Churchill, and northwest to the northern shores of the Great Bear Lake and the valley of the Mackenzie River within the Arctic Circle; south through the Northern States to northern Pennsylvania, northern Indiana and Illinois, and central Minnesota.

Reduced by sulphite process with some difficulty, fiber somewhat sticky from pitchy material, and requires a large amount of bleach. The wood, if mixed with Spruce, is likely to cause chips. Length of fiber comparable to that of Spruce.

POPLAR (*Populus grandidentata*). Nova Scotia, New Brunswick and west through Ontario to northern Minnesota; south through the Northern States and along the Allegheny Mountains to North Carolina, extending west to middle Kentucky and Tennessee.

The wood most commonly used by mills working the soda process; never used by sulphite mills, though easily reduced by that process. Pulp from both processes very easily bleached. Fiber short and soft, associated in the pulp with much wider pitted cells.

ASPEN (*Populus tremuloides*). Northern Newfoundland and Labrador to the southern shores of Hudson Bay, northwest to the Great Bear Lake, the mouth of the Mackenzie River, and the valley of the Yukon River, Alaska; south in the Atlantic region to the mountains of Pennsylvania, the valley of the lower Wabash River, and northern Kentucky; in the Pacific region south to the valley of the Sacramento River, California, and along the

Rocky Mountains and interior ranges to southern New Mexico, Arizona and central Nevada.

Much resembles Poplar in the character of its pulp and the ease with which its wood yields to treatment.

COTTONWOOD (*Populus monilifera*). Shores of Lake Champlain, Vermont, south through western New England to Chattahoochee region of western Florida, west along the northern shores of Lake Ontario to the eastern base of the ranges of the Rocky Mountains of Montana, Colorado and New Mexico.

Much resembles Poplar in the character of its pulp and the ease with which the wood yields to treatment.

SWEET GUM (*Liquidambar styraciflua*). Fairfield County, Connecticut, to the valleys of the lower Ohio, White and Wabash Rivers, south to Cape Canaveral and Tampa Bay, Florida, southwest through southern Missouri, Arkansas and the Indian Territory to the valley of the Trinity River, Texas; in central and southern Mexico.

Yields easily to chemical processes a short fiber, much resembling that of Poplar.

CYPRESS (*Taxodium distichum*). Sussex County, Delaware, south near the coast to Mosquito Inlet and Cape Romano, Florida, west through the Gulf States near the coast to the valley of the Mueces River, Texas, and through Arkansas to western Tennessee, western and northern Kentucky, southeastern Missouri, and southern Illinois and Indiana.

Easily reduced to pulp by sulphite process. Unbleached fiber is rather dark in color, and woolly; bleaches readily, and then much resembles that of Spruce.

BEECH (*Fagus ferruginea*). Nova Scotia and the valley of the Restagouche River to the northern shores of Lake Huron and northern Wisconsin, south to the Chattahoochee region of western Florida and the valley of the Trinity River, Texas, west to eastern Illinois, southeastern Missouri, and Madison County, Arkansas (Letterman).

Rather more difficult to reduce than Poplar; fibers somewhat shorter; pulp soft, and easily bleached.

SILVER MAPLE (*Acer dasycarpum*). Valley of Saint John River, New Brunswick, to Ontario, south of latitude 45 degrees, south to western Florida; west to eastern Dakota, eastern Nebraska, the valley of the Blue River, Kansas, and the Indian Territory.

More difficult to reduce than Poplar; fibers somewhat shorter; pulp soft and easily bleached; rarely used, and only by soda mills.

BASSWOOD (*Tilia Americana*). Northern New Brunswick, westward in British America to about 102d meridian; southward to Virginia, and along the Alleghany Mountains to Georgia and southern Alabama; extending west in the United States to eastern Dakota, eastern Nebraska, eastern Kansas, the Indian Territory, and southwest to the valley of the San Antonio River, Texas.

Very easily reduced, and yields by soda process pulp similar to that of Poplar.

WHITE BIRCH (*Betula alba*). New Brunswick and the valley of the lower Saint Lawrence River to the southern shores of Lake Ontario; south, generally near the coast, to New Castle County, Delaware.

Easily reduced. The pulp much resembles that of Poplar.

PAPER BIRCH (*Betula papyrifera*). Northern Newfoundland and Labrador to the southern shores of Hudson Bay, and northwest to the Great Bear Lake, and the valley of the Yukon River, Alaska, south in the Atlantic region to Wading River, Long Island, the mountains of northern Pennsylvania, Clear Lake, Montcalm County, Michigan, northeastern Illinois, and Saint Cloud, Minnesota; in the Pacific region south to the Black Hills of Dakota (R. Douglas), the Mullen Trail of the Bitter Root Mountains and Flathead Lake, Montana, the neighborhood of Fort Colville, Washington (Watson), and the valley of the lower Fraser River, British Columbia (Engleman and Sargent).

Somewhat more difficult to reduce than Poplar. Pulp easily bleached and similar to that of Poplar.

BUCKEYE (*Aesculus glabra*). Western

slopes of the Alleghany Mountains, Pennsylvania, to northern Alabama, westward through southern Michigan (rare) to southern Iowa, eastern Kansas to about longitude 97 degrees west, and the Indian Territory.

Said to be occasionally used in pulp making.

BLACK WILLOW (*Salix nigra*). Southern New Brunswick and the northern shores of Lakes Huron and Superior, southward through the Atlantic region to Bay Biscayne and the Caloosa River, Florida, and the valley of the Guadalupe River, Texas; Pacific region, valleys of the Sacramento River, California, and the Colorado River, Arizona.

Said to be occasionally used in pulp-making.

LOCUST (*Robinia pseudacacia*). Alleghany Mountains, Pennsylvania (Locust Ridge, Monroe County, Porter) to northern Georgia; widely and generally naturalized throughout the United States east of the Rocky Mountains, and possibly indigenous in northeastern (Crowley's Ridge) and western Arkansas and the prairies of eastern Indian Territory.

Said to be occasionally used in pulp-making.

CHESTNUT (*Castalia vulgaris*). Southern Maine to the valley of the Winooski River, Vermont, southern Ontario and southern Michigan, south through the northern states to Delaware and southern Indiana, and along the Alleghany Mountains to northern Alabama, extending west to middle Kentucky and Tennessee.

Said to be occasionally used in pulp-making.

PROCESSES OF REDUCTION TO PULP.

The principal processes by which wood is reduced to pulp, are the mechanical, the soda, and the sulphite.

The mechanical process consists essentially in grinding the wood after the bark has been removed. Thus all the sound wood in the tree is used, provided it is comparatively free from knots and not too small to be handled economically. The bark, branches and tops of the trees are therefore not available. In this process

the whole structure of the wood is reduced to pulp and employed in making paper. Roughly speaking, a cord of Spruce wood will produce nearly a ton of pulp.

The soda process is based on the solvent and saponifying action of alkali at high temperature. Poplar is used more than any other wood in the soda process, but considerable quantities of Pine, Spruce and Hemlock are consumed in making long fiber stock, while such woods as Maple, Cottonwood, White Birch and Basswood are not infrequently made to replace Poplar. The portions of the tree useful in this process are practically the same as in the mechanical. Portions of the tree of somewhat smaller diameter, however, are available, and knots are not as objectionable. The yield of fiber is about 50%, thus approximately two cords of wood are required to produce one ton of pulp.

The sulphite process consists in treating the vegetable substance which contains fibers, with a solution of sulphurous acid in water, heated in a closed vessel under pressure sufficient to retain the acid gas until the intercellular matter is dissolved. The woods which may be used are Spruce, Hemlock, Balsam and other similar varieties. Any coniferous wood which is not too resinous may be used. The same portions of the tree which are used in the mechanical process are used in this. The percentage of yield is somewhat more than 50 per cent., but roughly speaking, two cords of wood are required for one ton of pulp.

THE PULP INDUSTRY.

Ground wood, or mechanical pulp, was first made in this country in 1867, Stockbridge, Mass. There were in 1897 197 mills in operation in 24 States, having an estimated capacity of 3,810 tons, distributed as follows: (See table on following page.)

It is probable that the capacity of the mills is overestimated at least 10 per cent. and an allowance must also be made for the curtailment of production during the low water season. This reduction is est

mated at 20 per cent. Making these corrections, the average daily production would be approximately 2,800 tons, which may be estimated as equivalent to 2,800 cords.

STATE.	MILLS.	TONS.
Alabama	1	2
California	1	10
Colorado	1	16
Georgia	2	5
Illinois	1	10
Indiana	7	78
Maine	16	762
Maryland	1	12
Massachusetts	4	51
Michigan	7	165
Minnesota	2	35
New Hampshire	13	225
New York	81	1,357
North Carolina	1	2
Ohio	3	43
Oregon	4	88
Pennsylvania	4	43
South Carolina	1	5
Tennessee	1	2
Vermont	15	359
Virginia	1	6
Washington	1	10
West Virginia	3	45
Wisconsin	26	479

The soda process was first introduced into this country in 1860, the first mill being near Philadelphia. The number of mills in 1899 had increased to 21 in operation in 9 states, having an estimated daily capacity of 524 tons, distributed as follows:

STATE.	MILLS.	TONS.
Delaware	1	35
Indiana	2	65
Maine	4	120
Massachusetts	1	6
New York	2	66
Ohio	1	10
Pennsylvania	7	172
Virginia	2	35
Washington	1	15

Estimating two cords of wood to a ton of pulp, this would indicate a daily consumption of about 1,048 cords. This estimate is probably nearly correct. This wood is largely Poplar.

The sulphite process was invented in America in 1867, but the pulp was first made by it in the United States at Providence, R. I., in 1884. The number of

mills in 1899 was 68, in operation in 16 states, having an estimated daily capacity of 1849 tons, distributed as follows:

STATE.	MILLS.	TONS.
Colorado	1	8
Florida	1	4
Iowa	1	5
Maine	10	337
Maryland	3	80
Massachusetts	3	47
Michigan	4	110
New Hampshire	4	290
New York	17	463
Oregon	2	26
Ohio	2	53
Pennsylvania	6	165
South Carolina	1	6
Vermont	1	30
West Virginia	1	25
Wisconsin	11	200

From data at hand giving the actual production of sulphite during the first half of '98, this estimate of capacity appears to be much too high, and should probably be cut down to 1,400 tons.

Estimating two cords to a ton of pulp, this would indicate a daily consumption of about 2,800 cords.

Assembling these estimates, we are enabled to form some idea of the amount of wood required for pulp-making, and assuming that the soda process requires Poplar wood mainly, we have an annual consumption of other kinds of wood used in the mechanical and sulphite processes amounting to about 1,680,000 cords (counting 300 working days to the year), or, allowing two cords to the thousand feet, approximately 800,000,000 feet, in addition to 310,000 cords, or 155,400,000 feet, mostly Poplar.

From this figure, representing the consumption of wood, to determine the annual cut in the United States, there must be deducted that which is brought from Canada, the quantity of which we do not know. A very rough estimate indicates that it is from 10 to 15 per cent. of the total quantity consumed in pulp making. This would bring the cut in the United States down to from 860,000,000 to 810,000,000. While this may seem to the uninformed a large quantity, yet compared with the quantity used for other purposes, it be-

comes almost insignificant. Mr. Henry Gannett, Geographer of the United States Geological Survey, in his 19th Annual Report, Part 5, estimates the amount of lumber sawed in this country annually at 23,500,000,000 feet, board measure. In comparison with this the amount cut for pulp making is but 3.6 per cent. But a great deal of wood is cut for other manu-

facturing purposes, so that the total is estimated at 45,000,000,000 feet, which would bring the percentage for wood put down to 1.9. If 180,000,000,000 feet used for fuel is added to this, we have a total consumption of 225,000,000,000 board feet, of which the amount used for pulp wood is but .4 of one per cent.

C. W. LYMAN.

TREE PLANTING IN OKLAHOMA.

PRESENT METHODS AND SUGGESTIONS FOR IMPROVEMENTS.

In Oklahoma the work of tree planting is being prosecuted as a rule with good judgment both as to the selection of varieties, and as to the methods of planting, but in the selection of locations for the plantations and in the methods of encouraging the growth of the best trees in belts of natural timber many mistakes are being made. It is the object of this paper to point out these mistakes, and to indicate certain methods of improvement.

The soils of Oklahoma vary greatly in their adaptability to tree growth, and at present planting is being carried on both on the desirable soils and on those which are undesirable. The uplands which predominate in area, though very fertile and well adapted to agricultural crops, are underlaid by a tenacious, resistant, clay subsoil, and are not usually good for growing trees. But in the case of valleys and ravines of small streams, which vary in width from a few rods to a mile or even more, and which cut into the upland in almost every locality, and in all parts of Oklahoma, the case is different.

The streams are almost always fringed with belts of natural timber of a dozen or more species, while along the ravines are found scattering trees of such hardy species as the White Elm, Green Ash, Hackberry and the Cottonwood. These trees usually occupy spots of ground which are fertile but inaccessible to the plow by reason of moisture or roughness. Their natural growth proves the adaptability of the valleys and ravines to arboriculture,

and suggests the idea of planting extensively in such places. Experience has corroborated this, the soil and moisture conditions are almost always more favorable than on the upland, and everywhere in the West trees have grown faster and attained larger size on the lowland.

Although Oklahoma has been settled but a few years it is already in the midst of active tree-planting operations, which extend to forest as well as to fruit-trees. Though the plantations are small for the most part, something is being done on almost every farm, and the aggregate is very large. In addition to this much young timber has appeared along the streams and ravines, especially where stock has been excluded, and has made rapid growth. But the better kinds of trees have to struggle with worthless shrubs and vines that obtain a hold in such places, and growth is slower than it would be were the conditions improved.

By proper management according to the following rules, many thousand acres of such land, at present almost worthless, might be made to produce valuable timber at little expense.

1. Stock should be excluded and the land protected from fire. The young timber which has already appeared or will appear should be assisted by cutting out the worthless shrubs and vines so far as they retard the trees, and by thinning the seedlings where they come up too thickly.

2. Where nature does not fill up the spaces between the trees already grown

they should be filled by planting. It will not be possible to prepare the ground by plowing, so the planting must be done without preparation. In many cases it will be most convenient to sow seeds broadcast and rake them in, or plant them in hills. In other cases it will be best to plant the young trees. It will sometimes be possible to take up small seedlings from places where they are not needed and set them where they are needed.

3. All the plantations that are to be established should so far as possible be located on the lowland and continuous with the natural timber already present. Along all the creeks there are small valleys and jutting points that should be planted. Cultivation should be given until the tops of the young trees shade the ground so densely that weeds and grass cannot grow. The thicker the trees are planted the sooner cultivation may cease. In this planting White Elm, Green Ash,

Mulberry, Catalpa, Black Locust, Russian Mulberry, Hackberry, Black Walnut and Black Cherry may usually be relied upon to be successful.

4. Orchards should be planted upon the lower slopes and in the valleys in the protection of the planting above mentioned, rather than upon the higher ground where it is frequently impossible to grow a wind-break of sufficient height to give the orchard the protection it needs.

The planting here suggested will not always place the trees where they are most desired but it will place them where they will succeed and where they will give the maximum return for the labor and money expended upon them. Upland planting is not to be wholly discouraged, but should be carried on in a limited way with a few of the most reliable species such as Black Locust, Russian Mulberry, White Elm and Soapberry.

WM. L. HALL.

TWO ARTICLES IN THE NEW YEARBOOK.

The Yearbook of the U. S. Department of Agriculture for 1899, which has just appeared, contains two articles on forestry. One, a history of the "Progress of Forestry in the United States," is by Mr. Gifford Pinchot, the Forester of the Department. The other is by Mr. Henry S. Graves, the Superintendent of Working Plans of the Division of Forestry, and is entitled "The Practice of Forestry by Private Owners."

The purpose of Mr. Graves in this latter article is to describe the extent to which the practice of forestry has come into use among private individuals in this country. He has gone over a great deal of ground that has hitherto been practically unexplored, and the value of what he says will be appreciated by all who have noted the frequency with which it is still declared, or assumed, that in America conservative management of woodlands is possible only in cases where considerations of profit are

not the most important. The author points out that although it has been easy to see that many large reserves and many laws for the protection of timber have resulted from the agitation which has been going on in newspapers, magazines and scientific associations during the last twenty-five years, "the work of the many small owners and the few large owners who have managed their lands conservatively has been overlooked." Much that these private owners have done has lacked system and been "imperfect in methods and results," but it "shows the intention of true forestry and marks a great advance in the treatment of our forests." That it should not be overlooked any longer is of the first importance; and Mr. Graves' article will be most encouraging to the hope that a general and practical interest in forestry may soon be established among small as well as among large land owners.

Mr. Graves' knowledge of the forest work carried on by private owners is based on the answers to a circular letter of inquiry regarding the prevailing methods of handling woodlands that was sent out by the Division. Answers were received from about 2,000 persons, from forty-six states and territories, "nearly 1,000 of whom stated that they had done some work which might be classed as forestry." As but little of this was guided by a scientific knowledge of methods and results, or called "forestry," Mr. Graves early takes pains to justify his use of the word, and to

comprising cases (1) of careful thinning; (2) of careful cutting of sprout-land; (3) of conservative lumbering; (4) of protection against forest fires; (5) of forest planting. In the matter of careful thinning it is of the first importance where woodlands already exist that the owners of small holdings should be able to take good care of them. It appears that many small farmers have studied this problem and manage their woodlots with great intelligence. As might be expected a large number of instances are from the older Eastern States, and especially the more



From the Yearbook of the
U. S. Dept. of Agriculture for 1899.

By Courtesy of the
Division of Forestry.

WHITE PINE GROVE IN WHICH THINNING AND PRUNING HAVE TAKEN PLACE, PLYMOUTH, MASS.

make clear his idea of its meaning, by saying that "wherever land is managed with the intention that it shall yield repeated crops of timber, and is so treated that the producing power is maintained at a high point, there true forestry is practised." He then goes on to give a general account of the attempts at forestry described in the answers to the letter of inquiry, with occasional references to instructive examples.

The material falls into five groups; that

northerly ones. A Massachusetts farmer for example is quoted as writing: "Ten years ago I began to cut all trees except White Pine. I trim the trees as high as a man can reach easily, namely, 6 to 8 feet, leaving all limbs on the ground. I leave the outside trees, which are exposed to the sun, as a protection to the trimmed trees. I thinned and pruned the trees when about twenty years old, leaving about 200 per acre." But yet "this careful work is by no means confined to the Northeast."

"Letters were received from nearly every state to the effect that a very large number of farmers endeavor to use conservative methods in cutting their wood lots." Among others a farmer in California is quoted: "In the winter season, when time will admit from farm work, I cut out all the poorest growth, leaving only thrifty trees, about 200 to the acre. I draw all brush to some clear ground and burn it. I burn all chips and trash and obtain a large amount of ashes, which I throw around my apple trees."

The article next states that on sprouting from hardwood stumps small owners have based a great deal of work with reference to a later forest crop. "It is common to hear this practice vigorously condemned, but as a matter of fact it is one of the established systems of forestry used in Europe as well as in this country. For the production of fire wood it has many advantages; and, if the cutting is done carefully, the growth will frequently amount to one cord per acre per annum. Thus, New England farmers calculate that about twenty-five years are required for cleared sprout land to produce twenty-five cords of wood per acre. This system has been in practice since the early settlement of the country, and in many cases old Oak stumps may be seen from which repeated crops of sprouts have been cut and which have become, under the treatment, gnarled, misshapen, and covered with irregular knobs." * * * "A number of correspondents stated that they are accustomed to cut the stumps close to the ground, so that independent roots will be formed and the wind will not break off the sprouts, as would often be the case with high stumps."

Mr. Graves next takes up the owners of large tracts of timber land, and begins by saying that "The most extensive work in forestry by lumbermen has been done in the Spruce forests of New York and the New England States." "A large number of owners," following the example of E. S. Coe, of Bangor, Maine, have "limited the cutting of Spruce to a certain size, but, so far as the writer is informed, the cuttings have not been regulated in a

systematic way, except on the tracts belonging to Dr. W. S. Webb and Hon. W. C. Whitney, in the Adirondacks, where the land has been lumbered under a system devised by the Division of Forestry." Several specific examples of conservative lumbering are cited and described. One interesting method is that used near Lake Winnepesaukee, "where the lumbermen, in a number of cases, have left White Pine trees for seeding purposes. The trees are usually spreading, scrubby specimens which are of no great value, but which, nevertheless, would bring a small price for box boards. The lumbermen calculate that about two to five good seed trees of Pine per acre, evenly distributed, usually secure an excellent natural reproduction. It is the custom, therefore, to leave standing not less than two or three spreading trees per acre." In Maine some of the lumbermen who cut second growth White Pine, "leave standing all trees under twelve inches in diameter, and calculate that they can return for a second crop in about twenty years." After describing certain methods which have been used in the South, and which, in some instances, have been adapted with much elaboration to a combination of forestry and stock raising, Mr. Graves concludes of the attempts at forestry on the part of lumbermen: "The instances of conservative lumbering described in the preceding pages are but examples of work which has been carried on by a large number of lumbermen. The systems have been devised by the owners themselves, and, while in many cases improvements could be made, the work shows that much more has been done in the way of forestry than is generally supposed."

In many parts of the country the problem of protection from fire is the first one which the forester has to solve. In the farming countries the small and well-separated holdings can usually be protected by some care in watching, and by taking certain further precautions which are "now coming into use, such as clearing wood roads, burning fire lines, piling and burning tops, after cutting, etc.," but on large tracts the case is different. It is often im-

practical to construct fire lines, and on these tracts the most disastrous fires occur. Mr. Graves points out, however, that many lumbermen have devised methods of protection, based usually on systems of ranging and patrolling the woods, which have proved successful in every way. Some of these are described with more or less detail. Among them is that used by Dr. W. S. Webb on his tract of 4,000 acres in the Adirondacks.

Several interesting pages are devoted to forest plantations. Of these many have been made not only in the treeless regions of the West but in the East also, and notably in Massachusetts.

The fact that stands out above all others in this article is that the land owners who devised and put into practice the simple but effective methods of forest management which it classifies and describes, were guided in almost every case solely by their business instincts. Most of them probably had no knowledge of what European foresters have accomplished, but they also had no unattainable ideals before their minds. Their rough-and-ready methods have doubtless been defective in more ways than one; but most of them have been based on sound common sense. In so far as considerations for the future shaped their work it has been true forestry. It shows that in this country, although technical knowledge has been entirely lacking, forestry, even in small private woodlots, is not inconsistent with management solely for profit.

The nature of the article by Mr. Pinchot on the "Progress of Forestry in the United States," can easily be gathered from its title and from two sentences which are quoted in the preface of the Year Book from the annual report of the Secretary of Agriculture for 1898. "For 1899 I am considering the propriety of making a special effort to prepare a publication which shall contain a résumé of the achievements of the United States in every branch of science as related to agriculture during the nineteenth century, for distribution at the Paris Exposition."

"Every bureau and division in the Department charged with scientific work

should therefore contribute one or two articles reviewing the progress made in the application to agriculture of the particular science in which it is concerned."

The article occupies twelve printed pages and is illustrated by a map and by photographs. It first gives a brief but clear and very interesting account of the way in which the forest resources of the country have been regarded and treated since the earliest times. This is done chiefly by sketching the changes which have taken place in the treatment of the forest, from the time when the first settler hindered rather than helped themselves by an economy, which was the result of their early associations with the game and forest laws of Europe, through the period when every man could own woods and cut them freely, to the era of railroads and great lumber markets in which lumbering on a vast scale came into existence. When the cutting of great stretches of primeval forests for railroads and for distant cities in states and countries began, the need of taking preservative measures again became apparent. Little by little a distinct interest in forestry and a forest policy developed. At first the signs were all too faint, partly perhaps because "contrary to the general rule in other countries practical forestry here began first on private lands and wholly without relation to government action." But legislative measures for protection against fire in many of the states, the creation of public preserves and parks; the action of the National Academy of Sciences, the American Forestry Association, and other associations and the work of committees and commissions, brought forest questions to the attention of the public generally, and attracted to them an ever increasingly wide and active interest.

Mr. Pinchot devotes the last half of his paper to a thorough survey of the present situation, not only in the separate states where more or less control of the forests is beginning to be exercised, but also as regards the work of the Federal Government and the general condition of public opinion expressed through various associations, schools of forestry, etc. Of the position

which the Division of Forestry of the Agricultural Department now occupies, Mr. Pinchot says, "Through a system of coöperation with experts in forest matters throughout the United States, the Division of Forestry is becoming in fact what it has long been in intention, the center of all forest activity in the United States, while through the appointment of student assistants it is gathering about its work a corps of young men, who, beginning their forest studies while actively engaged in the work of the Division, principally in the field, will complete them at one or another of the forest schools. In this way, as well as through the schools alone, the need for men, which is among the most pressing requirements of forestry in the United States at present, will gradually be met." The weakness which necessarily results in the present division of work between the Geological Survey, the Land Office and the Division of Forestry, is pointed out.

It would be well if some of the things which Mr. Pinchot says about the present situation in this country in the last part of this paper could be read and heeded widely. The statement of the complete separation "between the administration of the reserves in the General Land Office, and the force of trained foresters, specially equipped for that purpose in the Division of Forestry" is one of them. Another concerns the relation between forest legislation and the protection of fish and game, and can be quoted in part. "Hitherto it has been much easier to secure legislation for the protection of fish and game, than for the protection of forests. In the future however, as the various states produce or perfect their machinery for the right handling of forest lands, a much closer connection may be expected, in which it is most probable that all interested will find their profit. The protection of fish and game is a natural function of the forest guard."

DAMAGE TO TIMBER BY ACID FUMES.

It is common to find certain species of trees in large cities sickening and dying from the effects of poisonous gases. The damage to forest trees from smoke is very common near mines and chemical works, especially where the smoke contains a large amount of sulphur fumes.

A striking instance of the injury to timber by acid fumes has recently come under my observation at Ducktown, Tennessee, where there are extensive copper mines. Here the crude ore is roasted in open sheds in order to drive off a certain proportion of the sulphur. In the immediate neighborhood of the mines the timber has long since been cleared to supply the roasting-sheds. In consequence, the winds have a clear sweep, and the smoke containing a large amount of sulphurous acid is carried for a great distance. Immediately about the roasting-sheds no vegetation whatever can live. At a distance of about one-third of a mile grass is

able to survive; and about one-half mile away, certain species of trees maintain a sickly existence.

The tree most susceptible to injury appeared to be the White Pine. I found trees of this species at a distance of seven miles in an air line from the roasting sheds which were without doubt killed by the sulphur fumes. It is probable that Hemlock is fully as sensitive, but as it occurs in protected ravines the damage is much less extended. River Birch appears to be easily killed by the smoke, and as in the case of other trees, begins first to die down from the top. It is common to see trees with the tops dead and broken, and with a fringe of living branches at the base of the crown.

In passing rapidly through the country only a general study of the effect of the smoke on different species could be made. Enough was seen, however, to make possible the following provisional list, which shows the relative degree of sensitiveness

of the various species. The list begins with the most sensitive. White Pine, Hemlock, River Birch, Mulberry, White Oak, Chestnut Oak, Chestnut, Black Oak, Red Oak, Ash, Willow, Beech, Poplar, Blue Beech, Bellwood, Locust, Honey Locust, Red Maple, Virginia Scrub Pine, Black Gum, Sourwood, Dogwood.

The last three trees in the list are very hardy and were found within one-half mile of the roasting sheds. It was somewhat surprising to find the Scrub Pine so resistant, but it appeared to stand the sun much better than any other trees except Black Gum, Sourwood and Dogwood.

HENRY S. GRAVES.

THE INVESTIGATION OF THE GRAZING QUESTION.

The investigation of the question of grazing in the forest reserves has been begun by Mr. Gifford Pinchot, the Forester, and Mr. Coville, the Botanist, of the Department of Agriculture, who left Washington, D. C., in the middle of May and are now studying the conditions in Arizona.

The grazing question is the most important one which has thus far come up in connection with the reserves, and in it have been involved most of the strong objections to them. Until the advisability of permitting grazing is no longer an open question, until it has been determined after a thorough and impartial investigation of the conditions in each reserve, the angry opposition to them which exists in some regions cannot be expected to diminish. At present there is probably nothing that could do more to establish the desirability of reserves in the minds of those who still object to them than to make possible an intelligent regulation of grazing. For this reason the letter of instructions which is being issued to its field agents by the Division of Forestry is both important and interesting. The letter tells its own story and is here given in full. It is being sent to all of the agents of the Division who are to be at work in the Big Horn, Washington, Mount Rainier, Uintah, Gila River, and Yellowstone Park Timber Land Reserves, and to those in the Sierras and southern California. The letter is as follows:

"The investigation of the effect of grazing upon the national forest reserves in which you are about to engage will be

governed throughout in accordance with the following considerations:

"This investigation is undertaken at the request of the Honorable Secretary of the Interior. In the letter to the Honorable Secretary of Agriculture which contains his request, after referring to the preparation of other reports on forest matters for the Interior Department by this Division, he says:

"Grazing in the national forest reserves being one of the most important of all the questions which relate to them, will naturally form a chief subject of the above mentioned reports. In the necessary investigations and in preparing these reports, I have the honor to request that special attention be given to the following phases of the subject:

"1. The grazing industry in the forest reserves in relation to taxation and the general propriety of specified localities.

"2. The relation of grazing to forest fires.

"3. The relation of grazing to the preservation and reproduction of forests.

"4. The relation of grazing to irrigation and water supply.

"5. The relative effect of grazing by various kinds of stock.

"6. Moderate grazing and over-grazing in forest reserves."

"In undertaking the investigation along these lines this Division occupies a completely impartial position. It has no case to prove, no interest to favor except the public interest, nor any preconceived ideas to establish or defend. Its only concern

is to discover and report the essential facts, and upon them to base its recommendations. In order to destroy any chance of mistake or misunderstanding upon this subject I quote from an official statement by the Honorable Secretary of Agriculture. Certain misconceptions of his attitude, by which he has been represented as uncompromisingly hostile to forest grazing having been widely circulated, it is important that you should know where he stands. He says:

“Every question of grazing should be decided in each reserve and each part of a reserve on its own merits. As a rule, grazing should be regulated, not prohibited, except in special cases like southern California. Many parts of forest reserves contain excellent grass and other forage which can be harvested only by grazing and which should not be wasted.”

“This investigation will be carried out strictly in the spirit of the Secretary’s statement.

“Just now public interest in forest grazing is exceedingly keen. Great industries will be affected by a decision to permit or prohibit it in the forest reserves or in any part of them. The possibilities for public and private gain or loss are large. Radical differences of honest opinion are frequent, and testimony both that grazing injures the forest and the interests that depend upon it, and that it does not, is forcible and abundant. While you should hear both sides fully, and should avail yourselves of whatever friendly assistance you may require and either side may offer, your report must be based on your own personal observations. The statements of interested parties should be tested in all cases by comparison with the facts you have yourself ascertained at first hand on the range. It is of the first importance that you should know the range thoroughly. You will find it necessary to plot the ranges on a map as part of your report.

“It is essential that a full description of the forest should accompany each discussion of the effect of grazing upon it. An outline for such a description is supplied to you on a separate sheet.

“Your report should be illustrated and your conclusions supported throughout by numerous photographs.

“The following list of questions is intended to indicate some of the lines along which facts are needed. It is not complete. The questions apply to all kinds of grazing animals, but especially to sheep, since sheep grazing is by far the most important grazing question which relates to the forest reserves. Your attention is specially directed to the last two questions, the need of a full report upon the relative effect of grazing by different kinds of stock, and in particular upon the relative loss and gain if grazing is permitted or prohibited.

SPECIMEN QUESTIONS.

“1. What kinds of plants are grazed, in order of preference, including grasses, herbaceous plants, shrubs and trees?”

“2. Are conifers eaten, and if so, under what circumstances and to what extent?”

“3. How does grazing affect the native grasses?”

“4. How is over-grazing related to forest preservation?”

“5. Does continual moderate grazing affect the reproduction of the forest, and if so, how and to what extent?”

“6. Do grazing animals injure young trees by trampling? If so, how and to what extent?”

“7. Are old trees, if shallow-rooted kinds, such as Spruce, injured by trampling?”

“8. Is damage done to soils of various kinds and situations by trampling, and if so, how and to what extent?”

“9. Does grazing affect the run-off of streams? If so give proof in full.

“10. Does grazing affect the superficial run-off of rain-water?”

“11. Do the streams from areas denuded by grazing carry more sediment than formerly, and if so, how is it proved?”

“12. Does grazing increase or diminish the danger from fire?”

“13. Do herders or stockmen set fire to the forest in order to improve the range?”

“14. What is the effect of repeated burning on the forest and on the range?”

"15. How long is required before burned range can be grazed again, in the forest and outside?"

"16. What is the relative effect of grazing before and after burning on the grass, the forest, and the soil?"

"17. What areas are most often burned?"

"18. What areas in the reserve are grazed?"

"19. How many head are grazed in the reserve?"

"20. What proportion of this number are assessed?"

"21. What proportion of the head owned and assessed in any one county are grazed in the reserve?"

"22. At how much are they assessed per head?"

"23. Are the owners and herders usually citizens or aliens?"

"24. What lands are best adapted to grazing?"

"25. How long has grazing been carried on in the reserve?"

"26. Discuss handling during the year: wintering, when driven into the mountains, how herded in the mountains, when driven out, the cost of herding, etc., etc.

"27. Discuss the wool market and the market for hides and meat, with reference to the grazing industry in the reserve."

"28. How large an area in the reserve is required to graze 1,000 head during one season without over grazing, and what number of head will the reserve safely carry?"

"29. Would a system of leasing grazing lands in the reserve work well, and if so, under what regulations?"

"30. Is the grazing in the reserve more or less valuable to adjacent communities than the protection of the forest by the prohibition of grazing?"

J. D. W. French.

John Davis Williams French, the son of Jonathan French, a Vice-president of the American Forestry Association, died at Atlantic City on May 2, 1900. His early home was in Roxbury, where among the productive and beautiful horticultural surroundings of those days he acquired his fondness for all out-of-door occupations. Mr. French obtained his early training at the schools of Roxbury or Boston, and graduated at Harvard College in the Class of 1863. After graduation he served as a valued member of the Christian Commission, with our army at the front.

In his agricultural work, results upon his land at North Andover, Essex County, have proved him to be a skillful farmer, horticulturalist and forester. He knew the value in agriculture of the wise application of intelligence thereto, and it was his earnest endeavor to impart, and have imparted, such ideas to those who could or would be benefited by such application and knowledge.

He was an exhibitor and officer in the Massachusetts Horticultural Society and a leading member of its Library Committee,

and its Committee on Lectures and Publications.

His interest in all branches of forestry, and his activity in "Village Improvements," made him useful and influential in national as well as local forestry matters. His last effort in the cause of tree culture was shown in his earnestness to complete the organization of the new Boston Common Society, with the object of aiding in the maintenance of Boston's ancient Common in the best possible condition.

He was an earnest and active worker with mind, body and purse in the cause of Christianity within the Episcopal Church and outside of it; and in many places will be greatly missed, and his place will be hard to fill.

Mr. French was at one time a member of the Boston Common Council from Ward 11; and at the time of his death was a trustee of the State Agricultural College; President of the Bay State Agricultural Society; Vice-president of the American Forestry Association, and Vice-President of the Essex Agricultural Society. In his will he bequeathed \$2000 to the American Forestry Association.

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No. 6.

The Summer Meeting in New York.

The special summer meeting of the American Forestry Association, which is to be held in New York City, June 25th and 26th, promises to be very interesting. It is expected that the President of the Association, Hon. James Wilson, Secretary of Agriculture, will be present and preside at one or more of the sessions. An interesting program has been arranged, and among those who will speak or contribute papers to the meeting are Mr. Henry Gannett and Mr. F. H. Newell, of the U. S. Geological Survey; Hon. Charles W. Garfield, President of the Michigan Forestry Commission; Prof. Wm. B. Clark, of Johns Hopkins University; Dr. B. E. Fernow, Director of the New York State College of Forestry; Col. William F. Fox, Superintendent of State Forests, New York; Mr. Ernest Bruncken, Secretary of the Wisconsin State Forestry Association; Dr. J. T. Rothrock, Commissioner of Forestry for Pennsylvania; Prof. J. W. Toumey, Mr. Henry S. Graves, Mr. Geo. B. Sudworth and Mr. Otto J. J. Luebker, of the Division of Forestry, U. S. Department of Agriculture; Mr. James McNaughton, of New York City; Prof. Wm. R. Lazenby, of Ohio; Hon. E. V. Preston, President of the Connecticut State Forestry Association.

Among others papers on the following subjects will be presented: The work of the U. S. Geological Survey in the Forest Reserves, The Michigan Forestry Commission and Its Work, Forest Survey Work in Maryland, Some Adirondack Forest Problems, Adirondack Forest Fires of 1899, Forest Matters in Wisconsin, Forest Reserves of Pennsylvania, Progress in Tree Planting in the United States, particularly the Middle West, History of Forest Legislation and Administration in the State of New York, Notes on Some Forest Trees of Ohio, Forest Interests in Connecticut, Work of the Federation of Women's Clubs, Forest Insects, Forest Fires.

Increase of Appropriation for the Division of Forestry.

On May 25th, President McKinley signed the "Act making appropriations for the Department of Agriculture" by which the Division of Forestry is allowed \$80,000 for the fiscal year ending June 30, 1901. This sum is just twice as large as the annual appropriation for 1899-1900, which, in its turn, doubled the appropriation for the previous year.

The Division of Forestry could well use many times \$80,000 with great profit to the country, but for the time being the appropriation may be considered a matter for rejoicing. It shows that Congress understands better than it did, that the rapidly deteriorating forest resources of the United States present problems which should be faced and looked after, and that the public is beginning to realize how far from profitable or desirable is indifference to these problems. Once the ball has got well under way too, it can be counted on to grow of itself. The Division can now hope to make its value and importance evident to a much greater extent than it has ever been able to before; and if the interest in forestry and the intelligent understanding of the country's need of it go on increasing, it may even be hoped that people will see soon that in distributing what is really a forester's work, between the General Land Office, the Geological Survey and the Department of Agriculture, much waste of time, money and en-

ergy, and a decided loss of efficiency is necessarily involved. As a leading New York paper said recently: "There is fair reason to assume that Congress will discover ere long that it has done only half its duty in increasing appropriations, and will follow this with new legislation giving the Division not only more money, but the authority which logically belongs to it." This month one is much more than ever before inclined to hope this may prove true.

Last Month's Forest Fires. During the month of May the newspapers and lumber journals have again been sadly full of notices of forest fires in Minnesota, Wisconsin and Michigan. At the beginning of the month an early and prolonged drouth in these states had dried up everything, and had so reduced the streams that many of the log drives were stranded. Lumber yards, mills and settlements were destroyed, and in many cases the unsawed logs, held up on their way to the mills by the shrinkage of the streams, were burned. A correspondent of the *American Lumberman* wrote from Marinette, Wis., under date of May 10th—"Logs in the river were actually on fire last week. Mr. Stephenson says that both banks of the Menominee river for over a hundred miles up and thirty miles inland were covered with smoke and flames." "The losses of Cedar stock, standing timber and property will aggregate many hundred thousand dollars." The tract here described is large enough to embrace the whole of the White Mountain region of New Hampshire, or of the Adirondack region in New York, and yet it is only one of many over which, during this spring alone, similar fires have been raging. The correspondent of the *American Lumberman* mentions the disaster in his particular district briefly and then passes on to other subjects. In a short editorial the paper makes this comment: "The proposed Minnesota National Park was invaded by the forest fires in that section of Minnesota and it has been feared that irreparable damage might be done to the Pine growing in it. If it were

now a national forest reserve prompt measures would be taken to check the spread of the flames."

Public Indifference to the Fires. This quotation from the *American Lumberman* is on its face, merely one more argument for the Minnesota Park. Such the editor probably intended it to be; but significant in this regard as it is, it leads the reader's thoughts into another channel also. If the land within the proposed boundaries of the park, "were now a National Forest Reserve prompt measures would be taken to check the spread of the flames," says the writer. One can but wonder again that it should be only in the National Forest Reserves that measures for protection are to be expected, that the American public at large is so completely indifferent to forest fires. It is easy to go off in explanation and to refer to the warfare which our fathers, axe in hand, had to carry on against the wilderness. But this does no good. The important thing is the thing itself—that strange though it may seem, this country prefers to see millions of dollars worth of property go up in smoke year after year, to protecting its forests from fire as it protects its farms from floods and its cities from conflagration. Crowds flock to see a burning house; a burning forest passes unnoticed. One eastern editorial-writer may remark that: "If the fiery lesson involved in the loss of millions of dollars worth of grown and growing timber shall make no impression upon the public mind and create no active interest in the enactment of measures intended to prevent such preventable destruction, the friends of forestry might almost despair of their cause." But in another column of the same issue his paper is likely to devote but twenty lines to recording the destruction of four new towns, the loss of two score lives, and the conversion of a green and flourishing county into a charred waste. The editorial goes unread; the public estimate of forest fires is gauged by the brevity of the inconspicuous news-item.

What is to be done then? The fr

quency and extent of the fires is the reason why they attract so little attention, and are not more generally recognized as serious. That people are not alive to their full consequences is the sole reason why steps are not taken to prevent them within the hour. Indifference and the fires are then one. But it also follows in the same breath that if you reduce either the disappearance of the other is sure to begin. There is no way out of a circle until you break out; but do this and the circle disappears. Let the fires burn and a young forest will be valued at little more than the price of an ash heap. Spend one half cent per acre on New Jersey and every land owner in the State wakes up to the fact that he has become richer by a prospective normal forest crop. He realizes that forest fires are unnecessary and do great harm. He becomes interested, and may even find himself eager to pay a cent an acre. Practical forestry begins to be possible.

This is not an idle speculation but what all those who have considered the question of enabling the country's forest lands to yield a sustained revenue realize and agree to. As long as no effective measures to prevent burning are taken, nothing can be done. Foresters say this, reserve rangers say this, and it is justly the burden of the lumberman's excuses and complaints.



Mr. Boardman's Letter. In his communication on another page Mr. Boardman comes near to stating in a nutshell what is almost the whole forestry problem in Michigan and some of the neighboring states. Mr. Boardman says that on the lumbered and burned-over lands "the tax liens are so heavy, that the State is practically, but not technically, the owner." In other words, the State forces the owners to abandon responsibility for the land, to leave it unprotected from fire and thieves; but does not in its turn undertake to shoulder the burdens which it has made the private citizen lay down. The young growth, which, if protected from the annual fires, would come up of itself, and which land owners would be glad to en-

courage, is so heavily taxed that merely to retain title to it while it grows up is out of the question. The result, as things are now, is that every year fire ranges over thousands of acres, destroying the trees and the soil, and gradually but surely depriving the region of all the benefits to industry, land and climate which accompany flourishing forest vegetation. Lumbermen may have cut down the first growth, but that many towns and counties are now only ragged and blackened wastes is not all their fault. Much of the blame should be laid at the doors of the legislatures and tax-assessors who compel the abandonment of cut-over areas, and then take no proper charge of them themselves.



For an Appalachian Park. The promoters of the Appalachian National Park have drawn up a resolution in its favor addressed to Congress which they invite "every person, corporation, association, business firm or other organization interested in these important economic factors in our national and social well being," to endorse:

"The application of scientific forestry under government control to the rapidly disappearing forest lands of the southern Appalachians.

"The preservation of the forests and the perpetuation of the natural scenery of these mountains.

"The protection of the headwaters of the various important streams which find their origin in this section, and of the many minor water courses upon which the fertility of the lower levels depend and which many of our industries require for power.

"The protection of the game, song-birds and fish of the region.

"The opening up of this great and impressively beautiful region by adequate roads, thus supplying the large centers of trade with a great sanatorium and resort within a few hours' journey.

The circular also says:

"It is urged that whosoever may read this circular will take active interest in this

great project and obtain its endorsement by the most influential body or organization which he can approach."

Copies of the circular and resolution may be obtained by application to Dr. C. P. Ambler, Secretary of the Appalachian National Park Association, Asheville, N. C.



Left Unfinished. The June number of THE FORESTER goes to press as Congress is about to adjourn. It is to be feared that in the rush of business, which precedes adjournment, action on the Minnesota Park project, the purchase of the Calaveras grove, and other less important matters will be left incomplete. Regrettable and disappointing as this is, the situation still has some features which enable one to feel not altogether discouraged. On the twelve Indian reservations in Minnesota no cutting is being allowed even under the dead and down timber act. Under date of May 23d the Chicago correspondent of *Forest and Stream* wrote: "Col. Cooper has done that much already. He has kept all that Pine standing where it was. This is a great deal to have accomplished, but it

surely has been done, and Secretary Hitchcock stands firm in his position that no more Pine shall be cut until this matter has been looked into." Similarly in the case of the Calaveras grove immediate lumbering is hardly to be feared. The authorization to purchase it came so near to being passed that the owners could have small inducement to begin the work of felling the trees until Congress has had a chance to finish with the question one way or the other. That the purchase should not be authorized, if proposed again, in the light of the favor the resolution have met with this year, almost inconceivable; and finally that it will once more be brought in is happily not to be doubted. This project like that for the Minnesota Park and the one in the southern Appalachians, has been put before the country too well, and has received popular support that is too general and enthusiastic for it to die a natural death. The ground that has been gained in the way of resolutions brought in and passed may apparently be lost, but the work that has been done has counted none the less, and if it is kept up it will gain its objects in the end.

CORRESPONDENCE.

An Interesting Holly.

TO THE EDITOR OF THE FORESTER.

Sir: During a recent trip in the Unaka Mountains of Tennessee I encountered a Holly which was of unusual interest in that nearly every leaf upon it was entire. An occasional leaf showed one, or sometimes two, spines on the sides, but fully 90 per cent. were wholly without spines except the apex. This interesting specimen stood beside a Holly with leaves normal in every respect, while a short distance from it were trees whose leaves showed every variation from the entire to the ordinary type.

HENRY S. GRAVES.

The Fires in Michigan.

TO THE EDITOR OF THE FORESTER.

Sir: During the early weeks of May this year, I traveled over many miles of the wild lands in the northern part of the southern peninsula of Michigan, where the usual yearly fires were making slow consumption. These fires do not burn everything cleanly, or cover the same ground each year. They seem to have a devilish tendency for finding their fuel after an interval of years when the second growth has acquired, or is about to have, value. They travel slowly, supported by the dry grass, the smaller trees that were killed by a preceding fire, the fallen Pine

and old skidways. On the hills the clear sand of the Pine lands, before cuttings were made, gave no support for fires. The wet Cedar and Tamarack swamps protected themselves. After cutting, the slashings, fire weed and grasses became the kindling.

The state which has set the pace for all others in fish culture has apparently ex-

owners practically lost title by non-payment of taxes; the logging railroad spurs were abandoned; and each year the fires consumed more and more of the less valuable Pine, Cedar, Poplar, and hardwoods. The tax liens are so heavy that the state is practically, but not technically, the owner. Now, since the railroads and settlements have reached the edges of the burnings,



SECOND GROWTH POPLAR KILLED BY FIRE.

celled all in riotous waste of its timber wealth. The pity of it is that this useless waste could be stopped at small cost. Never was there an easier place for starting a fire. A smoker needs to be only ordinarily careless with his match. But never, also, was there an easier region for fighting one. A few men with tools for handling sand can turn the flanks and rapidly narrow the front of a Michigan fire. But, owing to an extraordinary complication of ownership, no one person is vitally interested except in isolated cases of large tract ownership; for after the first great crop of White Pine was burned or marketed, the land was commonly assumed to be worthless; the

and the developments of civilization have shown new uses for wood not formerly considered valuable, it is easy to look backward and, with visions of the wealth that has gone up in smoke, sigh for what might have been.

Even now it is not too late. Although a great deal of hardwood is destroyed yearly, nevertheless there is apparently enough left to make cheap furniture, tool handles, spools and the like, for a nation. There are bunches of Norways, which, because of their location on the sand hills, are only occasionally burned; Cedar, below the size for railroad ties, which in the swamps is partially protected from fire; second-growth Poplar, which down to

5 inches diameter has value for boxwood and pulp. There is much to be saved now, and more to be had in future years if the trees could be allowed to grow.

I regret that I had a camera with me

only one day, but I send you a photograph showing where the fire had just killed the second-growth Poplar.

W. H. BOARDMAN.

NEW YORK, May 18, 1900.

NEWS, NOTES AND COMMENT.

Investigations of Water Resources. By recent act of Congress the investigations of the water resources of the country being carried on by the Division of Hydrography of the United States Geological Survey, have been notably enlarged. The appropriation for this purpose for several years has been \$50,000 per annum. During the last fiscal year, however, this was increased in various ways so that upwards of \$90,000 were expended in surveying reservoir sites in the arid region, investigating underground waters, and measuring the flow of streams both east and west.

For the next fiscal year the amount of \$100,000 will be available. Attempts were made to secure an increase to \$250,000—the lead in this matter being taken by the National Irrigation Association and similar bodies throughout the country. Various Boards of Trade and commercial clubs interested in the development of the country joined in the movement, as well as engineers and investigators desirous of having official data upon which to found plans for various projects.

Although the full amount requested by the various petitions was not received, yet the increase makes it practicable to take up a number of problems throughout the United States. Reservoir surveys will be actively pushed forward in the High Sierras, in California and in the Rocky Mountain region, particularly in Montana and Colorado. In the South and East a number of important undeveloped water powers will be examined and detailed measurements made of the flow of the streams.

Requests and memorials are being received from various parts of the United

States for the extension of systematic measurements of important rivers. These are being carefully considered in the light of public importance and benefits of the results. In this connection, the officials in charge desire to have all such requests for systematic measurements of rivers, investigation of underground waters, etc., sent in at an early day, in order that each locality may have proper consideration. Engineers who have in mind streams—especially those flowing across State lines, whose waters are important for industrial developments may be able, by making prompt application, to secure systematic measurements of the available volume of water.

Tree Planting in the Plains Region. As is well known, the tree claims of the prairies of the West while occasionally successful have nearly all proved failures. This is accounted for by the fact that hitherto the requirements of the trees planted were not known to the planters. This spring however, thirty-three planting plans are going into operation as a result of the offer of the Division of Forestry in Circular 22, and during the summer similar plans will probably be completed for over one hundred more of those who have applied for them. These plans furnish the owners of the lands for which they are made, with detailed instructions for planting and recommend the species best adapted to each tract.

Of the applications for advice in planting plans, 90 per cent. have come from the treeless regions of Texas, Oklahoma, Kansas, Nebraska and the Dakotas. The results of the first investigations in the

Division are about to appear in print, as Bulletin No. 27, of the Division, under the title, "Practical Tree Planting in Operation." This bulletin reviews the general situation in what may be called the tree planting region. The sort of work it outlines will be followed up vigorously this summer.

As a further result of its work in help to tree planters the Division of Forestry will place two or three field parties in the plains region of the West after July 1st. These will study the encroachments of trees on the plains and will also estimate by valuation surveys, the kinds, growth and size of trees in planted groves. This work will give for the first time an approximate estimate of the yield of planted trees and of the actual timber value of forest plantations in the United States.



Wrecking Dams and Stealing Timber. "Within the past fortnight two important logging dams on the upper Mississippi River have been blown out by means of dynamite handled by lawless men. The one was on the Crow Wing, where a drive of 54,000,000 feet of logs was dependent on the water of the dam: the other on Bemidji Lake, where 30,000,000 feet of logs were ready to come out through the dam. The destruction of the Crow Wing dam was the second depredation of the sort committed there within the past two years.

Both of these cases are aggravated acts of lawlessness. Both were done by citizens near the dams and for the alleged reason that the dams flooded property owned by citizens. The first destruction of the Crow Wing dam was affected while the watchmen were away under arrest on charges trumped up by the people who destroyed the dam. The second destruction was probably by the same people, though the owners of the dam had paid liberally for all damages claimed. The wrecking of the Bemidji dam was, however, a step beyond the Crow Wing crime. Presumably for purposes of spite, but on pretended grounds of damage from high water, the Sheriff of Beltrami County,

with a posse of deputies, ordered the watchmen off the dam, and, in spite of their promises to raise the gates and give the desired relief, blew up the dam after the gate had been raised; then, as if from sheer wantonness, returned and blew all the remnants of the dam to pieces. This they professed to do on the order of the Board of Health of Beltrami village, in spite of the fact that the village had urged the construction of the dam and had never made complaint to the owners concerning the dam.

There is something about the woods life in Minnesota—probably common to other wooded sections—that encourages thieving and destruction of property owned by non-residents. About Bemidji, timber stealing by settlers is such a common custom as to be thought not even a minor error. Many small mills saw steadily on timber largely stolen by settlers from tracts owned by absentees, but contiguous to the homesteads of the thieves. This timber is generally stolen in a most wasteful way, the finest and most accessible trees being felled and but one or two clear logs taken from them, the rest being left to rot. The lumber made from these stolen logs is hauled to railway stations, sometimes as far as thirty miles from the stolen timber tracts. The thief is generally immune from punishment, for he knows that he will be tried by a jury of his peers, that is to say, a jury of timber thieves. The laws protecting human life were never violated in the black parishes of Mississippi with more impunity than are the laws protecting non-resident property in the Pine counties of Minnesota."—*Mississippi Valley Lumberman.*



The Mohave River Watershed. A field party from the Division of Forestry has started for southern California to make a detailed investigation of the soil cover of the watershed of the head waters of the Mohave River. A preliminary investigation of this watershed was made in October, 1899, when it was ascertained that comprehensive data regarding precipitation, run off, wind velocity, and evapora-

tion, covering a period of several years had been collected. It was further ascertained that the watershed in question included secondary drainage basins representing different types of soil cover which varied from dense forests to open chapparal.

Conditions appear to be particularly favorable for undertaking the solution of the important problem of soil cover and the run off of streams. The party now going into the field is to investigate the soil cover including forest and chapparal growths on all parts of the watershed. The data regarding soil cover obtained from each of the secondary drainage basins will later be compared with the data regarding rainfall and run off on the same basins. It is thought that the investigation will result in the possibility of arriving at a scientific conclusion regarding the relation of soil cover to run off.

**Drouth, Fire, and
a Shortage in
Lumber.**

"A shortage in lumber and consequent higher prices for this season are predicted by dealers in the West. The shortage is ascribed to the forest fires and the drought in the lumber-producing sections of the Northwest. The shortage of December 1, 1899, as compared with the same date in 1898, was 766,000,000 feet; as compared with the same date in 1897, was 1,187,000,000 feet; and with the same date in 1895, was 1,452,000,000 feet, showing a large ratio of decrease in product. It was expected, on account of advanced values, that the production for 1900 would overcome a large part of this shortage for the present season by the stimulation of log output, but because of unfavorable logging conditions there has resulted an additional shortage of log production. Lack of snow in the lumber districts seriously interfered with the hauling of logs to the river bank, and low water in the rivers has prevented the delivery to the mills of much of the timber sledded to the rivers. There is no likelihood of relief in this respect, as the season of floods is past. Added to the shrinkage in supply are the losses of millions of feet

by forest fires, and the loss by the fire in Ottawa, coupled with the fact that there can be no output this season from the mills burned in that fire."—(New York) *Evening Post*.

A Southern Hard-wood Purchase. "The purchase is announced of 156,750 acres of hardwood timber land in Sharkey and Washington counties, Mississippi. The buyer is George T. Houston & Co., and the sellers the Illinois Central and Yazoo & Mississippi Valley railroad companies. This tract is the largest virgin forest in the South and is situated in the Yazoo Delta. It consists mainly of White Oak the quantity of which cannot be estimated. It is virtually a solid body 70 miles long and 8 to 20 miles wide. It is between the Yazoo & Mississippi Valley Railroad and the Sunflower River. The price exceeds \$1,000,000 and gives Houston & Co. the largest holdings of hardwood stumpage in that territory. * * * A number of mills are to be erected on the new acquisition and the lands as soon as denuded of timber will be sold for agricultural purposes. In addition to the White Oak there is a large quantity of Cypress, Poplar, Cottonwood and Red Gum."—*Mississippi Valley Lumberman*.

**Preserve Natural
Reservoirs.**

Mr. T. P. Lukens, vice-president of the Forest and Water Supply Society of Southern California, began an article which appeared recently in the *California Cultivator*, with the statement that it was not the question of cheap lumber, but that of the water supply which concerned the southern part of the State. In the course of this article Mr. Lukens said: Far up the San Gabriel river, there are vertical walls many hundred feet high. At first glance they appear as solid as a marble shaft, but on observing closely, you see innumerable places where water is exuding. Further down the formation is more broken and the granite disintegrated. In fact, our mountains are a perfect sponge, admirably adapted for conserving the water, if there is something to hold the excessive precipi-

ation in check for a while. This great natural reservoir cannot be emptied suddenly as can the artificial one, by opening the flood-gates, neither can it be re-filled so quickly, owing to the slow process of percolation. What are we to do to fill and keep full this great reservoir? First of all, prevent fire from burning off the trees and brush. The fires in destroying the foliage not only permit the sun and wind to evaporate a large per cent. of the water, but consume the humus that does so much to hold the water in check, acts as a mulch to prevent evaporation and permit percolation; after fire the rain deposits a cement on the surface with the ashes, that prevents percolation, and concentrates the water into torrents, tearing out great quantities of debris to cover up and flood the fertile valleys."



Forestry in Arkansas.

The Sawyer and Austin Lumber Company, which owns 85,000 acres of short leaf Pine land in Grant, Jefferson, and Saline counties, Arkansas, recently applied to the Division of Forestry for a detailed working plan for their tract. The preliminary examination has been made and a favorable report submitted to the company. A contract has now been drawn up between the Sawyer and Austin Lumber Company and the Division of Forestry, in which the latter agrees to make a thorough investigation of the tract and to make out a detailed working plan and the Lumber Company undertakes to pay the expenses of experts of the Division in the field.



The Fire Came too Fast.

"The North Western Lumber Co., had an experience near their plant at Stanley that illustrated how rapidly fire moves when it gets under headway. They are pretty well prepared for emergencies of the kind, but in this case protection did not protect. They have mounted two old boilers on a flat car with a small engine, and when it becomes necessary run a hose from the locomotive, to furnish steam. With this they can keep a stream of water running

from the boilers for an hour or more. Some days ago their men saw a fire in an old Hemlock slashing about two and a-half miles from a landing where they had a million and a half Hemlock and Pine logs. They ran to town with a locomotive and hooked up to the fire department car. They were back in about a half an hour, but the fire had moved more rapidly than they, and the logs were just a charred lot of stubs when they reached the landing."

—Mississippi Valley Lumberman.



At a meeting of the Yale Corporation, on May 22d, Professor J. W. Toumey was elected Assistant Professor of Forestry. The Yale Forest School is very fortunate in securing the services of Professor Toumey. He was formerly connected with the Arizona Agricultural College, as Professor of Botany and Horticulture, and was for a time Acting Director of the Experiment Station. For about a year he has been the Superintendent of Tree-Planting in the Division of Forestry. His training in the Division and previously in the West has given him a wide knowledge of forestry, especially along the lines of tree planting. The courses which will be given by Professor Toumey will be Forest Botany, Outlines of Forestry, Forest Planting and Sowing, Forest Technology, Lumbering, and Forest Protection.



An Ancient Cedar.

"A Cedar tree whose age has been reckoned by geologists at twenty-five thousand years has been found in California, standing in an excellently preserved state, the fibers so perfect and the wood so strong that it was cut up and used for timbering in the construction of a mining tunnel. This remarkable instance of the preservation of organic remains was found in the heart of a mountain, perhaps five hundred feet below the summit. This mountain is a spur of the Sierra Nevadas, near the Forest Hill divide, in Placer County, between the North and Middle forks of the American River.

The mountain is lava capped with one of those singular table tops which show that there was once a day when all those ravines with which the region now abounds did not exist, and that what is now the crest of the mountain was once the lowest plane in a topography vastly different from that which exists to-day."—*St. Louis Lumberman*.

Gathering up Black Walnut. "White county, Tenn., is one of the plateau counties on the western slope of the Cumberland Mountains, and once contained a vast amount of the finest Black Walnut timber. The timber has pretty well all been cut, and now they are selling the stumps. The trees were cut down in a wasteful manner with axes, leaving high stumps. In the early days of the lumber trade these fine Walnut trees were sold for 'a song,' so to speak, and the songs remain unsung. Some of the large stumps now bring more money than the whole tree sold for. A correspondent at Sparta, the county seat, says:

'The railway yards here are full of Walnut stumps ready to be loaded for shipment. Considerable money is being paid out through the county for these old stumps. Some very fine specimens have been brought in which will net the dealers a handsome profit.'

We are not informed as to who are the dealers, to whom the stumps are sold, or to what uses they are put, but presume the veneer manufacturers buy most of them."—*Southern Lumberman*.

On the Raquette River. The "Malby Bill," which was brought into the New York Legislature "to provide for the establishment and maintenance of storage reservoirs on the Raquette River and its tributaries," failed to pass the Assembly. A bill of somewhat similar appearance, which was passed, however, and signed by Governor Roosevelt, is of an entirely different character. It provides for levying an assessment on owners of water power along the Raquette River, such as-

essment to be used for repairing the dam at Raquette Pond, just below the railway station at Tupper Lake Junction. The reconstructed dam will not be high enough to injure any timber or do damage to the scenery. That mischief was inflicted years ago by the old dam which was maintained at a height much greater than that of the one now proposed. Any change in the scenery which may result from the reconstruction will be in the way of an improvement.

The Largest Tree. The largest tree in the world is to be seen at Mount Etna, near the foot of Mount Etna, California, is called "The Chestnut Tree of a Hundred Horses." Its name rose from a report that Queen Jane of Aragon, when her principal nobility, took refuge from a violent storm under its branches. The trunk is 204 feet in circumference.

To Lumber in the Philippines. "A company has been organized at Chicago and incorporated under the laws of West Virginia with a capital of \$5,000,000 to handle the woods, such as Mahogany, Rosewood, Ebony. The company will operate in the Philippines, developing the lumber industry there and shipping their products to this country and to Europe."—*Mississippi Valley Lumberman*.

Comment on the Appalachian Park. "The Appalachian Mountain Club, of Asheville, N. C., has petitioned the Senate and House of Representatives of the United States to take measures looking to the establishment of a National Park in the southern Appalachians. The main idea of the park is the application of scientific forestry to non-agricultural lands of this section. The application of scientific forestry to the park, the conservation of the lumber industry by the application of scientific forestry is very evident to every practi-

lumberman, and, should this effort of the Appalachian National Park Association be crowned with success and lead the government to do what they asked them to do, we have no doubt that in time the park might be made self-supporting. We have no data as to what it would cost to keep the park in order, but we have an idea

that the mature timber which might be cut and sold on such a reservation would produce enough revenue to pay the interest on all its costs.

The *Journal* is heartily in favor of such a park, and hopes that Congress will give it favorable attention."—New York *Lumber Trade Journal*.

RECENT PUBLICATIONS.

A Guide to the Trees, by Alice Lounsberry and Mrs. Ellis Rowan. 313 pp., 64 colored plates, 164 uncolored illustrations. Frederic A. Stokes Co., New York. 1900.

"A Guide to the Trees" is another sign of the increasing popular interest in trees and things outdoors. It describes and illustrates early two hundred species of trees and shrubs, the description of the parts of each tree being given in semi-botanical language, followed by notes of a general and untechnical nature—historical, anecdotal or otherwise. As the object of the book is to help the reader to recognize our common trees at sight a colored or uncolored illustration of each species is given.

The scale to which the drawings in this book are made is not shown, and the descriptions often fail to indicate the average size of the leaves, etc., from which might be determined the proportionate size of the different parts. Of the illustrations of entire trees few can be said to give an adequate idea of the form and other characters of the species they are supposed to represent. Many of our important timber species are illustrated by examples grown in the open, which are wholly unlike the types met with in the woods. The distinguishing features of these two types are not accounted for in the text, nor are the real characters of many of our common trees either mentioned or illustrated. It would seem that a book which, like the "Guide to the Trees," is intended for unscientific readers, ought to bring out clearly the special differences between the various trees considered. To this end life-size illustrations of distinctive points, and also comparisons of those which look alike in some species would be of the greatest help to the majority who have no time to discover the distinctions by painstaking analysis.

J. F.

The Difficulties and Possibilities of Forestry as a Business. Two articles in the *American Lumberman* for March 31st, by C. A. Schenck and Geo. H. Holt.

Mr. Schenck concludes, in the words of Mr. Holt, "that neither the small nor the large land

owner, nor the investor, nor the speculator can afford to engage in it [forestry], and that as the country requires forestry, the country had better practice it on its own account." Mr. Holt is an active lumberman and timber owner who agrees "with him that lumber-forestry by private ownership under existing laws and conditions" would be out of the question, but proposes an interesting plan for government ownership under contract. He would have the private individual bear the expenses of planting, supervision, etc., and make an "equitable" "division" of profits with the government in return for remission of taxes, and protection from fire and theft. Mr. Holt thinks that such a plan would pay and prove popular.

Our Native Trees and How to Identify Them: a Popular Study of Their Habits and Their Peculiarities. By Harriet L. Keeler. Svo, pp. 533; 178 illustrations from photographs and 162 from drawings. New York, Charles Scribner's Sons. 1900. Price \$2.00, net.

The appearance in 1890 of Newhall's popular book on the *Trees of North Eastern America* marked the beginning of a period of book making for the help of busy people interested in trees. Some good, and some doubtfully useful tree books have since appeared. Markedly there is a praiseworthy attempt on the part of authors of this period to make the study of our common trees as easy as possible. They have recognized that there is a much larger class of interested, casual observers of trees, than there is of those plodding students of botany who have time and inclination to learn these plants by the old long way. The attempt to serve the former busy class of people with books in which technical plant characters are clearly described in every-day language seems one of the most admirable efforts of modern popular science work. There is room for more and better works with this popular intent, and it is with pleasure that we notice the coming of another tree book.

The compass of the present book includes the following features: a short key, based on leaf characters, to serve as a guide to groups and

species of the broadleaf trees only. The conifers are omitted. Technical descriptions are given for 126 native trees (one of which is usually considered a shrub), with partial descriptions of 11 other natives and 8 exotics. The leaf characters of 129 native trees and 16 exotics are illustrated by half-tones. One hundred and sixty-two line drawings are intended to illustrate many characters not displayed by half-tones. Eighteen half-tones give the general appearance of as many different trunks; while a few other half-tones show additional leaf-forms of species already illustrated.

The author has added to the formal descriptions some wood lore and popular notes including poetic and historical allusions to the species, with occasional mention of its geologic history. As a help in understanding the technical description the book concludes with a short chapter on the form and structure of roots, stems, leaves, flowers and fruits; together with a glossary of botanical terms.

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C. A. SCHENCK, Ph.D.

Forester to the BILTMORE ESTATE



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in THE FORESTER in writing

Vol. VI

JULY, 1900

No. 7

The Forester

A MONTHLY MAGAZINE

devoted to the care and use of
forests and forest trees and
to related subjects



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The Forester

Vol. VI

No. 7

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THE PLATFORM OF THE FORESTER

In order to assist its readers to lay hold vigorously of present problems the FORESTER indicates five directions in which an effective advance is chiefly needed.

1. The forest work which is now being carried on by the Department of Agriculture, the General Land Office, and the Geological Survey should be completely and formally unified. The division of authority between the three offices involves great waste, and consolidation is directly and emphatically pointed to by the present voluntary co-operation between them.

2. A system of forest management under the administration of trained foresters should be introduced into the national and state forest reserves and parks.

3. Laws for the protection of the forests against fire and trespass should be adapted to the needs of each region and supported by the provisions and appropriations necessary for their rigorous enforcement.

4. Taxation of forest lands should be regulated so that it will encourage not forest destruction but conservative forest management.

5. The attention of owners of woodlands should be directed to forestry and to the possibilities of applying better methods of forest management.

Persons asking themselves how they can best serve the cause of forestry will find suggested here lines of work along which every effort will tell. No opportunity for doing good along these lines should be neglected.

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JOHN GIFFORD, D.Oec., Assistant Professor.

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ARTICLES OF PARTICULAR INTEREST
IN THE FORESTER

THE FORESTER still has in stock copies of every issue of the year 1899, any of which will be sent upon receipt of ten cents. A few of the titles are:

¹GENERAL.

²FOR LUMBERMEN.

³IRRIGATION.

¹What Forestry Means to the United States; by the Secretary of Agriculture—²The Practical in Forestry—³Effect of Forests on Water Supply (continued, 2 numbers)—¹In the Southern Alleghenies—³Influence of Forests upon Storage Reservoirs—²Natural Reproduction of Forests—²Second Growth Pine *vs.* Agriculture—³Sheep Grazing in Arizona (continued, 2 numbers)—¹In the Woods of Minnesota—¹Massachusetts Forestry Association—²Reclamation of Drifting Sand Dunes—²Minnesota's Park for the People—¹Forest Conditions of Puerto Rico (continued, 2 numbers)—²The Prevention of Forest Fires—¹The United States Forest Ranger System—¹The Forest Problem in the West—¹Minnesota's Proposed Park (with map)—¹The State and Forestry—³Water Conservation in Soils—³Nature's Storage Reservoirs—¹A Forest Experimental Station—²Natural Reforestation in the Southwest—¹Redwood Forest of California—¹Restoration of Mountain Covering—¹The Profession of Forestry—¹The Famed Forest of Vallombrosa—¹Fishermen for the Forests—¹Relation of Forest Preservation to the Public Welfare—¹What Shall We do for the Forest (symposium)—²Propagation of Forest Trees—²The Lumberman's View of the Forest—¹Mount Rainier National Park—¹The Training of Professional Foresters in America (symposium)—¹Tree Planting in Kansas—¹False Mahogany of South America—³Water Supply and Forestry—²Mining and Forestry—²Government Forests and their Preservation—²Indiana Forest Tax Legislation—²Lumbermen and Forestry—²The Douglas Spruce (Red Fir) of Northern Oregon—³Irrigation and Forestry—³Grazing—²New Growth on Burned Areas—³Forests in their Relation to Irrigation.

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By Courtesy of the N. C. Geological Survey.

HARDWOOD FOREST ABOUT GRANDFATHER MOUNTAIN IN THE SOUTHERN APPALACHIANS.

THE FORESTER.

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In response to the courteous invitation of the American Association for the Advancement of Science, a special summer meeting of the American Forestry Association was held in connection with the sessions of the A. A. A. S. at New York city, on June 25th and 26th.

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Hon. James Wilson, Secretary of Agriculture, presided over the first day's sessions.

More than 25 papers were read, reviewing the Government work, the work in eight or ten different States, in Canada and Cuba, the progress in allied lines of study, and the spread of interest in the general subject. Many of these papers will be published in *THE FORESTER*.

An evidence of the increasing public interest in the forestry problem is the generous amount of space which the daily papers devoted to reports of the meeting.

MINUTES.

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The draft of a Bill for the protection of the public domain from forest fires was presented for endorsement and was referred to the Committee on Resolutions.

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Resolved, That Secretary Wilson be invited to participate in the opening exercises of the Association at the approaching General Session in such manner as the outgoing and incoming presidents may determine.

President Wilson responded to the invitation and the resolution was ratified by the Forestry Association.

Secretary Newell moved that the printed program, which had been prepared, be adopted as the official routine of business for the sessions of the Association. Agreed. The chair appointed as the committee on resolutions—Prof. A. D. Hopkins, Dr. John Gifford and Col. William F. Fox.

On motion of Dr. Fernow the Association then adjourned to join with the A. A.



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On motion of Dr. Fernow the Association then adjourned to join with the A. A.

A. S., in their opening exercises at Have-meyer Hall.

AFTERNOON SESSION.

The Association met at half past two Monday afternoon and listened to the reading by Secretary Newell, of two papers, the first by Mr. Henry Gannett, of the Geological Survey, entitled "Work of the United States Geological Survey in Forest Reserves"; the second by Mr. Newell on "Hydrographic Investigations in New York."

A paper by Prof. J. W. Toumey, entitled "Progress of Tree Planting in the United States, particularly in the Middle West," was read by Mr. Otto J. J. Lueb-kert.

Mr. H. H. Jones, of the General Land Office, read a paper entitled "Forest Work of the U. S. General Land Office." This was followed by a short discussion.

Secretary Whittlesey read a paper by Treadwell Cleveland, Jr., entitled "The Forestry Laws of New York."

Col. Wm. F. Fox followed with some extemporaneous remarks on "Adirondack Forest Fires of 1899." Dr. B. E. Fernow read a paper on "Some Adirondack Forest Problems."

Mr. Henry S. Graves of the Division of Forestry, read a paper on "Forest Work on the Reserves."

Adjourned to 10 o'clock Tuesday morn-ing.

MORNING SESSION.

Tuesday June 26th.

Met at 10 a. m., the Hon. Warren Higley in the chair.

Secretary Whittlesey, read a paper by Judson N. Cross on "The Minnesota Forestry Plan." Mr. Lueb-kert read a paper by Ernest Brucken on "The Legis-lative Outlook for Forestry in Wisconsin."

A paper by Charles W. Garfield on "The Progress of the Forest Movement in Michigan," was read by Secretary Whittlesey.

Dr. Fernow commented favorably upon these three papers.

A paper on "Forest Survey Work in

Maryland," by Professor Wm. B. Clark, was read by Mr. Lueb-kert.

Mr. C. C. Vermeule read a paper upon "The Forests of New Jersey," illustrated with maps. A short discussion of this paper followed.

Secretary Whittlesey then read a paper by Dr. J. T. Rothrock on the "Forestry Outlook in Pennsylvania."

A paper on "Forest Conditions in Kan-sas," by John P. Brown, was read by the Secretary.

Mr. A. M. Lyman, of Massachusetts, followed with a few remarks on forest work in Massachusetts.

Adjourned until 2:30 o'clock.

AFTERNOON SESSION.

Met at 2:30 o'clock, Dr. Fernow in the chair. Mr. J. A. Holmes presented a plea for an Appalachian National Park.

Mr. John Craig read a paper entitled "Hardiness of Forest Trees as Influenced by Climate."

Professor A. B. Hopkins presented a paper on "Forest Insects," which was followed by some discussion.

Mr. Hermann von Schrenck read a paper entitled "Forest Fungi," which was followed by some discussion.

Miss Mira L. Dock then presented the "Work of the Federation of Women's Clubs in Forestry."

Miss Dock's paper was followed by an earnest appeal on behalf of the Minnesota National Park by Mr. Charles Christadoro, of St. Paul, who asked the support of the A. F. A. for this project.

A paper by Mr. Fred E. Olmstead on "A Glimpse of Forestry in the Himalayas" was read by Mr. Lueb-kert, who also read papers by Mr. E. Stewart on "Notes on Forestry in Canada" and by Mr. H. B. Ayres on "Cutting, Burning and Fire Protection."

Professor John Gifford presented a paper on "Sylvicultural Prospects of Cuba."

A paper by Mr. James MacNaughton on "History of Forest Legislation and Administration in New York," was read by Mr. Lueb-kert.

The chair (Hon. Warren Higley) pro-

posed the adoption of a resolution such as Mr. Christadoro had asked for, and called for a vote, which was favorable.

Professor Hopkins moved that a committee be appointed to cooperate with the Federation of Women's Clubs in their effort to obtain the Minnesota National Park. After some discussion the motion prevailed and Messrs. Pinchot, Newell, Fernow and Miss Dock were proposed and adopted as members of this committee.

The committee on resolutions reported the following resolution, which after some discussion was adopted:

"WHEREAS, the Pacific Coast Redwood forests (*Sequoia sempervirens*) are now practically all in the hands of private owners, who hold them for lumbering purposes; and

"WHEREAS, this species occupies a certain coast-range belt of remarkable climatic characteristics, the study of which ought to be of profound interest to science; and

"WHEREAS, the only other living *Sequoia*; usually known as *Sequoia gigantea* which the Redwood rivals in its proportions, as well as in its interest to travelers and to men of science, has already received protection in part, from the United States,

by the establishment of the Sequoia National Park and the General Grant National Park in the Sierra Nevadas:

"Resolved, That the American Forestry Association strongly approves the recent efforts of the several societies, clubs, colleges, universities and private citizens in California, to create a public opinion that will result in the purchase and permanent preservation, as a public forest park of a tract of over 25,000 acres, largely made up of the primeval Redwood forest, situated in the Santa Cruz Mountains, forty miles southeast of San Francisco and fifteen miles south of Leland Stanford, Jr., University, and known as the 'Big Basin Redwoods.'"

They also reported back the proposed Bill for protection against fire, with the recommendation that it be revised before receiving the endorsement of the Association. On motion of Mr. Luebker the appeal was referred to the Board of Directors with power to select a committee to revise the same.

A vote of thanks was tendered to Mr. Luebker for his energetic and able services in arranging for the meeting.

Meeting then adjourned.

FOREST LAW IN THE UNITED STATES.

BY TREADWELL CLEVELAND, JR.

I. FOREST LAW IN GENERAL.

All law is relative to conditions. Just as there is no single form of government which is absolutely the best, but only a number of forms which are better or worse with respect to the needs and the possibilities of a particular land, a particular people and particular conditions of civilization; so all law derives its warrant and its effectiveness from like demands and limitations.

Forest law will accordingly exhibit different aspects in different nations: in order to produce good results it will have, in the fullest sense, to be national.

Yet in as much as all civilized law constitutes theoretically a single body of science which conforms to the general

frame of human experience as a whole, the laws of all nations are rationally related. And from this it follows that, while forms will differ, the substance will be everywhere the same. Stated briefly, specific laws will differ, but they will be analogous and comparable because the underlying legal principles are identical. Thus, while the forest law which is now taking shape amongst us in response to the requirements expressed by our national conditions must be American, we are yet bound to turn for guidance to those countries which from various causes have already developed forest codes. From the example of Germany, France, or India we shall derive the spirit if not the letter of wise forest legislation.

The important contrast between economic conditions in the United States and those, for example, in Germany is perhaps too potent and familiar to require extended notice. A single consideration will suffice to show that contrast in its proper importance. Forestry in so far as it relates to productive forests is neither more nor less than an enlightened form of business management. The question of profit and loss is in this case always the first and the last. In Germany the population is dense, labor is cheap, every forest product has commercial value. In the United States the conditions are reversed. The inference need hardly be drawn. As a matter of business, the management of productive forests cannot be so conservative or so intensive here as there. Consequently all that body of legal regulations which in Germany, and in Germany only, is economically possible and useful would be worthless because inapplicable in the United States.

Again, different forms of government, which of course imply different material ideals, determine to a marked degree the practicability of a specific kind of legislation. The German, for instance, admits and even courts government control where the American would stiffen his democratic backbone against central authority or paternalism. In the United States, therefore, it is not desirable, because it is not feasible either for the forest owner to adopt a Teutonic economy of management, or for government, whether State or Federal, to assume an imperial custody of the individual's interests. Plainly, then, it is both impolitic and unjustifiable to censure the American lumberman as irrational because his business methods have not at all points the systematic conservatism of the German, or to demand of the State that it shall take upon itself the care and custody of each and every forest tract.

Yet the theoretic contrast offered by a comparison of the situation in the two countries mentioned should not be over-emphasized. Despite all differences a fundamental principle gives a bond of union. This is the principle that the good of the many must sometimes be sought at

the cost of the few. Applied to forestry, it takes the form that government possesses the right and hence the duty to restrict the liberty of the individual producer or consumer of timber so far as may be necessary for the sake of all or for the sake of posterity. The conception of "protective forests" illustrates this principle perfectly. Where the general or permanent well-being of a district requires the maintenance of forest conditions over a definite proportion of its area, while local appreciation of requirements is wanting or inadequate, there government may and should intervene between the individual and the community, or between the interests of the moment and the rights of later generations. There all distinctions, whether national or other, vanish before the general human interest. And this same principle extends beyond the sphere of mere protection. Not only is it needful that many of the forest areas of our country be preserved intact, as where continuous water-supply for irrigation is the first want, but it is needful also that its forests as a whole be exploited with all possible economy and foresight. Where economic conditions compel present methods, the law can intervene only to alter these conditions; it cannot force the lumberman to ignore them. In districts, for example, where taxes on forest lands are excessive the law cannot justly force the owner to delay the harvesting of his timber crop so long that his profits are eaten up; but it can reduce the taxes, or render them payable when the crop is harvested, or commute them into taxes on the gross receipts of the sales of harvested timber, or in some other way alter the conditions so as to remove the necessity of hasty and excessive cutting so far as the high taxes are the cause of it.

But if the American lumberman is not always in the wrong, according to the fanatical cry of the early forest movement amongst us, neither is he always in the right. He is in the business to make money, it is true, and he has the right to make it as fast and as long as he pleases. Nevertheless, if forestry is first of all an enlightened form of business management,

he cannot afford to ignore its principles. Frequently enough he is ready, both as a business man and as a citizen, to substitute economic for wasteful exploitation; all he is waiting for is the requisite knowledge and the encouraging example. After practice has established theory, he is generally eager, when economic conditions permit, to learn and to apply the principles of conservative management.

These observations will perhaps help to explain the course of forest legislation in our country, which, because of the existence of conditions such as those indicated, has had of necessity to be tentative and empiric. Forest law in the United States has taken a number of forms, which may be conveniently classified as follows: (*a*) Federal and State protective laws against theft and against injury by fire; (*b*) Federal and state laws in encouragement of tree planting; (*c*) Federal laws governing the disposal of public timber and of public lands bearing timber; (*d*) Federal and State laws establishing and regulating forest reserves; (*e*) Federal and State laws creating commissioners or bureaus of statistical inquiry.

The present paper deals with the early State laws and with the Federal laws down to the year 1891.

II. THE EARLY SETTLERS AND THE FORESTS.

The first colonists imported from home some appreciation of the value of trees and in the new country enacted for their protection laws which have an ancestry abroad. The colonies of Massachusetts, New York, Pennsylvania and New Jersey, especially, made speedy provision against the wasteful use of trees and against fire. The value of Pine timber for the masts and spars of ships and for naval stores—pitch, tar, turpentine and rosin—was particularly recognized by the loyal and energetic Earl of Bellomont, governor of New York, in the last decade of the seventeenth century; and a provision against fire from the burning of clearings became a law in Massachusetts as early as 1631. In 1791 New York passed the first law enacted in this country for the encourage-

ment of tree planting, providing a bounty for the successful cultivator of Mulberry trees. This was done through the influence of the New York Society for the Promotion of Agriculture, Arts and Manufactures, and in 1795 a committee of this society made a report upon the best ways of growing useful trees. Through Lord Bellomont's efforts New York passed also an act restricting the cutting of Pine timber fit for masts.

Such laws were, however, of foreign pattern, and though many of them, the forest fire regulations in particular, were retained upon the State statute books after the formation of the Union, they were but ill adapted to our conditions. The same is true of the forest fire laws which States early enacted. Though still to be found in the statute books of nearly all the States, these laws have become dead letters and they now possess little more than historic value. This is chiefly explained by the fact that in the early days, while only the resources of the Atlantic coastline were known to the settlers, there seemed to be real danger of a timber famine. When pioneers began to push inland the profusion of the forest growth was both a surprise and an impediment. The forest resources then opened up must have appeared to the pioneer truly measureless if not inexhaustible. Agriculture, moreover, could take root only where the forest had been cut and burned away, so that the woodsman's ax became a natural symbol of civilization and progress. Interest in forest preservation died a natural death, and this interest was not to be resuscitated till the lusty settler found that the enemy with which he had been forced to contend had become transformed into a friend upon whose bounty he would have thereafter to rely. In the first tide of settlement the consumption of wood, only a small percentage of which was economic consumption, rose above the prudent limit, and the farmer found himself with tilled fields, indeed, but without the woodlot to supply his needed fence and building materials or his fuel. The first broadly correct estimate of the actual value of our virgin woodlands really dates from this turning

point. Especially in the Middle West, the day soon came when local wood supplies were no longer adequate and recourse was had to the still undiminished stores of the North and East, to the vast forests of Michigan, Minnesota, Wisconsin, New York and Pennsylvania. The sudden, almost miraculous, growth of our railway system, which began to reach a full impetus immediately after the Civil War, and the building of telegraph lines, a little later, created an enormous demand for ties, poles and construction materials, for rolling-stock, stations, and so on, and soon began to tax available resources to the full. It is accordingly from about 1850, when the lumber industry began the rapid development which it has pursued ever since, that sentiment, and hence, incidentally, law favoring a wiser use of forest riches began to make themselves felt.

III. THE BEGINNINGS OF A FEDERAL FOREST POLICY.

The first national interest in the preservation of timber, like the first regulations of the colonists, was partly due to tradition on one hand and to ignorance on the other. The proposed enlargement of the Navy, which began to excite so much interest about 1790, explains the origin of the first Federal timber laws. With a view to discovering the best woods for naval construction, investigations were made as to the character and the supplies of suitable timber. The agents charged with this work reported emphatically in favor of Live Oak, which they assured the government would outlast all other woods. Their opinion was just, and the vessels subsequently built from this material proved even more durable than had been anticipated.

This judgment once reached, surveyors were ordered to seek out the quantities of Live Oak available and to report upon their situation and extent. Sums were appropriated for suitable tracts. Thus, by the first Federal forest law, passed February 25, 1799, \$200,000 were appropriated for the purchase of growing or other timber, or of lands on which timber was growing suitable for the Navy, and

for its preservation for future use. As a result of this act several small purchases were made on the coast of Georgia. An act of March 1, 1817, renewed the earlier law and directed the reservation of such public lands, having a growth of Live Oak or Cedar timber suitable for the Navy, as might be selected by the President. Acting under the authority of this law the Secretary of the Navy, under direction of the President, appointed agents and a surveyor to explore and select such lands. A reservation of 19,000 acres in Louisiana followed, some 240,000 acres in all being acquired by these and subsequent acts. Further acts were passed in 1820, 1822, 1825, 1827, 1828 and 1831. The act of 1822 (February 23d) authorized the President to employ so much of the land and naval forces as might be necessary effectually to protect public timber in the State of Florida, and to take such further measures as might be advisable. (U. S. R. S., Sec. 2460.) The act of 1831 provided a fine of triple the value of the timber and imprisonment not exceeding twelve months, where timber was cut or removed from public lands reserved for the use of the Navy; and also for the forfeiture to the United States of any vessel having on board, with the knowledge of the master, owner, or consignee, timber taken from naval reserves or public lands, with intent to transport the same to any port or place within the United States, or for export to any foreign country; the captain or master of such vessel being required to pay a sum not exceeding \$1,000. (U. S. R. S., Secs. 2461, 2462, 2463.)

These highly restrictive enactments were productive of more harm than good. In the first place, they were far too severe, especially when a judicial decision declared (9 Howard, 351) that the provisions of the law of 1831 applied to all timber on public lands, whether that timber was suitable for naval purposes or not. A law which took no account of the needs of the settlers, which made it a penal offense to take timber from public lands, where timber was necessary and where only public timber was available, could not possibly be respected. Depredations in open dis-

regard of the Federal provisions became the common practice, and have, indeed, continued almost undiminished down to the present day. In the next place, when iron and steel began largely to replace wood in the construction of ships, there was no further pressing need of the reservation of Live Oak. Again, such measures could never have been pushed except for the prevailing ignorance as to the real extent and character of the country's forest resources. But perhaps the effect of this early legislation would have been more beneficial, if it had not been for the passage of laws whose provisions are either ambiguous or inconsistent with the above, or both. Sections 4205 and 4751 of the Revised Statutes contain regulations covering the same heads, but furnishing other definitions of the offense and also different penalties for the offender. Redundancy and confliction have, indeed, always been a drag upon the operation of the Federal timber laws. The want of a satisfactory definition of the offence and of the penalty attached to it robbed these laws even of effective expression. Again, among the pioneers of the West there had grown the feeling, sprung from frontier independence, that government property was common property; and to this was added the natural inference that a government which was unable to frame adequate or intelligible laws for the protection of its property roundly deserved to be robbed.

Between the years of 1828 and 1831 the government experimented with two plantations of Live Oak, one near the Pensacola Navy Yard, and one at Deer Point, Fla. According to existing accounts the Pensacola plantation proved unsuccessful. The Deer Point plantation appears to have been more ambitious and perhaps better managed. Judge Breckinridge had the supervision of it, and from his letters to the Secretary of the Navy and the reports of Clark, his overseer, it would seem that the work done consisted of the grubbing out of over-crowded patches of Live Oak, the planting of seedlings over sparse areas, the cutting of fire-roads and the planting of acorns. Apparently the plantation thrived under this treatment; but

the political interests changed with the appointment of a new Secretary of the Navy, difficulties about appropriations arose, and when a special agent was appointed to inquire into the progress of the work, his report, which is in part commendatory and in part equivocal, determined the Secretary to discontinue the work, and it was never afterwards resumed.

From the date of the first Live Oak laws down to 1831, the Secretary of the Navy had charge of the naval timber reservations. In that year this authority passed into the hands of the Solicitor of the Treasury, where it remained till 1855, the year in which it was transferred to the Department of the Interior. That Department, through the General Land Office, has since had the care of the public timber lands, both reserved and unreserved. Special appropriations for the protection of the public timber lands from theft began in 1872. Five thousand dollars were annually appropriated till 1878, when, the depredations having gone on unchecked Congress increased the appropriations to \$25,000. After that year the yearly sum given for this purpose rose to as much as \$120,000 and declined, till in 1898, the increased appropriation of \$175,000 was made, which this year has been increased again under the new Federal Forest Service, to the sum of \$300,000.

IV. THE FEDERAL LAND POLICY.

Intimately connected with the Federal forest policy, and in large measure explanatory of it, is the general Federal policy with regard to the disposal of its public lands. The government was interested in encouraging the squatter, the homesteader and the miner, to take and develop these lands. The Preëmption law was passed in 1841. In 1862 came the Homestead law, which permitted a settler to acquire 160 acres of public land after a residence of five years, its aim being, of course, to further agricultural settlement. Fraudulent settlement for purposes other than agricultural, however, soon began to be common. The settler had only to pay the moderate entry charges, and where the

land was covered with valuable timber, there was offered the obvious temptation to occupy the claim for the five years required and then, on acquiring title, to cut off the timber and abandon the ground, which in such cases was then, or soon became, worthless for agriculture. Where such fraudulent settlement was made by the dummies hired by rich lumber men or railroad companies, who defrayed the entry charges and paid for the settler's time and trouble, the same results followed in an exaggerated form.

The great railroad grants soon followed. The first of these was made by the law of 1850, and its operation has been characterized by the present commissioner of the General Land Office as "opening the flood-gates." From that date the people became growingly conscious of the great value of the timber standing upon the public domain, and of the profit which might be derived, whether under law or in defiance of law, from its harvesting and sale. In 1875 (18 Stat. L., 482) was passed an act granting the right-of-way through the public lands to any railroad company which filed, as required, with the Secretary of the Interior due proof of its organization, etc.; *and also the right to take timber for construction purposes from public lands adjacent to the lines of the road.* With these laws the ultra-restrictive policy represented by the act of 1831, already noticed, was completely reversed. Enormous amounts of most valuable timber were donated to the railroad companies, which had begun their marvellous rise just after the Civil War, and which grew during the next quarter century with a rapidity difficult to realize.

It will have been noticed that the railroads were granted timber from *adjacent* lands and for *construction* purposes. Much ambiguity clung to the official and judicial construction of the italicized words. In some cases "construction" was ruled to cover the rolling-stock and even stations, while "adjacent" was liberally interpreted to mean anywhere within fifty miles or so on both sides of the line and one hundred miles beyond the termini. Great as has been the gain to the enter-

prise and commerce of both East and West from this extravagantly generous policy, the enormous havoc it has played along the great forest belts might well have been avoided by laws more considerably framed.

Close upon the heels of the railroad timber grants, came the so-called "Timber and Stone Act" and the "Mineral Act," passed upon the same day, June 3, 1878.

Their passage is well known to have marked another epoch in Federal forest legislation. Their effect was to open to the general market all the timber on the greater portion of the public domain lying west of the Mississippi. The "Mineral Act" (20 Stat. L., 88) authorized "all citizens and other persons, bonafide residents of the State of Colorado, or Nevada, or either of the Territories of New Mexico, Arizona, Utah, Wyoming, Idaho, or Montana, and all other mineral districts of the United States * * * to fell and remove, for building, agriculture, mining, or other domestic purposes, any timber or other trees growing or being on the forest lands, said lands being mineral, and not subject to entry under existing laws of the United States except for mineral entry * * * subject to such rules and regulations as the Secretary of the Interior may prescribe for the protection of the timber and the undergrowth growing upon such lands, and for other purposes:

Provided, The provisions of this act shall not extend to railway corporations. The words "or other domestic purposes" render the scope of the privilege granted almost without limit. Besides the uses to which the public timber was put under color of the law, the removal of timber for sale outside the State or Territory often took place in violation of its obvious spirit, which was to encourage settlement by removing hardship-working restrictions upon the use of timber and wood for purely local needs. The ambiguity of the word "mineral" in the context was responsible for still further breach of that spirit.

The "Timber and Stone Act" (20 Stat. L., 89) provided for the sale of unreserved, unoffered, surveyed timber lands in Cali-

ifornia, Oregon, Nevada and Washington. The scope of the act was extended August 4, 1892, to all the public land States. It resulted in bringing such lands into the possession and under the control of a few wealthy syndicates, saw-mill operators and lumber dealers.

Judicial rulings under these laws could not be enforced because the laws themselves were impracticable. Section 2461 U. S. R. S., for instance, is so severely restrictive as to be a dead letter. Again, its conflict with Section 4 of the Timber and Stone Act, regarding penalties, renders the latter law also ineffective. Under Section 2461 the penalty for theft is not less than triple the value of the timber removed and imprisonment not exceeding 12 months, while for the same offense under the later act the penalty is a fine of not less than \$100 nor more than \$1,000, without imprisonment. A glaring defect of the Mineral Act was its compromise of theft. It provided that in cases of prosecution under Section 2461 relief therefrom and from further liability might be obtained by payment, at the rate of \$2.50 per acre, for the land from which the timber had been cut or removed. Such a provision was virtually an invitation to unscrupulous lumbermen to take the chances and cut their choice of public timber from the designated lands. If they were detected, compromise at \$2.50 per acre—for less than the timber was worth—was a mild punishment enough; and if they escaped, so much the better. Like the earlier acts, the Mineral Act thus hastened the waste of the public forests.

The situation was further complicated by the passage in 1888 of an act (25 Stat., 166) which provided yet another penalty for the theft of public timber. By an act known as the "Permit Act" (26 Stat. L., 1093), passed in 1891, residents of the States of Colorado, Montana, Idaho, North Dakota, South Dakota, Wyoming, Nevada, and Alaska, were authorized to obtain permits from the Department of the Interior to cut timber free of cost from mineral lands therein for purpose of sale and traffic; while miners, farmers, and other bonafide residents, who had not a

sufficient supply of wood on their lands or claims for developing the same, or for fire wood, were permitted to procure the needed timber from public lands without a permit. February 13, 1893, New Mexico and Arizona were also brought under this act.

V. THE TIMBER CULTURE LAWS.

Beginning with an act passed in 1873, Congress, aroused at length to a sense of its own folly, enacted a series of laws known collectively as the "Timber Culture Law." Broadly speaking, this law was supplementary to the Homestead Law and, like it, was intended to facilitate the settlement and improvement of unoccupied public lands. But it strove to offset the fraud and the waste of timber that had resulted from the Homestead Law—by provisions, however, which in their turn failed, from their impracticable nature and want of safeguards, to effect that end.

The Timber Culture Law gave lands to settlers on the condition that a specified proportion of their claims, within a fixed period, should be planted and cultivated to certain varieties of forest trees. The original law was scarcely passed before the need of amendment became only too manifest. Settlers were required to do so much that, even when disposed to carry out the terms of the act, they found compliance impossible. Again, trees could only be planted at a distance from one another that was far too great to result in the creation of forest conditions according to the object of the law. Among further difficulties was the want of knowledge both on the part of government and on the part of the planter as to a right choice of trees for local conditions and their proper care. And when, soon after, it became law that the settler who had taken out a "tree claim" might commute it into an ordinary Homestead entry, he very commonly took this channel of escape between the Scylla of the law and the Charybdis of failure. Consequently, though several million trees were set out in Kansas and Nebraska alone, and though great number of trees still grow in the Prairie States as the result of this law, yet true forest conditions were nowhere

established and the timber supply of the country, which other bad laws had helped to deplete, was in no way augmented by its inapplicable provisions.

Efforts to repeal the Timber Culture laws began not long after their enactment,

and at last, after ten years of failure, these efforts were crowned with success, in 1891, by the same act which first provided for the establishment by the President of National Forest Reserves.

(To be continued.)

THE PROPOSED APPALACHIAN PARK.*

The reckless destruction of forests in many portions of our country; the resulting scarcity of timber in many sections; and the increasing irregularity in the flow of our streams, in regions where these forests have been, in part, removed, are all serving to awaken a new interest in practical forest problems—such as has never been felt in America before. Meanwhile, also, the park idea has been developed until we are now setting aside in all of our larger towns and cities park areas for the pleasure and comfort of the people. We are also setting aside for the preservation, in as nearly as possible their original condition and under public control, such historic regions as the Gettysburg and Chicamauga battlefields.

We are also beginning to preserve and set aside remarkable landscape features, such as are found in the Yosemite and Yellowstone National Parks. Furthermore, the demand for the preservation of large forest areas in different portions of our Western States and Territories about the headwaters of important streams has resulted in the setting aside by the Government during this closing decade of some thirty different forest reserves, embracing more than forty millions of acres. The two great Western National Parks just mentioned contain three million acres of land additional, a considerable portion of which is forest-covered.

The success attained by the promoters of the new forest movement in securing the establishment of these great forest reserves in western States and Territories stimulated and strengthened the long ex-

isting wish that somewhere in the heart of the great Appalachian system of Eastern America there might be secured and set aside by the Government one or more areas still covered with the original hardwood forests in order that these, also, may be preserved for the examination and admiration of future generations.

Out of this desire has grown the recently developed movement for the establishment somewhere in the southern portion of this Appalachian region of a park or forest reserve, which should include the finest of the forests, the largest of mountains and the headwaters of important streams. A few decades since these forests were generally regarded as being inexhaustible and even those who could foresee the conditions existing to-day, were unwilling to believe that a government forest reserve anywhere in this region was even a remote possibility. But already the lumbermen are making serious inroads on these forests; already streams in the Piedmont Plateau region bordering the mountains are becoming more irregular in their flow; and, fortunately, already public opinion is demanding that careful surveys be made of these more important Appalachian forest areas and of the streams which flow from them with a view to the selection of the most suitable area for such a forest reserve. Such investigations are now in progress, and it is hoped that at the beginning of the new century we may see the establishment under the control of the Government of such a reserve or park as may be considered most suitable.

At the present stage of this investigation no specific area or areas can be described as most suitable for the location of such a

* Read before the meeting of the American Forestry Association in New York on June 26th.



By Courtesy of the N. C. Geological Survey.

ONE OF THE MAMMOTH YELLOW POPLARS, ON THE WEST SLOPE OF THE
BLACK MOUNTAINS IN NORTH CAROLINA.

forest reserve. In favor of selecting for this purpose an area in western North Carolina and the adjacent States, it may be said that here we find the highest and most massive of the Appalachian Mountains, nearly half a hundred peaks rising more than six thousand feet in height; the finest remnants of the original hardwood forests, still unaltered by man; and the deepest gorges, resulting in the most varied and beautiful scenery. The region is accessible through the winter as well as in the summer seasons, and can be reached within a twenty-four hours' ride by more than one-half of the total population of the United States. It is unsurpassed in healthfulness by any other in the country; in it we have the headwaters of streams which have to do with manufacturing enterprises and with navigation in the two Virginias, the two Carolinas, Georgia, Alabama, Tennessee, Kentucky and Ohio.

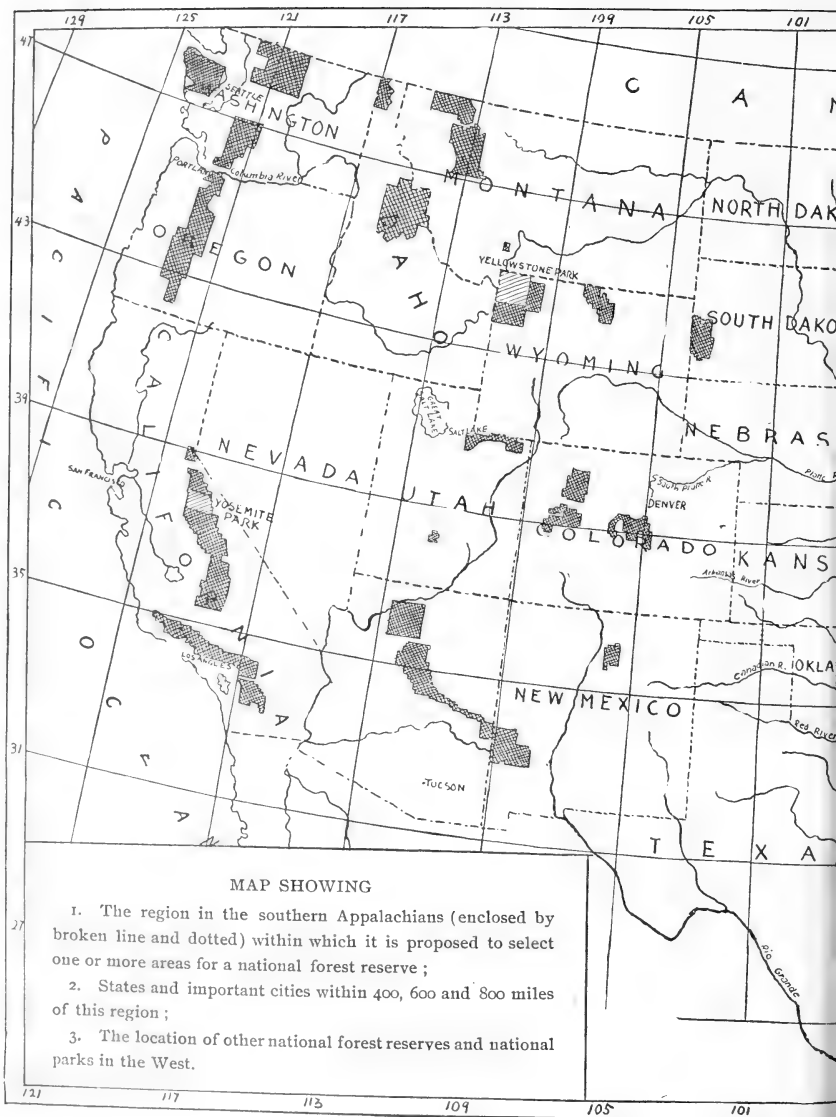
Only those who have studied this southern Appalachian region have any intelligent conception of the richness and variety of its forest and floral growth. Botanists are agreed that it is unequaled elsewhere in America. Here the forests of New England meet those of the extreme southern states; so that, ascending from the tops of the gorges to the tops of the higher mountains one sees much the same variety of plants as he would in traveling from Alabama to Canada. In the cool moist coves of this mountain region the hardwood forest trees reach their maximum development. Oaks from five to seven feet in diameter, Chestnuts still larger, and Tulip Poplars from six to ten feet in diameter are associated with Beeches, Birches, Lindens, Maples, and numerous other species which have found conditions most favorable to their growth. Here they have lived together for centuries without man's interference. In the gorges of deeper valleys one finds the trees and shrubs which are common over the Piedmont plains, which lie to the east, south and west. Ascending the mountains along the lower slopes one passes through the splendid growth of Maples, Oaks and Poplars; above these come the Beeches, Birches, Hemlocks and

their associates; but higher still one passes through groves of Balsams and Fir trees. At the tops of the higher mountains even these last have generally disappeared, giving place to grass and the rose-colored Rhododendron. Interspersed among these trees in the coves, on the crags, and up the mountain slopes, one finds the Rhododendron, the Kalmias, and hundreds of other beautiful shrubs and a rich variety of delicate flowering plants.

This rich inheritance is being rapidly destroyed. Let us, at least, set aside a limited portion of it for the pleasure and instruction of generations that are to come after us. As illustrating the importance of prompt action in the establishment of this Appalachian forest reserve it may be said that never before has the activity of the lumbermen and timber speculators been so great in that region as at present. The great forests of the North and East have been cut away to such an extent that the attention of lumbermen in all this portion of the country is now being turned toward the great hardwood forest of this southern region. A few decades hence hardly a remnant of this forest will be left that will not then have been visited and altered by the lumbermen.

In considering the question of a National Park among the southern Appalachians, it should be borne in mind that the parks now under control of the government (the Yosemite and Yellowstone) are inaccessible to the vast majority of the people of this country during all seasons of the year, on account of their distance from the centers of population and the expense of reaching them, and that they are accessible to the traveling few during only the summer season. The proposed Appalachian Park will be within a few hundred miles of all that portion of the United States east of the Mississippi River, and it will be open to visitors throughout the entire year.

The vital question is: How can such a park or forest reserve, as is desired in the southern Appalachian region, be secured. If the land belonged to the Government, the problem would be one of easy solution, but the lands which are available for such a purpose are owned by private individ-



MAP SHOWING

1. The region in the southern Appalachians (enclosed by broken line and dotted) within which it is proposed to select one or more areas for a national forest reserve ;
2. States and important cities within 400, 600 and 800 miles of this region ;
3. The location of other national forest reserves and national parks in the West.



uals, who cannot afford to donate them for this, or any other, purpose. None of the States interested can be induced to purchase the land for this purpose, nor should they be asked to do so. Were any one State to make such a purchase, it would be to preserve the headwaters of streams which flow through half a dozen adjacent States, and which would benefit people of these States in connection with their manufacturing and transportation enterprises. Were any one State to set aside such an area as a National park it would be for the pleasure and benefit of people who visit it from all portions of the country. Such a park or forest reserve would be of but limited benefit to the State in which it might be located; and, indeed, its establishment would withdraw from taxation valuable lands within her borders; but, nevertheless, it would be of benefit to that

State, as it would do to all adjacent States, and, indeed, to the country at large.

There is only one way in which such a park or reserve can be established; that is, for the Government to purchase the lands which are to be incorporated in it and perpetually to dedicate the same as a park or forest reserve as a part of the public domain. But, while this would entail considerable outlay on the part of the Government, owing to the great value of these hardwood forests and their proximity to the great centers of population, such a Reserve, if judiciously managed, will pay a good interest on the investment, beside proving of inestimable value to the people of this country as a public resort for health and pleasure, as a lesson in practical forestry, and as a means of preserving the headwaters of important rivers.

J. A. HOLMES.

NOTES IN OKLOHOMA.

I. THE EXTERMINATION OF THE RED CEDAR.

Twenty years ago the Red Cedar grew abundantly in western Oklahoma, especially in the country tributary to the Cimarron and Canadian Rivers. Few specimens grew in the sandy valleys of the rivers, or on the better agricultural land, but back in the rough country and along the tributary streams and in the canyons they appeared in considerable numbers. Nowhere did they grow thickly enough to merit the term of forest, yet in places they formed almost unbroken lines along the precipitous sides of the canyons. Growing in poor soil and where grass could not obtain a hold, they lived year after year and grew, unmolested by the fires that annually swept the prairies.

For the last twenty-five years these trees have furnished most of the posts used by the ranchmen and settlers of Oklahoma and adjacent parts of southern Kansas. Since the settlement of Oklahoma the post-cutting has greatly increased. Large numbers of men have had little other

business than the cutting and marketing of these Cedar posts. As the accessible trees have been removed, choppers have entered more remote and more difficult places, where often the wagons could not be brought within a mile of the trees and where the choppers had to drag posts out with a single horse.

A few years ago posts hauled from the canyons could be bought in the nearest towns for four or five cents each. As the difficulty of obtaining them has increased, prices have advanced continually, until now those of inferior quality sell for twelve or fifteen cents each. But few Cedars now remain, and they are so difficult to reach as to be of little use. With the removal of the large trees for posts, the small ones have also been taken to be used for ornamental purposes in yards. The removal of these smaller trees has been an almost complete loss, for probably 99 per cent. of them have died in transplanting.

In these two ways the Red Cedar of western Oklahoma has been all but exterminated.

II. REPRODUCTION OF TIMBER IN THE BLACK JACK FORESTS.

On the watersheds of eastern and central Oklahoma and wherever the soil is sandy a growth of Black Jack timber is found. At the settlement of the country most of the trees were old and many had to be removed. Fire and stock had kept the young growth down for the trees seldom stood near enough together to keep out the grass, which covered the hills on which they occurred here and there as scattering specimens. In such a stand of trees a deer could sometimes be seen half a mile away, so clear was the forest of undergrowth.

With the settlement of the country the conditions have changed. Many of the original trees have been cut away, but stock has been kept out and fires have been prevented. In consequence, every stump has sent up a thrifty family of sprouts, and many seedlings have appeared. The young trees have grown rapidly. An annual increase in height of two to three feet is not exceptional, and many now stand twenty feet high. In some regions the young growth has already become so

dense as to form favorable conditions of leaf canopy and ground cover, and persons who have desired pasture rather than timber have had to resort to frequent burning.

Other species are also appearing among the young Black Jacks. Post Oak, Bur Oak, Hackberry, White Elm, Shittimwood and wild China are frequently seen. The last two appear to be very much on the increase. The result of ten years' protection in these forests indicates their strong natural tendency to increase and to run to a mixed growth.

In a few instances some of the hard and more valuable species have been introduced among the natural growth with remarkable success. Hardy Catalpa, Black Locust and Black Walnut seem to thrive under such conditions. The former two have made very straight and rapid growth, averaging an annual increase in height of from four to five feet. By proper methods of interplanting, there is little doubt but that the Black Jack forests of Oklahoma can, in a very short period of time, be changed to forests of valuable timber.

W. L. HALL.

FORESTRY FOR THE NEW YORK PRESERVE.

After the New York State Legislature appropriated \$2,000 for the State Forest Preserve, the New York Fisheries, Forest and Game Commission requested the Division of Forestry of the Department of Agriculture to examine its lands, and to submit recommendations for the management of the forests, in accordance with the regulation for furnishing working plans to those who pay the field expenses of the experts. Accordingly the work of investigating the forest conditions of the Preserve began in June, and the completed working plans are to be ready for submission to the Legislature by the first of January, 1901. The beginning of this investigation marks an epoch in the forest history of the country. For the first time the Division of Forestry is coöperating in

practical forest management with one of the state governments; and if the final report leads to the repeal of the forest clause of the 1894 amendment to the State Constitution (section 7, article 7) that now prohibits any cutting or utilization of the forest crop of the preserve, a large public preserve will for the first time in our history be put under skilled forest management, and operated with a view not only to its permanent preservation, but to the production of a regular revenue. The clause referred to was passed in fear that if any lumbering were allowed, mismanagement would be inevitable. The attempt to repeal it in 1896, at a time when the State had no machinery for regulating the cutting in a scientific manner, was defeated by the greatest majority that ever

defeated a proposal to repeal in New York State.

The working plans for which the data are being gathered will amount to a detailed scheme for managing and harvesting the forest crop of an important section in the Preserve. They will show whether or not a steady revenue can be drawn from it without diminishing its timber yield in the future; and whether it is necessary or not to prohibit all cutting whatsoever in order to preserve the forest. Their preparation will involve, first of all, an examination of the forest itself with a view to finding out what timber there is now on the ground, in quantity as well as in kind; and, secondly, a thorough study of the possibilities of lumbering on a sound business basis; or, in other words, an examination of the forest trees from the lumberman's point of view, and of the most profitable methods of marketing the timber. Thirdly, it will necessitate a thorough investigation of the fire problem, taking into consideration not only the best means of preventing fires in the future but also those of dealing now with lands which have been injured or devastated in the past; fourth, the preparation of forest maps; and lastly, an examination of the forests in their relation to the water supply of the region, and of the importance of preserving them as natural reservoirs, and for other reasons than those involved in the immediate production of revenue. This part of the investigation, to be taken up in collaboration with the hydrographer of the U. S. Geological Survey, will dispose effectually of any danger to the water supply in the proposed cutting and will fix all those areas which must be totally protected, or which will require particularly careful and conservative treatment.

In this investigation of the New York Reserve the direct supervision of the field-work and the preparation of the working plans is to be in the hands of Mr. Henry S. Graves, the Superintendent of Working Plans of the Division of Forestry, and recently appointed Professor of Forestry at Yale. The preliminary investigation

will be made by Mr. Ralph F. Hosmer, Field Assistant for the Division, and Mr. Eugene S. Bruce, of Tupper Lake, a very well-known Adirondack lumberman.

The investigation of the forest from a forester's point of view is to cover the stand of timber, the reproduction of the most important kinds of trees, and the extent and distribution of the forest types. It will thus ascertain what there is now on the ground, a matter of which there are no records, except those on the tax-rolls, for any part of the preserve. Furthermore, it will be the basis from which the regulations under which lumbering is to be carried on will be formulated. These regulations will insure against damage to the forest as a whole by providing for the perpetuation or increase of commercially valuable trees, and for the production in the shortest time of a second marketable crop wherever lumbering takes place. This can be accomplished without serious loss to the immediate returns in money.

The study of the possibilities of conservative and business-like lumbering will require a complete familiarity with the condition of transport by water and rail, with the marketable stand of timber in amount, quality and distribution, and with the state of the market; in short, a knowledge of the entire situation from the lumberman's point of view, and of the most economical and profitable methods of marketing the timber.

The work of Mr. F. H. Newell, the Hydrographer of the U. S. Geological Survey, on the water supply question will be one of the most important parts of the investigation. The supply of water from the Adirondack region is of great importance not only because of the Hudson River, but also because of the canals which are largely dependent upon it. It has long been known that lumbering in the Adirondacks has affected the flow of the streams, but to what extent has never been determined. The result of Mr. Newell's investigation will give the first accurate figures respecting the run-off of streams and the importance of forest cover on their watersheds.

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Consider.

One of the greatest lumbermen in the country, Mr. Fred. Weyerhaeuser, says that the dirth of logs at the mills is not the only trouble in the White Pine region. "The grief of the lumbermen is not wholly because it is evident to most of them that very soon they must cease to cut logs, for the very good and sufficient reason that soon they will have no logs to cut. There is worse trouble than this. There is the gravest danger that the whole Pine producing region, cut and uncut, green, growing and all, will take fire and burn up. If the dry weather in the north is the usual thing, that part of the country is going to have the worst summer for fires, and the heaviest losses it has ever had." Consider the state of things in which a danger of this sort is foreseen simply to be feared, not to be guarded against with extra care and every due precaution; in which its prediction means, not that the vigilance of an efficient fire patrol is increased, but that the timid who are able to leave set about packing up and moving away.

Arrested for Starting Fires. Dr. Rothrock, the Forest Commissioner of Pennsylvania, is seeing to it that the act of July 15, 1897, shall not remain a mere expression of good intentions on the statute books of his state, and in doing so he is

educating a class in the community as important as it is unthinking in the only way in which it can be educated. To this class belong the otherwise harmless citizens who start fires without meaning to, and a good specimen of them is a teamster, who, as a result of Dr. Rothrock's request that the act be enforced, was arrested on June 12th. According to the Philadelphia *Record*, which reported the case, this man was charged with being responsible for the fire which ran over thousands of acres in Lycoming and Sullivan counties some six weeks ago, and which did inestimable damage to timber and saw logs. His only intention, he stated, was to burn the underbrush from a strip of clearing, "but the fire got beyond his control." This is the story of many of the worst disasters of the past, and will continue to be of those of the future until arrests and prosecutions have made even the most thoughtless see possibilities of trouble in any fire, however humble and good of purpose. For the trouble is not that people are not told, but that telling cannot make those who ought to, comprehend. The serene carelessness of men who burn their brush just when conditions make it easiest for the fire to get away from them is beyond the power of statistics or of exhortations to ruffle. For people of this sort to order their doings by such an abstraction as a sense of the "legal and moral responsibility" incurred in the setting "of any fire" is impossible. Nothing short of enforcing the law can rouse them to caution.

But in the past it has often been just in the enforcement of the law that the difficulty lay, or more strictly speaking, in bringing the law to bear. For though it might be easy to see that a fire was started in some particular settler's clearing, the neighbors who knew it were unwilling to inform, and usually had slight provocation to. The one person who did have provocation was too apt to be the non-resident owner of a large timber tract into which the fire escaped, and in which there were no farms or fields to interrupt its progress; and for him to bring about a prosecution would be merely adding expense to loss. So for lack of somebody

to take the initiative nothing happened. It was in view of this that in 1897 Pennsylvania passed the act which made it the duty of the county commissioners to ferret out those responsible for fires, and to bring them into court. The inertia is still so great that the county commissioners have to be requested by Dr. Rothrock to perform their duty; but such a request must be complied with and the end is attained. A lever is supplied by which an energetic Forest Commissioner can set the machinery in motion. Until this was done, no amount of talking, writing, and passing of acts, did more than a limited amount of good; but now that the present state of things has been brought about the education of the harmfully careless can begin.



A Good Result. One of the many good results of the investigation on the New York Preserve will come from the hydrographic work. For years ignorant, or more often worse than ignorant, damming of the Adirondack streams has been going on with bad results, the reason frequently given being that for some industry or community down the stream a reservoir to regulate its flow was necessary. These excuses could be made to look so plausible, and the arguments brought in their favor to wear so benevolent an aspect, that it was only too simple and easy to persuade the state legislature to swallow them. No one knew anything exact about the flow of the streams or their volume, and the few people who might be able to perceive that the real purpose of the dam was to help some lumberman float out his logs could do little. They had nothing definite wherewith to back their arguments and support their opinions. Mr. Newell's surveys will put an end to this state of things. Hereafter statements about the flow of a stream will have to conform to the results of scientific measurements, not to the momentary needs of a lumberman. The needless flooding of fields and forests and the other deplorable consequences which have so often followed the building of dams in the past, will no

longer occur through legislative ignorance.



"The Inexhaustible Forests." Within fifteen years school children were learning the phrases of a geography which described the wealth of Washington as being largely in its lumber, and taught that "the forests of this Territory are considered inexhaustible." To-day we read that "about 57½ per cent. of the original resources" of the State are still available. Somewhat less than half the remainder has been destroyed by fire, somewhat more than half has fallen by the axe. At the same time a correspondent of the *Mississippi Valley Lumberman* writes of the timber in the Oregon coast range, which resembles that of Washington: "It is astonishing how fast it is being taken up; the woods are full of men examining and estimating it, and by the end of the year I think there will be but little land left in the hands of the government unappropriated." A later sentence indicates one of the chief reasons for the rush. "I meet many Minnesota and Wisconsin men, all looking for timber either for themselves or for others." In plain words, the Lake States have been well-nigh cut out, and the lumbermen who skinned them are hurrying to get a foothold in the "inexhaustible" forests of the Pacific slope before it is too late.

To a great extent these lumbermen are in the right. We cannot go to them shouting "forbear," or deprive them of their opportunity. But what we can do and should do is to see that the kind of short-sighted destruction which has turned into barren wastes great sections of Michigan and Wisconsin is not repeated. Profitable lumbering can go on without this, if the right precautions are taken. What is needed is, first, investigations of the Pacific forests, in order that ignorance may not characterize their exploitation, and appropriations for carrying these investigations on; next a public demand for the passage of any laws they may show the necessity of before it is too late; and finally proper provisions for the rigid enforcement of these laws. Thus only can disastrous devastation in the Red Fir region be avoided.

Agricultural Journals and Forestry. In reviewing Mr. Bruncken's book on "North American Forests and Forestry" the *Nation* recently said: "It is to the well-informed agricultural journals throughout the land that we must attribute much influence in helping to lift the weight of despair which has so long discouraged concerted effort to save our forests. Through evil report and ridicule, they have kept up the fight against the universal spendthrift policy which has hitherto characterized all lumbering here. To them and to the special forest journals must be given high praise, if lumbering in our country ever yields to wise forest management." This is true and should not be forgotten. But in attributing "much influence" to the agricultural journals, the *Nation* might lead one to suppose that they have done all there is in their power to do, and this is hardly yet the case. How many of the farmers in the country who are deliberately trying to make their woodlots profitable are aware for instance that they can now have the expert advice of the Agricultural Department's trained foresters for the asking, or know that this does not mean general good counsel, but specific recommendations for each separate farm, based on a careful examination of its conditions and needs? The dissemination of information of this valuable sort is one of the first objects for which the farmers' and lumbermen's journals exist. Yet the correspondence of the American Forestry Association shows that comparatively few farmers know of this opportunity; and similarly that few lumbermen realize that practically the same one is open to them.

The beautiful thoroughness of European forestry, the grand extent of our national reserves, and the size of the smaller, but perhaps more impressive because more familiar tracts of natural woodland, sometimes lead us to disregard small woodlots and forest tracts, and the small improvements which can be made in their management. But yet though these improvements may be so slight as to seem hardly worthy of the name of forestry, they alone can make all the difference between baneful waste and the economy whose results will

be profitable to the individual and most precious to the community. Until the truth of this is generally recognized the agricultural and lumber journals will not have finished their work. So much more still remains for them, that at times all they have already accomplished seems to be no more than a hint of encouragement for future effort.



In Massachusetts and Michigan. Two publications which have recently been issued by the State Forestry Commission of Michigan and by the Massachusetts Forestry Association show what can be done in the way of State work. It is only when each particular region is ready to take hold of its own particular difficulties with the earnestness which characterizes the efforts in these two States that the best results can be expected in the country at large.

Michigan has only recently taken up forestry and the chief problem which those of its citizens, who realize its needs, now have to deal with is the arousing of public opinion and the creation of a popular demand for good legislative and other measures. For this reason the Commission has undertaken among other things to secure the cooperation of the women's clubs of the State. A list of fourteen topics for discussion with necessary references has been issued, and correspondence regarding any of them is invited. They are grouped in five classes; those relating to: 1. The Primeval Forest of Michigan, 2. The Passing of the Forest, 3. Reforestation, 4. Interest of the State in Reforestation, 5. Some Practical Problems. Three of the practical problems are: How to plan a system of taxation in aid of reforestation, How municipalities can aid the work of reforestation, What is the most efficient aid to be rendered by the women's organizations in promoting tree planting and forestry. The way in which the women's clubs have taken hold of the Minnesota Park project and the work they have already done in Pennsylvania has shown that much can be expected from them.

Massachusetts is the State in which efforts to preserve forests and trees and to

use them economically have probably been made since earlier times and with more consistency than in any other. Its problem is not so much that of arousing public opinion, for a large body of people are already interested and ready to exert themselves in improving the forest conditions of the Commonwealth. Forest work can also be carried on more intensively there than in other States, and it is possible to give much more attention to æsthetic considerations. Hence to educate those who have charge of trees in the right ways of taking care of them is one of the chief objects of the Massachusetts Association. It is the purpose of the pamphlet which it has just issued, and which is described

by its title, "Practical Suggestions for Tree Wardens." This pamphlet contains advice about carrying out the provisions of the law of 1899 which determined the powers and duties of the tree warden; general directions for pruning and planting, with recommendations regarding literature, nurseries, etc.; and finally ends with some statements regarding insect pests and their treatment. The hope is expressed that the wardens will see the value of coöperation with the Association, and it is pointed out that "such suggestions for changes in the present laws are dictated by the experience of the wardens will be of much value to the Association Committee on Legislation."

CORRESPONDENCE.

Planting White Pine Seedlings.

TO THE EDITOR OF THE FORESTER,

SIR: I send the following description of a plan for planting White Pine seedlings which I have been using for some time, and which has been a great success. My idea was to find a method by which planting could be carried on at any time in the year when the ground was free from frost, and at odd times when best suited to the planter.

In the spring I bought 4,000 White Pine seedlings six inches high and potted them in four-inch neponset paper pots, using well-worked rich soil. They were then placed in the shade, under apple trees on the north side of a barn. They were well watered from time to time, and when rooted and started in the pots as many as convenient were carried to the woodlot and planted. As the paper pots are light a large number can be carried with ease. Their bottoms are made in such a way that the roots soon protrude through uninjured, and pots and all can be placed in the ground without disturbance to the young trees. The manner in which the pots are put together is such that they soon become loosened and then rot apart. I have planted in dense sprout growth and pasture land under bushes in the shade.

Thus have the seedlings been protected from sun and drying winds.

How far this method could be carried in extensive plantations I do not know, but it has solved the problem of planting at odd times all through the summer at small expense, without loss of seedlings. With an ordinary trowel I have planted one hundred pots in an hour, and thus far no trees have died. Any number of potted trees can be carried to future plantations and left in places near the field of planting, to be placed in the soil when convenient. The pots are so small that even when wetted they weigh but little. My trees cost me here potted about .8 cents, we having done the work ourselves, which may seem a large sum; but the ease with which they are transplanted and the small number lost in the process well offsets this.

I trust that this will prove of enough interest to your readers to have a notice made in your paper. A neighbor of mine who owns a woodlot of some thirteen acres that has been cut is now planting with Pine seedlings by this method, I having proved to him that it was sure of success. He is a man of small means and can plant but one day a week.

HENRY BROOKS.

LINCOLN, MASS., JUNE 25.

NEWS, NOTES AND COMMENT.

In Minnesota. In a letter which was received by THE FORESTER last month the Secretary of the Minnesota State Forestry Association said of the condition of things in his State: "Throughout the greater portion of the State it has been very dry this season, and forest fires have done great damage in sections. Spring planted trees are barely keeping alive. Prairie planting has received much attention by the Association, and at various times has been encouraged as much as possible by the distribution of seeds and seedlings. This spring 10,000 Jack Pine seedlings were distributed to applicants, a charge only being made to cover actual cost of the same. The Jack Pine is one of the hardiest native evergreens, a rapid grower while young, resists drought better than any other I know of, and for trying situations like those on some of our prairies or droughty soils it should be planted more extensively.

"The National Park movement has been discussed considerably and many clubs and organizations as well as private parties are doing all they can to further the cause. Man naturally seems inclined to be a forest destroyer, partly for the reason that he is quicker to notice present opportunities and to take advantage of them in his greed for wealth, than to bank on future possibilities—even though they may return a hundred fold and be perpetual."

Comment on the Forestry Movement. "The attendance at the special summer meeting of the American Forestry Association held in this city on Monday and Tuesday of this week, and the interest manifested in the proceedings, afforded an encouraging evidence of the growth of forestry in public appreciation. The Association deserves a much wider support than has been given to it, and this, we cannot but believe, is due only to want of information about the society and its aims. *Forest and Stream* readers as a class are interested in forestry, and should be allied

with the Association in its works. The movement deserves their support. We are doing nothing more than what is due to both when we urge that our readers may give their active coöperation to the Association by joining its membership.—*Forest and Stream*, June 30.



Reserve Statistics. Mr. Henry Gannett gives the following table of areas reserved in each State and Territory with the proportion which the reserved area bears to the total area and to the wooded area of each State or Territory. (20th Annual Report of the Geological Survey, part 5, p. 3.) :—

State.	Area Reserved. Sq. Miles.	Per cent. of Total Area.	Per cent. of Wooded Area.
Arizona.....	6,825	6	27
California.....	13,509	9	30
Colorado.....	4,848	5	15
Idaho.....	6,264	7	18
Montana.....	7,885	5	19
New Mexico.....	4,273	3	18
Oregon.....	7,271	8	13
South Dakota...	1,893	2	76
Utah.....	1,474	2	15
Washington.....	12,672	19	27
Wyoming.....	4,994	5	40



Irrigation Investigation. As the proper use of the water supply is an important factor in promoting its conservation, readers of THE FORESTER will be glad to know that the investigations bearing on the subject are progressing under favorable conditions. The appropriations for the investigations under the Department of Agriculture have been increased from \$35,000 to \$50,000 this year and the California Water and Forest Association has signed contracts with the Department for studies in the duty of water and in the results of the present irrigation laws in its state. A share of the expense involved is being borne by the California Association, which intends to be useful later in promoting such legislation as the results of the

investigation point to as desirable. The importance of this work, which will be under the charge of Mr. Elwood Mead, and the value of the service which the Water and Forest Association is rendering the State, may be gathered from part of an editorial which appeared in the *San Francisco Chronicle*: "Our courts are constantly burdened with water-right litigation, so much so that many believe that the expense of litigation is greater than that of physical development. Irrigation enterprises cannot go on under such circumstances. For all these legal troubles there must be some fundamental cause in the nature of our legislation, but as to what that cause is, or how, if in any way, it can be removed there is no general knowledge whatever and no agreement among experts."



Division of the Forest Work. "Somewhat the same problem which presents itself in the army staff system, where it takes three bureaus to feed one soldier, confronts the forestry service of the United States Government. The law covering this subject is now a most ragged piece of patchwork. The administration of the Federal forest reserves is committed to the General Land Office, which does its task badly or not at all; the mapping and description of the reserves are the care of the Geological Survey, whose share is very creditably done; while the Forestry Division of the Department of Agriculture, to which the whole business normally belongs, is clothed only with a general authority over the forestry interests of the country and for the establishment of relations between the Government and the private forest-owners.

The absurdity of thus splitting up a work which ought to be under a single management is obvious when we see what some of the subjects are that occupy the attention of the Forestry Division. Chief among these, perhaps, is the study of forest fires. The division has been for years engaged in investigating the causes of such fires, the damage they have done, and the most effective means of preventing them.

Here, surely, are matters of quite as much consequence to the Government as to any individual land-holder, and involving details of administration on the intelligent performance of which depends the safety not only of a great deal of public property, but of adjacent private property. The recorded losses from fire foot up some \$20,000,000 in a year, and to these must be added, for a grand total, a multitude of which the story is never written. Nor is the question of the introduction of the flame to the fuel the only one involved in the investigation of such fires; quite as much importance attaches to the condition in which the flames find a forest after they have got under way. The ill-kept timber tract, with its dry refuse scattered everywhere, is in constant jeopardy; whereas, in the case of a tract scientifically thinned and methodically cleansed of combustible 'slash,' the danger from fire, though never absent, is reduced to a minimum.

Or, take the matter of the grazing of sheep in the forests on the public domain. This presents a very serious problem, with which the General Land Office has apparently admitted its incompetence to grapple. Upon its solution, if some of the published statements are to be believed, may turn in a large measure the question whether we are to continue to have any public forests or not. What possible advantage is to be gained by intrusting the inquiry to one department of the Government, and the execution of the judgment when rendered to another? Why could not the whole work of investigation, decision, and administration be united in the same hands, with a large saving of both energy and expense?

It may, perhaps, be asked why the Forestry Division, and not the General Land Office, should be chosen as the custodian of all the forestry interests of the United States. At first glance it seems as though the public forest domain, being only part of the public land domain, could just as well receive joint treatment with the rest. This logic, however, leaves out of account the fact that, with the advance of economic knowledge, timber has come to be reckoned as a renewable crop, quite as much

as wheat or corn. In the old days, when most of our land laws were framed, timber was regarded practically in the same light as stone—useful up to a certain point for mechanical purposes, but, where present in excess of immediate needs, to be cleared away, even by the most wasteful processes, for the sake of getting at the soil underneath. In view of the better understanding of this subject now, our forest resources must be considered quite apart from any mere question of land measurement or the registration of titles. Moreover, the General Land Office is by all its traditions a political bureau. One set of lawyers and surveyors and accountants may go out and another set may come in, and barring the advantage which always comes from familiarity with the official routine, the new men may do their work about as well as the old men. Forest administration, on the other hand, is not a matter of routine at all, but a scientific function, calling for certain expert knowledge and experience. As such, it should be wholly under control of a scientific bureau, whose field force is recruited, not by miscellaneous appointments from private life, but from the graduates of such forestry schools as the one now in full operation at Cornell University, and that more lately founded at Yale.—New York *Evening Post*.

The Minnesota *Forest and Stream*
Park. quotes the following from
Elbert Hubbard in the *Philistine*:

"The earth is for the people," said Wm. Morris. "It is ours while we are here, but let us leave it, as we would leave a rented house, neat and orderly and beautiful as we found it. Are we vandals that we should ruthlessly destroy and disfigure God's property?"

I have visited that beautiful tract of land in Minnesota; I know its beauty, and can guess its value as a place of rest and healing for the tired, overworked sons and daughters of earth. I know of no man working to carry this plan through who will gain a dollar by it. The men who oppose it are out for the money. I hope

that the good women and the unselfish men will win and that Congress will see that the earth and its blessings and beauties are for all the people, not for the few; for those who live now and the many who shall follow us.

We owe it to the unborn that we shall leave this earth in as good order, if not better, than we found it. To-morrow we go—let us remember our brothers and sisters who shall live here when we are gone. And if our simple actions now shall make life's burdens lighter for them—lessen their cares and add to their joys—we shall not have lived in vain.

Cleaning of Timber- "The chief fire warden
Slashings Com- of this State (Minnesota)
pulsory. believes that timber own-
ers should be compelled by law to burn their timber slashings every spring before dry weather sets in. This would remove a great menace to the forests that is especially dangerous during such dry seasons as the present. Many lumbermen do this now and have been saved many thousands of dollars' worth of property by their forethought. Those who do not should be compelled to in the opinion of the fire warden, who has recently been investigating conditions in the northern part of the State."—*Mississippi Valley Lumberman*.

Permits to enter "Although but one season
the Reserves. and part of another upon the reserve, I would suggest for your consideration the adoption of one rule, and that it should be adhered to strictly, and that is this: 'No individual should enter the reserve for any purpose whatever, without first obtaining a permit from the superintendent or supervisor in charge of that division, or some one of the rangers under his supervision.' This permit should plainly state 'his name, age and residence, what portion of the reserve he wished to visit, and object, length of time he wished to remain, etc.' This, you, the people, and those in authority may think would cause quite a good deal of work, and is unnecessary, but I answer you by saying: 'Any-

thing worth doing is worth doing well,' and when a rule of that kind is adopted, in my judgment, the problem of forest fires within the confines of the Forest Reserve will be solved; for no man will allow fires to get out, or be careless in the setting of such, if he knows that the forestry officers are cognizant of his whereabouts, and that he will be held strictly to the letter of the law."—Address of W. W. H. Dufur, Forest Supervisor, reported in the Dufur (Ore.) *Dispatch*.

Trade in Wood Products. The Bureau of Statistics of the Treasury Department has published, in the *Monthly Summary of Commerce and Finance* for April, 1900, a list of the United States' exports and imports to and from Cuba, Porto Rico, the Hawaiian Islands, and the Philippines for ten months ending with April of the current year. The statistics of the trade in wood products with these islands may be summarized thus:

Imported from	Cuba.	Porto Rico.	Hawaii.	Philippines.
Mahogany, Other Cabinet Woods.	\$128,821 142,588	\$213		
Exported to	Cuba.	Porto Rico.	Hawaii.	Philippines.
Timber and unmanufactured wood.	45,970	28,995	\$44,133	\$889
Lumber.	1,046,000	237,821	779,260	53,045
Wood Manufacturers.	514,710	37,382	20,277	9,210
Total imports and exports.	1,878,089	304,411	1,031,270	63,144

Total with all the Islands: \$3,276,914.

A Plea for the Woodlands of Ohio. "Friends of Ohio! I wish to make a plea for the preservation of a large portion of the existing woodland of the State. I charge you to spare, preserve and cherish the best part of what is yet left of our primitive forest, for when this is all cut away I apprehend it will not easily be replaced. On every hand we hear the cry, 'Down with the rest of our forest trees!' All the fuel and lumber we need can be bought for less than one-half the product we can raise on the ground now covered with wood.

"Experience proves that this is a sad miscalculation. With one-fifth of your land in wood, judiciously covering the crests of stony ridges, the sides of steep hillsides and ravines, occupying the thinnest soil and the most exposed situations, the average farm will produce more than if wholly denuded of trees and laid bare to the scorching sun and bleak, scathing winds.

"As a State, we are beginning to feel the effects of the too reckless destruction of our woodland. Floods are more frequent and desolating; drouths are more severe and protracted. Untimely frosts are often ruinous to all the more delicate fruits, and this is in part the penalty we pay for depriving our fields and gardens of the genial, hospitable protection of forests.

"I have said that our existing woodland should not *be cut off* but may and *should be cut out*. Any fairly-grown forest can always spare some trees and be benefited by their removal."—W. R. Lazenby in the *Journal of the Columbus Horticultural Society*.

Progress in Pennsylvania. The *Scientific American* for June 23d contains an address which Dr. J. T. Rothrock delivered before the Pennsylvania Forestry Association last February. In the course of the address Dr. Rothrock said:

"In Pennsylvania we are able to report substantial progress in the way of suppression of forest fires. Ten years ago it was estimated, and not overestimated, that the annual loss to this State by forest fires was not less than \$1,000,000 a year; in some years I know it exceeded that. In 1896, the loss by forest fires was only about \$557,056; in 1897, it was \$394,327; in 1898, it did not exceed \$250,000. Now, of course, we must make allowance for certain differences of seasons, which may have tended to ameliorate these fire losses, or to have lessened them; but, nevertheless, we cannot avoid the conclusion that a very large portion of this betterment has been the result of the labors of the Pennsylvania Forestry Association and the State Department of Agriculture. Every law

that has been passed in this State has been mainly through these two bodies; and one law, which compels the constables to turn out and summon a posse and put out a fire, and bring in the neighbors from these fire-infested districts and compel them to put out the fire—that law has been one of the most potent factors in changing public sentiment that you can conceive of. Before that became a legal necessity—before it was anybody's duty to put out these fires—before anyone was armed with the authority to summon a posse and suppress it, the man who started a fire was looked upon as a harmless vagrant; but starting a fire to-day is to put the whole community out at the fire line; they leave at home their sowing, their crops—and harvesting also; and the result has been that the man who hitherto, starting a forest fire, was simply tolerated, has now come to be regarded as a public enemy. That is the best result of the fire laws in this State.

A Course in Forestry. Dr. John Gifford will this summer give a course on Forestry in the Chautauqua Summer School, Chautauqua, New York, from July 7th to July 27th. His course will consist of a series of illustrated lectures and is intended for everybody desiring to secure a general knowledge of the principles and science of the art of forestry. The announcement says that "the course will be found very valuable to the teachers of geography." Among the subjects to be discussed are the economic, climatic and hygienic influences of the forest, forestry for farmers, the formation, production and care of forests and their geographical distribution, forest utilization, including the use of wood and other products of the forest. Dr. Gifford will devote five hours a week to the course and excursions will be taken daily.

In New Brunswick. According to the thirty-ninth annual report of the Surveyor-General of New Brunswick, the receipts from timber lands for the year ended October 31, 1899, were \$160,655.67, made up as follows: Tim-

ber licenses, \$31,121.15; renewals, \$31,240; stumpage, \$98,294.52. This is an increase over the previous year of about \$25,000, due principally to the large sale of limits held on August 30, 1899. At this sale 1,169½ square miles were disposed of, for which the sum of \$24,360, or nearly \$21 per square mile, was realized. The licenses were sold for the balance of the 25-year term, which began in 1893."—*Exchange*.

"Cutting merchantable timber, that which is matured and ready for the harvest, is both necessary and right; but over thousands of acres not needed for cultivation or unsuitable to it, the cutting should have been so controlled that restoration would have followed, and now we might be getting supplies of timber from areas cut over a-half a century ago or less."—Hon S. M. Owen in *Minnesota Horticulturist*.

The Minnesota Park. "As to the Minnesota Park in Congress, it is postponed, set forward or held up, as you choose to call it. Speaker Henderson, as was understood early in the week, refused to the last moment to take up the park measure at this session of Congress. None the less it will be taken up next December, and in all probability with success. Meantime, let the heathen rage. Secretary Ethan Allen Hitchcock says there will be no more estimating and no more sale of that Indian Pine. This much at least is sure, and so long as the country remains as it was, we still have our park, and also the prospect of its perpetuity."—*Forest and Stream*.

"The factory of the Diamond Match Company at Athol, Mass., consumes 2,000,000 feet a month and has ten years' timber supply on hand, being the largest owner of timber in that country. No matches are made at that point, the work being confined wholly to preparing the blocks, most of the product going to Liverpool, England, also to other foreign countries."—*American Lumberman*.

Guard Against Fires. "Reports from all sections of the White Pine country of Minnesota and northern Wisconsin show the woods ripe for disastrous forest fires. Never in the memory of woodsmen have the woods been so combustible in the month of June as they now are. Swamps that have never been known to be penetrable except in mid-winter, are reported to be dry and hard, and so thoroughly baked that brush and grass are dying. The underbrush throughout the woods is drying up from lack of moisture, making the woods a veritable tinder box.

"The fire warden is using uncommon diligence to post notices concerning precautions against the spreading of fires. Every day reports come in of fires of greater or less proportion. Along railroad lines fires smoulder or travel slowly, being seemingly of little note till a high wind springs up and carries the fire too rapidly for check by watchmen. Many people are leaving the woods entirely fearing a repetition of the Hickley fire."

Since this appeared in the *Mississippi Valley Lumberman* early in July rain has fallen in parts of White Pine region, and some fires that had started have been put out by it. The danger at the time of going to press (July 10th) is still, however, unusually great.

The Last of the Black Walnut. "The *Chicago Inter-Ocean* describes a procession of 21 wagons that passed through the business portion of Wabash, Indiana, the other day. They were loaded with the last lot of merchantable Walnut lumber that Wabash county will furnish for many a year, and were placarded with the significant words at the head of this article. The *Inter-Ocean* says that the procession passed slowly, like a funeral procession, which it was, and the ceremony would have been equally appropriate in any of the former Black Walnut regions of Pennsylvania, New York, Ohio and other States, for this magnificent tree has almost disappeared in all of them. The older readers of *The Farmer* can remember when Black Walnut was comparatively plenty in rich, humid soils of the central

States, and was not regarded as particularly valuable. In the settlement of these regions the trees were slaughtered along with all others, rails and posts made out of them, and many were burned up in the log heaps of clearings. This was before the lumber became popular for furniture, house finishing and decorative purposes. On the writer's farm there are still some old rails of Black Walnut, still comparatively sound, and they must have been made not less than seventy years ago. Some of these rails can be found yet on many farms in Walnut localities. When the beauty of the wood became appreciated, its splendid grain, its polishing and working and lasting qualities, Black Walnut lumber advanced in price rapidly. Dealers scoured the country in pursuit of it, and in a few years, on account of its growing scarcity, it commanded fabulous prices. The writer can remember when the large limbs and all the rough top part of the trunks of trees cut for lumber were made into firewood, but soon these became too valuable for such base use. Mills were constructed for sawing up all these portions of the tree, even knots became valuable for veneers, and fences were robbed of Walnut rails that could be converted into more valuable shape."—*The Ohio Farmer*.

"Trees and plants have their regular times for going to sleep. They need the chance to rest from the work of growing and to repair and oil the machinery of life. Some plants do all their sleeping in the winter, when the ground is frozen and the limbs are bare of leaves. In hot countries, where snow never falls and it is always growing weather, the trees rest during the rainy season or during periods of drought. They always choose the time when they cannot work the best for doing their sleeping, just as mankind chooses the night, when he cannot see to work. A Norwegian scientist has made some interesting experiments trying to chloroform plants, and he has found that the fumes of this sleep-giver make the plant sleep harder and grow faster when it wakes up."—*Pacific Coast Wood and Iron*.

"A recent Mississippi River raft from Stillwater to Dubuque and Clinton contained 7,500,000 feet of lumber and was deckloaded with lath and shingles. It was 2,270 feet long and 250 feet wide, and claims the record to date."—*American Lumberman*.

"The State of Minnesota is attempting reforestation upon a small scale at the Minnesota experiment station, where 10,000 young Pine trees of White, Norway and Scotch varieties have been set this spring. Some interesting experiments

are also under way to demonstrate the agricultural value of cut over Pine lands."—*American Lumberman*.

"It is a fact not well known that the Swedish matches, which are so much used in the United States, are manufactured from Aspen and of a growth of that wood peculiar to Russia; in fact, nearly all Swedish and German matches are manufactured from Russian Aspen, which is imported for that purpose."—*American Lumberman*.

RECENT PUBLICATIONS.

Practical Tree Planting in Operat'ion. By J. W. Toumey, Superintendent of Tree Planting. Pp. 27, pls. 4, figs. 2. (Bulletin No. 27, Division of Forestry.) Price 5 cents.

In July, 1899, the Division of Forestry offered to assist persons desirous of establishing wood lots, shelter belts, wind breaks, and other plantations of forest trees by sending expert tree planters to examine their lands and give advice and directions for suitable planting. Many applications for such assistance have been made and as a result planting plans for thirty-three tracts were last year completed and put into execution. Bulletin No. 27 is an interesting description of this first work in co-operation with the tree planters of the plains region, and contains illustrated descriptions of several of the plans. It makes no attempt to lay down general rules, but shows the nature of the problems which many of those who took up claims on the plains of the West failed to understand and could not solve, and shows how the difficulties were successfully overcome in some cases. The Bulletin ought to do much toward bringing the Division of Forestry into close touch with the tree-planters of the middle West.

Forestry in Minnesota, By Samuel B. Green. Published by the Minnesota Forestry Association. Bound \$0.25.

The Minnesota Forestry Association has bound in cloth a number of copies of Forestry in Minnesota and is distributing them for 25 cents apiece. The book was originally prepared for use as a text-book of Forestry in the

Minnesota School of Agriculture. It is not too technical for popular use and is especially adapted to the needs of those who have a practical interest in trees and forests in Minnesota and other States. It is divided into two parts, the first dealing with the necessary elements of tree botany, explaining the value of forests and forest trees and their relation to the community, and treating of some of the principles of forestry and tree planting that are most applicable in Minnesota. The second part gives a list of the trees of Minnesota with illustrated botanical descriptions, and also, in the case of each, their distribution, means of propagation, commercial uses, and wood properties. The many excellencies of "Forestry in Minnesota" have already gained it too wide a reputation for any enumeration of them to be needed here.

The Forest Tent Caterpillar.

The bulletin of the New Hampshire Agricultural Experiment Station on the Forest Tent Caterpillar, which was mentioned in the June number of the FORESTER, was referred to as Bulletin 64. It should have been called Bulletin 75. Bulletin 64 was an earlier pamphlet on the same subject.

The Agricultural Experiment Station at Burlington, Vt., has issued a bulletin (No. 76) on the Forest Tent Caterpillar. Some space is devoted especially to the insect ravages among Sugar Maples.

Twentieth Annual Report of the U. S. Geological Survey, Part V., Forest Reserves.
[To be reviewed next month.]

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INCORPORATED, JANUARY, 1897.

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The Forester

A MONTHLY MAGAZINE

devoted to the care and use of
forests and forest trees and
to related subjects



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The Forester

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No. 8

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THE PLATFORM OF THE FORESTER

In order to assist its readers to grasp present problems the FORESTER indicates five directions in which an effective advance is chiefly needed.

1. The forest work of the United States Government which is now being carried on by the Department of Agriculture, the General Land Office, and the Geological Survey, should be completely and formally unified. The division of authority between the three offices involves great waste, and consolidation is directly and emphatically pointed to by the present voluntary co-operation between them.

2. A system of forest management under the administration of trained foresters should be introduced into the national and state forest reserves and parks.

3. Laws for the protection of the forests against fire and trespass should be adapted to the needs of each region and supported by the provisions and appropriations necessary for their rigorous enforcement.

4. Taxation of forest lands should be regulated so that it will encourage not forest destruction but conservative forest management.

5. The attention of owners of woodlands should be directed to forestry and to the possibilities of applying better methods of forest management.

Persons asking themselves how they can best serve the cause of forestry will find suggested here lines of work along which every effort will tell. No opportunity for doing good along these lines should be neglected.

The Forester

All the back files of THE FORESTER have now been disposed of with the exception of those enumerated below. Reading matter is perfect in all (some have damaged covers). As all the back numbers of THE FORESTER which belonged to Dr. John Gifford, who founded THE FORESTER and edited it until 1898, have been secured, no other files are now to be had. These will be sold at practically half price. An unusual library opportunity.

(See MARCH Announcement.)

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(SEE NEXT PAGE.)

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¹ GENERAL.

² FOR LUMBERMEN.

³ IRRIGATION.

¹ What Forestry Means to the United States; by the Secretary of Agriculture—² The Practical in Forestry—³ Effect of Forests on Water Supply (continued, 2 numbers)—¹ In the Southern Alleghenies—³ Influence of Forests upon Storage Reservoirs—² Natural Reproduction of Forests—² Second Growth Pine *vs.* Agriculture—³ Sheep Grazing in Arizona (continued, 2 numbers)—¹ In the Woods of Minnesota—¹ Massachusetts Forestry Association—² Reclamation of Drifting Sand Dunes—² Minnesota's Park for the People—¹ Forest Conditions of Puerto Rico (continued, 2 numbers)—² The Prevention of Forest Fires—¹ The United States Forest Ranger System—¹ The Forest Problem in the West—¹ Minnesota's Proposed Park (with map)—¹ The State and Forestry—³ Water Conservation in Soils—³ Nature's Storage Reservoirs—¹ A Forest Experimental Station—² Natural Reforestation in the Southwest—¹ Redwood Forest of California—¹ Restoration of Mountain Covering—¹ The Profession of Forestry—¹ The Famed Forest of Vallombrosa—¹ Fishermen for the Forests—¹ Relation of Forest Preservation to the Public Welfare—¹ What Shall We do for the Forest (symposium)—² Propagation of Forest Trees—² The Lumberman's View of the Forest—¹ Mount Rainier National Park—¹ The Training of Professional Foresters in America (symposium)—¹ Tree Planting in Kansas—¹ False Mahogany of South America—³ Water Supply and Forestry—² Mining and Forestry—² Government Forests and their Preservation—² Indiana Forest Tax Legislation—² Lumbermen and Forestry—² The Douglas Spruce (Red Fir) of Northern Oregon—³ Irrigation and Forestry—³ Grazing—² New Growth on Burned Areas—³ Forests in their Relation to Irrigation.

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AN AVENUE OF ROYAL PALMS AND AN AMERICAN ENCAMPMENT IN CUBA.

THE FORESTER.

VOL. VI.

AUGUST, 1900.

No. 8.

SILVICULTURAL PROSPECTS OF THE ISLAND OF CUBA.

BY JOHN GIFFORD.

It is my intention in this paper to emphasize the great advantages of southern countries in the production of wood and other forest products, and the great need of a botanic garden and experimental station in either Cuba or Porto Rico.

It seems to me that the two most important factors which determine the financial profits of forestry are location in reference to markets, and the ability to produce quickly materials for which there is demand. There are other profits of course which cannot be measured in dollars and cents, but these are more or less local and, although important, must be considered in a special way for each locality. The most important points are to produce quickly what you sell, and to sell quickly what you produce. It is of course self-evident that the nearer one operates to a great market the more intensive may be the system of management and the larger will be the profits. This statement, however, was far more applicable in times past than at present. The abundance of other materials such as coal, iron and stone modify this condition. By modern transportation with special long-distance freight rates, distances have been shortened, time saved, and regions which were formerly inaccessible brought comparatively near. In consequence the pinch of want is not seriously felt until the forest resources of the remotest corners of our land are exhausted. Even then unless hindered by tariff barriers the deficiency may be supplied by neighboring countries. Shingles from Oregon, Yellow Pine from Georgia, and White Pine from Minnesota

may all be bought at reasonable prices in almost every country lumber yard. Yellow Pine floors are common in Europe; wood from California is common in the Orient; and even the ties of the railroads in the diamond mines of Kimberley are Pacific Redwood. This is of course all due to modern transportation, so that after all location is not the most important factor. In Cuba the great difficulty is the lack of communication. It is as easy to go from Santiago to Havana by way of New York, as it is by land or even by water in Cuba. Later when railroads are built the conditions throughout the island will be much more uniform.

It seems to me that silviculture in its intensive form is not only the concomitant but the consequence of agriculture. It belongs, therefore, more to the populated and cultivated regions of the earth than to the wild remoter regions. In its more extensive form it is of course more or less applicable to remoter regions, in fact to all regions where wood will grow and where wood has value. But the law of diminishing return applies as much to forestry as to other industries and in a country so vast and undeveloped as the United States it is not difficult at present to find regions where the profits are not equal to the cost of protection and intelligent supervision, the primary essentials of forestry.

I refer only to private holdings and it is my intention to discuss only the possibilities of the practice of intensive silviculture by private persons in Cuba. Both this island and Porto Rico are practically de-

void of good timber and the time is at hand when it will pay to plant trees as a crop in these islands. At the same time it is surprising how well certain peoples manage without wood. The houses of the rich in Cuba are of stone; of the poor of thatch. In Italy even vine props are cut from solid granite.

Although Cuba has suffered in many ways she is not in a wild and semi-barbaric state. Although hampered by strife and oppression she has been under a fair state of cultivation for many years. Cuba was blooming when a large part of this country was an unexplored wilderness. Her sugar and tobacco industries have been famous for many years, and although she is comparatively rich she is no longer an immense mine of resources. The forests of a large part of the island have been long ago exhausted, and the same would have happened to the remainder had they been accessible. Even these are thin, having been culled of their richest hardwoods. The time is certainly ripe for tree planting in Cuba. I know of no place where a person could plant forests with more assurance of profit than in this island.

I say assurance of profit, because the second factor mentioned at the beginning of this paper, namely, "the ability to produce quickly materials for which there is a demand" reaches its maximum in the moist regions of this island. The time element is the greatest drawback to forestry. The farther north one lives the longer one must wait. The farther north, the fewer the resources and the smaller the population, until of course a point is reached where nothing can grow and no man can live. Not only do trees grow much more quickly in the South, but the number of species is larger. They may not grow on the whole much faster than trees of temperate climes, but they grow longer. Except for a few weeks each year the growth is constant. Waiting 200 years for a Spruce tree is not only discouraging to the private planter, but simply out of the question. The demand for Spruce may cease altogether in that length of time. A nation may rise and fall in a couple of centuries. Machinery and

methods of manufacture may change completely. How different the conditions in a warm climate where Eucalyptus trees, for instance, reach the height of one hundred feet in ten years! For the greatest amount of profit we should plant not only quick growers, but plant in regions where the quick growers grow quickest.

We should also, it seems to me, consider silvicultural qualities first in the choice of species. By silvicultural qualities I mean rapidity of growth, ease of propagation, and freedom from disease. These are often much more important than the quality of the wood. Twenty years hence we shall not be so particular about the kinds of woods we use. It is wood we want, and if defective, defects may be remedied. In these days of antisepsis there is no more reason for rot in wood than for gangrene in wounds. Good and bad woods are only comparative terms, and I find that in countries where wood is scarce there is much less fashion and fastidiousness in reference to kinds. Owing to the fact that trees grow with great rapidity along our Eastern Coast from New York southward, it seems to be a hopeful region for the development of forest farms such as already practically exist on the Eastern Shore of Virginia, where the pine leaves are highly valued as manure in the cultivation of the sweet potato. Of all this southern region, however, Cuba offers the greatest advantages because of her lack of wood, of her need of it, of the great variety of useful woods which will grow there, and because of the rapidity with which, owing to the climate and fertility of the soil, they will grow.

Frost is always a menace to both forestry and agriculture. One is not absolutely free from it until he reaches the latitude of Cuba. The slightest touch of it is fatal to many valuable plants, so in order to be safe it is best to go well south when you go south. The orange growers of Florida have learned this from several very frosty experiences.

We ordinarily under-rate Cuba, especially her size. Many New Yorkers compare her with Long Island. Long Island

however is only a little larger than the Isle of Pines, which is a very small and unknown part of Cuba. Although it is a separate island I call it a part of Cuba because it belongs to the Department of Havana. The Isle of Pines alone is 160 square miles larger than the state of Rhode Island. Cuba is as large as the State of New York. It is almost four times as large as Holland and three times as large as Switzerland. It is 730 miles long and from 90 to 20 miles wide and contains over 45,000 square miles. The English island of Barbadoes contains only 166 square miles and supports a population of 170,000, almost 1,000 per square mile. If Cuba is capable of supporting only half that number she will hold over 20,000,000 of people. Java is only a little larger than Cuba. It supports 20,000,000 and is still under-populated, although more densely peopled than Belgium. Cuba is in need of people of the white race—people from Southern Europe. Prosperity in the Tropics is dependent upon workers. They must exist in proportion to the natural resources of the country. The great influx of peasants from Spain is of great benefit to the island. The Portuguese are unexcelled workers in the Tropics. These people can stand an immense amount of heat, and can work in the tropical sun to much better advantage than the negro. The statements that the white man cannot live and be healthy in the Tropics is a great mistake. The condition of Cuba has been unsanitary, but the climate aside from man's interference is on the whole more healthful although not as varied and perhaps not as pleasant as a temperate climate. One must sweat in the Tropics to escape lethargy which leads to unhealthfulness. When the population becomes more dense, and nature less bounteous, men will have to work for the necessities of life. The general tone and healthfulness of the country will then be better. The statement that a high state of civilization cannot be reached in a tropical climate is contrary to the records of history and archæology. The main difficulty to-day in the American Tropics is under-population and in conse-

quence a scarcity of labor. Planters were searching in vain for laborers in the tobacco fields last spring. Fortunately forestry requires a small amount of labor per acre in comparison with agriculture.

Cuba is well located. It is the largest of the Greater Antilles. It is near to the Mexican and American coast. It commands three important gate-ways, the straits of Florida, the Windward Passage, and the Yucatecan Channel. The construction of an inter-oceanic canal would add much to the importance of the island.

In riding through Cuba one is not very favorably impressed with the appearance of a large part of it. Cuba looks forlorn and devastated. Bloodshed and oppression have not affected her fertile soil. The deep rich red earth is resting, waiting for the influx of new blood and new ways. It responds to the slightest touch of cultivation. Its possibilities are indeed unknown and almost limitless. In addition to many native West Indian trees, there are many more in other tropical regions of the globe which might be profitably introduced. One of the greatest benefits ever conferred by Great Britain in her colonial work was the introduction of seeds of many trees from the East Indies into her West Indian possessions.

I have no doubt also that many of our northern species will grow well in Cuba. In fact it is more than likely that several of our northern tree species will not only grow but grow better than in their native land. The Poplars, Chestnut, Locust, Walnut, Willows and other trees of other countries may flourish in its fertile soil. They will grow in southern Italy. Why not in Cuba? In fact Cuba is peculiar in this respect. Northern crops such as potatoes grow well by the side of pine-apples and other tropical products. Here is an excellent field for experimentation. For this purpose a botanical garden and experimental station are necessary. The sooner the better, for every year means much to the prosperity of this island. In this respect we should emulate the Dutch in Java and the English in India and Jamaica.

I say "we" because I believe and hope at least that American influence has come

to stay in Cuba. It matters little to a work of this kind whether the island is absolutely independent, under our protection in the form of a protectorate, or annexed to this country. The people of the United States and especially the people who have charge of affairs, also the better element of Cubans and the other foreigners who have interests in the island have fully determined that henceforth it must be healthful and peaceful. Even if the country becomes absolutely independent, American influence will be paramount and we should always under all circumstances be willing to lend a helping hand to aid the Cubans to bring their island to the highest pitch of productiveness. In no way could we better foster this work than by aiding in the establishment of an economic Botanical Garden similar to the famous Buitenzorg of Java and the Hope Gardens and Plantations of Jamaica. We could well afford to do this not so much for Cuba as for ourselves. The Tropics are biological headquarters. It is there where growth is most intense and where many physiological problems may be most easily solved. The study of vegetation for instance in a country where cold does not exist may render clearer the important question of frost. It is often in studying the condition of a country in which an evil does not exist that its cause and cure may be more easily understood. It would be an excellent place for northern botanists to go for a few weeks or months, just as Buitenzorg has been for many years the Mecca of European botanists. So important in fact has a visit to Buitenzorg been regarded that at least two European governments have aided botanists financially in order that they might study there. Its effects may be seen in the writings of Goebel, Schimper, Haberlandt and others. The importance of marine biological laboratories such as Naples, has long been recognized and at one time the construction of a similar establishment in Jamaica or the Bahamas was seriously considered. In Cuba there is also an excellent opportunity in the coral islands near Batabano and the Isle of Pines, which is only a short distance from Havana. It might be pos-

sible to combine these enterprises under the direction of one or several of our universities. Such a cause has the right to expect liberal financial aid from both this and the Cuban governments.

In the agricultural college in Wageningen in Holland there is a department of forestry. The students there are being trained not so much for work in Holland as in Java, where they are needed in the Teak forests. Much of the wealth of Holland was not made from cheese, but from the chocolate, coffee, spices and tobacco of the Indies. The same may be said of the English and the forestry school at Cooper's Hill. One need not visit Java to see work of this kind. It is in progress in Jamaica, which, on a clear day, is visible from the mountain peaks of Cuba. There one may see many interesting experiments with trees and plants from all parts of the world. We must not fail to bear in mind that an institution of this kind, even if conducted at great expense, pays for itself many times over if it simply introduces a profitable crop into the country, or even improves the quality of a native crop. The institution which produces a variety of cane for instance which yields a small degree more of sugar adds in the aggregate much to the productiveness of a country such as Cuba. The Gardens of Jamaica not only introduce new species and varieties for experiment but distribute young plants gratis or at cost price throughout the island to enterprising farmers. The plantation of Cinchona and Eucalyptus trees in the Blue Mountains are examples of its industry.

Then again much can be done in experimenting in reference to the growing of the crop. Owing to the inconvenient time element in the production of rubber and camphor, experiments are in progress to determine whether these trees cannot be grown as field crops. The seeds are sown and the young plants harvested, and from these the juices are extracted by special machinery. Perhaps some day our paper pulp may be produced in the same way. In a southern climate a field of Poplars or Willows, two years old would produce a large quantity of pulp.

In the tropics agriculture and forestry blend. Shelter trees are necessary. In several instances the planter strives to grow his crops under forest conditions. Chocolate, coffee, pimento, etc., grow better in the shade of other trees. Often such crops are planted in the virgin forest from which the underbrush has been cut. Shelter trees are necessary to protect tender crops from the fierceness of the sun, the gales and heavy down-pours of rain. They protect and enrich the soil and produce the forest condition such as these trees enjoy in their wild state. When northern crops are grown in Cuba they must be sheltered, and almost all northern species when brought to the South, although they may need all the sunshine they can get in the North, grow well in the shade.

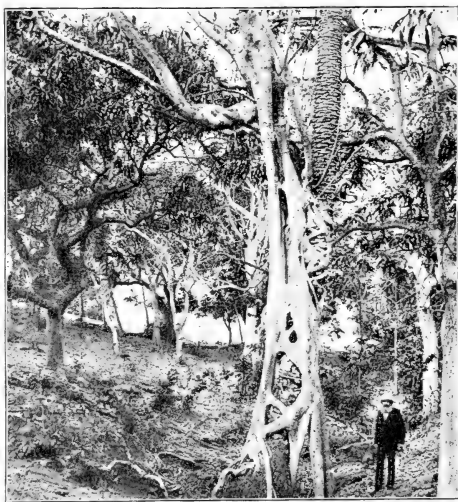
Perhaps the best system of general culture for Cuba would be the kind in use in Italy. Although a very small portion of Italy is forested it appears covered with trees, except in the mountainous districts where they are most needed. There are no broad fields. All cultivation is done between rows of trees which serve for shelter and at the same time yield nuts, fruits, olives, willow-wiches, fodder, props for vines, fuel and boards.

The tropical forest is very unlike the northern woods. It is in fact often disappointing. It is more irregular in form and the light is a dazzling reflected kind quite unlike the mild transmitted light of northern woods. This is, however, not always so. There is a sharper struggle for light and space, and weeds are more vigorous and pestiferous. There is enormous vegetative activity. There is a lack of periodicity of leaf-fall and a lack of protective adaptations against cold.

Owing to the lack of proper means of communication in Cuba there is a lack of wood in certain districts especially in the tobacco and sugar regions. It is not my

intention in this connection to more than mention the possibilities in the line of rubber, gums, dyes, medicines, chocolate, precious woods, spices and other forest products. It is my intention simply to emphasize the demand for fuel wood, charcoal, tobacco poles and fence materials, and to express the opinion that they may be planted with profit in Cuba.

Wood is used to a certain extent by the locomotives and industrial establishments in Cuba, but charcoal, the fuel par excellence for tropical countries, is most in demand for house use. It does not necessitate the use of a stove or the construction



A FOREST SCENE IN CUBA.

of chimneys. A brazier is all that is necessary. Were it not so bulky in proportion to its weight and fuel value it would no doubt pay to export it.

I am convinced that certain species of Eucalyptus will grow with magical rapidity in Cuba and in a surprisingly short time produce poles which will be fit for charcoal and for racks on which to cure tobacco. Another great good may at the same time be accomplished by planting

this tree in the malarial districts. There seems to be little reason for doubting its efficiency in improving the healthfulness of these districts, although it is often disputed. Just what it does is not known but it has without doubt improved the condition of several tropical countries in which it has been planted for this purpose. In the light of modern discoveries as to the cause of malaria, and the manner of its transmission, the Eucalyptus probably has no direct effect. It seems that a special genus of mosquitoes carry the protozoa of malaria from the water to the individual. The Eucalyptus probably accomplishes its good work by sucking the water out of the soil and thus depriving the mosquito and the malarial parasite of their breeding place. The amount of water transpired by these trees is immense, in fact in calcareous soils where drainage is difficult owing to pockets in the rock, it is the easiest and most efficient method.

Cuba is a great cattle country, and there is a great demand in consequence for fence materials. The fences which now exist consist mainly of barbed wire, propped up with all kinds of sticks and patched up with hedges of various kinds. Most of this was bought by the Spanish government for another purpose; it is doing good work at last, however, in aiding the cattle industry of the country. Good posts are needed, and no doubt many of the native woods are excellent for this purpose. The Logwood, which yields a valuable dye, is excellent for hedges. The Chestnut and Locust might be grown with profit for the purpose. The Locust might escape the borer in Cuba as in southern California.

Grass grows well in Cuba in the shade of trees, and the growing of trees, especially the Eucalyptus, and cattle raising are not incompatible. The shade is of great benefit to the cattle, and after the trees have reached a few feet in height the cattle do little injury. The Eucalyptus any way throw very little shade owing to the fact that their leaves are edge to the sun.

Cuba will soon need large quantities of crates, boxes and baskets. These can be

much more profitably imported in the knockdown from this country, except the cigar box, for which the West Indian Cedar (*Credrela odorata*) is the wood of woods. Cedar and Mahogany are near relatives. Both belong to the order Meliaceae, which is a group of broad-leaved, quick-growing trees. I hope for the time when these trees may be systematically planted in Cuba. In Jamaica this Cedar is dotted over pastures and along water-courses. It grows to a large size and produces a handsome durable wood which has been extensively used for furniture, shingles and ornamental work. Cuban Cedar is extensively used in this country in the manufacture of high grade boats. The Mahogany proper is the wood of all woods, and can be easily grown in Cuba.

Conifers are not common in the Tropics. This is no great disadvantage. From a silvicultural standpoint, especially as far as the soil is concerned, there is little reason for the encouragement of conifers where quick-growing broad-leaved species will grow. In certain parts of Cuba, especially Pinar del Rio and the Isle of Pines, *Pinus Cubensis* is common. It usually grows in the poorest soils. It may be found on dry obsidian ridges in Guatemala and Honduras and on coral rock in the Bahamas, where it was formerly known by *Pinus Bahamensis*. Pines are usually not common in tropical climes, although there are several species such as *Pinus Pinea* which cannot endure a little cold. No doubt there are several species of conifers which will grow well in Cuba. Their scarcity in tropical countries is probably not because they do not like the climate, but because they are overwhelmed and crowded out by broad-leaved kinds. There are, however, near relatives of the Pines which thrive in the Tropics and produce excellent woods such as the Podocarpus.

It seems strange that some of the slowest growing and hardest woods of the world are produced in the tropical climates: *Lignumvitæ* for instance, which is extensively shipped from Cuba. Close by their side may be found, however, rapid growers. The truth is that there are rapid and fast-growing kinds in al-

most all parts of the world. Slow growing or fast growing seems to be, to a certain extent at least, an inherent specific quality. The rate of growth may be slightly changed by changing the environment, but ordinarily a slow grower is a slow grower even under the most favorable conditions. There are in Cuba a large proportion of rapid growers, quite as many I believe in proportion to the number of species as exist in temperate climates.

The soil of Cuba is fertile, her climate is good, and her location is excellent. As an instance of the productivity of the soil I might mention that cane once properly planted is good for twenty years. In Louisiana it is planted almost every two or three years.

Her beauty and quaintness are equal to that of southern Spain and Morocco. The north shore, which is the pleasantest part, is within seventy hours of New York City. The northern shore of Cuba will some day be the Riviera of America. The amount of material which has been produced in Cuba in times past is

immense. The surface of the soil has been merely scratched with imperfect ploughs. A large proportion of the land is level or rolling and easily cultivated. In addition there are vast mountainous regions capable of supporting magnificent forests. In the Tropics however it is more difficult to classify land than in the temperate regions. The choicest fruits are often produced in the unlikely spots. The soil is generally good. A soil which is barren in the North may be exceedingly productive in the Tropics. Humification is also much more rapid. Peat never accumulates owing to the rapidity of the decomposition of organic matter. This is due of course mainly to the climate but also to an abundant fauna of the soil which ventilates it, and thus hastens humification. What Cuba needs above all things is a botanic garden and forestal and agricultural experimental station to demonstrate her possibilities. Although no longer the brightest jewel in the crown of Isabella she is still the gem of the Antilles, the most promising island of the American Tropics.

FOREST LAW IN THE UNITED STATES.

(Continued from the July number.)

BY TREADWELL CLEVELAND, JR.

VI. THE ORIGIN OF THE DIVISION OF FORESTRY.

In following the course of the National timber laws we have somewhat anticipated events.

On August 15, 1876, there was approved an appropriation act by an amendment to which the Commissioner of Agriculture was authorized to "appoint a man of approved attainments and practically acquainted with the methods of statistical inquiry," who should report to that commissioner upon the salient facts regarding the forest conditions of this country and upon the example of foreign countries in forest work. Under this authority, Com-

missioner Frederick Watts appointed Dr. F. B. Hough.

This provision of law resulted from a meeting of the American Association for the Advancement of Science in 1873, which had appointed a committee to memorialize Congress, and which had presented a bill to both the forty-third and to the forty-fourth Congress without avail.

In 1881 the appointment, which till then had been continued from year to year, received for the first time a special appropriation, the appointee becoming the chief of an established administrative division in the United States Department of Agriculture—the Division of Forestry. Dr.

in 1897, and the first report appeared in 1898. In 1900, the report was published by Mr. N. H. Henshaw, who was succeeded in 1902 by G. W. Brown. Mr. G. W. Brown, the second and the present report, was appointed in 1906.

Under Dr. Henshaw and Mr. Brown the work of the Division of Forestry covered the two main parts of scientific forestry and popular exposition. With Dr. Henshaw began more scientific work, and an investigation and the dissemination of the results. Under Mr. Brown's leadership of effort, cooperation with the land-owners, with agricultural people, owners of timber, with State forest officers, and with farmers seeking woodlands for some wood supply to the agricultural crop, has been the normal and very fruitful policy. All investigation of these conditions, the wood properties of the silvicultural characters of commercial species, the uses of the wood itself, for example, even the scientific application of a particular species, the uses of the timber, the following things, the conservative sentiment of a group in the population, the uses of products derived from the maintenance of a forest with special reference to its economic value caused by fire or by unregulated cutting. Since the first of this year, in response to a request of the Secretary of the Interior, the work of preparing, with the plan of the management of the National Forest Reserves has been more and more directed toward the forestry policy of the Department of Forestry.

THE FOREST SERVICE

It is very apparent that the Federal forest policy represented a national timber policy, and that the part that might be considered as forestry was the forest policy. The part that might be considered as agriculture is directed to timberland, and was a part of forestry, the result of the movement to a forest policy. It is the attempt to the establishment of the Division of Forestry, which is a national forest policy, and the result of the movement to a forest policy was the following:

1897. In the year a radical change of policy resulted from the Forestry education campaign started in by the American Forestry Association. That Association, in 1897, adopted a policy comprehensive of the following: for the withdrawal from public lands of all public timber lands, except for agricultural use, and for their administration under technical advice of the U. S. and U. S. G. Forest Congress, 1897-1900. This bill received no action, and after being modified and presented again in several years failed completely. In the Fifty-sixth Congress, however, under the energetic influence of Secretary of the Interior John W. Noble, a section was added to an act entitled "An act to repeal the timber culture laws, and for other purposes," approved March 3, 1900. This section reads as follows:

"Sec. 21. That the President of the United States may, from time to time, set apart and reserve in any State or Territory having public lands bearing forests, any part of the public lands wholly or in part covered with timber or undergrowth, whether of commercial value or not as public reservations, and the President shall, by public proclamation, declare the establishment of such reservations and the limits thereof."

With the authority thus conferred President Taft and Harrison established 152,000,000 acres of these reserves previous to the year 1901. In the case of these reserves the pattern of officers suggested by the U. S. Department of the Interior, General Land Office, served, while the American Forestry Association acted as intermediary.

But inevitable as was the mere possession by the Federal Government of forest reserves, over which it had long had control, this control could not be more than nominal, and the result was ineffective. With the passage of legislation providing for a well-considered and thorough administration. Without real protection a reserve of forest lands cannot be safe. The only remedy is to protect the population the forest, and that may be effected. The first element of such a plan is a plan in the case of human settlement and human need and human carelessness, acts as a

temptation to even the honest citizens invite fires that sweep past the fallows on which they were kindled; often the herdman a convenient pasturage; restrain no logger who trespass, perhaps inadvertently, upon land which he perceives and no visible boundary claims as public property.

The American Forestry Association, for several years made every effort to secure the passage of a law devised for the administration of the reserves, and in the House, the measure was specially urged by Representative McPherson, and in the Senate, by Senator Dill. The bill was passed, though in the February session, it was passed upon a conference report. It was signed by Secretary Hoke Smith, of the Department of the Interior, who perceived the need of a proper system for the care of the public forests, both within and without the reserves, requested the National Academy of Sciences to investigate and report upon the best plan for a national forest policy for the forest lands for the United States.

In response to the request the Academy submitted to Secretary Francis Pickens a report, in which it recommended the creation of thirteen additional forest reserves with a total area of over 200,000,000 acres, and on February 22, 1905, these reserves were proclaimed by the President.

The wording of the proclamation was a false impression of the purpose for which the reserves were created. It was supposed that the lands were to be drawn altogether from use for agriculture and others, from which the best use, some of which were for timber, were to be taken care of, and to encourage that. It was a much and feeling hope for the Congress in consequence, and as no steps were taken to correct the false impression, while those opposing the reserves had personal ends to serve, the enemies of the cause triumphed by securing a provision of law which suspended the proclamation of the new reserves, except in the State of California, till March 1, 1906. Before the expiration of this term, further action of the reserve policy had been taken in the West by its hearty support, and a further effort

made by the reserves had served to confirm their desirability, so that all attempts to prevent their suspension proved it was well worth a few momentary alterations of wording, they were accordingly established. From that time down the Federal Forest Reserve policy has remained unquestioned by any considerable element of population, it has become an integral part of our National policy.

THE WORK OF THESE OFFICES FOR FOREST WORK.

We have seen that since 1892 the Department of the Interior, through the General Land Office, has been in charge of the reserves, and that the Department of Agriculture, through the Bureau of Land Management, has been in charge of the public lands. The administration of the reserves that is under the Secretary of the Interior, what is authorized by the law of June 2, 1897, to make rules and regulations in harmony with the principles laid down in that law. The same law entrusted to the U. S. Geological Survey the work of mapping and describing the best of the land, and also the area of the reserves, and to lay out the boundaries of the reserves, and to lay out the areas which might be reserved. Meanwhile, the Department of Agriculture, performs all the scientific forest work of the Government, and the Bureau of Land Management, the preparation of the maps, and the collecting and describing of the reserves.

The *New York Evening Post* in an editorial recently quoted in these pages, has already alluded to this division of authority as "a most ragged piece of patchwork." Certainly there is no rational basis for the arrangement, and the arrangement is being improved as more and more steps are taken to put into practical effect. Thus the work of the Geological Survey is concerned with the reserves, and it is a very close and ready sympathy with the work of the Department of the Interior, and the result between these two offices is obvious, but temporary. But the separate activity of the General Land Office, in its work of admin-

istering the public forest lands, both reserved and unreserved, may well continue indefinitely, unless law intervenes to unite the powers of that office with those of the Division of Forestry, either under the Department of Agriculture or under the Department of the Interior. " 'Tis a consummation devoutly to be wished." A clearer understanding of what forest work is and should be, the favorable attitude of Congress showed in its increased appropri-

tions for the current year, and the vast and widening field for forestry throughout the country, all point directly to a radical reorganization of the offices now charged with forest work. Till that reorganization has been made all effort in the right direction is hampered and in part nullified by checks and hindrances which are as easy of legislative removal as they are opposed to reason and common sense.

(*To be continued.*)

THE YALE FOREST SCHOOL BUILDING.

The photographs, reproduced on the opposite page, show the building which will be used for the Yale Forest School. The property was left to the University by the late Professor O. C. Marsh, who wished it to be used for a botanical garden. Inasmuch as the funds of the University do not permit the establishment of such a garden, the estate will be devoted for the present to the uses of the Forest School.

The house is admirably adapted for the purposes of instruction. A large entrance hall on the first floor will be used for a general assembly room, and the other rooms on this floor will be converted into offices and recitation rooms. On the second floor there will be a laboratory, a library, and an herbarium room. The museum specimens will be placed at first

about the assembly room, until the material collected justifies the use of a separate room for this purpose.

Surrounding the house there are ten acres of land, on which have been planted a large variety of trees and shrubs. A certain amount of planting will be done on the grounds for arboretum purposes, and a forest nursery will also be established. The material from this nursery will, however, eventually be planted on the tract at the outskirts of New Haven which will be used for the chief practical forest work of the students while they are in New Haven.

There are two greenhouses on the place which will be maintained in view of their probable use in connection with the botanical garden.

THE LAST REPORTS ON THE FOREST RESERVES.

Part V. of the Geological Survey's 20th Annual Report* contains a great deal of information about the general condition of ten of the national reserves, in which

Twentieth Annual report of the U. S. Geological Survey. Part V. Forest Reserves; Henry Gannett, Chief of Division. Reports by Henry Gannett, John G. Jack, George B. Sudworth, H. B. Ayres, and John B. Leiberg.

For a review of Part V. of the Nineteenth Report, the first report on the Forest Reserves, see THE FORESTER for March, 1900 (VI., 3, 55).

foresters, botanists and everyone can be interested. Besides this there is much material relating to the climate and topography of the reserves, and to the varieties of trees to be found in them, their distribution, etc., for all of which those who are interested in it will go to the complete text. The most impressive thing about the parts of these reports which will be of interest to the general reader, is the clearness with which they show that these reserves, which have been set apart for



THE YALE FOREST SCHOOL.

the future good of the country by as statesmanlike acts as any that have marked the history of the last decade, can be saved from deterioration and brought to the point of greatest usefulness only by prompt and efficient care and protection.

The reserves of which the examinations are reported are the San Gabriel, San Bernardino, and San Jacinto reserves of southern California, the Flathead reserve of Montana, the Bitterroot reserve of Montana and Idaho, and the five reserves of Colorado known as the Pikes Peak, Plum Creek, South Platte Battlement Mesa, and White River Plateau Timber reserves. But although these are only ten of the thirty-five tracts already set apart in the West, the fact that the conditions which exist in them prevail over the whole Rocky Mountain region and that of southern California give to the reports a wide interest and significance.

Of the 17,000 square miles which these reserves contain much the same general statements can be made. The land is all, either because of altitude, or roughness, or poverty of soil, unfit for agriculture; grazing can be carried on profitably on only a limited number of acres and mining seems to have met with small success. So that it may be said justly that the value of the reserves depends almost wholly on their forests. Yet these are now practically lacking in many places, and but a comparatively small part of the area supports timber that has commercial importance. This state of things is not due to any such cause as the climate, but almost wholly to the effects of timber-stealing, and of the fires which have been burning all through the Rocky Mountain region for centuries, and which are now, if anything, more frequent and destructive than ever before.

Some of the papers which make up the fifth part of the Twentieth Report are better described as surveys of the land and what is on it than as examinations of the reserves and the conditions which are affecting their history. In these reports a good deal of information about the causes of fires, the extent of damage done by them, and the relations of settlers, grazers,

hunters and others, to the welfare of the reserve can be gathered between the lines and from brief specific statements. In others, however, notably in two by Mr. George B. Sudworth, the economic and social conditions to which the administration of the reserves will have to be adapted are more fully considered. These, as also others though with less clearness, show that the destruction of the forest which is now going on is almost entirely due to human malice or carelessness. Avalanches and land slides destroy some trees; occasional fires are started by lightning; insects and fungi are also ever-threatening enemies of a forest. But were man excluded from the reserve these enemies of the trees would do comparatively little harm.

The fires that are now so common are due first of all to the carelessness of thoughtless hunters and tourists—"tender-foot campers"—and of irresponsible herders. In his report on the White River reserve Mr. Sudworth says of this latter class, "They have no interest beyond their season's or month's wages, and the burning, through even their own carelessness, of a few hundred acres of reserve timber is of little moment to them. The writer saw a few such irresponsible herders light their pipes and afterwards throw the burning matches among dry grass and forest litter. Several incipient conflagrations from such sources were prevented, but through no effort of these herders. The common sentiment among this class is expressed in the following: 'Well, I guess Uncle Sam can stand the racket, if the whole shootin' match burns up!'"

After a fire is thus once started its history is that of most other fires. In case there is rain or snow it is apt to go out; but otherwise it smolders and burns slowly, perhaps burrowing into the soil and destroying the roots of the trees, sending up a small column of smoke which can often be watched for days from miles around, until finally it is fanned into fury by a wind, and blown across scores or maybe hundreds of acres. Often valuable timber is thus destroyed, but where the growth is still young the damage though

at first sight less may after all be much greater. For it may mean that as no trees are old enough to leave seeds behind them, the possibility of future growth is indefinitely postponed. Of the Battlement Mesa reserve Mr. Sudworth says (page 236):

"This danger is a constant menace—to the thousands of seedling conifers which have slowly crept across so many blackened wastes. Their inflammable crowns are all within reach of even the lightest blaze that may run through the abundant grass of the region. If fire should enter, every vestige of promising forests would be swept from thousands of acres. The scanty reforestation which the last twenty or more years have effected in these regions could not be reproduced in fifty years. Each successive burning removes the elements of a possible return of original species by at least a score of years. The limit at which safe recovery can be expected from destruction by forest fires has been reached in this region. Greater inroads upon these depleted forests are sure to bring far-reaching effects to the vitally connected agricultural interests of this vast territory."

In another place (page 147) the way in which the ground fires burn, and the similarity in character between the second rate hunter and the ordinary herder are both shown in a paragraph of Mr. Sudworth's report:

"In September a small fire, covering about one-fourth of an acre, was discovered by me on the north bank of the South Fork of White River, about twenty miles above its mouth. The river bank is 5 or 6 feet above the water at this point and the timber very dense, with a deep, dry humus and many buried, dry, half-decayed logs. A deep, almost smokeless, fire had felled a number of big green spruces by slowly burning off the roots, the fire being fed by the mass of inflammable matter in contact. Such fires are flameless. They are buried 12 to 16 inches below the tangled, mat-like surface cover of green plant roots. Here they eat into the punky buried wood and powdery humus in a line of living coals a foot deep and as broad. The heat is intense, soon converting big green roots into charcoal, which serves to feed the destructive advance of such fires. Several hours' digging exposed the fire, which was finally extinguished with many hatfuls of river water. It proved to be a neglected, long-smoldering camp fire, for besides the usual signs of a camp fire the perpetrators had, on leaving, obligingly left a record nailed to a tree, which is illustrative of their law-observing spirit in respect to game and fish:

'July 25, 1898.—This is to certify that we leave this mornin' with a lode of fish and dear meat.

Joel Barnes & Chas. Baird.'

It is lawful to kill deer in Colorado only from September 1 to October 15. Fisherman are allowed to carry off not more than 20 pounds of trout, the only fish in the region."

Fires of this kind result in the end in the 'parks' and tracts of Aspen and scrubby brush with which some of the reserves are now filled, and which are being seeded down to timber much less rapidly than the remaining groves are being burnt off. The waste and loss involved are clearly shown by Mr. Gannett who says of the above mentioned reserve in his introduction (page 7). "The timber upon this reserve is of exceedingly poor quality. The stand is everywhere very light, the trees are small, branched low down and knotty, and a considerable proportion, 25 % to 40 %, including all the largest timber, is dead or defective." Of the South Platte reserve he remarks, "Through fires and timber cutting nearly all the timber of value has been destroyed, and it will require generations of care and protection before this area can again become a source of supply."

In regard to cutting the reports show that but little timber is now taken away. But considering the manner in which the work is carried on, and the fact that it is usually accompanied or followed by burning, it is far too serious a menace to the welfare of the reserve to be brushed lightly aside. In some instances the lumbering operations are doubtless undertaken in ignorance of the boundaries of the reserves, but this does not lessen the harm that is actually done. The object is always to get out as much wood as possible as quickly as possible, and in the process all seed trees are usually cleared away, and young growth is broken, bent and slashed most destructively. When fire follows this sort of cutting the ruin of the forest is complete. Sometimes, however, it precedes it, for the mill operators are apparently given to firing desirable blocks of wood at a time of year when there is no danger of more than the bark and lower branches being scorched. "It is said that these parties then cut the fire-killed timber with a feeling that they are committing a less culpable theft than if cutting green timber.

Moreover if caught by timber agents, the stumpage claimed is less for 'dead' than for green timber."*

As public sentiment is always an important factor in enforcing the law it is interesting to note that though the poorer class of settlers sees nothing to respect in the reserves, the mill operators who are responsible for all the depredations of any magnitude are quite sensible of the nature of their undertakings. A couple of quotations will make this clearer than could any but a long explanation. On page 143 the author of the report on the White River reserve says:

"Strangely enough, nearly all illicit lumbering and other timber depredations are looked upon by the settlers as blameless ventures. Such operations furnish a limited amount of employment to the poorer classes, and but for occasional sore enmities toward the richer mill operators, the latter are held in the light of benefactors. Indeed, by very many, they are considered to be taking only what rightfully belongs alike to them and all other settlers. The depredator's good name is not thought to be sullied by the veritable theft of timber from the national domain. The spirit of some landless settlers of the poorer class is well illustrated in the following remark made to the writer by a party suspected of stealing dead building logs: 'This timber belongs to us settlers and we're going to get it! The Government officials can't prevent us, either, with an army! If they attempt to stop us, we'll burn the whole region up.'"

On the next page we read, however, that:

"Notwithstanding this moral acquiescence, it is observable that the mill operators resort to various shrewd protective tactics. Almost no sawed timber is left at the mill or anywhere on the reserve. Often the lumber is drawn as fast as it is cut to some point just beyond the boundary of the reserve; whence it is disposed of with less danger of implication. Again, if pounced upon by 'timber agents' it is held to be less criminal to have dead logs on the mill yard than green. The haul of green and dead logs from the forest to the mill yard is, therefore, arranged so that all the green timber is conveniently run through the mill first.

One of the speakers at the recent meeting of the American Forestry Association in New York reported that this method of increasing the supply of convenient and valuable "dead and down" timber is also being practiced in Minnesota.

"Operators are watchful and suspicious of all strangers. My unexpected arrival in the region of the Coal Creek mill resulted in stopping all cutting, sawing and skidding, and within twelve hours 17 teams were at work hauling away timber accumulated at the mill."

This is encouraging. It shows that though the members of one class of the reserves' enemies, the lumber thieves, are willing to rely on the settlers for support, they do not also accept ideas of their "rights" from their employees, and are already alive to the nature of their guilt and its possible consequences.

Much more could be said about these reports, and a great deal also about Mr. Henry Gannett's second paper on the "Forests of Washington" which begins the volume. But many pages are filled with material which, however, important and valuable, will be interesting to only a few; and enough remarks and quotations have already been made from what remains to indicate what the reports and papers show about the general condition the reserves are now in. This condition is typical of thousands of square miles in the mountain regions of the West, and is as bad as it is simply because the people who make laws and those who enforce them, do not realize or do not care. Parts at least of these reports should be read by every congressman and member of a State legislature.

In the *Conservative* (Nebraska City) for July 26th appears a letter from Mr. C. D. Robinson, of Pawnee City, about the profits from a 40-acre plantation of Catalpa and Osage established in 1890. The trees when set out were one year old. The Editor of the *Conservative* reviews the letter thus: "Estimating the forty-acre tract to be worth \$2,000, the labor cost \$1,000, the total investment would be \$3,000. The market value of the 200,000 posts is \$20,000. This is what Mr. Robinson may sell his posts for and still have his land and the stumps from which to grow more posts and the second growth would mature in about ten or twelve years. The return on the investment is about 45 per cent. simple interest.

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Changes in the
Forest Division.

The appointment of
Mr. Henry S. Graves
as Professor of Forestry

in the Yale Forest School, and of Prof. J. W. Toumey as his assistant, has deprived the Division of Forestry of the Agricultural Department of two of its heads of sections. Professor Graves has been in charge of the Section of Working Plans since its inauguration, and Professor Toumey has been Superintendent of Tree Planting since his connection with the Division. Under the administration of Mr. Graves the Section of Working Plans has furnished the larger portion of the rapid growth which has characterized the Division of Forestry in the last two years. Beginning with a comparatively small area, the applications for working plans under the coöperative scheme of his section have now extended to approximately 50,000,000 acres, including all of the National Forest Reserves, the whole of the Forest Preserve of the State of New York in the Adirondacks and Catskills, and about 2,000,000 acres of private lands. Under Professor Toumey's administration the Section of Tree Planting, organized on a similar coöperative basis, has had very marked success, and is now thoroughly established in a career of special usefulness.

It is greatly to the credit of both of these gentlemen that the organizations

which they have conducted and which they are about to leave have been so firmly established under them that the work will suffer no interruption by their departure. Mr. Graves' place as Superintendent of Working Plans and Assistant Chief will be taken by Mr. Overton W. Price of the Division. Before entering the Division Mr. Price had an exceptionally thorough training as a forester. After graduating from the University of Virginia, he studied for a while at Biltmore, N. C., and thus was at the great advantage of having had practical experience in this country before he went abroad. In Europe he spent nearly three years, chiefly in Switzerland and Germany, where he worked under Sir Dietrich Brandis, formerly Director of the British Forest service in India. He also studied for a while at Munich. He entered the Division of Forestry a year ago. The position of Superintendent of Tree Planting has yet to be filled.

The contribution of Professors Graves and Toumey to the progress of forestry in the United States through the Yale Forest School will be not less conspicuously useful than it has been while they were members of the Division of Forestry.



Reserves and the
American
Lumberman.

In its issue of July
7, the *American Lumberman* took occasion

to publish the following editorial: "If a plan of any forest reserve or government park that is timbered in whole or in part contemplates the non-utilization of the timber it is a mistaken one, for natural resources should not go to waste as timber will if not cared for and marketed in season. But if the timber is handled as a commercial proposition and judiciously put on the market in fair competition there can be little or no objection to the incorporating of almost any quantity of timber owned by the government into a reserve."

The truth of this is undeniable, but it is also denied, and one wonders for whose edification the *Lumberman* saw fit to give it space. It is sad to find a lumber journal, which in importance is second to none in

this country, betraying at this late date such seeming ignorance of the nature of forestry, of the objects for which seventy-two thousand square miles have been set aside as forest reserves, and of the real problems which complicate their management. These problems are many and, whether simple or difficult, are of pressing importance. The *American Lumberman* could do more good by discussing them, and by informing its readers about them, than by spending its time in groping among the old and well-settled foundations of the whole reserve system.

**The Important
Work of the
Fire Warden.**

The report of Colonel Fox, the Superintendent of Forests of New York State, for 1897 appears in time to emphasize the importance of one of the duties which devolves on the newly created Chief Fire Warden—that of bringing those who start forest fires to justice. In New York, as everywhere else, the great difficulty has hitherto been that of making the laws which were provided for the punishment of these offenders effective. The local warden who believes that the well-meaning neighbor, or perhaps even friend, who started the fire through criminal negligence will be more careful in the future, has every temptation not to have a warrant sworn out. So he does his best to put out the fire and turns in a report of it with no indication of the cause. Of the 98 fires reported from October, 1896 to the end of the year 1898, the causes of only forty were given. And though, as Colonel Fox says, “the wardens may have been unable to ascertain the cause in some cases,” yet more often they knew the reason and though their attention was repeatedly called to their failure to make proper reports, “refrained from stating it to avoid trouble with the neighbors.” Not only this, but no one who looks over the reports can fail to notice that of the forty out of ninety-eight fires of which the origin is set down, only a few were started in such a way that neighbors could be held responsible. It is largely sportsmen, locomotives, children, etc., that are blamed.

Indeed experience of fire laws in whatever part of the country they have been passed, and of game laws also, has shown that local wardens cannot be counted on to have offenders prosecuted. Some one is needed who, with no special interests in the locality, can investigate the source of each fire on the scene, and see that the law is enforced. If this is not done the educational value of the law is lost; but when a competent person is appointed to give this business full time and attention, the best and much needed results can be hoped for.

**Preventable Fires
and their
Toleration.**

At the New York meeting of the American Forestry Association in June, Colonel Wm. F. Fox related some very interesting facts about the fires that occurred in New York State during the year 1899, which are also illustrative of the experience of Maine and other States where similar conditions exist. The drouth during the summer of that year was greater than any that had occurred for many seasons, and the forest was so dry that a spark could start a fire anywhere. In all 322 fires were recorded—ten times as many as have occurred in any other of the fifteen years during which the Forest Commission has been in existence. But though conditions were so favorable and fires so common, Col. Fox stated that in the two million acres, more or less, of forest land owned by private individuals and clubs, there was only one fire. The 321 others were all on the one million owned by the State. The reason for this was simply that private lands, especially those which belonged to the clubs and over which guides were constantly going and coming, were patroled thoroughly and efficiently. All burning was not merely checked but prevented, and this through no such thorough supervision of the forest as would be possible on private estates and in club preserves but out of the question as an undertaking for the State. For the lands which are held by the pulp companies and managed solely for the money that may be got out of them are among the private holdings referred to above; and the cost to the State of fighting

the fires which broke out on its lands, and the damage done by these fires, far outweigh the greatest possible cost of preventative forest supervision. The case shows that forest fires are no longer to be looked on as necessary evils in New York, but as needless disasters.

When this is so important and so plainly demonstrated, what must one think of "a large owner of New York Timber Lands," who lists himself as reported in the *New York Tribune* (July 8th) as saying: "Most of us are simply sitting in our offices waiting for the danger season to pass, each one hoping that his particular lands will escape the fiend." Fifteen years ago this statement could have been made on every hand and no one could have challenged its reasonableness; but to-day the man who makes it shows, if correctly reported, that he travels in an old rut and is content with the foresight of the last generation. Not only for their own sakes but for the good of the country, it is time that those who control its forest lands should wake up to the meaning of the lessons which the experience of forest commissions like that of New York are teaching them.



The New York Meeting and Press Comments.

York during June, showed, as few things have done for a long time, how widely the interest in forestry and the preservation of our forest resources has spread. This was made clear, partly by the papers read at the meeting and by the corre-

The meeting of the American Forestry Association in New

spondence incident to it, but most strikingly by the notices in the newspapers. While the meeting was going on three-fourths of the two columns which the New York dailies usually gave to the sessions of the Association for the Advancement of Science and its affiliated societies, were devoted to the meetings of the Forestry Association. Furthermore, during the week of June 25th, and also during the three weeks that followed, special articles of greater or less length, summarizing in some way the results of the meeting, or giving apropos thereof information about one thing or another allied in interest to it, appeared in almost all the New York papers and in many of the leading journals and reviews throughout the United States. In a number of cases the meeting was reported as far west even as California.

In some instances these reports and notices had in them an element of the amusing. Some editors in out-of-the-way places seem to have got wind of the meeting only about a fortnight or more after it was over. These appear to have felt vaguely that forestry was a good thing in which their readers were doubtless interested, and to have done their best accordingly. Often the notices which they brought forth were scanty; sometimes they said that the meeting had begun as much as ten days after it had adjourned; frequently they alluded hurriedly to its proceedings with nothings of most respectful brevity. But still the reports appeared; and with all due allowance for the fact that the journalistic world at large makes news of all things, they showed that the interest in forestry is spreading.

NEWS, NOTES AND COMMENT.

News from New York.

Fire Warden, pursuant to the provisions of the law passed last winter. His duties will consist principally in maintaining a systematic and efficient organization of the

Mr. L. M. Emmons, of Oneonta, N. Y., has been appointed Chief

large number of town fire wardens throughout the Adirondack and Catskill regions. When vacancies occur among these officials, it will be the duty of the Chief Fire Warden to recommend to the Forest Commission suitable persons for appointments to fill their places. One of the most im-

portant duties devolving upon him will be the prosecution of persons who start forest fires wilfully, negligently, or in violation of rules and regulations of the Commission.

Mr. Ralph C. Bryant, the first graduate of the State College of Forestry at Cornell, was recently appointed an Inspector or Assistant Forester, and, having passed the Civil Service examination satisfactorily, has been assigned by the Superintendent of Forests to Township 8, Herkimer County, where he will inspect the lumbering operations which are being carried on there, and see that the timber is cut in accordance with the terms of the contract. Although this township is owned by the State it was subject to a lumber contract at the time it was purchased by the Forest Preserve Board. Part of Inspector Bryant's duties will be to see that no trees are cut which are smaller than the diameter specified in the contract; and also to enforce certain other provisions relating to the trimming of the tops which are left by the jobbers after the logs are skidded—this trimming being necessary in order to lessen the danger from fire.

A forestry camp has been established on Township 40, Hamilton County, the tract on which Raquette Lake is situated. The party occupying it is under the charge of Mr. Ralph S. Hosmer, of the Forestry Division at Washington, and is busily engaged in making working-plans for lumbering the township, in accordance with the plan of coöperation between the Division of Forestry and the New York Fisheries, Forest and Game Commission which was described in the FORESTER for July. It is expected that these plans will be submitted to the Legislature for approval at its next session. There are eleven men in this camp, including the two recently appointed State Forest Inspectors, H. S. Meckham and Grant Bruce. With this party there are also Eugene S. Bruce and five student-assistants from the Division of Forestry. The camp is pleasantly situated on the shore of Raquette Lake, its white tents partly hidden by the trees. A tall flagstaff from which floats a large national flag, marks the location plainly.

The Forest Preserve Board is meeting each month either at Albany or at some place in the Adirondacks, and at each meeting extensive purchases of forest lands are made. As a result, the acreage of the State Forest Preserve is rapidly increasing. It is expected that another and a larger appropriation for the further extension of the Preserve will be made by the Legislature next winter.

**Lumbering, Drought,
and Laminished
Production.**

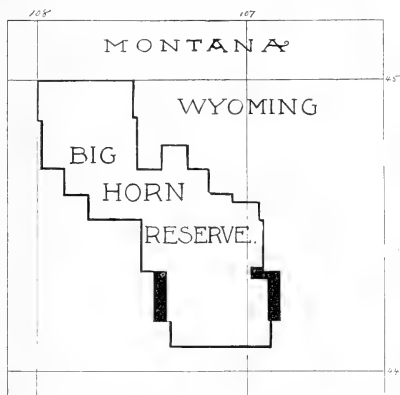
“While the present dry season is, as it were, an accidental circumstance, still the question of log driving is growing more important each year. The forests are being cut back steadily and more dependence is necessarily placed on the more distant and smaller streams. A drought which a few years ago would have been a temporary inconvenience only, to-day serves to hang up enormous drives of logs for an entire year.”—*Lumber Trade Journal*.

“Figures made public Thursday by the surveyor of logs for the Minneapolis (Minn.) district show a reduction of 50 per cent. in the production of White Pine lumber for June as compared with June, 1899. During the past month 312,948 logs were scaled, aggregating 24,292,230 feet, as against 520,129 logs aggregating 49,199,000 feet for the same month a year ago. This amounts to a reduction of a little over 49 per cent. and was due to the inability to float logs to the sorting gap, owing to the drouth and the low stage of water in the Mississippi River all through the month.”—*American Lumberman*, July 14.

**Additions to the Big
Horn Reserve.**

On June 29th President McKinley signed a proclamation which has added to the Big Horn Forest Reserve of Wyoming the areas indicated in heavy black in the accompanying map. This enlargement of the reserve brings within its boundaries a number of areas which are covered with timber, and also brings the limits of the reserve into better harmony with the topography of the country by ex-

tending them to the Rimrock at the edge of the plateau on which a good part of it



is situated. The addition contains 53,120 acres and brings the total area of the reserve up to 1,180,800 acres.

Growing Poplar.

“A few days ago I cut a Silver Poplar which had been planted for ornamental purposes in the spring of 1889, and which had grown nearly eighteen inches in diameter a foot above the ground, and probably contains a cord of wood. The tree became a nuisance where it stood, and so it had to come down. But it made me think of the possibilities of growing such trees for commercial purposes. Poplar is being much used for paper-making. How many years will it take at the present rate of using the native Poplars for this purpose alone before the natural supply will be exhausted? Possibly we may be able to find other materials for paper-making, such as corn-stalks, etc., but I would feel pretty safe to predict a ready sale of all Poplar wood that one could grow for the next one hundred years. I do not know what price paper-makers have to pay a cord for the wood they use. But think how quickly one could produce a big lot of Poplar wood. The tree grows marvelously fast. In ten

years from planting you would have quite a good forest, and even before that time much of the wood could be utilized for various purposes, as the trees could be set quite thickly at the start and gradually thinned out. Trees can be cheaply procured, too. I only offer this as a suggestion,”—*Farm and Fire Side*.

Forests and Stream-flow.

In a pamphlet recently issued by the Minnesota National Park and Forestry Association a number of pages are devoted to the need of preserving the forests in the region of the headwaters of the Mississippi in which it is proposed to establish the park. For emphasis a number of quotations from a collection bearing on the influence of forests on the water supply are reprinted, among which are the following:

It may be said that the measure of attention given to trees indicates the condition of the agriculture and civilization of a country.—*Mahé*.

It is not wars which have brought most evil on the region of the Mediterranean, but aridity, brought on and aggravated by the reckless destruction of woods, and by the excessive abuse of pasturing sheep on the mountains.—*Déherain*.

The clearing away of woods—in that lies the principal cause of the arrest to which agriculture has been subjected in Algeria.—*M. Calmels, Génie Civil*.

From Madrid to Jerusalem history and geography tell the same tale: forests given up to sheep, forests destroyed; mountains devoid of woods, mountains devoid of life.—*Broilliard, Les Massifs de Sapin et la disette de Bois en France*.

In the place of the fertile fields of cis-Atlantic Africa, we find now nothing but plains rendered sterile by desiccation and the absence of trees.—*A. Maury, Histoire des Grande Forest de la Gaule*.

In felling trees growing on the sides and summits of mountains, men under all climates prepare for subsequent generations two calamities at once—a lack of firewood, and a want of water.—*Humboldt*.

Now may be seen clearly whither tends this fatal connection of cause and effect which begins with the destruction of the forest, and ends in the miseries of the population: dooming thus the man to share the ruin of the soil which he has devastated.—*Surell*.

**The Coast
Redwoods.**

“Prof. C. S. Sargent of the Arnold Arboretum, Harvard University, has just written a letter to Mr. Edward T. Potter, a trustee of the Society for the Preservation of Scenic and Historic Places and Objects, calling attention to the danger threatening another class of great trees on the Pacific Coast. He says that there are two kinds of great trees in California, *Sequoia Wellingtonia*, or Big Tree of the western slopes of the Sierra Nevada and the Redwood of the coast. Assuming that the Sierra Sequoias will be saved, he continues:

“The future of the Redwoods of the coast gives cause for greater anxiety. This is a tree second in trunk diameter only to the Sierra Sequoia. It is a much taller tree, the tallest of all North American trees, and probably taller than any of the Australian Eucalypti, which have usually been considered the tallest trees in the world. To my mind, the Redwood is a more beautiful tree than the Mountain Sequoia, although I cannot get Mr. John Muir to agree to this, and it is economically more valuable. The Redwood extends, or did extend, in a maritime belt from the southern borders of Oregon southward to Monterey County, Calif. The whole of the land covered by this tree has been allowed to pass from the control of the Government, and a few years, fifty perhaps, will see the destruction of the original Redwood forests.

“Four years ago, when I was serving on a Government commission to study the western forests, I made a special trip through the Redwood belt in company with Gen. Abbott and Mr. Muir, in the hope of being able to find a tract belonging to the Government, but we were unable to find a single acre that had not passed from Government control. What

ought to be done for the credit of America and American civilization is to purchase, through act of Congress or by individual effort, a block of a few thousand acres of this forest with the idea of preserving it for all time. It is doubtful if the Government can be got to do this, but possibly some rich man or men can be found glad to immortalize themselves by saving from destruction one of the great marvels of the world, for this Redwood forest is the most stupendous and productive forest that exists. Unless a Redwood reservation is made, all trace of the original Redwood forest will disappear before the end of the next century.”—*New York Evening Post*, July 25.

**A Lumberman's
View.**

Under this title the Michigan Forestry Commission prints the following in a pamphlet entitled *A Little Talk About Michigan Forestry*:

“Mr. Edward Lowe, who is connected with a firm having large forest interests and carrying on lumbering in an extensive way, in a recent interview deplored the wasteful methods of lumbering and the total lack of thoughtfulness on the part of citizens and officials having in charge the affairs of the State. He has traveled extensively, and finds in no other country such an entire lack of thoughtfulness with regard to economical forestry as is displayed in this country and especially in our own State. He thinks the State cannot take hold of the matter of forestry too quickly and work out a plan that shall have in view the utilization of lands that are now entirely a waste, and by judicious management based upon the experience of other nations, create upon these same lands a legacy of wealth for future generations in our State. He would like to see lumbermen beginning to discuss more economical methods of manufacturing lumber, and conserving the young growth upon lands that are cut over. He believes there should be a united effort on the part of land owners and lumbermen to secure such legislation as will stimulate the investment of money in lands used for growing timber.”

Arrests in Pennsylvania.

"On Monday Geo. White, of Elimport, and William Welshans, of this city (Williamsport, Pa.), were arrested by Constable Mitchell and yesterday morning given a hearing before Alderman Kellenbach on a charge of starting a forest fire on land owned by David Stuempfle, of this city, with intent to destroy trees. The case against the men was worked up by Constable Mitchell, who has been made special detective by the County Commissioners, and the prosecution was carried on by District Attorney Kaupp.

The story of the affair is simple. In April the men were working for Stuempfle & Dunbar, sawing logs and the ring of a small kept coming off so that they decided to make a fire and weld it on. The wind carried blazing leaves about and set fire to the trees and about nine acres of worthless timber was burned before it was extinguished. The two men worked with others to extinguish the fire and it was shown that they did not start it maliciously or intentionally.

The District Attorney insisted that they be held for court so that a jury might decide their guilt or innocence of criminal negligence. They were held in \$100 bail for court."—Williamsport *Gazette*, July 14th.



His Own Enemy.

"Were our lands held as permanent producers of lumber as they would prove themselves to be, such investments would be held at a lower rate of interest. The manufacturing plants would be built in a more permanent manner, there would be a greater incentive for the upbuilding of large, well arranged and well managed industries. Those in the business would have a greater incentive for the bestowing of their life work upon its details, there would be an *esprit de corps* among lumbermen that does not now exist, and which is not shared by his neighbors. Why should American lumbermen be held as robbers and ravagers by a certain class of people? They supply

the nation with material for homes, their industrial establishments and millions of dollars of exports. Without its forest revenues and the wages from the workmen engaged in forest industries, the country would be crippled. In the hundreds of half-deserted villages, whose idle dismantled lumber mills attest a once prosperous community, whose furnaces have been cold for many a day, the whirr of the saws forgotten, can be found the explanation. Forests that were intended as a source of supply for all coming generations, were stripped, ravished, to satisfy the greed of one generation and the all-devouring forest fire came to complete the devilish work. Lands that would have furnished timber supplies for ever are only areas of burnt stumps, worse than waste. Farms have succeeded in some places, but there are millions of acres that will never be profitably farmed. In his unthinking greed the lumberman accomplished his own ruin. Before he was aware extinction of timber stared him in the face. He moved his machinery to some distant place and began life anew, amid new friends and unravished timber. Each week we read in the press of some timber firm in the middle Northwest that has cut out of timber, and is seeking new fields for work. It is their own indictment. There is only one solution of the problem for American timber owners and that is that lands more valuable for timber growing than agricultural purposes should be so managed as to secure a constant future supply."—F. H. Lamb, "The Manufacture of timber on the Pacific Coast of North America" in *Timber and Wood-working Machinery*, London.



Not Single Trees but Forests.

"It is true, now that we have Arbor Day, and the children turn out here and there and plant a few trees, and the sentiment which is there inspired may bear fruit in time to come, yet the planting of an occasional tree along the highway or in the towns and cities is of no particular consequence. A few trees in Jerusalem or Antioch were as nothing compared to the destruction of

the mighty forest of Lebanon. The change in the face of nature caused by that action has permanently impoverished the entire region, the Judean valley was rendered arid, and Palestine to-day can support but few people because her water courses have been dried up and the great trees which sheltered the snows and kept the pitiless sun from reaching into the heart of the springs have been destroyed utterly, without a successor. Our need in the future shall be not so much a few trees about our homes, as great areas of trees all up and down this beautiful State, protecting head waters of our rivers, making use of our unfertile sands, giving variety and beauty to our gentle hills and refreshing the weary, whether human or otherwise, with nature's quiet cathedrals. Some time it may be, our State shall be so ruled by men of vision and men of taste—some-time, it may be fondly hoped, our legislature shall have the leisure from the immense burdens of petty politics and the strident voice of the lobbyist and the crank to turn its attention to the State of Michigan—to renew its waste places with forest life—to make this peninsula, which is bound to shelter 10,000,000 of people, as beautiful as God intended it to be." From a sermon by Rev. D. F. Bradley, of Grand Rapids, quoted in the latest pamphlet of the Michigan Forestry Commission.

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The Minnesota Park and the Mississippi.	"An allotment of \$2,250,000 has just been made for the im- provement and deepening of the Mississippi River. A further amount of \$8,000,000 is asked from the River and Harbor Com- mission for rendering this river more nav- igable at certain shallow places.
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"Now, at this river's headwaters in the northern part of Minnesota is an Indian reservation already ceded to the Government under the Rice Treaty with the Indians. This reservation is known as the Leech Lake Chippewa Reservation.

"In this tract are 830,000 acres, of which 200,000 are water. Within its boundaries are the three great lakes of Leech (with 540 miles of shore line), Winibigoshish

and Cass, besides seventy smaller lakes connecting with the infant Mississippi, making one great checkerboard of forest and water.

"It is said that upon this reservation is to-day the greatest body of White and Norway Pine to be found in this country. Conservative estimates give 2,000,000,000 feet of standing Pine, exclusive of some hard woods and Jack Pine, making altogether a great watershed and filter bed for the Mississippi River.

"Some prominent citizens of the Northwest are doing their utmost to have this land reserved as a National Forest Park by the Government instead of having it sold to the lumbermen.

"Upon this tract are tribes of Chippewa Indians numbering in all 1,500 souls. It is proposed that the Indians be left where they are instead of being driven away to a foreign reservation.

"The intelligent, thinking person must realize the effect upon the flow and quantity of the water in a river with its timber-covered headwaters denuded. A flood in the early spring and midsummer and low water for the rest of the year is the history of every stream after its headwaters have suffered at the hands of the lumbermen.

"The mean depth of the Mississippi would undoubtedly be greatly lowered were the timber to be cut from this great watershed. This being so, to keep the river navigable its entire length from St. Paul to the Gulf would require the expenditure of many millions annually. Instead of a request of eight or ten millions, a hundred millions would be asked for. To do that which would lower this great river two or three feet would prove a catastrophe to the whole Mississippi River Valley with its more than 30,000,000 inhabitants."—From a letter to the *New York Sun* by Charles Christodoro, of St. Paul.

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Scarcity of White Oak.	"A buyer of timber land who has been operating in the south country for two or three years past says the White Oak stumpage of that section is rapidly disappearing, and predicts
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that quarter-sawed White Oak will be selling at \$75 to \$80 a thousand within the next five years. This may be a somewhat radical view, but it is a fact that the amount of oak stumpage in this country is much less than is commonly believed."—*American Lumberman*, July 21.



Forest Fires during July.

During the past month forest fires, though much less common than a month ago, have been burning with greater or less destruction in all parts of the country. The following are a few of the many press accounts which have been received. They refer to only a few of many fires and are not selected because they are especially striking. Anybody who has read the papers will have seen more impressive articles. They are merely typical notices of the burning of woodland, a large part of it unrecorded, which is taking place in every State.

"A Despatch special from Kalispell, Mont., says: One of the worst forest fires ever known in northwestern Montana is now raging in the Swan Lake country, on the western part of the Lewis and Clarke forest reserve. The Indians set fire to the timber and are slaughtering the game. Within the space of thirty miles up and down the river there are over thirty fires now burning fiercely. As fast as one fire is extinguished another is set, and the rangers are almost worn out. The weather is very hot and dry, and the fires spread rapidly."—*Boston Transcript*, July 26.

"The forest fires which have been raging around Eldora for the past three days are still burning, and show no signs of immediate abatement, and unless a rain comes soon the loss, which is already great, will be simply tremendous. The loss already involves millions of dollars' worth of standing timber, and the Boulder Cañon region for an area of ten square miles has been changed from a virgin forest to a smouldering desert. The whole valley for miles is full of smoke, which mounts up in huge clouds above the highest mountains in the neighborhood, while at night the sky is painted with a lurid glow visible for miles.

"At Eldora the fire is reported under control and dying out, but it is admitted that a high wind from the southeast would rouse it to a fury of flame, and a spirit of uneasiness pervades the community. * * *

"The immediate cause of the fire has not been discovered, but it is said to have been due to the carelessness of the men at Caviness mill. * * *

"While the loss in buildings has not been so great as was feared, the destruction of timber will give a set-back to mining operations in that district for years to come, for the reason that the needed timber will be missing and it will have to be brought from long distances at a great outlay of trouble and expense."—*Post* (Denver, Col.), July 15.

"ANGELS CAMP, July 10.—A most destructive grass fire has been in progress a few miles from this place since Saturday noon. The damage it has wrought in one way and another is unestimated, but will amount well into the thousands. This is the first fire this season of any great importance, and has set wonderful object lessons on the necessity of guarding against such accidents. It is not known how the fire originated, but there is a possibility of it being the work of an incendiary. On Saturday the alarm was first sounded, and hardly had the work of extinguishing the first blaze begun before the wind turned and the fire swept from one hill to another, until Bear Mountain was one mass of flame and smoke. * * *

"On Sunday the fire broke away again, and with a roar like a distant cannonade started down the valley at the base of Bear Mountain. Men, wearied with their efforts and all-night vigils, rushed beyond to 'back fire' and try to turn the course but before they were aware of it a flame shot across Angels Creek and into the treetops on the opposite side, a distance of 300 or 400 feet. Almost immediately a cloud of blackest smoke rose into the air and could be plainly seen for miles around. All efforts to check the fire were in vain, and it swept on for four miles to the Stanislaus River, which it reached in two hours. Every effort is being made to keep it from jumping across the river, and men

are stationed on Bear Mountain to keep a close watch and sound the alarm in the event of the fire starting up again."—*San Francisco Call*, July 11.

"SANTA BARBARA.—What appears to be a big forest fire in the Mono district of the forest reservation is indicated by dense volumes of smoke rolling above the mountain tops. It appeared shortly before noon, and the forest supervisor left early this afternoon with a force of men to quell the flames."—*Los Angeles Times*, July 13.

"PHOENIX, ARIZ., July 2.—Reports from eastern and southeastern Arizona state that forest fires have broken out afresh in many of the mountain ranges, and unless there is rain soon the loss in timber will be immense.

"For over a week a great fire has been raging on the Sierra Ancha, and is particularly visible from Globe. It has burned already a distance of twelve miles and over a strip from three to four miles wide, an area covered entirely by fine timber and affording range for hundreds of cattle. A fire in the Huachuaca Range has taken a fresh start and has driven out all the cattle and game. The military department at Fort Huachuaca will make an effort to stop the fire before it encroaches on the reservation."—*San Francisco Call*, July 3.

"H. G. Hamaker, supervisor of the Black Hills forest reserve, returned to Deadwood yesterday from Sand Creek, where he had been since Friday night, fighting the big timber fire that was burning there. He and his men put in a trying time for several days and nights, with no sleep, limited rations and unremitting toil. * * *

"Mr. Hamaker said it cost the government about \$200 to fight this fire. It had been burning a week or ten days before Mr. Hamaker was notified of it. There is no ranger in that section of the country yet, and the people living there neglected to inform the government official. Mr. Hamaker heard of it a week ago Friday and went out there immediately, getting there Friday night. * * *

"Mr. Hamaker says the tract burned

over is about five miles square, and he estimates the loss of timber on the public domain to be about 12,000,000 feet. About 5,000,000 feet of the timber was destroyed on patented land. This was some of the finest timber in the country. Mr. Hamaker says it is not destroyed, and could be utilized for lumber if it were in an accessible locality. But it has been killed and must be used within the next year or it will be worthless. The branches have been burned off, and the bare trunks have been left standing."—*Herald*, Salt Lake City, July 8.

"SANDWICH, Mass., July 20.—A forest fire which now extends over a territory of at least twenty-five square miles and which threatens with destruction nearly a score of towns about this portion of the Cape district, is the result of a blaze started yesterday in the vicinity of Patchville by some berry pickers. Hundreds of men are working night and day to check the progress of the flames, but as the brush is as dry as tinder and as the flames jump first one way and then another they are almost helpless. * * *

"The fire now has no general direction, but is spread out in the district between Sandwich and Buzzard's Bay, bounded by the main line of the Consolidated Road and by the towns of Cataumet, Wenaumet, and the Falmouths, and the brush and timber between is a roaring mass of flames. Oftentimes, backfiring has proved of no avail. It has been a terrible battle for the men, and many are coming out of the woods in an exhausted condition, and they express no hope that the fire will be checked unless rain comes. * * *

"To-night the wind is from the southwest, which is likely to increase rather than diminish the ferocity of the fire. No estimate of the damage already done can be given, nor can anything definite be said as to the progress the flames will make to-night and the probable damage they will cause."—*New York Times*, July 21.

This fire was finally checked by backfiring and the help of a favorable wind after it had burned over thirty square miles.

RECENT PUBLICATIONS.

The Third Annual Report of The Commissioners of Fisheries, Game, and Forests of New York State—1897.

The Annual report of the Commissioners of Fisheries, Game and Forests of New York State for 1897 contains a great deal of matter relating expressly to the forests of New York. In all seven papers are concerned directly with these forests and two more—one on the natural and artificial reservoirs of New York and the other on the State's title to lands on the forest preserve, will have a particular interest for the forester. As a whole this volume, with its handsomely colored illustrations of fish and birds, its many sketches and photographs of hunting and fishing scenes (in which all men appear brave, and all women fair) and its many accurate pictures of the different phases of the forest industries of the State, is in striking contrast to most government reports, and shows that the New York Commissioners realize how great and many-sided is the economic and social importance of the forests over which they exercise control.

The first part of the Annual Report of the Superintendent of Forests, Colonel Fox, gives an account of the areas and conditions of the forest preserves, and statistics about the fires which occurred in it between October, 1896, and January, 1898, and also the usual annual compilation of the statistics showing the product of the Adirondack forests for 1897. In this it is clear that many of the trees which have had little value in the past are one after another coming into commercial demand. Colonel Fox does not fail to point out the significance of this fact and says: "All this means that the time is near when the different species in our forest, both conifers and broad-leaved trees, will become merchantable timber—this growing demand for hardwood, the merchantable character of all the species, will increase the revenue-producing capacity of our woodlands, and enable the State to produce an annual permanent revenue without depending on some one species as at present."

Five of the papers relating explicitly to forestry are of the nature of "tracts and circulars of information," written for the purpose of awakening an interest in the behalf of forestry, and imparting elementary instruction. Colonel Fox prefaces these by saying that they will doubtless appear to some, "A mere repetition of what has been said in one way or another * * * but they were not written for those who had made a study of forestry. They are for the use of the thousands to whom the subject is new, and whose attention is called to it for the first time." They are entitled, Why our Forests should be Preserved and Protected, Fores-

try, Forest Management, Forest Fires and Tree Planting. For the purpose for which they were written they could hardly be better, and the fact that the information which they contain is not new, does not lessen its value.

The paper which, considered apart from all others, is probably the most interesting and valuable, is that dealing with the maple sugar industry and entitled "A Forest Product." The production of Maple syrup is practically the only forest industry in this country which is widely practiced with forethought and on scientific principles. Its great importance can be gathered from the fact that 17% of the granulated sugar manufactured in the United States comes from the Maple tree. Colonel Fox gives a brief history of the industry by way of introduction and then goes on to describe the way in which it is now carried on by the most advanced and improved methods. He pays attention to the rules for tapping, the methods of handling the syrup, and to the machinery for evaporating and refining. He also considers at some length records of the amount of sugar produced per tree and per acre under different conditions, and hence of the profitableness of a sugar bush, and takes up the possibility of carrying on the industry in the more southern and northern regions where the Sugar Maple grows, but where it is now valued only for its wood. There is probably no article on the manufacture of sugar and the care of the orchard, as good as Colonel Fox's, and those who are interested in the subject should not fail to read it.

The Forest Wealth of Canada. By James M. MacCooen.

The Wood Pulp of Canada. By George Johnson, F.S.S., Hon., Statistician of the Department of Agriculture, Ottawa.

These two pamphlets are printed for the Paris Exposition by direction of the Canadian Government, and intended, as their method of publication would imply, to convey to foreigners information of the business opportunities in the forests of Canada. Statistics about Canada's forest products, and their value, lists of her trees, their uses and distribution, and a map and illustrations of mills, streams, etc., do this with as much thoroughness as is possible where no attempt to be exhaustive is made. A good deal is put into the pamphlets, however, which attracts even readers who have no intention of investing their savings in Canadian Spruce or Pine. Mr. Johnson's pages on the history of paper and the materials used in its manufacture—since the days of Egypt to the days of "the land of the Spruce tree," Canada, are especially interesting. The second pamphlet shows that in 1891 there were twenty-four pulp factories in Canada rep-

representing \$3,000,000 of invested capital. To-day there are thirty-five mills, and the invested capital is between fifteen and twenty millions.

Statement of Facts Relating to the Proposed Minnesota Park. Published by the Minnesota Park and Forestry Association.

A Little Talk about Michigan Forests. Michigan Forestry Commission.

The Forestry of California and The Distribution of Rain-fall.

These three pamphlets are all in the nature of "educational campaign" literature. All, as such literature should, contain much substantial and useful information.

The Statement of Facts, 'submitted' by the Minnesota National Park Association, is a handsomely printed pamphlet, thirty-four pages in length, which begins with a full description of the boundaries of the proposed National Park, of the character of the land which it contains, and of the game, and fish, which are found in it. The importance of preserving the woods of the region for the sake of the Mississippi which flows for seventy-five miles through it, and which drains its three hundred square miles of water surface, is pointed out and emphasized by a number of quotations from authorities on irrigation and forestry. As the lands within the proposed boundaries of the reserve are now Indian Reservations, the question of dealing with the Indians is taken up with thoroughness. The Nelson Law and the Rice Treaty and their workings are considered, as also the value of the lands and the Pines now standing on them. The conclusion reached in regard to this is given in the following paragraph.

"It is proposed by this Association, that, acting upon the opinion of the best authorities on forestry in this country, the government shall retain these lands, and cut the matured Pine timber from year to year and sell it for the benefit of the Indians; that by keeping out forest fires, clearing up the slashings and caring for the young trees and shrubs, so that they shall not be injured or destroyed, a beautiful natural forest will be preserved for all time to come."

A Little Talk about Michigan contains at the beginning a "Glimpse of the Situation,"—a statement of the present condition of Michigan's

forests, and of the nature of the State's immediate needs. The rest of the pamphlet consists of quotations of different authorities, dealing more or less particularly and in different ways with the same subject. They are all interesting and to the point, and cannot fail to do good wherever they are read.

Two short papers on "The Forestry of California" and the "Variation and Distribution of Rainfall" by Prof. George Davidson and Mr. Marsden Manson respectively, appear as a supplement to the proceedings of the eighth annual convention of the California Miners Association. The first of these goes to some extent into the history of California's forests and their destruction and its effects, points out what is now being done in the way of governmental examinations and protection, and finally makes clear the "necessity for a thorough and exhaustive examination of the mountain region of California upon the coast and in the interior, for the location of dam and reservoir sites." The pamphlet contains a list of the reservoir sites examined by the U. S. Geological Survey and recommended to the government for reservation from sale, and ends with Mr. Manson's note on "The Variation in and Distribution of Rainfall," in California.

Prof. Davidson devotes some space to the question of forest fires, and says many things about them which are only too true, and which should long ago have been made unnecessary; but he makes one statement which luckily will not hold. He says that as far as his "experience extends in noting this reckless and absolute destruction of millions of forest trees yearly, the trees—say the Douglas Fir of Oregon and our northern coast—do not reappear, but very inferior and almost useless species of trees take their place." The forester would indeed have a discouraging future in the West if this were true. But luckily unless repeated fires occur it is not; in support of which it is enough to point out that in the Red Fir (Douglas Fir) forests of Washington, signs of fire slightly older than the living trees are everywhere to be found. This means that practically all the Red Fir now standing has grown up after fires, not that it exists because the region has been free from fire. Nor has it been shown that the growth which preceded the present Red Fir forest was not also Red Fir.

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SEPTEMBER, 1900

No. 9

The Forester

A MONTHLY MAGAZINE

devoted to the care and use of
forests and forest trees and
to related subjects



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The Forester

Vol. VI

No. 9

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THE PLATFORM OF THE FORESTER

In order to assist its readers to grasp present problems the FORESTER indicates five directions in which an effective advance is chiefly needed.

1. The forest work of the United States Government which is now being carried on by the Department of Agriculture, the General Land Office, and the Geological Survey, should be completely and formally unified. The division of authority between the three offices involves great waste, and consolidation is directly and emphatically pointed to by the present voluntary co-operation between them.

2. A system of forest management under the administration of trained foresters should be introduced into the national and state forest reserves and parks.

3. Laws for the protection of the forests against fire and trespass should be adapted to the needs of each region and supported by the provisions and appropriations necessary for their rigorous enforcement.

4. Taxation of forest lands should be regulated so that it will encourage not forest destruction but conservative forest management.

5. The attention of owners of woodlands should be directed to forestry and to the possibilities of applying better methods of forest management.

Persons asking themselves how they can best serve the cause of forestry will find suggested here lines of work along which every effort will tell. No opportunity for doing good along these lines should be neglected.

The Forester

All the back files of THE FORESTER have now been disposed of with the exception of those enumerated below. Reading matter is perfect in all (some have damaged covers). As all the back numbers of THE FORESTER which belonged to Dr. John Gifford, who founded THE FORESTER and edited it until 1898, have been secured, no other files are now to be had. These will be sold at practically half price. An unusual library opportunity.

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Kindly mention THE FORESTER in writing.

The object of **The American Forestry Association** is to promote

1. A more wise and conservative treatment of the forest resources of this continent.
2. The advancement of educational, legislative and other measures to that end.
3. The diffusion of knowledge regarding the conservation, management and renewal of forests, the proper utilization of forest products, methods of reforestation of waste lands, the planting of trees for ornament, and cognate subjects of arboriculture.

The Association desires and needs as members all who are interested in promoting the objects for which it is organized—all who realize the importance of using the natural resources of the country in such a manner as not to exhaust them, or to work ruin to other interests. In particular it appeals to owners of timber and wood-land, to lumbermen and foresters, as well as to engineers, professional and business men who have to do with wood and its manifold uses, and to persons concerned in the conservation of water supplies for irrigation or other purposes.

Forest matters are being discussed by committees of national and State legislatures and by the public. Much good can be accomplished if there is organization of
ort.

THE AMERICAN FORESTRY ASSOCIATION, Washington, D. C.

SEE OPPOSITE PAGE 228.

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THE FORESTER.

VOL. VI.

SEPTEMBER, 1900.

No. 9.

ON THE POSSIBLE EFFECTS OF THE GYPSY MOTH ON AMERICAN FORESTS.

By N. S. SHALER.

Harvard University.

Between twenty and thirty years ago the Gypsy Moth (*Oenaria dispar*) was effectively introduced into this country. Owing to the peculiar nesting habits of this insect, which lays its eggs in crannies of furniture, barrels, etc., as well as on the trees it infests, colonies had doubtless been frequently hatched within the United States before the successful implantation in Malden, Mass., was made. The reason for this difference is to be found in the fact that the naturalist who attained the unhappy success took pains to have a succession of broods, so that there was a chance for a certain process of acclimatization of the species and also for effective cross-fertilization to take place. It was the purpose of Mr. Trouvelot who did this work, to keep the introduced insects in confinement and to interbreed them with various native species of moths with the expectation of producing a hybrid which would feed on the leaves of our numerous American species of oak and produce a valuable kind of silk. A storm broke up and scattered his cages and their tenants so that his experiment was abandoned. Mr. Trouvelot thought that this accident had destroyed all his captives; he died without knowing that his well-meant endeavor was to bring a serious evil upon this country.

For several years after the Malden insectary was destroyed, the presence of the Gypsy Moth was not remarked. Suddenly the creature began to appear in in-

credible numbers, so that in two or three successive seasons it had multiplied at a rate probably greater than has ever been observed in any other species of moth, and hardly surpassed by that of the African locusts. All the vegetation on many hundreds of acres of tilled land was stripped of its leaves as were also considerable areas of forest. The starving hosts of caterpillars were forced to march to fresh fields. They invaded homes and so covered the sidewalks of the villages that their crushed bodies made the footing slippery. At this stage in the history of the invasion the creature was first recognized as the Gypsy Moth. In the previous year it was supposed to be some native species which had temporarily increased, as is the habit of certain ferns which suddenly become numerous and then as suddenly disappear. When it was known that the most destructive of European insects had become firmly established in this country and was even more vigorously at work than in any part of the old world, the people were quickly aroused to action. As the species had already spread to several towns it was evident that no local authorities could be trusted to suppress it. Therefore the Commonwealth was asked to appoint a commission which should undertake the task. Unhappily the commission at first appointed as well as the sum supplied for the task were alike inadequate; so that two more years were lost before an effective campaign was be-

gun. Finally the task was committed to the State Board of Agriculture, to whom it should in the first place have been assigned.

The history of the work done by the state Board of Agriculture cannot be told here. The results of its labors were in brief the determination of the area occupied by the insect and the institution of systematic and effective means for the extermination of the pest. A careful inquiry showed that the moth, though developed in large numbers on a comparatively small field, perhaps in all not more than three square miles in extent, had been planted in small but flourishing colonies on an area of about one hundred square miles. In the course of ten years the insect was substantially exterminated in the field which it originally occupied and the growth of the greater part of the outlying colonies was arrested. It is probable that the number of insects alive in the spring of this year was not the thousandth part of that which it was when the task of suppression was undertaken. It seems likely that the development of new colonies had ceased and that the greater part of those once in existence had been destroyed.

At all stages in the work of the State Board it has been found impossible to obtain adequate and timely grants of money from the Legislature. Owing to this difficulty much of the large sum that has been expended has not been applied in the most effective manner. Of late, because the ravages of the pest have been interrupted—it has become so rare that it is not easy to find a dozen specimens of the insect in a day's search—public interest in the work has declined, and there is danger that it may be brought to an end. It is well, therefore, to consider the consequences that are likely to arise from the abandonment of the effort to exterminate the invader.

It is barely possible that the work which has been done in reducing the numbers of the Gypsy Moth may have brought the colonies to the state in which the few survivors may not be able to hold their own and multiply. There is some reason indeed for believing that a solitary nest, though it may hatch and yield several

hundred insects, often fails to found a colony. Yet the frequent experience that an infested area which had been nearly cleared of the species after two seasons of neglect becomes again thickly occupied makes it almost certain that within five or ten years after efforts for suppression are discontinued the evil will be as great as when it began.

If the Gypsy Moth is allowed opportunity to develop in the area now occupied by its colonies we may expect the next outbreak to include an area at least ten times as great as that of twenty years ago. Allowing for the gradual extension of the colonies on every side the field is likely to include not less than six hundred square miles; it may be a thousand square miles. Whatever may be the amount of public interest it is not to be reckoned that the State would feel inclined to appropriate annually the million or more dollars required for a new campaign of suppression. The several efforts which have been made to obtain aid in this task from the federal government have proved futile. So that there is no more reason to hope for aid from that avenue. It is, therefore, reasonable to assume that if the work of fighting the moth is interrupted for a term of years the creature will become a chronic and widespread pest.

What we know of the distribution of the Gypsy Moth in the old world leads to the conclusion that it is likely to flourish in all the country between the northernmost parts of the tilled districts inward to the Gulf of Mexico—in all the region where there is abundant vegetation and an immunity from killing pests for a summer of ninety days' duration. In this field it will find few natural enemies, for neither the birds nor the insects of America have acquired the habit of preying to any considerable extent upon the stranger. So far as the tilled ground and orchards are concerned it is probable that by various means the danger of destruction may be averted; but for our forests, to which the moth mostly betakes itself, there seems to be no prospect of safety. The experience of the State Board of Agriculture clearly shows that the only way in



Courtesy of Mass. Board of Agriculture.

A WOOD INVADDED BY THE CATERPILLARS OF THE GYPSY MOTH. THE GRAY AREA HAS BEEN STRIPPED OF ITS FOLIAGE.

which the creatures can be cleared from a wood is by felling the trees and burning the ground over in a complete manner.

A careful inquiry into the habits of feeding of the Gypsy Moth has proved that none of our forest trees are safe from its at-

tack. The creature has, it is true, preferences, and until it becomes crowded will feed on certain species only. When it has so far increased in numbers that it is pressed for food, every green thing will be devoured. If need be it will eat the leaves of the poisonous species of the *Rhus*, both the *R. toxicodendron* and the *R. venenata*. While in general it prefers the foliage of the broad-leaved trees, when pressed it readily resorts to the conifers. In fact, it sweeps a wood as effectively as a fire.

For a year the secondary buds of most trees, buds that put forth after the crop of caterpillars has matured, serve to maintain the life of the forest, but the plants are rapidly weakened by the tax, and perish after two or three seasons of the infliction. It appears likely that in five years none of the aboreal forces would survive. Therefore we may assume that if the Gypsy Moth becomes firmly implanted in our forests, these forests are in a large measure likely to disappear. The processes will probably be slow, for the rate of dissemination of the insect is not great, yet the moths if plentiful will invade railway cars and other vehicles, so that the new colony may be planted at a distance of hundreds of miles from the fields where the species have become abundant.

It is not unlikely that some of the curious alterations in the distribution of forest trees which geologists have recognized may have been due to the development in former ages of the Gypsy Moth or other like destructive species of insect. Thus in

the early Miocene Tertiary Europe was tenanted by a host of arboreal species closely akin to those that now form our admirable American broad-leaved forests. The Magnolias, the Gums and the Tulip trees, etc., were then as well developed in Europe as they are in this country. Suddenly all these species disappeared from the old world. There is no reason to believe that the change was due to an alteration in climate. There are many evidences indeed that such was not the case. It is a very reasonable conjecture that that alteration was brought about by the invasion of an insect enemy which may have been the ancestor of the Gypsy Moth.

What has been said above may make it plain to the reader that if the Gypsy Moth is allowed freely to extend itself in this country, the consequences are likely to become most serious. They may indeed attain to the height of a calamity. It is possible that effective enemies of this species may be developed in course of time, but the past twenty years has failed to show any such. It is possible that some change of climate may reduce or destroy the species, but for more than a score of years they have in no wise suffered from frosts or drouth or excessively wet seasons. It is the part of wisdom to face the issue; we should see that our generation has in this matter no right to trifle with the right of the generation to come. Our forests are next after our fields the natural basis of our prosperity. It is evident that they are endangered by the presence of this enemy.

THE BIG TREES OF CALIFORNIA.

By WILLIAM R. DUDLEY,

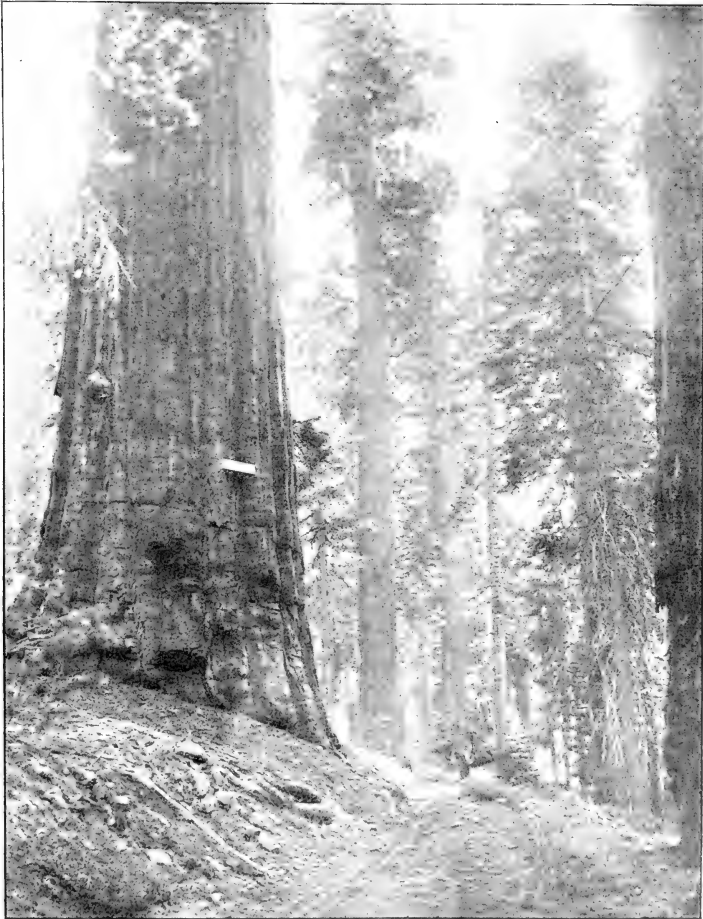
Stanford University, California.

A few weeks since the Editor of THE FORESTER addressed me a note requesting a discussion of the present condition of the Big Tree tracts in the Sierras, plans for, and the prospect of their permanent preservation. This courtesy was greatly appreciated for the reason that I have spent a con-

siderable portion of three summers, since 1894, camping beneath the shade of the larger and the little known groves south of the Kings River, and travel has led me through from one to three other groves, in each of three additional summers or springs.

I shall be able, however, to give at the present time, no more than a concisestatement of the facts with which I am familiar.

photograph many of the trees, and, indeed, to study their habitat as closely as possible. Incidentally I have learned much



ROAD PASSING THROUGH "WAWONA," MARIPOSA GROVE.

My object in thus visiting these groves was to study the flora of the Sequoia region, visit all the groves, measure and

of their ownership, and of their geological situation, in a region difficult of access from the standpoint of an ordinary traveler.

THE CHARACTER AND NUMBER OF GROVES OF SEQUOIA GIGANTIA.*

Some have attempted to separate the various tracts, on the basis of acreage, into two classes — "groves" and "forests." This is not a natural division, and we will use only the term "groves." Like other species the Big Tree favors certain exposures, soils and elevations. The western slopes of the Sierras being furrowed by large stream valleys or profound barrancas, and bearing the disturbing marks of many local but extinct glaciers, the preferred elevation and soil of the Big Tree is often interrupted, and this interruption is still more often emphasized by the racial and aristocratic tendency to reproduce the species but sparingly. Hence the trees as individuals appear scattered, and are confined to irregular and isolated tracts. These tracts are often on two slopes of a lateral spur, springing westward (eastward also, in the southern part of their range) from the main divides of the Sierras; and the two groves sometimes approach or connect over a timbered gap on this divide. A careful consideration leads me to the enumeration of thirty-three distinct groves of the *Sequoia gigantea*, eight of them north and twenty-five of them south of the Kings River. Some eighteen or twenty of these are in the fairly well marked pairs mentioned above, where the trees cling to the brooksides or steep hollows in the true timber belt of the Sierras, but well toward its lower border. Another set of them occupy the upper canyons of the river forks, and still another the limited benches or plateaus found at the big tree altitude—5,500–8,500 feet.

MILLING AMONG THE BIG TREES.

Of the northern group, the Mariposa—a group of the second or third class—belongs to the State of California; three others, one of six trees, one of thirty, and

* It is most unfortunate that scientific nomenclature has made such a mess of the most remarkable species of tree in the world, that purists in priority must always disagree as to its specific name. Hence I shall use for the readers of THE FORESTER the name of *S. gigantea*, which is the best known.

one of fifty trees apparently belong to the National Government. The Madera grove has been largely cut over; while the two Calaveras groves, one containing ninety the other nearly fourteen hundred trees, and historically worth to the world more than all the others, are, as every one knows, now held for lumbering or speculation.

Generally speaking the larger part of the Sequoia acreage south of the Kings River is in private hands, but it is an interesting and an important fact, known to but few, that through the operation of the lien-land law some private claims containing a considerable acreage of the Sequoia have gone back to the United States during the past year in the Tule River region. Of the important groves those of the Kings River proper are owned by the Sanger Lumber Company. These are three in number, and the Converse Basin grove is said to be the largest grove in existence. Much of these three groves has been lumbered off, and there appears no hope of saving any from the saw. The Kings River mills are first-class in capacity and run night and day during the open season. The General Grant Park, scarcely to be dissociated from the western-most of the Kings River Groves, contains four sections only (2,560 acres). It is nearly cut in twain by two private claims amounting to 320 acres, but there is no mill on them. Southwest of the Park is the Redwood Creek grove, all in the hands of a considerable number of private owners. There was formerly some lumbering here, but none has existed for many years. Next comes the beautiful Sequoia National Park, of seven townships, stretching entirely across the fan-shaped drainage basin of the Kaweah, and containing six, we might say eight, tracts of big trees, five of which are among the noblest in existence. The "Giant Forest" is the best known of these. Three of the five mentioned have not an acre of private claims. The Giant Forest, reputed to contain 2,500 acres, has apparently something over one-fourth of its area in private claims; but the amount of Sequoia thereon is more apparent than real, as the Giant

Forest is a plateau with many meadows, and the private claims are mostly taken up by two local stockmen on the meadows. There are, however, a considerable number of big trees of fine proportions about the meadows within the claims. By proper procedure all these claims could be exchanged by the owners for other public lands. The Giant Forest is in no danger of decimation through milling. The other principal grove—that along the Mineral King road—has in it 360 acres of private claims and two small mills. Atwill's mill has been running on the Atwill claim of 160 acres for at least four years, and interruptedly before that. Its capacity is about 20,000 feet a day, but I think it now never runs as high as 10,000 feet. On a second claim a shingle mill has started during the past year, cutting, however, very little Sequoia so far.

Therefore no very vigorous lumbering is going on or likely to go on in the Sequoia Park, and wise governmental action might secure a complete cessation of it in the near future. There are several small outlying groves just beyond the park limits, some held privately, viz, Redwood Meadows and Salt Creek groves, which ought to be included in the Park. They are too inaccessible apparently to be lumbered. The North Tule River grove was mostly owned by N. P. Dillon, who at one time had a mill on it, abandoned years ago. Last May, if report is correct, he sold his claims to a local lumber company, which expects to erect a mill. The writer, knowing this grove was in the market, advised its purchase by the nation. If we had possessed a National Forestry Bureau charged with such matters this grove, commanding the entire forested slope of the North Tule watershed, would no doubt have been secured by it as a part of the national domain. In situation it occupies wild rocky benches, and surveyors of the Park boundary tell me that a portion of it is within the southern boundary of the Park. The writer discovered a small grove of big trees in this watershed outside the private claims and since then some others have been found.

The next grove, and the last of the groves really remarkable for its trees of superior size, is that centering around the Mountain Home, the Bear Creek or Middle Tule grove. It has all along been in private hands and most of it will go the way of the Kings River groves. Coburn's mill, running for some years is said to have a capacity for cutting 15,000 feet a day, but cuts much less. The Enterprise Company's mill, with a capacity of 30,000 feet has been running only about two years, and cuts on the average, 15,000 a day. In all these mills a large percentage of the cut is I believe of Pine and Fir.

Of the five groves remaining in the Tule River system, the majority are in private hands, held mostly by eastern capitalists, who make a specialty of investing in timber. No milling is now in operation on them.

It is not generally known that at least three tracts (the one on Freeman's Creek containing over 1,200 acres, all in private claims) are on streams running eastward toward the Kern River. Two of these are now on government land. Near the southern end of the Sierras—Western Divide—is the last of the groves, on Deer Creek, a stream which runs into the San Joaquin Valley. It is a small grove, not quite as large as the Calaveras "Home Grove," and, like the three preceding, has never been disturbed by the saw.

SAVING THE BIG TREE GROVES.

In connection with the question of saving the big tree groves, there are two distinct phases. The appeal for the salvation of the Calaveras Grove is an expression of one of the noblest sentiments in human nature. In a measure also this sentiment goes out to every grove of the species. But the Big Trees are numerous enough south of the Kings River to constitute an important factor in that problem of tremendous importance to central California, viz, stream protection. Hence the salvation of as many groves as possible becomes a forestry question. At present opportunities for the reacquirement by the United States of the Sequoia land may offer, but the machinery is so slow as to be necessarily clumsy, and one expects it to fail.

Every effort of the American Forestry Association and the friends of forestry everywhere should be bent to the unification of the present triune system of government forestry work, and to the subsequent enlargement of the service in the Forestry Division, until it is developed to the necessary strength for dealing adequately with our great forestry problems. Then we may expect the local superin-

tendent of the Sierra forests to watch his opportunity to secure for the United States any private claim of Big Tree timber, and we may confidently expect, moreover, that the confidence reposed in the Division by Congress will be so strong and the administration so efficient that eventually four-fifths of the primeval Sequoia land will come back to the government from which it should never have passed.

FOREST LAW IN THE UNITED STATES.*

BY TREADWELL CLEVELAND, JR.

IX. LINES OF STATE ACTION.

We cannot attempt within the straitened limits of these papers to give a detailed review of forest legislation in all States having important forest laws, or even to treat exhaustively its whole course in a single State. All we can do is to give its general tenor and perhaps to indicate probable lines of further growth.

In 1867 there was appointed in Wisconsin a committee of the State Agricultural and Horticultural societies to report upon the disastrous effects of forest destruction; and the following year an act was passed "for the encouragement of the planting and growing of trees," etc., which provided an exemption from tax and a bounty for the growing of timber belts. The appointment of the committee of inquiry is an early instance of the general movement which is marked in a number of States by provisions of law establishing commissions of investigation, notably in the cases of Ohio and New York in 1884. Sometimes such commissions have been continued, sometimes their terms have expired and been renewed, as in New Hampshire, where the first commission was appointed in 1881, the second in 1885, and the present commission in 1893. Sometimes again, from

a variety of causes, they have ceased to exist, as in the cases of California, and, recently, Wisconsin.

It has become the custom to cite the example of New York as typical for commissions, and the examples of Pennsylvania, Minnesota and Maine as typical for forest-fire laws. Certainly these States offer a wide legal horizon, which suggests instructive inferences.

Since 1885 New York has persisted in dealing with its forest problems through a several-headed commission having charge of a definite area of reserved State forest lands. From the first it has possessed a well-framed fire law and the support of a widening and deepening public sentiment; and up to 1894 it possessed also ample opportunity for experiment in forest management. Unhappily, however, the earlier personnel of the commission was not exemplary. Shrewd suspicions of malpractice disturbed the public confidence, and by an amendment to the State Constitution, adopted in 1894, the hands of the commissioners were tied. Since that date no timber can be cut, destroyed or sold from the State Preserves, and forest management is consequently impossible. To say that at least the forests are safe is but a very partial truth. They are safe from dishonest use on the part of their guardians; but this could be an important gain only so long as dishonest use was to be

* For Mr. Cleveland's first and second articles on this subject see the July and August numbers of THE FORESTER.—ED.

feared. With the appointment of a trustworthy commission, such as that now in office, the danger ceases and with it the need of legal safeguard, if indeed such a safeguard ought ever to be sought in the organic rather than in the special law. But no policy of "let alone" can keep a forest truly safe, as we have seen with reference to the Federal Reserves. That forest officers should be in charge of forests which they cannot manage, *i. e.*, harvest, except in cases where protective considerations demand complete stagnation, which is certainly not true of New York, is from the forester's standpoint simply absurd. There is promise that this dilemma—a commission able to use the forest and a forest that may not be utilized—will soon be removed. By legislation enacted in the last session of the legislature, the commission, in cooperation with the Division of Forestry, is preparing, for the first time, working plans, which are to be laid before the legislature next winter with recommendations that action be taken looking to the repeal of the Constitutional amendment. At the end of some two years we may look for the beginning of forest management in the New York Preserves.

The New York forest fire law, though excellent on paper, has never been more than tolerably efficacious. The example of Minnesota has shown the reason. A single head, a chief fire warden, is directly indicated as the only means for overcoming local indifference or favoritism and for offsetting that heaviest drag upon all provisions for public good, namely self-interest. Here also New York is beginning to learn from experience and example. By a recent law a chief fire warden is provided for. Good results cannot very well be wanting. Yet from the example of Pennsylvania, New York has perhaps still another lesson to learn. Pennsylvania has a law, passed in 1897, which provides for detective work in the detection of careless or intentional offenders against the forest fire laws. This device is successful in practice, and even on paper is no inconsiderable restraint upon the negligent or the mischievous. When we have said

that the fire law of Maine is the basis for that of New York and several other States, the typical character of the legislation in the States just cited is made apparent.

Let us turn now to another set of conditions, those of Michigan, for example. Here we have, as in New York, a commission, but without the reserved State lands for it to control. Here also, by way of further contrast, we find the public sentiment, at least in so far as it reaches definite expression in law, hostile rather than friendly. Of the citizens of no other State can it be more truly said that those who are not with the forests are against them. For one Judas there are the others who sleep. And there is no sanctuary in which these can escape responsibility. Here the lumbermen have, over large areas, already completed that work of desolation, which, if partly the result of their anti-social motives, is also, and perhaps equally, the result of an economic condition for which the people of the State are themselves to blame. This false economic condition is the ultimately unintelligent excessive rate of taxation of forested lands. Such lands when owned by non-residents are assessed at rates which prohibit temperate and provident cutting. The taxes insure either loss for the owner or, in the long run, vastly greater loss for the State. The problem offered is by no means easy of solution. The commissioners are making every effort to find a satisfactory answer. Towns must live for the present, even if it cost them, first the timber which the non-resident owners of the county are driven to cut wholesale, and then the assessable property itself. The crux is this: How to tax values without overtaxing resources, and so draining them dry; or in other words, How to make the forest owner pay for his profits without forcing him to consume outright the capital from which those profits and at the same time the profits of the community are drawn. One way would be that suggested by Mr. Bruncken in his recent volume "American Forests and Forestry." This is to tax the gross receipts of sales of timber. By this device the enforcement of immediate harvesting is avoided, and the

chance is offered for recurrent cuttings, the continued if not perpetual devotion of present forested areas to forest uses. Only a revision of the tax laws can accomplish this or any similar amelioration of conditions resulting from excessive taxation, and the only real obstacle in the way is the apathy of the people themselves, who tolerate the neglect of their own interests by their own chosen representatives. If they will they can insist at this point; if they do not they will have at last to feel the sting when opportunity turns its back.

When speaking of Wisconsin some moments ago we noticed a tree-planting law. This would serve very well as an example of all such laws that have been passed by a number of States during the last twenty-five years or so. It is true that in a number of States so-called laws for the encouragement of tree culture have been rather prize-offers for the best row of shade trees along some highway adjacent to the competitor's property; and where this is the case the laws fall outside the domain of forestry and have no direct bearing upon our present theme. Nevertheless, in so far as such laws indicate an interest in tree growth, they demand at least passing notice. The best part of the timber culture laws up to the present time has been their intention. Practical results have seldom justified their passage, and the good sense which prompted them has often vindicated itself by their repeal. In short, an index of legislation as to tree laws in the States shows for the past few years more results in repeal than in enactment. If causes are sought for this failure to encourage tree planting by law they may be found, first in the lack of expert knowledge in their framers, next in an æsthetic rather than an economic impulse, and finally in the want of a real inducement to the planter. Experience teaches also in some cases that larger bounties than have been offered can scarcely be afforded by the State. Here again we are brought round to the conclusion that all such work in tree planting as does not produce to the farmer return in kind should be placed under the control of the State.

Reference has already been made to the

function of protective forests. Probably all of the States will at some date have passed through a period in which the maintenance of forests for their protective value was advantageous, or even necessary. If we turn to California we find among other interesting local aspects of forestry the need of permanent protective forest areas over a large portion of the State. Here, though legislation has not yet emphasized the general feeling, a strong public sentiment and, within the past few months especially, a vigorous effort to satisfy the need, have become conspicuous among the more intelligent citizens of Lower California. Considerations of irrigation render the forests and the prosperity of the farming population of one and the same fate. If the forests go, or even materially dwindle, irrigation cannot hope to keep a permanent footing; while with due protective regulations coupled with State control of water supply, or at least with State regulation of individual consumption, there is every reason to expect the continuance of a thriving irrigation system.

We have already touched indirectly, in dealing with tree planting, the skirt of the problem of the reforestation of denuded areas. Unfortunately work of this character, though projects are everywhere in the air, has not been more than begun, the work of the New York State College of Forestry on the 30,000-acre College Forest being the most promising public attempt of which we have knowledge. In this case however, as in the others, we must wait for results, though there can be no reasonable inference that the work will be brought to any other than a successful conclusion. There are signs that in Michigan an energetic attempt will be made anon to bring the vast denuded areas, once so fertile in timber, again under tree growth. A number of States with similar forest interests eagerly watch the results of this attempt. It can succeed only with State aid, or by the work of the State itself, and for this a careful law is needed.

(To be continued.)

PROGRESS IN TREE PLANTING IN THE UNITED STATES.*

BY J. W. TOUMEY,

Yale Forest School.

It may be of interest to some members of the American Forestry Association to know something of the plan of coöperation by which the Division of Forestry gives personal and practical assistance to farmers and other land owners in establishing plantations of forest trees for economic purposes. It may also be of interest to know something of the practical results attained by a system of coöperation that has now been in operation a little more than a year, and what may be expected of it in the future.

Prior to the publication, in the Summer of 1899, of Circular No. 22—which outlines the plan of coöperation under which the work in tree planting since that time has progressed, the work of the Division in this branch of forestry was confined to establishing and maintaining less than a dozen forest plantations of a few acres in extent. These plantations were, for the most part, established in coöperation with Agricultural Experiment Stations in the Middle West. One plantation, however, of 15 acres in extent, was established at Ridgway, Pa., and at an earlier date a small plantation of coniferous trees was established in the sandhill region of Nebraska. During this same period a large quantity of seeds and seedling forest trees were distributed to applicants in various parts of the country.

Under the old régime the expense in procuring the stock and setting out and caring for a half dozen plantations was so great that it exhausted the funds available for tree planting, hence little else could be attempted. According to this method of coöperation the experiment station, or the individual with whom the Division was working, provided nothing but the ground upon which the plantation was established. The Division not only provided the plant-

ing plans, but bore all the expense and responsibility of putting them into execution. Thus while the officials of the Division resided a thousand or more miles away, where from the very nature of the case it was impossible to give explicit instructions regarding the details of management, the other party to the coöperation, who had no financial interest in the enterprise and usually none other, gave but little time or attention to the establishment or subsequent care of the plantation.

The plan of coöperation as outlined in Circular No. 22, under which the Section of Tree Planting is now working, is of an entirely different character from that shown above. It aims not so much to give as to assist. The fundamental principle is this: viz, the function of the Section of Tree Planting is to provide the applicant for our* assistance with information which will enable him to establish the best possible plantation of forest trees under his conditions of soil and climate, and for the purpose or purposes which he desires. The applicant for our assistance must have more than a cursory interest in the coöperation, he must have a financial interest in it. It stands to reason, and is verified by practice, that an average farmer will be much more careful in the planting, and will give closer attention to the subsequent care of a plantation, where he pays the bills than where they are paid by an outside party. Under the present plan of coöperation the applicant for assistance must be prepared to provide the necessary seeds and young trees, to plant the same, and to care for them afterward. In other words, planting plans are prepared by the Division for each applicant, which give complete instructions regarding the trees to plant, mixture of species, spacing, plant-

* Read before the meeting of the American Forestry Association in New York on June 25th.

* Professor Toumey did not give up his duties as Superintendent of Tree Planting in the Division of Forestry until August.—Ed.

ing and subsequent care, based upon a personal examination of each tract of land for which plans are made, and the applicant must put them into execution.

Experience has already shown that there is a great demand for planting plans from nearly all parts of the United States, and during this past year such plans have been made for farmers and other land owners from Maine to California, and from North Dakota to Texas. When the Section of Tree Planting is only at the expense incurred in making the planting plans, and when the plans were made for large areas are paid for by the applicant, hundreds of plans can be made to be put into execution by others where very few could be made and executed at equal expense to the Division were the Division to undertake the detailed care and direction of each plantation.

As one would naturally expect, the greater number of planting plans have been prepared for farmers on the prairie lands of the Middle West. During the fall of 1899 thirty-three plans were prepared for this region, and are now being put into execution by the persons for whom they were made. Already this season between forty and fifty planting plans have been made for farmers in New Mexico,

Texas, Oklahoma and Kansas, while fully as many more yet remain to be made for farmers in Nebraska, Iowa, North Dakota, South Dakota, Minnesota, Illinois and Indiana. During the year the Section of Tree Planting will make in all probably about one hundred planting plans, all based upon the personal examination of each tract for which a plan is made.

When it is remembered that these co-operative plantations are scattered throughout many States, and that the experts of the Division in visiting the various sections of the country frequently arrange to give lectures on the subject of trees and tree planting, it is difficult to estimate the value of the work in stimulating the planting of forest trees according to the most approved methods. In this connection it is interesting to note that nurserymen and seed dealers report a larger sale of seedling forest trees and tree seeds during the past spring than during any previous season since 1872, when there was a great demand for both seeds and trees to be planted upon tree claims in the West. This increase in tree planting has unquestionably been largely the result of the activity of the Division of Forestry and the impetus that it has given to tree planting, particularly in the prairie States.

SECOND GROWTH PINE vs. AGRICULTURE.

By W. M. HAYS,

University of Minnesota.

The article on Second Growth Pine vs. Agriculture, in the FORESTER of last November, by Ernest Brucken, touches a very important subject. It is most unfortunate that the sandy tracts of land suited to the growth of White Pine, but unsuited to supporting farmers, are being sold, even at low prices, to settlers who would in the end be much better off on a smaller number of acres of good farm land costing them a higher price per acre.

From the standpoint of the agriculturist

who seeks the best interests of the settlers it is a misfortune for state and country to have these sandy lands brought under cultivation and exhausted of their small amount of fertility. But now the untutored foreigner, the susceptible easterner, and the would-be farmer from the city are constantly being hawked into settling on them by western land agents. These agents in boom times are so saturated with "boom talk" that they come to believe that sandy soil is "sandy loam with a clay subsoil."

The writer has seen much of the selling of lands in the Pine region and his greatest present interest in the forestry movement, which is taking on new and practical life in America, arises from a sense of the wrong policy of settling farmers on our sandy lands. Good lands in the wooded districts are much more profitable at present prices than the poorer sandy lands at the lowest prices or even at no price. The farther one goes west toward the great prairies in the pine regions of northern Michigan, Wisconsin and Minnesota, the more frequent are the periods of summer drought. A combination of sandy, leachy, poverty-stricken soil, with irregularity of rainfall, is a poor basis for building up a good family of American citizens. Such lands can not even support good rural schools, let alone provide means for sending children away for secondary education. I know neighborhoods where many of the pioneer homes have been abandoned because a few droughty years have made the mortgages thrive so fast that the farmers were bankrupted; and yet these lands will support tree growth. These same farmers had better have purchased small tracts of our western bonanza farms at present prices and have paid for them on the crop-payment plan. Every county in the forest regions of the three states mentioned has large areas of good farm lands. The larger part of our soils of mixed clay and sand, and of boulder clay, of silt soils, of sandy loams and of peaty lands should be thus utilized for agricultural purposes.

The States and the National Government should teach the folly of trying to build up strong, prosperous homes on light, weak lands. They should go much further, also, and use every practical means available to keep these lands under forest crops. The plan of encouraging private owners to manage their forest lands and farm woodlots properly is in harmony with American institutions, and the country is to be congratulated that Secretary Wilson and Mr. Pinchot are meeting with success in inaugurating this plan of helping timber owners to help themselves. The various schemes which have sprung up in many quarters for National

and State forest reserves seem to the country, on first inspection, to be a visionary way of spending money and creating a larger class of public officials. But the national mind is in an expansive mood, and, fortunately, the seeds sown by the advocates of a State and Government forest policy have responded in the fertile soil of the times and are multiplying with unprecedented rapidity.

Large tracts of our sandy lands, and of our mountainous lands, could be acquired by the States and Government at a nominal cost, or could be retained by the Government without cost. Looking at all our lands as Uncle Sam's great farm no one can doubt that the two classes last mentioned should be a part of the great woodlot. Uncle Sam's tenants, the farmers, cannot thrive on these lands, nor can they make any money on them with which to pay him taxes to support schools, build roads, and run the government. Besides, they cannot raise him a good lot of tenants for the next generation, nor can they supply him with strong, well-educated citizens to inject into the life of his cities. If Uncle Sam leaves his woodlots to his tenants they will not take good care of them, because profits seem to be too far in the distance. But if he will set aside woodlots in each sandy or mountainous county and will have his agents care for them and employ the young men, who live on the neighboring good farm lands, to harvest his timber crops, he will sometime brag about his wisdom.

It is greatly to the interest of every settler on good land in counties having large areas of sandy soil to have these poor lands under proper forest management. The opportunities for remunerative labor in winter, the cheap fuel, the climatic benefits of the forests, the better financial conditions of the community, and the greater home demand in proportion to supply, for horses, grains, vegetables, meats and other farm products, make it important to the farmer to have forests on adjoining poor lands under a system of management which will make them productive. Towns and villages often object to forest reserves in their near vicinity.

They have an abnormal fever for tree destruction, and they see actual objections to promoting tree growth. If the citizens of these towns could look into the future they would see the stable, substantial advantages to the whole community of having many tracts of forests. The villages of Germany value their forest interests highly.

We ought to give more attention to the acquisition of forest lands and the inauguration of system in their management. Forestry experts and promoters should avail themselves of every opportunity to develop any forest reserve schemes which seem practicable. Possibly some of the land agents who are so well versed in titles, eliminating taxes, financing corporations for speculating in lands, and in colonization could be induced to direct a part of their energies into promoting forest reserves. The forestry board plan of Minnesota promises much good. The people, the legislators, and the farmers, in particular, should lend encouragement to such organizations and enterprises as will give

us forest tracts managed under a forestry system better organized than that of any other country. Beginning later than older nations we should profit by their mistakes as well as by their successes. While the farmers in the vicinity of forest lands have a local interest in present investments to develop forests for future forest harvest work, the farmers and other citizens of communities without forest lands have also a very large interest at stake. They must have a perpetual supply of cheap lumber. The farmers of Iowa, for example, can not afford to withhold their moral and material support from plans which are designed to give this to their children. Care for our children's interests, and patriotism, call upon us to keep up the fertility of our farms, build good roads and permanent buildings, and plant groves about our farmsteads that our children may have better facilities than we have had, that they may at once meet the closer competition of the future and also reach the greater individual development made possible with the yearly march of progress.

A RECENT FIRE IN THE SIERRA MADRES.

At about noon on July 22d, a fire was started in the Big Santa Anita Canyon in the Sierra Madres just above Pasadena, and within the boundaries of the San Gabriel Reserve. Although the cause of the fire does not seem to have been determined with certainty, most reports agree that a spark from a pumping engine was the beginning. There is no doubt that the fire started quite near such an engine, where three or four workmen first discovered it and tried to put it out. It soon got beyond their control however, and then, for nearly a fortnight, was reported daily in the papers as sweeping over the Santa Anita Canyons and over the region on each side of and to the north of them.

The fire at first spread up both sides of the Big Santa Anita and then, as it reached the canyon's head, worked over in a northeasterly direction toward Monrovia Peak,

and on the other side northwest into the canyon of the Little Santa Anita. For a week these two branches of the fire were fought by large bodies of men who were called up from Pasadena and Los Angeles, and by August 1st, the fire which had spread from the Little Santa Anita toward Mount Harvard was thought to be under control. It got away again however (there seems to be some suspicion of incendiarism at this point) and for four days more burned fiercely on Mount Harvard and across in the direction of Mt. Wilson. Meanwhile the part of the fire which had passed eastward onto Monrovia Mountain succeeded in burning its way over the divide into the watershed of the West Fork of the San Gabriel. There the fire luckily had to burn down hill and could be met by a large force of men; for if it had burned on unchecked for a few days the whole valley

of the West Fork would doubtless have been swept clean, and the fire might have spread over such a large area that it would have been impossible to stop it before the autumn rains. In all many thousand acres of reserve timber were destroyed, and in most places the soil was swept clean of every vestige of vegetation. At times there were 300 men employed in fighting the flames, and the cost to the government in wages and food will amount to about ten thousand dollars.

The best account of the fierceness and rapidity with which the fire burned was given in the *Western Graphic*, whose special artist took the photographs which

for taking photographs, the ridge led into an unburnt section like an inverted 'V.' The breeze was blowing steadily from the west, and, all unconscious of danger, one of the cameras was set in position, when, without warning, the wind suddenly changed, bringing the fire down the canyon at a terrific pace, the flames mounting fifty and seventy-five feet in the air. The roar was louder than a dozen batteries of artillery, and great masses of rocks, liberated by the fire, came down the mountain sides, breaking down trees and brush. The heat was intense, and at times the smoke was blown down in volumes, making it difficult to breathe. But I was



By courtesy of the *Western Graphic*.

This picture was taken looking up a steep canyon, and shows a "hog-back" in the center which the fire, still some distance away, had just passed over. The line of flame extended across the entire canyon. "Two minutes after this photograph was taken the fire had reached and passed the artist's position."

are reproduced in this number of *THE FORESTER*. The magazine reported him as saying in comment on his trip:

"Leaving the team at the base of the mountains, I 'broke brush' up a long ridge, and came in above where the fire was crossing into the Little Santa Anita. The fire was raging fiercely above me, and in making my way to a suitable place

there for pictures, and pointing the machine at random, pressed the bulb, and then did record time down the canyon. The fire gained steadily, but a bare ridge was in sight, and as I made for it I stopped several times and took 'snaps.' The pencil pusher was wise enough not to go into the trap, and when I was safely out assisted me with the cameras. It was the

hottest work I was ever detailed on, and may God have pity on the brave men who are risking a terrible death to save the mountains and preserve the watershed." So fast did this fire advance in the canyons and up the mountain sides that many people were caught and forced to run for their lives. Although nobody seems to have been hurt, several had narrow es-

rangers, skilled in the work of dealing with fire, and familiar with the position of every cliff and opening in the woods, would have found great difficulty in getting to points of vantage with promptness; but when the rangers were at most fourteen in number, and the fire fighters were many of them green men, delays were necessarily multiplied and increased.



By courtesy of the *Western Graphic*.

In the foreground is an unburnt ridge and in the distance is the devastated east side of the Big Santa Anita Canyon.

caples, and got off only after having hair or beard singed and clothing burned.

When one considers that this is the dry season in California, and what the other conditions were under which the fire had to be fought, the wonder is not that it should have burned for a fortnight, but that it took no longer to bring it under control. The mountains in which the San Gabriel Reserve lies are so broken that a ranger often has to spend several hours in making detours to get ahead one mile. When there are no paths to lessen the natural difficulties, slow progress is necessarily the rule for the most experienced mountaineer. Up the steep slopes the fire can easily outclimb a man. Such being the case even a large squad of constantly employed

Called up suddenly from the nearest town, these volunteers were largely, sometimes wholly, incapable of doing anything without supervision, or of keeping up with their leaders. They had to work in a region where the lay of the land, complicated and unfamiliar at any rate, was probably shrouded in smoke; and even with enough competent men to direct their efforts, they were not the sort of material upon which to rely. One of those who left the woods with twenty-six others, on July 31st, characterized both himself and his companions by saying (as reported from Pasadena):

"Ranger Carter's legs were too long. He would walk over the mountains as if he had seven-league boots on. We city-

bred fellows had soft muscles, and we couldn't keep up with him. Why, he would walk up a perpendicular precipice just like a fly, and look back at us, and swear at us because we couldn't do it. He is about six feet tall, and about two-thirds legs anyway. Then he accused us of sneaking back and lighting fires of our own just to keep work going on in convenient places, where the climbing was easy. So we said we would quit and we wanted our pay. They begged us with tears in their eyes to stay, but we wouldn't do it."

The last of this may be exaggerated but there is probably some truth in it. When the country is rough, and the wind, which may at any moment give the fire a new direction, is changeable, such men may be more than half exhausted before the actual fight with the flames begins. When the fire broke out some of those who went into the woods were without food for twenty hours. One man was discovered asleep, almost surrounded by fire, and lying beside a log of which the other end was burning.

Considering these conditions it is not strange that most of the many reports of the Santa Anita fire should have been

taken up with descriptions, not of the struggle with the flames, but of the many difficulties under which the fire fighters had to work. It is not too much to say that fifty experienced men thoroughly familiar with the lay of the land could, if given the advantage of a few trails and well-cleared fire lanes, have accomplished much more than the several times as many people who were actually engaged. When a fire is going through the tops before a strong wind nothing can stop it. But such a condition cannot last for many hours, and there are times and places in the history of every fire in which its strength is measured by the weakness of the forces that attack it. If all unnecessary obstacles to effective work at these times and places were eliminated many a sad report of destruction could be made shorter. The Santa Anita fire differed from many others only in that it occurred in a forest reserve, near towns like Pasadena and Los Angeles, and under conditions which led to its being photographed and reported fully. It pointed the lesson again that if a forest fire is to be controlled it must be dealt with, not merely soon after it has been set, nor yet in its very beginning, but long before it has started.

Victor B. Fay.

Victor Bradshaw Fay, a student-assistant in the Division of Forestry, died of typhoid-malaria at Pine Bluff, Arkansas, on the sixth of August. At the time of his death he was on a field party from the Division of Forestry which was surveying a lumber tract near Pine Bluff. His illness was sudden and short. On July 31st he left camp and went to the hotel at Pine Bluff; on the 6th he died.

Mr. Fay's home was at Washington, D.C. After spending two years at Harvard he studied forestry for a year at Biltmore in North Carolina, and then entered the Division of Forestry. He was much interested in his work, and left many friends to whom his death is a severe loss.

Hiram Hurlbut.

Hiram Hurlbut, of Utica, N. Y., also a student-assistant in the Division of Forestry, died at Holland Patent, N. Y., on August 30th. He had been at work on the field expedition in Arkansas, and, though he came north with the rest of the party at the time of Mr. Fay's death, was taken ill with the fever.

After going through the Utica Free Academy, from which he graduated in 1899, Mr. Hurlbut entered the Division of Forestry as a student-assistant in December of the same year. He was much interested in forestry, and quickly showed an exceptional capacity for earnest and persevering work. Although he was without special training and still under twenty, the record of his short connection with the division promised much for the future.

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An Announcement.

Those of our readers who were subscribers to the FORESTER when Dr. John Gifford used to edit it will be glad to learn that he is once more to contribute regularly to each issue. Now that there are so many people in this country who have a scientific and practical interest in forestry, it is only fitting that the FORESTER should devote some space to supplying this class of its readers with information about all important or useful literature which appears either in this country or abroad. Dr. Gifford has therefore consented to keep run of the foreign periodicals relating to forestry, and of the botanical, entomological and other journals which appear in America, and to contribute to each issue of the magazine a record, with reviews, of what has been published during the month. Dr. Gifford is Forestry Librarian at Cornell. With the help of the exchanges which the FORESTER receives, he will be able to make this record complete and thorough. With this great addition to the regular book reviews, the department of "Recent Publications" should henceforth prove itself most valuable to every American student of forestry. Dr. Gifford will begin contributing regularly to this department next month.

Put out
the Camp Fire.

From the turning of the leaves until the time when the snow falls there are few days on which a spark dropped in the woods may not begin a forest fire. Throughout this season every one who takes a vacation with pipe, camp-kettle, and gun is a distinct menace to the welfare of the forest which he visits; and the only return he can make for the pleasure which Nature gives him is to take all possible care and precautions against the dangers which attend his presence. This is the least he can do and is only a duty imposed by decency. Nor is it a difficult one, for the necessary precautions are few and simple. Among the hundreds of sportsmen and campers who are already scouring the woods from the southern Appalachians to northern Canada and across to the region of the Rockies, there is none to whom they should prove burdensome. In regard to camp-fires—probably the greatest source of danger—the following set of rules from a recent editorial in *Forest and Stream* is clear and complete:

"Never build a fire where its flames can communicate to grass or brush or branches of trees.

"Never build a fire where the spark can be carried to brush, trees, leaves or grass.

"Never build a fire without first noting the lay of the land with respect to controlling it after it is kindled.

"Never leave camp for the day with the fire to burn unattended. Extinguish it thoroughly.

"Under no circumstances, when moving camp, leave the fire to burn or smoulder. Put it out.

"To extinguish a fire built upon the ground where there is turf, the roots of trees or other vegetable matter in the soil, pour water upon it until the ground is thoroughly soaked; then dig around about and well outside the circumference, throwing the earth in toward the center, and then wet it down again."

To this may be added:

Never use inflammable wads in a gun. Make sure that a match is cold before you throw it away.

Never empty a pipe near forest litter.

Whoever observes these precautions may feel reasonably sure that he at least has had no hand in whatever destruction the autumn season may bring. Though to observe them is the least a camper can do, it is also, in most cases, the most; and when the most is so little one is under a double obligation not to shirk.



What Forestry
Isn't.

In strange and disappointing contrast to the present frequency of speeches and articles on forestry, is the persistence with which many of their authors speak of the forester as if he were primarily a grower of trees whose chief work and aim is to plant seed. These people never weary of saying: Plant trees after you've cut; To preserve the forest resources of the country plant. Naturally the first question they suggest to the mind of the common-sense reader or hearer is: How long shall I have to wait for these trees to mature? But here with the word *plant* they end, and take no trouble to answer this question properly, or to show that the criticism which it involves has but a limited bearing on the value of forestry. As a result the old, and well-worn statement that forestry must be left to the government, is still made again and again, and the consequent crop of misapprehensions may be seen on every side. Only recently for instance the editor of a lumber-journal began an article by saying:—"It seems to be pretty well understood that from a business standpoint, forestry is not a good proposition;" and a few weeks before the same editor gave an editorial the title, "Forestry versus Commercialism" (*Mississippi Valley Lumberman* for July 27th)—a phrase as self-contradictory as would be one implying that agriculture, say, is essentially unbusiness-like. Rightly or not the seemingly authoritative repetition of such sayings has confirmed the inertia of scores to whom it comes easy to abide by the old ways of wastefulness. The word forestry is frequently used in a manner which shows that it is supposed to imply expense and sacrifice,

not something which brings with it a material reward.

But is all this right and true? The experience of the practical men in Maine, New York and other States who are finding it profitable to manage their woodlands for a repeated yield has already proved that it is utterly wrong and mistaken. The trouble is that the people who try to show that there can be no alliance between private enterprise and the forester by citing such facts as that "it takes from eighty to one hundred years for a Pine tree to attain its best commercial value" (to quote again from the editorial above referred to) are unpractical themselves. They consider disadvantages and obstacles only. They recognize the impossibility of planting White Pine on the cleared and burned-over wastes of Michigan and Wisconsin with profit, as long as present tax-laws are in operation; but they overlook the fact that even in these two states conditions often favor the encouragement of trees which mature faster than White Pine. With a carelessness as unbusiness-like as that of which they accuse the forester they reason off-hand on the assumption that a forest is useless until the trees in it have attained "their best commercial value." They neglect the possibility of profit from improvement cuttings, and they apparently ignore entirely the all-important consideration that a forester's work may, and should begin, not after a clearing has been deserted, but before cutting has been commenced, and that many years of the undoubtedly slow process of reforestation can frequently be forestalled. Even in the cases where the planting of slow-growing trees is the only possibility, those who talk about the impracticability of private forestry seem to be blind to the value of long-time investments. Above all and constantly they forget that, as the *Southern Lumberman* recently remarked, "There can be no difficulty in realizing a profit on anything as soon as it can be shown that the profit is there."

The affirmative based on fact may be worth any number of theorizing negatives, but too often it is only the negatives that get a hearing. The idea that forestry may help a man to make money, as well

as benefit the community, is unhappily new to the American mind, and so has to encounter all the forces of mental inertia, business timidity, and prejudice against the new. Under these conditions, the people who try to educate and direct public opinion should take every care not to misrepresent forestry and so retard the spread of truth. It is safe to say that nothing could add more to the material well-being of the country than to have its land owners, big and little, wake up to a perception of the essential practicality of forestry, and to the suspicion that where something unpractical has been called forestry, somebody has made a mistake. This idea should be emphasized on every opportunity. To strengthen an argument for forest reserves by speaking as if this truth were uncertain, is not only unnecessary, but harmful, and, however generous the intention, can only load a good plea with poison. To represent the forester as one intent on setting out Pines that will take eighty years to mature, to make him a mere tree-planter and agitator for costly reserves, and to make unreasonable financial demands of him—this is simply to fly in the face of what is really the true state of things, and to throw obstacles in the way of a good and much-needed work.



In cheerful contrast
to loose and careless
misconceptions of the
scope and nature of forestry is the very
practical and wholesome interest in it
shown by the number of applications for
the position of student-assistant under the
Division of Forestry. This position was
created somewhat over a year ago for the
double purpose of giving young men, who
are thinking of engaging in forestry as a
profession, practical experience and assistance
under the supervision of experts, and
of securing intelligent assistance for the
government at slight cost. No effort was
made to advertise the opportunity, but before
the summer field-season of 1899 had
begun, 35 applications were received.
This last year 232 came in, more than
seven times as many as the previous year.

Spread of Interest
in Forestry.

Striking as this increase is, its full significance cannot be appreciated until it is known that information about the student-assistantship and the work in the field had to spread largely through the twenty or so students of Yale, Harvard and other universities and colleges, who had appointments the first year, and through their friends. Thus 100 of this year's 232 applications came from Harvard and Yale alone, and 77 more were scattered over the Atlantic States near-by. If the information could have been spread throughout the Middle States as easily as it was in the neighborhood of these larger universities, the number of applications would probably have been greater still. Sixty-one of those who applied were appointed and sent to different parts of the country. These receive \$25.00 a month each and their expenses in the field—not enough to allure those who have no interest in the work. Their time is spent chiefly in making forest surveys and in collecting measurements of trees and their growth, from all of which the experts of the Division of Forestry can later draw conclusions and results. If they are observant and of an inquisitive turn of mind, the summer's work will afford them the best of opportunities for learning the character of the questions a forester has to deal with and the ways in which he does a part of his work.



An "American
Reforestation Company."

In a communication to the *American Lumberman* of August 18th, Mr. C. A. Schenck proposes the formation, under the *Lumberman's* auspices, of a joint stock company, issuing \$100 shares, to be known as "The American Reforestation Company." The object of this company is to procure from the Legislatures of Minnesota, Wisconsin, Michigan, or the Federal Government, release from taxes and protection from fire for an area of cut-over land which it proposes to reforest. Provided five hundred shares can be issued at the beginning, the payment of 5% of the face value of the shares for the necessary expenses of

traveling, lobbying and agitating for legislation, will be sufficient to start with. If five hundred shares are not bought, or if the necessary encouragement cannot be secured from the State and Federal Governments, the plan falls through. If all goes well, however, a tract of say three hundred and fifty thousand acres, worth a dollar an acre, will be purchased and planted up gradually with White and Norway Pine. According to Mr. Schenck's calculations, 11 per cent. of the stock will be left unpaid after the entire area has been planted, "the interest on which will be sufficient to meet the annual expenses thereafter." The probable returns from the investment are stated as follows: "Supposing that there will be available per acre

After 40 years, 2,000 feet b. m. at \$4.00,

After 60 years, 6,000 feet b. m. at \$5.00,

After 80 years, 10,000 feet b. m. at \$6.00,

our shares will have made 2½ per cent. interest per annum. If stumpage prices double every twenty years we should make 6 per cent. on the investment, and

if they double in fifteen years we realize as much as 7½ per cent." Those who wish to invest in the company should write to the *American Lumberman*, 315 Dearborn St., Chicago.

It will be plain to any one who considers this proposal that the organization of the company would involve the settlement of many questions on which Mr. Schenck's letter does not touch. These should by no means present insurmountable difficulties, however. It would also involve striking at the heart of the difficult and important taxation problems with a definite policy. But it is all the more to be hoped for these very reasons that the matter will not end with Mr. Schenck's letter. Almost nothing is risked, and even if the company should get no further than its appeals to the Legislatures its members could hardly grudge it their lost deposits of five dollars. Apparently there is no appeal to a legislature like one in which a note of selfishness can be discerned, and the company could not fail to do the cause of forestry an immense amount of good.

NEWS, NOTES AND COMMENT.

The Forest Garden.

"One of the best ways to see tree flowers is to climb one of the tallest trees and to get into close tingling touch with them, and then look abroad. Speaking of the benefits of tree climbing, Thoreau says: 'I found my account in climbing a tree once. It was a tall White Pine, on the top of a hill; and though I got well pitched, I was well paid for it, for I discovered new mountains on the horizon which I had never seen before. I might have walked about the foot of the tree for three score years and ten, and yet I certainly should never have seen them. But, above all, I discovered around me—it was in the middle of June—on the ends of the topmost branches, a few minute and delicate red, cone-like blossoms, the fertile flower of the White Pine looking heavenward. I carried straightway to the village

the topmost spire, and showed it to stranger jurymen who walked the streets—for it was court week—and to farmers and lumbermen and woodchoppers and hunters, and not one had ever seen the like before, but they wondered as at a star dropped down.'

"The same marvelous blindness prevails here, although the blossoms are a thousandfold more abundant and telling. Once when I was collecting flowers of the Red Silver Fir near a summer tourist resort on the mountains above Lake Tahoe, I carried a handful of flowery branches to the boarding house, where they quickly attracted a wondering, admiring crowd of men, women and children. 'Oh, where did you get these?' they cried. 'How pretty they are—mighty handsome—just too lovely for anything—where do they grow?' 'On the commonest trees about

you,' I replied. 'You are now standing beside one of them, and it is in full bloom; look up.' And I pointed to a blossom-laded *Abies magnifica*, about a hundred and twenty feet high, in front of the house, used as a hitching post. And seeing its beauty for the first time, their wonder could hardly have been greater or more sincere had their Silver Fir hitching post blossomed for them at that moment as suddenly as Aaron's rod.

"The Mountain Hemlock extends an almost continuous belt along the Sierra and northern ranges to Prince William's Sound, accompanied part of the way by the Pines; our two Silver Firs, to Mount Shasta, thence the Fir belt is continued through Oregon, Washington and British Columbia by four other species, *Abies nobilis*, *grandis*, *amabilis* and *lasiocarpa*; while the magnificent Sitka Spruce, with large, bright purple flowers, adorns the coast region from California to Cook's Inlet and Kadiak. All these interblending form one flowery belt—one garden blooming in June, rocking its myriad spires in the hearty weather, bowing and swirling, enjoying clouds and winds and filling them with balsam; covering thousands of miles of the wildest mountains, clothing the long slopes by the sea, crowning bluffs and headlands and innumerable islands, and fringing the banks of the glaciers, one wild wavering belt of the noblest flowers in the world worth a lifetime of love work to know it."—John Muir, "The Wild Gardens of the Yosemite Park" in the *Atlantic Monthly* for August.



Striking Case of Indifference.

In its article on the forest fire which recently started in the Santa Anita Canyons the *Western Graphic* says: "A striking case of total indifference was manifested by an orchardist who owns a fine orange orchard right at the mouth of the Santa Anita. The flames were running up the mountain in plain sight, and when asked why he was not fighting the fire, and trying to save his water supply, he calmly remarked that 'it is too hot to fight fire, and my deed called for so much

water any way.' The deed may call for the water, but the rancher may call for it in vain."



The Lumber Transgressor.

Under the title, "The Way of the Lumber Transgressor," the *American Lumberman* published a letter from its Duluth correspondent in the issue of July 28th, from which the following is quoted:

"If the auditors of the State of Minnesota during the past ten years had been as active in watching the interests of the State as is the present auditor, Minnesota would to-day be millions of dollars better off. If the present auditor had been in office from 1880 to 1890 the State's general and State school funds would have been incalculably larger, and hundreds of men would not now have the sin of wholesale theft upon their consciences. The work of Auditor R. C. Dunn in the Duluth district the past winter and spring alone is evidence enough of all this. He has saved the State in the past few months a share of its diminished resources that represents a proportion of far more than a million dollars on the Pine timber it held ten years ago.

"A few of these instances of saving will be interesting. A heavy Cedar tie and supply firm went into the woods down the north shore of Lake Superior last fall and contracted with settlers for the cutting of all ties, etc., on three sections of State land. The company had not a shadow of title to the land, and knew it, but its Duluth representative made contracts in his own name, representing to the choppers that he was the agent for the lands, and they went in and cut some 44,000 ties, relying upon his statements. The State heard of it and waited. The contracting firm settled with the tie makers under its agreement and then brought the ties to this city, where they were taken in charge by the State auditor. A settlement has just been made with the firm, by which it pays 15 cents stumpage for every tie, good and culls, in the entire lot. Fifteen cents is about three times what the stumpage would have sold for, good ties alone, in

an open market, but the auditor determined to have triple damages, and got them. The firm was in no position to make any kick and paid up rather than get into worse trouble. These ties ran 45 per cent. to culls, worth nothing, and the cost to the firm here, aside from the settlement with the State, was 21 cents to cut and haul, 10 cents to deliver at Duluth, and the superintendence, etc. To this add 15 cents stumpage on the entire cut, and then sell the good ties here at 40 cents or thereabouts, and it will be seen that some one has received a pretty severe lesson. The Duluth representative of the firm was spirited out of the State when the auditor first began investigation, in fear that a settlement more severe than in cash might be demanded.

"There have been several other, though smaller, instances of tie stumpage settlement on the same lines in this immediate neighborhood this season.

"A well-known logger who lives along the Mississippi River got hold of a part of a school section, claiming that his men had squatted there before the survey, and he took four 40's exactly in the center of the section. Last winter his Pine there was cut by a Rat Portage gentleman, who in some way failed to note the lines and, instead of cutting four 40's, cut the entire school section, sixteen 40's. This was so glaring an error that the owner called on Auditor Dunn and said he had by some unaccountable mistake cut over his lines and wanted to settle for it. He had cut, he said, 800,000 feet of State Pine and would settle at once if Mr. Dunn cared to. Mr. Dunn thought it all right, of course, and would not for a moment doubt the word of the big logger, but he would like to have his own cruisers look at the timber and estimate the cut. The logger didn't think this necessary, but was compelled to assent, and the matter was investigated by the State. Imagine Mr. Dunn's surprise to find that instead of 800,000 feet from State land the logger had taken 3,500,000 feet on the twelve 40's surrounding his little patch in the school section. He has, however, settled on Mr. Dunn's estimates."

Fire and Natural Reforestation.

An investigation of forest fires and reforestation on burnt areas is now being pursued by the Division of Forestry through Prof. C. S. Crandall, lately of the Colorado Experiment Station at Fort Collins. This work, which Professor Crandall began some years ago as a collaborator of the Division, will be carried on chiefly in the northern part of the State, where the prevalence of Lodgepole Pine makes the conditions very different from those farther south. The investigation is an important one, for until the forester knows what to expect from fire and how to deal with burnt-over areas, he can do little in a region where burning has been as extensive and is still as common as in Colorado.

In this investigation the examination of the first stages of reforestation will be made on areas of which some were burned over thirteen years ago, and on which Professor Crandall has already made surveys and recorded progress at different periods since. In the case of the old fires of which there is no record, the date of burning can usually be determined by the age of the trees which came up after the fire, and the necessary surveys and measurements can then be made. Special attention will be paid to the causes which make the cones of the Lodgepole Pine open and distribute their seed. These are not yet understood, and in view of the tree's habit of storing its seeds in the cone, often for many years, and setting them free when killed by fire, are very important.

Professor Crandall will have four assistants and will begin his examination in the Medicine Bow Range. From there he will work down the Continental Divide to the neighborhood of Long's Peak.



Planting Evergreen Seeds.

American Gardening published the following note from a correspondent in Nebraska, Mr. C. S. Harrison, in its issue of Aug. 11th:

"We have been in the habit of planting them [conifer seeds] in the spring,

but I am convinced the fall is the best time. The great trouble in raising evergreens is their damping off in hot weather. I have had hundreds of thousands mown down even under the most approved shade.

"Some things led me to believe the fall was the best time. In the mountains the squirrels have dropped cones in the water, where they have remained all winter, and sprouted in the spring. It occurred to me that if we could give our seedlings an earlier start we might avoid the damping off. This trouble occurs before the second set of leaves is formed. So last fall I planted Ponderosa Pine and Douglas Spruce. They were up the first thing this spring, and commenced growing and were vigorous enough to resist damping off when the weather grew hot. My fall-planted seedlings are twice the size of spring-planted ones. I shall make fuller experiments with other kinds. I think with most of them we shall have a better stand and finer plants."

Fish and Game in the Park.

A "Statement of Facts" issued by the Minnesota Park Association, gives the following summary of the animal life now found in the region of the proposed park:

"The waters contain the following kinds of fish: great northern pike, muskallonge, black bass, wall-eyed pike, pickerel, lake trout, white fish, silver bass, croppies, rock bass and perch.

"The big game in the forests are: moose, caribou, deer and bear in large numbers, with a few elk.

"Smaller game are wolves, foxes, mink, otter, squirrels and other smaller wild animals found in other parts of the country at this latitude.

"The wild fowl consists of nearly every variety of duck, wild goose, quail, woodcock, plover, pheasant, grouse and snipe.

"The game, wild fowl and fish, have been but little disturbed on account of the region's having only recently been made accessible to white men, and because the Indians only kill game and fish sufficient for their daily food.

"In the three large lakes of Leech, Cass and Winnibigoshish and in the Mississippi, Turtle and Leech Lake river steamers of light draught can ply hundreds of miles; while in a row boat, it is estimated, one might fish a hundred days over different fishing ground every day and never take his boat out of water for a portage once, except to go around the two government dams at the outlet of Leech and Willibigoshish lakes."

Smoke of Forest Fires off Shore.

"NORFOLK, Va., Aug. 12.—Dense masses of smoke, rolling out to sea from burning woods on the North Carolina coast, form at present an unusual menace to navigation, and one that has already cost the loss of one ship. Owing to the impossibility of locating the new lightship, other vessels may get lost in the foglike smoke, as did the Palestro last week.

"The government coast survey steamer Blake, which left this port on Friday for the purpose of locating the anchorage of lightship No. 69, the new vessel designed to warn the shipping from Diamond Shoals, returned to port to-night. She reported that the dense smoky haze off Hatteras prevented her working, and she therefore abandoned the delicate mission until the fire shall have abated."—*Washington Post*, August 13th.

Forest Fires in the Rockies.

Owing partly to last winter's light fall of snow, partly to the dry season this summer, the forest fires in Colorado and other Western States are already unusually common and extensive. The following three clippings from the *Denver Republican* of August 17th are examples of reports without end:

"MONTROSE, Colo., Aug. 16.—Forest fires are burning fiercely in all directions. To the east there is a big blaze on the Black Mesa, to the north huge volumes of smoke go up from the Grand Mesa and the Uncompahgre plateau to the west is ablaze in three different places. Thousands of acres of valuable timber

have thus far been destroyed, and unless rains set in soon the timbered sections will suffer as never before.

"One of the rangers in the government employ was in town to-day and secured a large body of men to go and fight the fires on the Uncompahgre plateau."

"BUENA VISTA, Colo., Aug. 16.—To-night the flames from the forest fires twelve miles west of here can be seen. This fire has been burning for a number of days, but not until to-night has it gained so much headway that it could be seen. It is reported that the amount of damage done the green timber will be beyond description. The fire since it has started, some days ago, has burned over several miles of timber, and at this writing seems to be in a fair way to reach this side of the mountain and finish what timber is on this side."

"CENTRAL CITY, Colo., Aug. 16.—The timber fire at the head of Silver Creek is reported to be gaining ground and is spreading over a considerable area. There are several shaft buildings in this vicinity, which it is feared will be destroyed, and, should the fire be turned toward the west,

it may endanger the safety of the people at Apex."

An Associated Press dispatch of Aug. 21st said: "Ten million dollars' damage is estimated to be the result of the forest fires in Colorado and Wyoming. The estimate was made by C. E. Wantland, general agent of the Union Pacific Railroad. According to that official, the loss on timber is only a comparatively small item. Mr. Wantland said to-day:

"In many places the fires are spreading over almost bare country, land where there is nothing but young growth, which might have made the forest of ten and twenty years hence if it had not been for these fires.

"Lands which could have been sold for homes because of the pleasant surroundings will now for years not be worth much. The vicinity of Glenwood Springs and such places, where the tourists resort, will be much affected in a commercial way because the scenery will be impaired."

"In Middle Park the fires are burning so fiercely that ranchmen are beginning to fear that their homes will be swept away."

RECENT PUBLICATIONS.

Annual Report of the Pennsylvania State Commissioner of Forestry. By Dr. J. T. Rothrock. Report of the Pennsylvania Department of Agriculture for 1899. Pages, 11.

Dr. Rothrock begins his letter of transmittal to the State Secretary of Agriculture by saying: "You will observe that it [the report] is briefer than usual. This is due to the fact that up to the commencement of 1900 much of the work done has pertained to what may be called the period of agitation of the cause of forestry. It was necessary before our people could be induced to enter upon a new work that they should be convinced that it was necessary. This has been accomplished, and the task now before us is to begin the practical work of forest restoration." The substance of this report even more than its comparative brevity, shows that Pennsylvania has advanced rapidly in its appreciation of the meaning and value of forestry. The report consists almost entirely of an account of the ways in which practical forestry is

beginning in the State, and of indications of lines along which work may best proceed. Many subjects which have an equal interest for other States, and many phases of these subjects which are peculiar to Pennsylvania, are touched upon more or less fully. Several passages from the report will be quoted or referred to from time to time in the FORESTER. Meanwhile it is fitting to point out that, as in Colonel Fox's New York report for 1897, the increasing value of hard woods is thought worthy of comment. On page 133 Dr. Rothrock says: "The cone-bearing timber is relatively, so far as this generation is concerned, a thing of the past, but there are still large quantities of hard wood remaining. Until within five years the Beech, Birch and Maple, which were usually associated with the Hemlock, were regarded as having practically no value. The owners of large tracts on which such timber still remains are beyond doubt aware that this 'hardwood' timber must speedily increase in value. The only

argument in favor of its removal is that if it is invaded by fire it will be destroyed. This is undoubtedly true, and it brings them squarely to the question whether they are not entitled to the protection for which they pay taxes? Ample legislation is upon the statute books if they will use their influence to have those apprehended who create the fires which destroy their property. There is no doubt whatever that it is not only the duty of the county commissioners, when possible, to ferret out, but to try, by legal process, those who are guilty of destroying by fire the forest property of our citizens, and failure to do so may well be construed as an act of infidelity to duty."

Several pages of statistics about the forest fires of 1898, compiled by R. S. Conklin, are appended to the report.

Paper in Foreign Countries—Uses of Wood Pulp. Vol. XIX. of the U. S. Consular Reports.

This is a five-hundred page volume of Consular Reports on the manufacture and consumption of paper in foreign countries and the materials used for its production. These reports are based on a list of questions propounded by the American Paper and Pulp Association. There is no attempt to summarize or classify the reports, but as their chief purpose is to give information in regard to particular foreign markets, this is hardly necessary.

Bulletin 62—Pennsylvania State Department of Agriculture; A Summer's Work Abroad in School-gardens, Home-gardens, Playgrounds, Parks and Forests. By Myra Loyd Dock. Pages, 33; illustrations, 9.

In England, Switzerland and the more thickly settled portions of Germany, the effort to make the most of woods, rivers, parks and gardens, both financially and in the way of æsthetic enjoyment has been carried much farther than in all but a very few places in this country. Miss Dock's interesting pamphlet is the result of a summer's observation of the ways, means and results of such efforts in these three countries. Its object can perhaps be gathered best from a paragraph on page 16, in which she says: "The states of New Hampshire and Massachusetts together receive about six millions of dollars a year from summer visitors, because these States have fine roads and clean, well-managed villages where visitors are able to enjoy their beautiful scenery. When village improvement societies have effected the same needed improvement in Pennsylvania, thousands of people will be able to enjoy the river and mountain scenery that is now almost a sealed book to the outside world." The subject matter of the pamphlet may be divided roughly under the heads Towns, Parks, Playgrounds and Improvement Societies; Farm and Garden-work for Women; School-houses and Grounds; The Black Forest and its Administration; and The Black Forest Community. These topics are treated with no great

minuteness, but it is not necessary that they should be. Details of work in this country would pretty surely differ greatly from those abroad. The object is mainly to suggest the many ways in which it is not only desirable, but possible, for individuals and communities in America, and especially in Pennsylvania, to engage in what is usually known as improvement-society work. The pamphlet is interesting and ought to serve the purpose for which it was written to good effect.

The Wild Gardens of the Yosemite Park. By John Muir, in the *Atlantic Monthly* for August.

No one who is fond of outdoor-life, whether he hopes ever to visit California or not, should fail to read Mr. Muir's articles on the Yosemite Park, of which the second appeared in the August *Atlantic*. Mr. Muir describes nothing which anyone might not see, but much more than all but a few ever notice. He observes not only with the interest of the naturalist but with a rare perception of the beautiful, and writes in a style that cannot fail to lift, somewhat at least, the blindness of even the most unobservant. There are few whom his articles could not help to a greater enjoyment of wood and field.

Growing Norway Spruce for Paper Pulp. By L. T. Duncan, of the University of Minnesota in the *Minnesota Horticulturalist* for August.

Mr. Duncan is of the opinion that the Norway Spruce which he has found "growing to a timber size in thirty years, around a well-drained open field, with sandy sub-soil," has much to recommend it to a prospective wood-pulp operator in Minnesota. He admits that the growth of Black and White Spruce, and their preferences in regard to soil, would not be encouraging. Though his figures are based on only a limited number of measurements, and, as he says himself, all the comparisons he makes are of growths under different conditions, he concludes that "it is evident that a Norway Spruce is a rapid grower and will, under proper conditions of culture and fire protection, furnish pulp-wood in twenty-five or thirty years."

The Practice of Forestry by Private Owners. By Henry S. Graves. **The Progress of Forestry in the United States.** By Gifford Pinchot.

These two articles which appeared in the Year Book of the United States Department of Agriculture for 1899, and which were reviewed in the *FORESTER* for June (page 131), have now been reprinted as separate pamphlets. They may be obtained by application to the Division of Publications of the Department.

Some Business Problems of American Forestry. By C. A. Schenck, Ph.D. Limited Edition. Price, \$1.00. French Broad Press, Asheville, N. C.

(To be reviewed next month.)

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ORGANIZED APRIL, 1882.

INCORPORATED, JANUARY, 1897.

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devoted to the care and use of
forests and forest trees and
to related subjects



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The Forester

Vol. VI

No. 10

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THE PLATFORM OF THE FORESTER

In order that the good will of its readers may become as effective as possible in aiding to solve our present forestry problems, the FORESTER indicates five directions in which an effective advance is chiefly needed.

1. The forest work of the United States Government which is now being carried on by the Department of Agriculture, the General Land Office, and the Geological Survey conjointly, should be completely and formally unified. The division of authority between the three offices involves great waste, and consolidation is directly and emphatically pointed to by the present voluntary co-operation between them.
2. A system of forest management under the administration of trained foresters should be introduced into the national and state forest reserves and parks.
3. Laws for the protection of the forests against fire and trespass should be adapted to the needs of each region and supported by the provisions and appropriations necessary for their rigorous enforcement.
4. Taxation of forest lands should be regulated so that it will encourage not forest destruction but conservative forest management.
5. The attention of owners of woodlands should be directed to forestry and to the possibilities of applying better methods of forest management.

Persons asking themselves how they can best serve the cause of forestry will here find lines of work suggested, along which every effort will tell. No opportunity for doing good along these lines should be neglected.

The Forester

All the back files of THE FORESTER have now been disposed of with the exception of those enumerated below. Reading matter is perfect in all (some have damaged covers). As all the back numbers of THE FORESTER which belonged to Dr. John Gifford, who founded THE FORESTER and edited it until 1898, have been secured, no other files are now to be had. These will be sold at practically half price. An unusual library opportunity.

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1. A more wise and conservative treatment of the forest resources of this continent.
2. The advancement of educational, legislative and other measures to that end.
3. The diffusion of knowledge regarding the conservation, management and renewal of forests, the proper utilization of forest products, methods of reforestation of waste lands, the planting of trees for ornament, and cognate subjects of arboriculture.

The Association desires and needs as members all who are interested in promoting the objects for which it is organized—all who realize the importance of using the natural resources of the country in such a manner as not to exhaust them, or to work ruin to other interests. In particular it appeals to owners of timber and wood-land, to lumbermen and foresters, as well as to engineers, professional and business men who have to do with wood and its manifold uses, and to persons concerned in the conservation of water supplies for irrigation or other purposes.

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SEE OPPOSITE PAGE 254.

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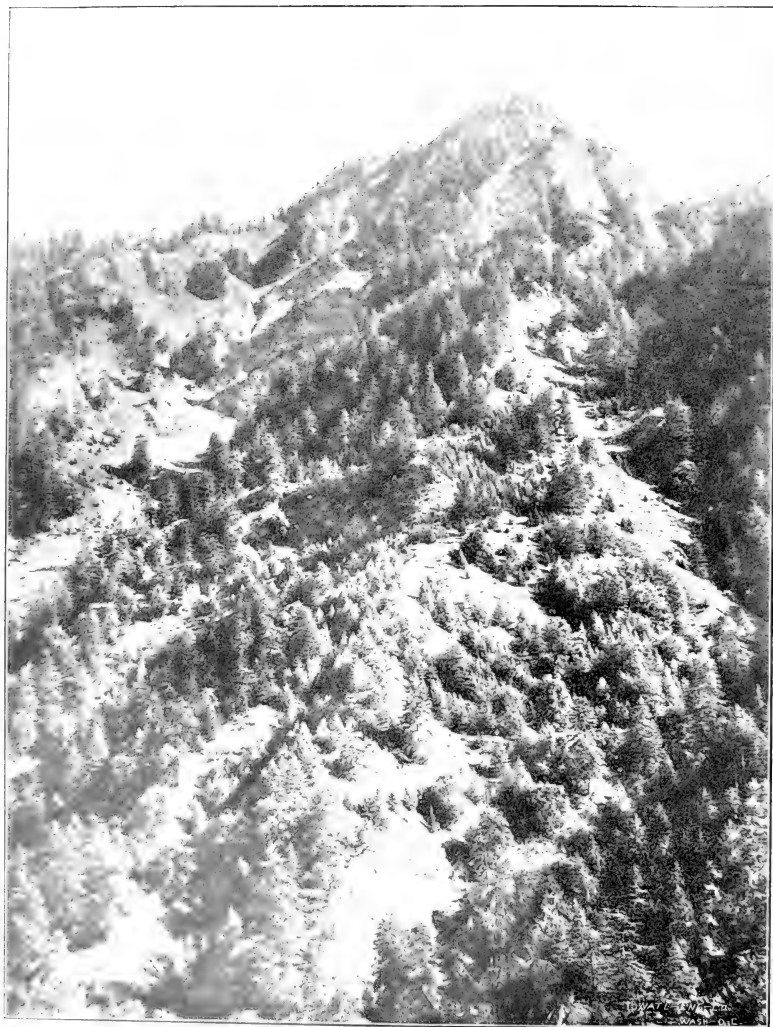
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CHARACTERISTIC SOUTH SLOPE OPEN TO GRAZING. REPRODUCTION IN GROUPS.
(See "Forestry in The Himalayas," p. 234.)

THE FORESTER.

VOL. VI.

OCTOBER, 1900.

No. 10.

ADIRONDACK FORESTRY PROBLEMS.*

By B. E. FERNOW,

Director of the New York State College of Forestry.

The main and fundamental question connected with the Adirondack Mountain forest, the problem of ownership, has been practically settled by various acts of the Legislature, namely, in 1885, when the State determined to retain the lands which it then owned and to administer them through a Forest Commission; in 1890, when the first act authorizing the purchase of additional lands was signed by a Democratic governor, with the memorandum affixed that the act was good but inadequate; and finally, in 1897, when the Legislature and a Republican governor constituted the Forest Preserve Board and determined to acquire for the State by purchase or otherwise control of the entire region within an outline comprising three million acres, more or less, or as much thereof as might appear desirable.

Thus the State of New York recognized as a duty of the State and a fixed and firmly established State policy the protection of its most important watershed and of the forest cover thereon; it recognized that in State ownership lay the only practicable assurance of its conservation.

The acquisition of lands has proceeded cautiously and slowly. Unfortunately the State did not embrace the opportunity of acquiring these lands at a low price when it existed, and delay has had three undesirable consequences: first, to raise prices; second, to allow a further decrease of vir-

gin forests and their deterioration by wasteful logging, and third, to allow private individuals and clubs to buy up large tracts for game preserves. While, at first sight, the passing of lands into conservative private ownership does not appear objectionable, inasmuch as a conservative treatment of the forest cover may as a rule be expected from such owners, there is no absolute assurance of the continuance of such conservative treatment. Besides, not only would public ownership of the whole give more satisfaction to the people at large, but in administering it the State would be benefited by a consolidation of its property. Even now the State would not make a mistake, financially or otherwise, if it were to settle the ownership question at once, and acquire without further delay the balance of what it intends finally to own.

The second problem is that of the administration of the property. At first a forest commission of three unpaid commissioners was charged with the "care, custody, control and superintendence of the forest preserve," and the law declared that "it shall be the duty of the commission to maintain and protect the forests now on the forest preserve, and to promote as far as practicable the further growth of forests thereon"; also, that the commission should "have charge of the public interests of the State with regard to forests and tree planting, and especially with reference to forest fires in every part of the State."

* Read at the meeting of the American Forestry Association in New York, June 25th.

In 1893 the number of the commissioners was increased to five, with additional powers as to acquisition and lease of lands, and especially the specific power, with certain restrictions, "to sell the standing spruce, tamarack and poplar timber, the fallen timber, and the timber injured by blight or fire." Another change was made in 1895, when an amalgamation of fisheries and game interests with the forestry interests was provided and the (five) Commissioners of Fisheries, Game and Forests were installed. The realization that the forest interests are decidedly more important than the other two interests has, during the last legislative session, led to the change of name by which "forests" are first mentioned in the title of the commission.

During the last session of the legislature a change in the administrative machine was also attempted; namely to change the five-headed commission to a single-headed one. Theoretically, such a single-headed administration may be commendable, provided a man of unusual administrative ability, broad-mindedness and experience is put in the place. With our Democratic principles of government, however, it would appear that wherever public policy, not single will, is to be administered, a judicious council representing varied interests would be more apt to give satisfaction, provided that it relies for executive work on expert advice and assistance and on single responsibility of its executive officers. In the end, the question of the personnel of the commission rather than the number is the important one, and still more important, the organization under the commission and the objects to be attained through that organization.

The first object, naturally, must be *protection* of the *property*, and that means, with forest property, mainly against the dangers from fire. This is the first and foremost administrative problem. The only way to furnish that protection is by proper organization of the fire service and by reducing the causes of forest fires.

It is not sufficient to have a system of fire-wardens, as the law now provides,

but the system must be kept in working order and the means for putting out fires that could not be prevented must be ready at hand. Again, the personnel of the organization is of the first moment; and even when proper persons have been chosen as fire-wardens, a constant inspection and oversight only will keep them on the alert. It must also be kept in mind that there are mechanical limitations to performing the duties of a fire-warden over too large a territory; hence the appointment of a sufficient number of deputies, properly instructed and properly located during the dangerous season, is necessary. Nor is it sufficient to have these fire-wardens employed only to put out fires. In most cases, a forest fire, when it has once gained headway, will run its course, all human efforts notwithstanding, until a rain or swamp or watercourse stops its spread. The fire-warden is usually too late. During the dangerous season patrols must be on the alert to prevent the starting of fires or to extinguish small fires in their incipiency. The cost of such service will be argued against it and this objection is valid until we have a fully organized forestry service, in which the fire-guards perform other necessary duties and useful work besides the patrolling.

There is one serious drawback in existing arrangements, which could be readily improved. It is the manner of paying for the service of fire fighting. At present, when bills are audited and paid by the town, the tedious delay of such payment is discouraging to the men who have to wait for the hard-earned wages for many months. Authority to make the necessary outlay on the part of the commission, for which the board may seek reimbursement through the town, is the ready remedy.

While these administrative problems are readily understood and their solution is not difficult, the problems of technical management of the property are more difficult to solve. What is to be done with the forest owned and protected by the State? What policy is to be followed in its treatment and what methods are to be applied?

The first legislation, instituting the Forest Commission, had in view the application of forestry to the management of the property, but the commission failed to devise such technical management and the people, as is well known, restricted the activities of the commission, by constitutional amendment, forbidding the cutting of trees on State lands.

Knowing the history of this amendment, we can assert that it was intended not to establish a policy of non-use and to exclude forever the proper use of the axe, but rather to delay it until conditions should be more favorable for the employment of technical forest management. If nothing else were to warrant this conclusion, the establishment of the New York State College of Forestry with its experimental forest area, within the limits of the proposed State Forest Preserve must stand as an earnest that, ultimately, technical forest management is expected and intended. There is, to be sure, no haste necessary to engage in such technical work, but even now the commission is in a position to do considerable preliminary work and to prepare for the future.

There can be no question as to the first step in attacking the problem of technical management. As the physician bases his treatment on a diagnosis, so the administrator of a property must first become acquainted with its conditions.

The first step, therefore, towards a technical management of the State's forest property must be a forest survey; *i. e.*, a technical description of the conditions of each parcel in such a manner that its character, condition and location can be readily referred to.

The commission should know not only the acreage of the burnt lands and of the virgin and the culled forest it controls; not only the location of each parcel of forest land, but the condition of each with regard to its possible treatment. Such a description can be satisfactorily made only by an educated forester who, like a physician, diagnoses with a view to devising the remedy. It is only when the condition of the whole or major part of the property is known that a harmonious, well-

considered plan for its technical management can be devised and followed. It is then that the silvicultural problems involved become apparent.

It was mainly for the solutions of silvicultural problems that the New York State College of Forestry was endowed with an area of thirty thousand acres in the Adirondacks, the tract having been so located as to exhibit the greatest variety of problems that might be met in the entire reserve.

The silvicultural problems can be classified into at least four groups, with any number of subdivisions according to the character of the prevailing forest conditions. They will have to do with the treatment (1) of virgin lands, (2) of culled lands, (3) of slashes or burns, and (4) of swamps.

Since the virgin lands in the Adirondacks are reduced to a comparatively small area, a few hundred thousand acres, they may, like the swamps, be left without detriment to future consideration. It is, therefore, to the culled lands and the slashes, of which the major part of the State property consists, that attention should first be directed.

The slashes and old burns and openings of various kinds exhibit quite a variety of conditions and admit, therefore, the possibility of a variety of treatment. But they are all alike in this, that in their present condition they are in the greatest danger from forest fires and that, in most cases, they fail to grow useful material. They are not only dead capital, but a menace to the standing timber. Not only do they furnish the best chances for the starting of fires, but once a fire is started, the winds, sweeping through the open, drive it with such fury that human efforts to stop its progress are in vain. Usually it burns over the entire opening and destroys whatever young growth nature has begun to cover the ground with.

In some places, repeated fires have almost cleared the area of the old debris and it is possible to begin planting with valuable species without further preparation. In other cases, there is need of clearing the ground of debris more or less thoroughly in order to reduce the danger

of fire and make the planting practicable. The degree to which the clearing is necessary varies, and so does the cost.

The college has started the solution of the question of how much clearing is needful and how cheaply this preparatory work may be done, as well as how cheaply a growth of valuable species may be re-established. Sometimes nature has covered the burn with a growth of Aspen or Birch, and if left alone, the most valuable conifers, Pine, Spruce, and Cedar would gradually establish themselves by natural process. But even here the helping hand of man may hasten the process of useful occupancy of the soil by using as much of the volunteer crop for nurse purposes as may be desirable. Lanes are opened through the Aspen growth at varying distances apart and Pines and Spruces set out in the lanes, where they will be benefited by the light shade of the Aspen and White Birch.

One of the essential requirements in this reclamation of waste lands is adequate protection against fire. As I have pointed out, the greatest danger lies in these very areas; hence special precautions to reduce it become necessary wherever the expenditure for planting has been made. Greater vigilance and special fire-guards are required, and in addition mechanical means can be employed to reduce the danger. Among these one would be to take the entire burn in hand at one time, as far as possible, clearing and burning the debris, so that the cleared and planted area be bounded by standing timber or by water or marshy land. The area could then be subdivided by ditches, or better still by lanes sown to grass, which can be kept in proper condition and made to serve as bases of defense in case of fire. Old snags, especially dead Pines, must be downed, as they are apt to be set on fire by lightning.

The question, I suppose, is asked, does it pay to reforest these wastes? The answer is that if the State really proposes to hold, protect and improve this forest area as a whole, it does pay unquestionably, even were we to look at it only as a work of internal improvement. And, if,

as the indications are, the cost of restocking these at present worse than worthless tracts be kept below \$10.00 per acre on the average, it can be figured out as a profitable financial proposition even.

This work of reclaiming wastes is, by the way, one against which no conditional bar exists and which, therefore, could be taken in hand at once by the Forest Commission.

The other problem, that of handling the culled lands, is one presenting much greater difficulties. While the reclaiming of the waste lands is merely one of expenditures which can be more or less accurately determined, the rational treatment of the forested lands requires not only much more skill, but their improvement, if it is to be kept within practically advisable expenditures, is dependent on market conditions over which the State may not exercise control. To understand the problem, we must state the conditions.

The Adirondack forest is one composed of a variety of species in which the hardwoods, Birch, Maple and Beech, preponderate, and the conifers, Pine, Spruce and Hemlock, form a more or less prominent part. The culling has been of the latter, so-called softwoods, especially Pine and Spruce, because they were most in demand and most easily handled and transported by water. As a consequence, after the culling process, the hardwoods, preponderating before, have become still stronger: and only the Spruce's ability to tolerate shade has maintained, besides the decrepit old trees which the logger left, the growth of young ones. The White Pine, which cannot reproduce itself under the shade of the hardwoods, is almost extirpated except on occasional openings. The hardwoods, while furnishing a full and pleasing canopy of foliage which may mislead the uninstructed into the belief that he is looking upon virgin woods, exhibit in the old specimens the decrepitude of age, dead branches and rotten heart; and many of the younger, thrifty looking trees, upon closer investigation, also show the signs of decay as a result of the running fires which have swept over nearly every tract of the wild woods.

This, then, is the condition; a forest of old, decrepit hard-woods, deteriorating from year to year, with a tainted progeny struggling beneath, and a small, though promising number of young Spruces impeded in their development by the former, with occasional older trees that can be used as seed trees. Can there be any question as to the changes which it is desirable to effect, if we apply the reasoning of rational political and financial economy? Remove the dead capital of old hard-wood timber and replace it by a young, thrifty crop growing into value, in which the more desirable conifers preponderate!

The silviculturist will have to decide as to how best to secure this young crop, which may be done by favoring the volunteer crop of conifers, by giving a chance for seeds from left-over seed trees to find a seedbed and favorable light conditions for development, or by planting or sowing artificially. But before he can apply his skill, the manager must have found a way of disposing of the hard-wood crop. And here is the pivotal point of the problem, as with most of the forest problems that are to be worked out on a financial basis in the United States, namely the market question.

If the silviculturist is to show his skill in producing a new crop, the old crop must be disposed of; not only must a market first be found for the sound, merchantable sawlogs, but for the much more bulky and less valuable portion of poor cordwood, which, in the Adirondack timber, may readily be set down as exceeding in quantity the saw material six to seven times. Where this cannot be done, the culled lands may still eke out an income by further culling the forest of Spruce and other pulp material, etc., but it is evident that this can only be at the expense and to the detriment of the value of the property. In such cases, there is nothing left to do but to wait for economic conditions to change until the old hard-wood crop is saleable—the time for the application of silviculture has not arrived.

One of the absolutely unavoidable conditions for marketing hard-wood material is accessibility to railroad transportation either for the raw material or the manu-

facture. Therefore, before the State can enter upon a policy which has in view the rational use of its property from a forestry point of view, it must change the provision which prevents railroad building over State lands. I do not advocate the indiscriminate opening of the State lands to railroad construction, but merely state that rail transportation is a necessity for technical management of these lands.

The State College of Forestry has been successful in securing a market for the hard-wood material on its tract of thirty thousand acres, by inducing manufacturers of staves and of wood alcohol to combine in establishing plants and in building the necessary railroad tracks. By such combination, the fullest and most economical use of hard-wood materials at present known is secured, since all sound material to a diameter of eight inches and a length of thirty-two inches can be used for stave-wood, while the retort and fuel wood used in the manufacture of alcohol takes the material down to three inches, thus assuring the fullest possible utilization of all the material in the tree. Of course no restrictions as to largest or smallest diameter of trees to be cut or to be left have been allowed in the contract, silvicultural considerations alone coming into the question as to what is to be cut and what to be left. The college is the sole arbiter. The amount annually to be cut is necessarily determined by the requirements of the manufacturer.

To the European forester, and to those who attempt to propagate European systems of forest management, based on doubtful calculations of capital stock and yield, the absence of such calculations and of an adherence to a so-called sustained yield management will appear strange.

In the first place, the data upon which such calculations are based can hardly be secured with any measurable degree of accuracy from the virgin woods, nay, it is well nigh impossible to ascertain the rate of growth which will prevail after the silviculturist has changed the light conditions under which growth proceeds. In the second place, the time for these finer methods has certainly not arrived in our

country, where we have to deal with delapidated virgin woods in which a sound financial policy can only be to replace them as soon as possible by a crop which will utilize the soil to its fullest capacity. No fine measuring, calculating and predicting of future incomes is necessary to assure us that the replacement of a decrepit, old stand of timber by a vigorous new crop of better kinds is the true financial policy for the State. Let the next gen-

eration count the chickens for which we have secured the opportunity of development, favoring the better breeds.

And so for the rest of the State lands the same policy should be pursued, namely, as slowly or as fast as market conditions and other æsthetic as well as economic considerations warrant, to change the old, unprofitable investment of nature into a new, live investment of art and skill, by practicing silviculture pure and simple.

A GLIMPSE OF FORESTRY IN THE HIMALAYAS.*

BY F. E. OLMSTED.

If one can picture to himself a country something like the mountains of North Carolina, but with a forest growth more like that of the Adirondacks, and then place a glorious range of giant snow-peaks in the background, one can form a very good idea of the Himalayan foothills; at least of that part known as the "Jaun Sar" Division of the Dehva Dun Conservancy, to which this very brief and rough account refers.

Strip the southern slopes of all tree growth, and the picture is still better; when the monsoon breaks in June of each year, the snows are quickly melted away, and the soil is left at once to the mercies of an Indian sun, which has remarkable powers of drying what little earth the snows and floods have left. The northerly slopes, however, are fairly well covered with conifers and broad-leaf species, both in pure and mixed woods, the trees running up to ten and twelve thousand feet in altitude.

Above and beyond the tree line lie the grand old snows, those snows from which the sacred rivers, Ganges, Jumus and Indus spring, in whose waters countless numbers of good Brahmans wash their sins away each day, and down whose streams a very business-like Forest Department floats its logs.

* Read before the meeting of the American Forestry Association in New York on June 26th.

Here the summer climate is most delightful, and the winter not at all severe. In fact on the coldest days the sun has a way of being very tricky, and if you step out of the bungalow without a hat you will certainly pay for your carelessness in a very painful way.

The forest organization is a most admirable one, the higher officers being men trained in the schools of Germany and France, while the subordinate positions are occupied by natives who have graduated or studied at the Royal Forest School in Dehva Dun. It must be said, however, that the majority of "natives" do not take to life in the jungle, but prefer positions in the towns and large cities; so that at times it is difficult to obtain good men.

Some Government forests are "reserved," that is, held without any hindering "rights" or privileges of any kind, while others are "protected," or subject to grazing rights and other ancient usages of the villagers.

As for the forests themselves, they consist principally of Deodar, Spruce, Fir and Pine, among the conifers, and various species of Oak, both mixed with the former and forming pine woods in certain localities. By far the most valuable of all the timber trees is the Deodar, which has a wood very much resembling our own Cedar, and which is used for many pur-

poses, the chief use being that of railroad ties. On account of the remarkable powers of endurance which this wood possesses (due to the oil it contains), it is very valuable when a wood is required which must be placed in contact with the soil for a period of years.

Sylviculturally considered, the Deodar is an easy tree to regenerate naturally;

position most admirably, although if not looked after it will gradually suppress the Deodar; but this danger is avoided by girdling the Pine over large areas, whenever it has served its purpose and threatens to kill out the more valuable species. It is an open question as to whether or not this girdling had been carried too far; in certain cases it certainly appears so; but



OLD DEODAR, SHOWING CHARACTERISTIC SHAPE WHEN BEATEN BY WIND.

but each different locality must be treated in a different manner to insure success. On moist northerly slopes the species grows flourishingly under most any condition of shade; but on the dry southerly slopes it almost invariably requires a nurse of some kind during youth. Blue Pine fills this

if moderately applied it is without doubt a great help to the forest's future value. All over the sunny southern slopes, little groups of Deodar can be seen taking advantage of the shade of Spruce, Pine, Oak and even Rhododendron, although the mother Deodar may be a hundred yards away.

The Oaks are found at almost all altitudes, running up to nine thousand feet, and they can be naturally regenerated if the ground is not covered with a pestiferous little plant called "Strobolanches," which with its very dense and compact root system entirely prevents the acorns from reaching the mineral soil. No oak is cut for timber, but the whole supply is used as firewood by the neighboring garrisons; this is carried down the mountain trail on little hill ponies, each one of which is so loaded down that you see nothing but a pile of wood moving through the forest.

In all localities where grazing rights prevail the forester is of course somewhat handicapped; this is especially true in forests kept simply for "protection," such as those on steep slopes, which are preserved to prevent the debris of the hillside from being washed down on the fields of the valleys. Of course if the seedlings are constantly destroyed by the cattle, the forest gradually thins out, and the rains rush down unimpeded over the hard trampled ground. In many places a very good system prevails of closing a certain area to grazing whenever regeneration is attempted; and as the natives are careful to obey the rules, the result is successful.

All along the foot of the hills one sees a vast amount of territory covered by so-called "raws," which are broad and very rocky stream beds, filled with water during the monsoons only; these eat their way, little by little each year, into the surrounding fields, and are gradually stealing away the farms.

In such an article as this, the subject of working plans is somewhat too deep to touch upon, and it will be enough to say that the forests are managed on the selection system, only the annual growth being cut each year. This is arranged according to diameter classes and areas, all trees down to a fixed diameter standing on a certain number of acres being felled annually. Consideration is always given to the sylvicultural demands, however, and where these clash with question of present financial returns, preference is given to the former.

Working plans are sanctioned for a

period of twenty years, and new ones are constantly being made. In this particular part of the Himalayas, extensive blocks, sometimes covering a whole slope, are taken in hand and every marketable tree down to a certain diameter is calipered; the area is determined from the excellent maps available and the necessary calculations follow. A splendid system of well-made trails covers the mountains, and wood is also taken out very economically and in great quantities by log railways, steep cables, dry shoots, and flumes.

As in every other part of the world the great danger here to the forest crop is that of fire. Although the country is an exceedingly difficult one to handle, owing both to its configuration and the character and religious scruples of its inhabitants, such a system of fire protection has been gradually built up that losses have been greatly reduced in late years. An officer in charge of a range looks upon it as a disgrace to himself if fire gets the best of him, and the forest is splendidly provided with a network of fire lines. These are cleared and burned over each year (sometimes two or three times a year) and during the dangerous season, from February to May, additional men are put to work in the woods in order to be on hand in case of emergencies. Villagers can be summoned at any time by the forest officer in charge. A most valuable thing in case of an extensive fire is a sketch map, showing simply the formation of the country, giving all streams, ridges, fire lines, roads, trails, clearings, houses and in fact showing accurately all points of vantage from which a fire can be fought.

A forest officer's life in the Himalayas is certainly a most interesting one, and provided he is a hunter or botanist, a most enjoyable one. In this corner of the world he must be content to live a life of solitude, as he is often off for many weeks together and sees no single white face. But this does not infer that he is uncomfortable, for an army of servants is always by him, and he lives in comparative luxury the year through. Besides, the hills, the trees, the tigers and deer are very good companions, after all.

RAILROAD PLANTATIONS AND CATALPA.

A LETTER FROM MR. JOHN P. BROWN.

[As many of the FORESTER'S readers already know, Mr. John P. Brown, the Secretary of the Indiana Forestry Association, has lately been traveling about the middle West with a special eye to plantations of Catalpa, and to the possibility of interesting railroads in tree-planting. In answer to an inquiry about his observations and the success of his trip, Mr. Brown wrote the FORESTER a letter from which the following is taken. ED.]

Almost without exception I have been courteously received by the highest officials of railways; the methods proposed have been recognized as sound business propositions, and further detailed information asked for. But railway organizations are vast machines, and so important a step as planting trees on a large scale must be considered with care by many officials. Hence it will take time to accomplish this work.

The work of forest planting has hitherto been largely experimental, especially that undertaken by railway companies during the past quarter century. While it was well known a century ago that Catalpa wood was the most enduring of all American trees, yet it was not known where it would grow, and hence a variety of timber was planted, much of which entirely failed. These numerous experiments have shown that *Catalpa speciosa* is hardy in all territory east of 100° Lat. and south of 44° even to the Gulf of Mexico, and in New England. Also that it is a remarkably strong grower—exceeding in that respect almost every American tree. Thus it has become known as the ideal tree for commercial planting, whether by railways or by individual planters.

The plan of utilizing the right of way for an avenue of trees has been imperfectly tried by a few roads. Skilled men have not been put in charge and the plantations have been neglected. Yet they have by no means been without results. Some two

decades ago one of the Pennsylvania lines in Ohio planted Red Cedar along the track, while the Catalpa was planted along an Indiana branch line. Cedar is so slow to mature that little has resulted from the Ohio plantation, except that, æsthetically, it does greatly relieve the monotony of railway scenery. In the case of the Catalpa trees a majority were unfortunately *C. bignonioides*, and worthless, yet a few good specimens of *Catalpa speciosa* did succeed in making substantial progress, even under such neglect, in a sod of blue grass, and with the principal branches mutilated by telegraph linemen. I measured some sixteen inches in diameter, seventeen years after planting. Along the Burlington, in Nebraska, many trees were planted on cuts to prevent the drifting of snow, and some of them have grown exceedingly well in a dry climate and without care.

I find that a serious mistake has been made where the theory of close planting has been followed. For instance in the 1,200 acres at Farlington, Kansas—4 x 4 feet and never thinned—the trees are stunted and no larger to-day than they were ten years ago. In fairly good soil it requires about 256 square feet of surface for the perfect development of root growth during the first quarter of a century. Thus with *Catalpa speciosa* my observations have shown that when planted sixteen feet apart both ways, the trees make one inch diameter growth per annum, while at a less distance apart the roots become so matted and interwoven in fifteen years as to prevent a satisfactory growth. The 4 x 4 method, giving only sixteen square feet of surface to each tree, has in every instance dwarfed the entire plantation *inside of six years*.

At Governor Furnell's place, Brownville, Nebraska, I dug up a cluster of Catalpa of four years' growth from the sod, where they stood four feet apart each way.

One tree was five inches in diameter and 24 feet high. The roots occupied a solid mass of 7 feet in diameter. One root extended 15 feet from the tree; two I traced 10 feet; and three others, 8 feet from the trunk. The surrounding trees were only 2 to 2½ inches in diameter, while the entire root system was confined to a space the size of a bushel basket.

In this case the one stronger tree had overcome all others, but this was an exception, since in the general plantation the trees were all very small; all starved at the early age of four years. I cannot put this too strongly when thousands are watching the results of these early plantings, to decide whether or not tree planting is profitable. The Yaggy plantation at Hutchinson, Kansas, 500 acres in Catalpa and Soo acres in Apple, the forest

planted in 7-foot rows, 4 feet in the row, to be gradually thinned, is from the start a profitable investment. This winter, the eighth year, the trees will be thinned to 7 x 8 feet and later to a permanent stand 14 x 16 feet. Three thousand dollars' worth of posts were sold last winter, and ten thousand dollars' worth are now ready for the market from the thinnings.

Actual measurement of more than five thousand trees, in all parts of America, prove conclusively that forest planting is a profitable investment, if systematically managed, whether by individuals or corporations. One thing is an assured fact, native forests are not increasing one-tenth as fast as they are being denuded. It is full time that Government, States and corporations should be moving in the matter of a future supply of timber."

FOREST LAW IN THE UNITED STATES.*

BY TREADWELL CLEVELAND, JR.

X. DISTINCT SUCCESSES.

It may be of some service to the general reader if we note particularly some of the more conspicuously successful efforts in forest legislation.

First in national importance among the successful measures comes the law on which the Federal Reserve policy rests. By the reservation of approximately forty-seven million acres of public forest lands the United States has pointed the way for an exemplary system of forest protection and management. Already there are laws enough on the statute books to provide for a full and efficient Federal Forest Service. The question is simply whether a true appreciation of the reserves on the one hand, and on the other of the laws by which they may be regulated, can be aroused and maintained in full effect among the people of the various districts of the country.

* For Mr. Cleveland's first, second and third articles on this subject, see the FORESTER from July to September.

Recent official intelligence confirms a statement made in the first paper of this series regarding the general sentiment toward the reserves. Everywhere a marked change of front is visible; the people may be said to be demanding the continuance and extension of the reserve policy.

Among the States, New York, Pennsylvania, Massachusetts, Minnesota and some others, in a less degree, have carried forest legislation to an excellent issue. This is not to say by any means that these or any other States have fully covered the ground in law, but merely that with their protective laws, and their administrative provisions, these States have taken steps which mark historic advance.

XI. DOUBTFUL ISSUES.

Yet a great deal still remains to be done in the way of exact local provisions as well as in efficient and conscientious forest administration. The lieu-land law which permits *bona fide* settlers within the pro-

claimed boundaries of reserves to relinquish their claims there and to take out claims as they choose in other forested public lands outside the reserves, has within the past year opened the way for fraudulent use of public timber. Suppose, for instance, as in the case noted in the first paper, that such *bona fide* (!) settlers are lumbermen's dummies, who have taken advantage of the letter of the law to receive pay for giving away to the lumbermen public forest property to which, in the spirit of the law, they were by no means entitled. Suppose the lumbermen to have cut from the claims of such dummies all available timber, so that the claims have become worthless for the axe. Then suppose the passage of the lieu-land law. Further supposition is unnecessary. Facts relate the rest. Some of the most valuable timber adjacent to the Olympic Reserve in western Washington has recently, under cover of this law, passed into the hands of lumbermen who have thus a second time robbed the government at its own invitation.

We have already seen when speaking of the Federal Reserves that the laws at present on the statute books which provide for the use of public timber, both reserved and unreserved, and for its protection from theft and fire, are individually inadequate and collectively inconsistent. It is true that the Commissioner of the Land Office drew up, and had presented to the last Congress, a bill aiming to repeal all these fragmentary enactments, and to substitute in their stead a single law drawn to meet the various local requirements. That bill, however, received no attention, and it is not altogether certain that its terms are at every point as good as might be wished.

XII. FOREST PARKS.

Beginning with the movement in favor of the creation of the Adirondack Park in the State of New York, there has been in late years a distinct development toward the preservation of forest lands for park purposes, a development which has been very markedly accelerated during the past few months by the promoters of the Appalachian and Minnesota Parks. The Ap-

palachian Park when completely mapped out will preserve to the population within a reasonable distance from its boundaries, the free use and enjoyment of one of the most beautiful forested regions of our country—that rich hardwood stretch in the mountain regions about Asheville and through the western end of North Carolina. There is every reason to hope that the interests which are touched by this project may so far appreciate its importance as to carry it through successfully. The example of the Adirondack Park is before us, while New Hampshire and Massachusetts, through the excellence of their roadways and village improvements, are able under analogous conditions to attract to their wooded regions numerous summer visitors who bring to the community its chief life, and who take away increased health and energy to their work at home. Pennsylvania, in her forest lands reserved by purchase, is also making an effort to combine the interests of the forester with considerations of health and recreation. In Minnesota finally, against a strongly hostile pressure, an effort is being made, as is now well known, to preserve the forested lands lying about the headwaters of the Mississippi for the pleasure and benefit not only of the citizens of the State but of all citizens of whatever State, who care for nature and the conditions of the wilderness. Odd as it may seem, one of the strongest elements of hostility to this project appears on excellent authority to be the rum-shop element. For this district has no agricultural interests; the population consists largely of lumbering crews; while the lumberjacks with their wants, and those whose business it is to set a bait for their pay checks, give to the region its distinctive character. Of course these interests have a direct share in Congressional representation, to say nothing of state politics. This is perhaps sufficient to show that the interests of forestry when pushed with vigor have sometimes to cope not only with apathy and inertia, but also with forces which are actively and positively evil. It is believed, however, that such facts as these will not long bear the light of day,

and that good sense and the right conscience of the people will find a way to put public improvement and individual health before public spoliation and individual corruption.

XIII. CLOSING WORD.

Even the brief glimpse of forest law that has been possible within the limits of this series of papers will probably suffice to make clear to the reader the following points: (1) The forest movement has acquired an impetus that cannot be checked;

(2) That movement has found effective expression in State and Federal laws; (3) These laws are laying the foundation for a perfected system of forest management; (4) Forest management has already reached practical success.

It will not do to close without noting the important effect of forest law upon the sentiment and practice of the people at large and especially upon private land owners. Where law opens the way the private possessor of forests is now ready to apply the lessons taught by public action to his individual benefit.

THE NATURAL SPREADING OF TIMBER AREAS.*

BY CHARLES E. BESSEY.

University of Nebraska.

SPREADING OF PINE FORESTS.

Since my last report on the natural spreading of timber areas, made last winter, I have had the opportunity of observing personally a number of cases. In a journey through northwestern Nebraska I observed with much interest that in many places the native Pines had spread out from the original timber areas. This was particularly noticeable where the Burlington railway had cut off the original sweep of prairie fires, thus permitting the seedlings to grow unmolested. In many places on Pine Ridge the little trees had pushed out from two to six or eight rods from the original line of the forest area. I am confident that within twenty years, if these spreading areas are protected, the timber line will have advanced from a fourth to half a mile.

In passing through the Pine region bordering on the Burlington railway west of the Black Hills in northwestern Wyoming I observed the same rapid spreading of the timber areas. Here there were in some cases veritable thickets of young Pine trees which extended the timber area

for many rods beyond its original line. The general northwesterly direction of the railroad cuts at right angles what I take to have been the usual direction of the prairie fires from the southwest, so that it was on the northeasterly side of the railway that these spreading areas of Pines were to be seen. In a small number of cases I noted that the Pines were spreading (but I thought not so rapidly or vigorously) on the southwesterly side of the railway. It is probable that in these cases there were local conditions which prevented the prairie fires from sweeping over the areas as formerly.

SPREADING OF DECIDUOUS TREES.

In a paper prepared for the United States Division of Forestry, last winter, I spoke as follows of the spread of the eastern forests:

"The deciduous forests of the eastern portions of the State are now enlarging their areas wherever man is not actively engaged in destroying them. Left to themselves the forest areas of Elm, Ash, Oak, Hickory, Walnut, etc., are spreading at a rate so rapid that it has attracted the attention of many observers."

I may add to this statement that wher-

* But for slight modifications, the same paper as that read before the Nebraska State Horticultural Society in July.

ever I have traveled in the State since the presentation of my last paper, I have found additional proof of its truth. I have the utmost confidence that the timber areas are much larger where they have been protected than they were twenty or thirty years ago.

In this connection I may quote from a private letter written to me by Professor Blankinship, of the Montana State College of Agriculture and Mechanic Arts. In a conversation with him on this subject in June he spoke of having observed the same thing in southern Missouri.

"The line between forest and prairie runs from the southwestern corner of the State, northeastward to the Mississippi somewhat north of St. Louis. Greene County is on that line and it was there that I studied the subject, and the fact of forest extension is very evident. This county is about half prairie and these prairies are now confined to the higher uplands of that region, the timber apparently having followed up the water-courses and united in the broken ground at their heads, leaving the prairies as mere islands in the on-coming forest; westward the prairies are larger and we pass in about thirty miles from the unbroken forest to the plains with streams scantily forest clad. From the united evidence of the old settlers, I found that the timber had encroached on these prairie islands about one mile in the last fifty years, and that, too, despite the fact that it was being constantly cut for log houses and particularly for fencing purposes and fire-wood."

IS INCREASED RAINFALL THE CAUSE?

If we take up the question of the cause or causes concerned with this very evident increase in the timber areas we are face to face with a very difficult problem. It has been held by some observers that the principal cause is the increased rainfall upon the prairies and plains. In Nebraska, however, we have learned that the supposed increased rainfall is an error. It is true that fifteen or twenty years ago we had publications which seemed to be quite authoritative, in which the supposed increased rainfall was discussed; and there

were maps drawn, even, to show how year after year the rain belt moved westward. As you are aware, Professor Swezey, of the University of Nebraska, has entirely overthrown this theory. His careful studies of the rainfall through long periods of time show that while there are short periods during which there is an increase in the rainfall, there are other periods in which there is a corresponding decrease. It is his opinion that there is no ground at the present time for the belief that the rainfall in Nebraska has increased during the period of its settlement. There can be no question that we must throw out of the discussion the theory that an increased rainfall has brought about this increase in the forest areas.

IS CHANGE OF TEMPERATURE A CAUSE?

It is sometimes said that other climatic changes than those directly connected with the rainfall have had to do with this increase in the timber areas. We hear the statement made that the climate is slowly changing, even where the increase in rainfall is not insisted upon. Now the climate of a country includes a number of factors. Moisture is one of the most important of these. Next to this perhaps may be placed temperature, and then wind, light, etc. With respect to these factors we have no indication whatever from a careful study of the meteorological data that there has been any permanent change in the temperature of the prairie and plains region. Our climate is neither growing hotter nor colder. Here again we find that we may have a series of years in which the temperature is increased, and then a series in which it is decreased, but no permanent change has been observed either in the way of an increase or decrease in the temperature.

IS LESSENERD WIND A CAUSE?

With respect to the winds, this only can be said, that as the ground is more and more covered with tall-growing vegetation, such as tall shrubs and trees, we notice the movements of the air less and less. It is a fact that if we pass into the strata of air above the tree tops there is about as much wind in a wooded country as in

one where there are no trees. The difference is that we live upon the ground, and we judge of the amount of wind by what we feel ourselves. So it must be said that as the trees have grown there will be less wind that we feel. I doubt very much whether there is any other connection than this between the forest areas and the wind. I doubt whether there is any possibility of showing that winds have decreased, and that as a consequence the trees have increased. It is rather the opposite—that as the trees have increased they have deflected the air currents upwards so that we feel them less and less.

EFFECT OF REMOVAL OF WILD ANIMALS.

Coming to matters which are of much more local importance, the inquiry may be made as to whether disappearance of the wild animals which formerly roamed over the plains and prairies has had any effect upon the timber areas. It is certain that the buffaloes, deer, elk and other herbivorous animals must have more or less affected the young timber areas, and yet when we compare the wild animals of this kind with the stock which man has brought in since, we are compelled to say that the former could have had very little effect upon the timber as compared with the latter. It is unlikely that the disappearance of wild animals has had sufficient effect upon the timber areas to be worthy of consideration.

EFFECT OF ADJACENT TILLAGE.

It has sometimes been said that probably the tillage of the adjoining fields has had a beneficial effect upon the timber areas. I think there is something to be said in favor of this suggestion. Here and there without question the tilled fields affect beneficially the surrounding untilled ground. This is especially the case where the tilled fields lie upon higher lands than the adjoining timber areas, and it will be noted that this is usually the case. The wash from the tilled ground will carry over upon the untilled areas rich materials along with the thin layer of actual soil, and so better conditions will be made for the springing up of young seedlings. I am inclined to give considerable weight to

the suggestion that we have here one of the factors aiding in the increase of the timber areas, and yet in many places in the State I have seen the timber areas spreading miles and miles away from any possible influence from the tilled fields. It is only here and there that this can be admitted as a factor in the problem under consideration.

EFFECT OF STOPPAGE OF PRAIRIE FIRES.

When we look over the whole field we find that there is, however, one factor which is efficient; namely, that of prairie fires. Originally the plains and prairies were swept annually with fires which burned down to the ground every living thing. These fires, coming every year, made it impossible for the tiny seedlings to live. They had not yet gained sufficient strength in their roots to be able to send up shoots again and again from the uninjured underground portions. There can be no question as to the effect of prairie fires upon the seedling trees. Wherever the fires sweep over every seedling is destroyed. Since man has taken possession of the open lands he has restricted more and more the sweep of the fires, and here we have for the first time an efficient cause which enables us to understand how it is, and why it is, that the timber areas of the open country are spreading.

HOW THE PINES SPREAD.

When we make the inquiry as to exactly how timber areas are spread we find that there is some difference between the Pines and the deciduous trees. Thus in the case of the Pines, the seeds are scattered by the winds, being aided in this by the wings attached to the seeds. Apparently the seeds are scattered for considerable distances in the direction of the prevailing winds. Those which fall upon favorable spots spring up and become the little seedlings mentioned above. In the extension of the Pine forests the Pine trees alone seem to be concerned. There are no shrubs or weeds to form a cover in which the little plants start up. I have seen many places where the Pine seedlings were springing out of the sparse sod, sur-

rounded by the ordinary prairie grasses. I observe that where the sod had been cut, as in the removal of the soil for railroad building, the Pines spring up more abundantly, but I have seen very dense thickets of Pine seedlings where the sod had not been disturbed at all.

HOW DECIDUOUS TREES SPREAD.

In the case of the deciduous forests, where they are spreading we observe that there is always a fringe of weeds and shrubs, and that in this fringe the seedling trees appear. The weeds are the common wild weeds of the neighborhood. Thus in regions where sunflowers are abundant these will be found; also the taller growing goldenrods, asters, ragweeds, etc. Here we have a hint that weeds are not always harmful, as in these cases they certainly do serve to cover the ground in such a way that the more permanent vegetation is able to come in after them. Mingled with the weeds there are always shrubs. At first these are small and inconspicuous, but later they occupy the ground almost to the exclusion of the weeds. In a typical fringe around a forest area the weedy belt is farthest away from the timber, while nearest to the timber is a belt in which the shrubs predominate and where the weeds are of less importance. The shrubs to be found in these fringing belts are Wild Roses, Wild Plum, in some places Dogwood and Wolfberry (*Symphoricarpos*), Hawthorn, and on lowland, Elderberry, etc.

THE STRUGGLE FOR EXISTENCE.

In this fringe of weeds and shrubs the seedling trees start up. Of course a large percentage of these perish. Many of them are smothered by the too rampant growth of weeds and shrubs, but here and there a little tree persists, and finally overtops the other growth; and from this time forward the tree predominates. There is a fierce struggle for existence in these fringing belts about the advancing forests, and it is only because of the immense fecundity of the trees that their offspring are able to survive in the struggle. We rarely think of the large number of seeds produced by even an ordinary sized tree.

I recently made a calculation as to the number of seeds produced by an Elm upon my place in the city of Lincoln. The tree is about thirty feet in height with spreading, well-balanced, and rounded top of about twenty-five feet in diameter. Every year this tree produces heavy crops of seeds, and my calculations show that a minimum estimate is one million seeds for the tree. I am confident that my estimate is too low rather than too high. Now let us stop for a moment and see what this implies. One million seeds, if scattered over an area in such a way as to have one seed for each square foot, would cover somewhat more than twenty-three acres of ground. If these seeds were all to grow, it would not be long before a great part of them would have to perish on account of their interference with one another. I am certain that my Elm tree produces so many seeds that, if they were properly planted and cared for, they would produce a forest of from ten to twelve thousand acres each season. Of course it is never possible for all the seeds to grow into large trees; and it would not be possible, even if the seeds were properly distributed at the first. What actually happens is this, the seeds are scattered within an area of probably not more than one-sixth of an acre, or say a circle of about fifty feet radius, with the tree in the center. A million seeds scattered over this small area would equal one to each square inch. Before the end of the first season these little seedlings so closely packed crowd one another so that many of them must die. I suppose that out of a million seeds not more than one-tenth of one per cent. succeeded in growing into young trees under natural conditions; and yet it is in this way, by the lavish use of the seeds which are produced by nature, that the forest areas are extended. These seeds fall upon the loose soil covered with leaf mould in the fringing belt of the weeds and shrubs about the timber, and here some of them spring up and eventually become trees. These when grown become centers for the distribution of more seeds and the formation of more seedlings; and so the growth goes on, and in this way the forests are extended.

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Fire in the Sierra Madre.

The last number of the FORESTER went to press with the statement regarding the Santa Anita fire that the wonder was, not that it "should have burned for a fortnight, but that it took no longer to bring it under control." A few hours later reports began to arrive in clippings from different California papers which showed that either this fire had by no means been extinguished during the first days of August, or that a new one had later broken out in the same region, and that under favoring circumstances and perhaps a not unnatural relaxation of vigilance, it had got under way with renewed vigor, and burned away once more over the mountain sides of the San Gabriel Reserve. It invaded one of the watersheds from which Los Angeles draws its water supply, and apparently threatened to keep on indefinitely before the steady wind. But after a week, heavy fogs on the 30th and 31st of the month did what rain could not have been expected to do till autumn—so reduced the size and speed of the fire that it was once more possible "to bring it under control." To quote one of the last reports which gave an account of the state of things in specific terms, there remained on August 31st only some smouldering logs, which were "be-

ing watched carefully by a large force of men." It will be noticed that this report did not say that the fire was entirely put out. To make certain of this only a great deal of unremitting drudgery, to which irregular labor could not easily be called in as in an emergency, would suffice. Could there be any stronger argument for mere numbers in the permanent force of forest rangers?

The Schools of Forestry.

In no way is the rapid progress which the country has been making toward a reasonable sense of the importance of its forests and of forestry during the last couple of years shown more clearly than in its greatly increased educational facilities. Indeed one might almost say that these have not so much developed, as sprung suddenly from nothing into vigorous existence. Until less than three years ago anyone who wished to make forestry his profession could receive only rudimentary and unsystematic instruction at home, and had to go to European schools for a good part of his education. Whatever the differences between European and American trees and economic conditions made it impossible for him to learn abroad he had still to learn well nigh entirely by himself. This autumn, however, no less than three well-equipped forest schools open for the winter term—at Biltmore, N. C., at New Haven and at Cornell; and at these institutions instruction is being given by the best and most experienced of America's foresters. In addition to this many State colleges and agricultural schools are devoting more or less time to the elementary principles of forest planting and conservation, and, further, the Government has, during the past year and a-half, been giving some eighty odd "student-assistants" training in the work of making surveys and field measurements. How great the value to America of this educational work really is becomes clear when one considers the difficulties which now confront whoever tries to solve any of the many forest problems with which the country is concerned. Of all our valuable trees there is hardly one of which

the silvicultural characteristics are known with any approach to nicety. Messrs. Graves' and Pinchot's studies of the White Pine and the Adirondack Spruce constitute almost all the literature of their kind. In regard to such valuable timber supplies as those to be found in the great Red Fir forests of Oregon and Washington, for example, no one can make more than the roughest guesses at the measures which should be taken in order that, where the cut-over lands are not devoted to agriculture, the growth of a good second forest crop may be insured. On every side it still remains to break the ground for the first time, and many laborers are needed. The American student of forestry must spend much of his time playing the pioneer in fields yet unexplored for some years to come, often letting the practice of his art wait for the results of investigation and experiment. His methods will be shaped by conditions which have to be studied on the spot. For this no European school alone can possibly give the right training. Although some experience abroad is valuable, the complexion of an American forester's education should just as certainly be distinctly American; and only with the help of good American schools of forestry can such an education be obtained at the best advantage.



According to a letter recently received from the office of the Massachusetts

Hope for New Hampshire.

Forestry Association, there seems to be better hope that New Hampshire may at last rouse itself to the point of doing something really effective for the preservation of the White Mountain forests. In his speech at the celebration of Old Home Week in Concord, the Governor of the State lately stated things squarely, and declared himself clearly and emphatically in favor of a vigorous forest policy. Referring first to what other States have done to encourage the summer tourist business, Governor Rollins went on: "What have we done? Not one dollar for good roads; a very small sum annually, \$5,000 for the fish and game, and no protection to our forests. Some one will say: 'We can't

afford to spend money for these things.' I am tired of hearing that; you can't afford not to. But we are not poor; we don't owe anything to speak of. Why, there are many towns and cities in this country with 20,000 inhabitants which owe more money than we do. In 1905 we shall be practically out of debt at the present rate of payment. A large portion of the towns receive to-day from the State more than they pay in State tax. So I say that the State tax to-day is no burden, and could not be if it were three times as large. What would I do? I would spend \$1,000,000 in good roads, distributed over a number of years. I would give the fish and game commission, \$50,000 a year if necessary, rather than \$8,000. I would make a park of the White Mountains, and of Lake Winnepesaukee, and protect them from ruin. In other words, liberal expenditure now is greatest economy for the future. This State sold thousands of acres of timber lands a few years ago for \$25,000. What is it worth to-day? Hundreds of thousands. We are throwing away an opportunity not to be regained if we don't act soon. The purchase of this timber land for a park is a good investment, if nothing else."

The truth and soundness of this need no comment. The summer visitors, the hotel proprietors, the railroads, the large manufacturing corporations along the Merrimac River, which more than ever of late years have been troubled by freshets and drouth, the lumbermen themselves, if they realized it, are all interested in having the White Mountain forests cared for and preserved. Their perpetuation is a matter of which the importance to New Hampshire and the neighboring States, for practical reasons alone, can hardly be exaggerated. But it is also largely because of these forests that the White Mountain region is one of the most beautiful in the country. For years fire and wasteful lumbering have carried destruction into one district after another of this region, without check or hindrance. But now Governor Rollins, a man who is already recognized as unusually discerning and

practical in the promotion of the State's interests, has taken up the preservation of her forest resources, and sounded a call to action. It remains for the citizens of New Hampshire and their legislature to give the Governor all the support they can.



Prosecution for Starting Fire.

An excellent example of the common indifference to all fires except those which burn buildings, and of the difficulty of carrying legislation about them into effect, is given by Gen. C. C. Andrews in his latest "Annual Report of the Fire Warden of Minnesota." The case was that of a man in Chicago County, who, in the early part of January, when the ground was bare and the weather dry and very windy, set a fire to burn his brush. The fire spread "and destroyed nearly two thousand dollars' worth of hay and other property belonging to his neighbors." The man's farm, buildings, stock, etc., were exempt from execution, so that none of the property could be taken in payment for the damage. The chairman of the town board would not make the complaint, and so the chief fire-warden had to go and make it himself. The man "pled guilty to carelessly causing the fire, was fined only \$15, together with \$3.05 costs, and yet the community did not sympathize with the prosecution."

This shows once more the importance of having fire-wardens who cannot be tempted to neglect their duty by the popular sentiment in their districts. It also shows how very important it is that prosecutions should be carried on, though they be as disagreeable as the punishment of a child. For though the prosecution of any one individual may, strictly by itself, be of little moment, it is the only denial of the assertion that a man must not be blamed for setting a fire "carelessly," which in any way tells. The more the people of a region growl at the enforcement of the fire law the greater is their need of it. Where they realize generally that the man who causes needless destruction by fire is practically robbing his neighbors and the community, more than half the difficulty is overcome. In such places the fire-warden is forestalled in the heaviest part of his work. Fires become exceptional misfortunes. But in other places where they are regarded as belonging to the natural course of events (and such places are grievously many), they occur with the greatest regularity, and further always will, until either an uncomfortable scarcity of wood or the pressure of some force from outside, like an efficient fire-warden, teaches them to see forest fires aright. As quicker and more economical than the diminishing wood supply, an efficient fire-warden is to be preferred.

NEWS, NOTES, AND COMMENT.

Forest Fires and the Recent Hurricane.

In summing up the damage done by the recent hurricane, which entered New England on Wednesday morning, September 12th, the *Springfield Republican* says: "It started into life scores of wood fires, and Wednesday night in many sections of New England thousands [?] of acres were ablaze, and several scores of houses had been burned." It is needless to say that the fires thus started into life were not set by the hurricane, or to any great extent, while the wind was blowing.

They were already burning, partly or wholly disregarded, and before the wind fanned them into activity they were probably thought to be insignificant. The labor that would have been required to put them out before the arrival of the wind storm would have been proportionately insignificant.



The "Grand Prix" Won by Canada.

Canada has won the highest award given the forestry exhibits at the Paris Exposition this year. In a letter to one of the

Canadian papers Mr. A. K. Stuart says that the principal reason why the Grand Prix was awarded to Canada was that its exhibit exceeded all others in the commercial excellence and the extreme variety of the woods which it displayed. The Russian exhibit was much larger, and many other countries spent much more money on their exhibits than did Canada. Mr. Stuart thinks that if Canada had made as great an effort as these other countries its exhibit might easily have eclipsed theirs in almost every respect. As it was, however, he says that it made a great impression, and that if Canadian lumbermen and manufacturers will follow up the opportunities which will undoubtedly come from it they will gain greatly by the exhibition.



Facts About the Big Tree.

The Report on the Big Trees, recently prepared by the Division of Forestry, contains as preface the following "summary of facts":

1. The dimensions of the Big Tree are unequalled.
2. The age of the Big Tree makes it the oldest living thing.
3. The majestic beauty of the Big Tree is unique and world-renowned.
4. It now exists only in ten isolated groves on the west slope of the Sierra Nevada Mountains, and nowhere else in the world.
5. The Mariposa Grove is to-day the only one of consequence which is completely protected.
6. Most of the scattered groves of Big Trees are privately owned, and therefore in danger of destruction.
7. Lumbering is rapidly sweeping them off; forty mills and logging companies are now at work wholly or in part upon Big-tree timber.
8. The southern groves show some reproduction, through which there is hope of perpetuating these groves; in the northern groves the species hardly holds its own.
9. The species represents a surviving prehistoric genus of trees once growing widely over the globe.

Lumbering the Big Trees.

"The lumbering of the Big Tree is destructive to a most unusual degree. In the first place the enormous size and weight of the trees necessarily entails very considerable breakage when one of them falls. Such a tree strikes the ground with a force of many hundreds or even thousands of tons, so that even slight inequalities are sufficient to smash the brittle trunk at its upper extremity into almost useless fragments. The loss from this cause is great, but it is only one of the sources of waste. The great diameter of the logs and, in spite of the lightness of the wood, their enormous weight make it impossible to handle many of them without breaking them up. For this purpose gunpowder is the most available means. The fragments of logs blown apart in this way are not only often of wasteful shapes, but unless very nice judgment is exercised in preparing the blast, a great deal of the wood itself is scattered in useless splinters.

"At the mill, where waste is the rule in the manufacture of lumber in the United States, the Big Tree makes no exception. This waste, added as it is to the other sources of loss already mentioned, makes a total probably often considerably in excess of half the total volume of the standing tree; and this is only one side of the matter.

"The Big Tree stands as a rule in a mixed forest composed of many species. The result of Sequoia lumbering upon this forest is best shown by the photographs. The destruction caused by the fall of the enormous trees is in itself great, but the principal source of damage is the immense amount of debris left on the ground—the certain source of future fires. This mass of broken branches, trunks and bark, is often five or six or even more feet in thickness, and necessarily gives rise to fires of great destructive power, even though the Big Tree wood is not specially inflammable. The devastation which follows such lumbering is as complete and deplorable as the untouched forest is unparalleled, beautiful, and worthy of preservation. As a rule it has not even had the advantage of being profitable. Very

much of this appalling destruction has been done without leaving the owners of the Big Trees as well off as they were before it began."—*Report on the Big Trees*, Government Printing Office.

Gypsy Moth Colonies.

Secretary Stockwell, of the Massachusetts Board of Agriculture, has recently made a survey of the districts infested by the gypsy moth to ascertain the effects of a cessation of the moth-killing. The legislation refused to make an appropriation this year for continuing warfare on the moths, but near the close of the session put in an item of \$1,000 for observation of the insects and care of the State's apparatus.

"The secretary tells a Boston paper what he found in Malden, Medford and Middlesex Falls. The most interesting discovery was an evergreen hedge, on a neglected farm in West Medford, that had been nearly stripped of foliage by the caterpillars of the gypsy moth. The hedge is in the care of a man who opposed an appropriation. A caterpillar that will eat the foliage of evergreens is certainly a rarity and a dangerous pest. For evergreens have slight powers of recuperation and die when the foliage is destroyed. Nothing but pure neglect would have permitted the destruction of a hedge that could easily have been saved by the use of insecticides.

"The secretary's survey showed that there will be a fair crop of caterpillars next year, unless the people in the localities infested do something to destroy the egg masses. As yet no enemy strong enough to kill the insect has made its appearance."—*Exchange*.

Forest Reserves as Game Preserves.

"In the annual report of the Zoological Society of Philadelphia for the year ending February 28, 1900, attention is called to the increasing difficulty of procuring specimens of the more important animals belonging to Pennsylvania, and says: 'It would appear probable that among the large tracts of land which are being acquired by the State of

Pennsylvania as a "forest reserve," there should be some which will offer opportunity whereby some of our native animals which are still resident, but in decreasing numbers, such as the common deer, the wild turkey, and the ruffed grouse, may be indefinitely preserved, and perhaps others, such as the elk, reestablished.

"This noble animal was formerly abundant in mountainous regions, and it is not fifty years since the killing of the last one known within the State. It is certain that with suitable forest tracts of sufficient extent, and with adequate protection, this species could, at small cost, be again established as a resident."

"We understand that it is the intention of the Forestry Commissioner to enforce the game and fish laws on the forest reserve, and possibly some portion could also be set aside as a game preserve."

—*Forest Leaves*.

Building Better than They Knew.

"Those working to secure a national park at the headwaters of the Mississippi River are certainly "building better than they knew." Every disinterested person will concede that the establishment by the Government of such a park within the borders of our State would attract many thousands of visitors annually. The publicity already given this Leech Lake region throughout the Union by the advocates of this park has already given the hotels at Walker and Cass Lake an overflowing patronage. The arguments to be put forth for the saving of the Pine forests on the Chippewa reservation and the bequeathing of same to the people for all time to come are legion. * * * The opening up of this reservation to settlement means simply a repetition of the Red Lake reservation timber sale, where the Government only realized on behalf of the Indians from the lumbermen \$198,000 for timber cut and removed and actually worth \$1,500,000—a deficit of nearly \$1,300,000 unlawfully gained and which should be refunded to the Indians. Opposition to the establishment of the national Minnesota park is today coming wholly from this source. It

is with the people at large and the Mississippi Valley particularly to say whether private interest shall prevail against the public good."—Mr. Charles Christodoro in the *St. Paul Pioneer Press*.



Michigan and her Forests.

Mr. Charles W. Garfield, the President of the Michigan Forestry Commission, delivered an address before the Federation of Women's Clubs at Grand Rapids not long ago, of which the opening paragraphs follow:

"During the last winter, there has been in our State, the greatest amount of thieving of timber ever known, which probably has been due to the fact that there has been an appreciation of the value of lumber, and that the temptation has been too strong to be resisted. In some portions of Michigan the trespassers have been great lumber corporations, and their cuttings have been of timber that is very young, not by any means mature, and the slaughter has been without precedent in the annals of the State.

"For a good many years, we have had annually a terrible visitation of forest fires that has devastated immense quantities of timber lands, rendering valueless quantities of the best timber, destroying every vestige of life that would perpetuate the forest, and even destroying the very vitality of the soil. These fires have very largely originated with careless hunters or wilful carelessness on the part of men and boys who desired to make a commotion. The annual loss from fire can scarcely be computed.

"From reliable data I learn that many of these forest fires originate with people who use the north plains for pasturage purposes. Not being content to steal pasturage, they devastate the country by firing it over, under the theory that the grazing will be better the following season. The increased value of timber has led to increased valuation of lands, and as a result, many tracts have been sold, the owners feeling that they were driven to it by excessive taxation, and tempted to it by the greatly increased value of the product.

"In our own vicinity here at Grand Rapids we have examples of this. The owners have given no thought to leaving behind them a valuable heritage in the new growth of timber that will naturally spring up when the mature trees are taken away, but have entered into contracts which have resulted in stripping lands of every last bit of forest value. The most flagrant case of this kind that has come to my attention is what is known as Slocum's Tract, lying east of Muskegon and northeast of Ravenna, in Muskegon County. This is an area of above 4,000 acres, covered with the most valuable timber that grows in the State of Michigan, aside from White Pine. There is a large value in the mature, but a far greater prospective value in the growing timber that will not mature for a generation. The soil is excellent and the young timber is growing very rapidly. A reasonable and economic method of lumbering would so deal with this tract as to make it continuously valuable. But it has been sold, to be cleared and left perfectly bare in six years. This is an irreparable loss to the entire country contiguous to it."



Comment of a Lumber Review. "Commercial forestry as a science and as an economic problem has been advanced in leaps and bounds and with a greater degree of consistency during the past half decade than during the earlier nine and one-half decades of the century, and it is a problem in which every lumberman is—or should be—deeply interested. * * *

"The point which lumbermen should grasp and retain is the demonstrable fact that by treating the tree as a crop—planting under proper conditions and harvesting when ripe and mature—a permanent and adequate return from the investment may be secured and the integrity of the forest preserved to be handed down to future generations."—*The Lumberman's Review* (N. Y.), August.



Growing Timber for Special Purposes. "The constant demand for timber for purposes which do not require trees grown to full maturity suggested sometime

ago that experiments might profitably be made in supplying such wants by means of tree planting, an expedient that if shown to be practicable, would relieve our forests of some important demands. A few railroads have already made some efforts to grow timber for ties, though with but indifferent success, but beyond this nothing noteworthy has been attempted, altogether nothing practical accomplished. One railroad now has some experiments of the kind in progress, and with the more skillful handling they are likely to receive, it would not be surprising if something should come of them. The failure of two or three companies to raise *Catalpa* ties does not prove anything, as it is quite likely the experiments were not conducted in a way and under conditions to produce conclusive results.

“The results of tree cultivation under favorable conditions, which were embodied in a recent article in these columns, goes to show that wood available for such purposes as railroad ties, fence posts and pulpwood, and no doubt for many other purposes requiring only comparatively small sizes of timber, can be produced within a time that will make them readily available for helping out the present supply. The case referred to seemed to show that railroad ties could be grown from the seed under favorable conditions in from sixteen to twenty years, during which time the land used would yield enough to pay a good share of the cost in cuttings required to keep the plantation in proper shape. If anything like the yield secured in the particular case mentioned could be counted upon railroad ties could be produced by cultivation as cheaply as they can now be made from trees already grown. The tie requirement is so large and so little real progress appears to be making in replacing the wooden tie with one of metal, that the question of a supply of such timber as they require is likely to become a very important one in the near future.

“It is equally necessary that some source should be found for a supply of wood pulp material, which now calls for the clearing of about as much good forest

land as the lumber business. Where can it be found, if not in the cultivation of woods for this special purpose? The wood-pulp industry is bound to grow, and it is most undesirable that anything should be done to restrict it; but if no provision is made for a supply of raw material, it will use up, and is now using up, a large proportion of our lumber supply. But as the pulp mills need wood fiber rather than lumber, there ought to be a good chance for them to get it without grinding up saw logs. Proper experiments would doubtless show that there is some variety of wood, susceptible of easy cultivation, and of rapid growth, that in a few years would yield such a quantity of pulp wood as should make its cultivation for this particular purpose a practical and profitable operation. There seems to be no reason why this should not furnish a solution of the pulp supply problem, whenever that question gets to a point where a solution of it must be found.

“One can readily see that the beginning of tree cultivation must be with those woods that are easily grown, and that will supply wants that may be met with such varieties. The cultivation of those of slower growth, but of larger use and wider value will follow. The largest consumers take the less valuable kinds, as a rule, and some of these could use sorts inferior in many respects to those they commonly employ, if such were to be had at lower cost. Take the box-makers for example. They use the poorest lumber they can find now, yet their requirements are mainly met with lumber that comes from large trees—in many cases, in fact, with lumber that might be used for purposes for which such narrow, low grade stuff as will do for boxes would not answer. The box people do not need wide lumber, nor long lumber; they can get along with almost anything that will hold together, and could as well use the product of a plantation which could not supply anything above six inches wide as the lumber from a forest of giants. Other purposes will suggest themselves, for which narrow stock, of comparatively few years' growth would answer as well as lumber wide enough for

any work."—*St. Louis Lumberman*, August.



Towns Without a Tree.

"How many readers of *Forest Leaves* can picture the following situation, or believe that the statement is true: 'There are towns in our State *to-day* without a tree, or shrub, or even a bit of lawn. Our children are missing that element of refinement which comes from beautiful surroundings outside the home. Girls and boys are nearing maturity in some localities in the State to which any tree would be of interest, and to whom a glimpse of a fruit tree in blossom would be a glimpse into Paradise.'

"It apparently is true, nevertheless, and appears in a late bulletin of the Wyoming Agricultural Experiment Station.

"Wyoming is not an arid region, as the above implies, but contains an increasing population and three national forest reserves! Two points are emphasized by the quotation: first, that settlers, the older

ones at any rate, rarely considered the importance of trees as shelter to their houses, their stock and their crops, and the source of lumber and fuel; second, that the forestry movement is spreading widely, and dwellers in such regions realize that a better state of affairs is possible for them.

"What we call the forestry problem has many phases, one or more applicable to every locality, but all closely related. If we, in Pennsylvania, need to preserve and reestablish the forests on our hill-sides to save the streams, to prevent the washing away of valuable soil, and to afford healthful retreats for a large population, to say nothing of making permanent the great lumbering industry, our working for these things encourages our neighbors to look after their needs, to see possibilities that had not occurred to them before.

"And so by mutual help and inspiration the good work goes on, and brings nearer the day wherein the whole country will see the true value of trees and forests."—A. G. in *Forest Leaves* for August.

REVIEW OF AMERICAN AND FOREIGN PERIODICAL LITERATURE.

Among the articles worthy of mention in recent foreign forestry periodical literature the series entitled *Naturwissenschaftliche und forstliche Studien im Nordwestlichen Russland*, by Prof. Dr. Heinrich Mayr, of the University of Munich, deserves first place. They appeared in Nos. III., IV. and V. (1900) of the *Allgemeine Forst und Jagdzeitung* but have since been reprinted together in pamphlet form. This pamphlet is so full of interesting suggestions that a fair review of it would almost equal a literal translation. Its distinguished author was formerly a professor in the University of Tokio, Japan. He visited this country some years ago, and has written a book entitled "The Forests of America." He is a man who fearlessly tears down old theories, propagates new ones, and does an excellent work for Germany, especially Bavaria, in importing and experimenting with exotics from all parts of the world.

Russia, says Dr. Mayr, of all countries in Europe, is least visited, because of its immense distances and scant railroad facilities. Russians cannot conceive of traveling for pleasure nor of

finding anything of interest to foresters in the vast monotonous plain between the White, Baltic, Black and Caspian Seas.

Prof. Mayr was especially interested in the seed supply question. It has long been the custom to buy Spruce seed in northern climates in order to secure hardy plants. This is wrong, says Prof. Mayr, for two reasons: first, we are ignorant of the condition of the young plants in northern climates, and second we are ignorant of the conditions and habitat of our own Spruce stands in Alpine regions. In such regions the young plants are protected by heavy snow. Their seed yield trees which require similar protection in youth. Such plants are really not frost-hardy. If frost-hardiness is an inherited trait, other traits must also be inheritable. Among these undesirable traits, slow-development and slow-increase, also stunted form, must be transmissible. The inheritance of such tendencies would outweigh the advantages of frost-hardiness.

The Spruce sheds its seeds during several weeks and thus produces plants which are both

frost-hardy and frost-tender in the same climate according as the frost is early or late. Nature's method of protection is not the cultivation of frost-hardiness but the provision of conditions under which sensitive plants can thrive, for instance by covering bare places with pioneer frost-hardy species such as Birch and Poplar. The best seed to use is that collected in your own neighborhood. Do not, says Prof. Mayr, expect any advantages from the usually much more expensive seed of northern regions, and do not fear the results from the use of the cheaper seed from warmer places.

Prof. Mayr is loud in his praises of the famous Pines of Riga with their straight boles and excellent wood. These plantations have been well established for years, giving rise to the variety "*rigensis*" of *Pinus sylvestris*. However, the author says, it is only shipped from Riga and that the wood really grows in the Southeast, where the Scotch Pine reaches its optimum. For years Riga Pine seed has been used in Germany with the hope of securing similar qualities. Dr. Mayr has long maintained that such qualities are not transmissible.

Prof. Mayr took a long zigzag trip with Max v. Severs, President of the Baltic Forestry Society, to investigate this Pine. He found wonderful stands of Scotch Pine superior to any in Germany. This superiority, he says, is due to the virgin soil—to the rich deposit of humus. Another cause is the atmospheric dampness. Dampness favors natural regeneration, which is impossible in southwestern Germany. This is easier in east Prussia, and so plentiful in Livonia and Finland that the tree is considered aggressive toward other species. Natural regeneration tends toward the formation of fine straight boles in that disease and accident are less frequent. He reaches the same conclusion in reference to Scotch Pine seed that he did of Spruce.

Professor Mayr next considers the Larch. Today, he says, we know the qualities of this tree against which our forefathers sinned—they are its demands as to rich soil, its non-shade-enduring quality, and its need of side room for crown and branches. All over Europe there are Larch plantations that are little more than tree hospitals in which insects and fungi propagate. No one now thinks of planting the European Larch. The Siberian Larch takes its place—the true Siberian Larch (*Larix Siberica*). Dr. Mayr considers that this is a distinct species and not a mere variety. A very remarkable stand of this Larch exists between the Gulf of Finland and Lake Ladoga. It is in a damp peninsula only a few feet above sea level. It ranks with the Maritime Pine of southwestern France and with the Silver Fir of Prinz Inn u. Knyphausen of East Friesland as one of the oldest and most noteworthy forest stretches of Europe. In the growing of the Siberian Larch, he says, don't plant it in sunny warm nurseries. Here it will freeze because it will bud too soon!

Dr. Mayr then considers the treatment of

moorland, and then forest protection. In Russia proper the condition is similar to that of North America—with large burnt areas and carelessness about fire. In the Baltic Provinces it is quite otherwise. The method of combating fire is not by fire lanes, but by a system of overseers or guards called "buschwächter," and of fire signalling. These bushwatchers have forest-farms here and there which are connected by telephone. The telephone has reached startling development, and in the treatment of fire its use results in an enormous saving of time and paper—by paper being meant the flood of reports and questions. Fire-alarm boxes are placed along the highways.

As to forest utilization and export, Dr. Mayr claims that Russia with her many waterways, with a few new canals, can supply immense quantities of wood to the rest of Europe for some time to come.

There is one forestry school in Finland at Evö—fifty kilometers from the nearest railroad—where the students and instructors lead a lonely life. The plan to have two years of the course at the University of Helsingfors and two years of practice at Evö, is however, being considered.

Russia herself has only one forestry institute (Lesnoj Institute) near St. Petersburg. It has 400 students. The government is planning another for Southern Russia. Dr. Mayr returned to Germany very favorably impressed and surprised, especially with the fact that the State alone owns, exclusive of the Caucasus, land more or less wooded which is more than twice the size of the German Empire!

In the latest "*Bulletin Trimestriel de la Société Forestière Française des Amis des Arbres*" there is contained an interesting note in reference to a new Poplar which has been recently discovered in southern Algeria. It is *Populus Euphratica* and was first found by G. A. Olivier in Persia. It is remarkable in that it has two sorts of leaves entirely different in form. It is being tested in the extreme south of Algeria as its ability to endure heat and its dense shade render it extremely useful. The results thus far are satisfactory. Why not try it on our western plains?

According to this interesting little journal truffle-culture should be encouraged wherever the truffle Oak will grow. One hectare of land produces annually 3,000 francs. These Oaks should be planted on otherwise useless ground, preferably limestone regions, 1,500 trees to the hectare.

A company has been organized in the Po Delta to manufacture willow tresses for hats. These are thin strips of the rods of *Salix alba*. These hats are as glossy as silk and were very fashionable in Paris in 1830.

A new book entitled "*Le Paturage en Forêt*," by Alphonse Mathey (172 p., 19 tables) is highly recommended by the Swiss *Journal of Forestry*.

Another interesting publication entitled "Statistical Reports of Growth and Development of Conifers at Schovenhorst, Putten," by Dr. J. H. Schober, has just appeared (published by Julius Springer, 1900, 48 p., 2 marks). Dr. Schober is the famous Hollander who, in order to show the possibilities of the barren heath or Geest-lands of Holland, established an enormous pinetum at Schovenhorst where conifers from almost every corner of the world may be seen.

Three members of the Forestry Congress at Paris spoke in favor of introducing a popular festival similar to Arbor Day of the United States to foster interest in forest preservation. It is interesting to note that they were M. DeJonele, of Paris; M. Ruig y Nalls, of Madrid, and M. Samios, of Athens.

A resolution was presented and adopted that the International Forestry Congress, which met in Paris, should be reconvened every two years conjointly with the Agricultural Congress.

D. E. Hutchins, Conservator of Forests at Cape Town, sends an interesting communication to the forest officers in India through the *Indian Forester*. In this letter he says: "There must, I suppose, be between 300 and 400 white forest officials in the Indian Forest Department, all able to ride and most able to shoot well. Some would be very welcome here now. In France and Germany the forest officials are, I believe, mobilized separately. It is a distinct gain that they should be, both for their esprit de corps and their special qualities as scouts. To young Anglo-Indians, service in South Africa just now must offer many inducements. Patriotism is a very practical virtue amongst Englishmen to-day; there is the excitement of service; the certainty of doing some good at least once in one's lifetime." There is an interesting footnote by the editor, however, which says that none were allowed to go because all were needed at home.

American foresters should read the *Indian Forester* carefully. It has the advantage of being in the English language and containing a great deal of general information in addition to many hints in reference to tropical growths which may be of service to us some day in Porto Rico and the Philippines.

The *Indian Forester* for April contains a translation of a series of letters in the *Revue des Cultures Coloniales* on "New Processes for Extracting Rubber." By these methods, which are both mechanical and chemical, rubber may be extracted from the smallest fragments of wood, bark and twigs which contain it. It is easy to see how, in case these methods are successful, tapping may be abolished, and that the whole tree may be utilized. This may also lead to the growing of rubber trees as one would field crops, reaping them while young and extracting from the twigs every particle of rubber which they contain.

In the *Indian Forester* for June there is an ar-

ticle on the "Camphor Industry for India," copied from the *Madras Mail*. According to this article the Camphor-Tree of Sumatra and Borneo is not the Camphor-Tree of China, Japan and Formosa. The Sumatra tree belongs to the Dipteraceæ. It has been named *Dryobalanops aromatica*, and *Shorea camphorifera* by another. The Japanese tree is *Laurus camphora* of the order Lauraceæ. He seems to think that there would be little difficulty in growing it in India and other regions of the tropics. It is no doubt abundant in the Philippines. He states that in Formosa the tree is recklessly cut down by the natives for the camphor and for boat timber. "Since the island came into the possession of the Japanese, the industry, instead of undergoing improvement, has only been further threatened by its conversion into a state monopoly so indifferently protected that any amount of illicit felling and manufacture goes on unchecked." Although, it is said, large quantities still exist, the industry has paid well in Japan, Formosa, Sumatra and Borneo.

The government of India on the recommendation of Mr. Ribbentrop, Inspector-General of Forests, has sanctioned the establishment of a plantation of Brazilian rubber trees in British Burmah. The plantation will cover 10,000 acres.

To the *Indian Forester* for June there is an appendix of fifty pages on the Sandal-tree by P. M. Lushington. The sweet-scented Sandalwood seems to be a very fastidious sort of tree. It won't stand transplanting, and, although it requires nurse-trees, it prefers to grow in the scrub in hedges and bushes rather than in the forest. It has peculiar tubercles on its roots, and many believe that it is more or less parasitic on the roots of other trees. The value of the wood is apparently rated by its scent.

In the *Allgemeine Forst- und Jagd-zeitung* appears an interesting note on the name of the White Pine. In Germany, in fact throughout the whole of Europe, the White Pine is called the "Weymouth's Kiefer," or Weymouth's Pine. This is due to the fact that Lord Weymouth introduced it into England. The peasants in certain sections, especially the wood-choppers, have twisted the word "Weymouth" into "Weidmann," which means "huntsman." In the course of time this tree may be known among the common people as the "Huntsman's Pine." In other sections it is called "Seidenföhre" or "Sidenföhre," which means Silk-tree, because of the striking silky brilliancy of its leaves.

In the next issue of THE FORESTER I shall give a list of all the important foreign forestry periodicals and endeavor in the future to review systematically any articles which may be of interest to the readers of THE FORESTER. Since every good forestry journal should be a mirror of what is happening in the line of forestry in the country which it represents, there is no bet-

ter and easier way of keeping even with the movement throughout the world than by reading the current literature on the subject. Although much that is contained in these foreign

journals is not applicable to this country it is all more or less instructive material which every well-informed forester should know even if he does not believe or use it.
J. G.

RECENT PUBLICATIONS.

Fifth Annual Report of the Chief Fire Warden of Minnesota for the year 1899. C. C. Andrews. Pp. 143. Illustrations 36. Maps 2.

This report falls easily into two parts. In the first the operation of the State fire law is dealt with. This law has limitations, and the existing popular indifference about fires is a great drag on it. But it has none the less produced excellent results. To a certain degree the public has been taught to exercise more care about fires, many have doubtless been prevented, and where burning has begun it has been checked more promptly than of old. The second part of the report is devoted to driving home in several ways the truth that to keep otherwise useless land under forest is the soundest of sound sense. A description of the practice of forestry in different parts of Europe occupies 82 pages. A brief report on the "Problem of Forestry in Minnesota," by Dr. C. A. Schenck, is compact and to the point. The pages which General Andrews devotes to advocating the establishment of the Minnesota Park will be interesting to all who are in sympathy with that project. The illustrations in the volume deserve much praise. They are unusually interesting and instructive.

One does not open one of these annual reports in the expectation of finding anything new or unexpected; but Minnesota is one of the most interesting States in the Union for the forester, and every record of progress toward a proper care of its forests, and every fresh account of its conditions and needs, is to be welcomed not only because it is interesting, but because of the good it will do in educating the public. To this General Andrews' present volume makes no exception. The only part of it that is disappointing is the end. The casual reader who has been shown the evil state of things naturally asks, What is to be done? Can I help? But the conclusion tells him nothing more definite than that a "thorough-going forestry system" is needed. Unless he knows what the questions at issue are, or has read the recommendations which are sprinkled through the body of the report, this will leave no very clear-cut idea in his mind. Considering that the aim of so many reports on forestry is still to build up the right sort of public opinion, and that they reach the general public not directly, but through such unsatisfactory channels as press reviews and quotations, their recommendations should be massed in such a way that even the most careless reader could not fail to take them in.

Report on the Big Trees of California. Prepared under the Division of Forestry of the Department of Agriculture. Government Printing Office.

This report, which was presented in the Senate, on May 23d, by Mr. Perkins, was occasioned by the demand for information about the Big Trees incident to the proposal to make a national park of the Calaveras Grove. It is a compilation of all pertinent information about the Big Trees—their number, situation, botanical characteristics, history, ownership, etc. The report contains 30 pages, 19 illustrations, and two large maps. It is compiled with great care and its contents are thoroughly and clearly arranged and indexed.

Although there is no attempt to plead for the preservation of the Calaveras or any other grove, the statement of the facts, especially about lumbering among the Big-trees and the wantonness with which certain of them have been killed and cut down, point clearly enough of themselves to the desirability of a reservation.

Practical Tree Planting in Operation. By Geo. W. Tinchler in the *Kansas Farmer* (Topcka), August 20th.

This is primarily a review of Professor J. W. Toumey's Bulletin (No. 27 of the Division of Forestry) which appeared under the same title. Mr. Tinchler thinks that to plant trees 4 x 4 feet apart and in mixed plantations, as recommended by Professor Toumey, is undesirable, and goes on to give detailed criticisms of some of Professor Toumey's planting plans with suggestions for alterations.

Some Desirable Forestry Experiments. By Professor S. B. Green, *Minnesota Horticulturalist*, September.

Under this title Professor Green writes a short paper advocating the introduction of the Douglas Fir, the Red Spruce of Maine, and the Norway Spruce into cultivation in Minnesota. It seems to him important "that a few varieties of trees be planted here on a considerable scale to determine their value for economic purposes, for which they seem especially promising."

Report on Forestry in Sweden. By General C. Andrews, U. S. Minister at Stockholm, 1869-77. Revised Edition. Government Printing Office. Pp. 35, illustrations, 2.

A revised edition of the report published in 1872, containing also a brief sketch of the present situation of Swedish forestry, to prepare which General Andrews engaged Mr. K. G. G. Norrling (extra jägmästare).

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The Forester

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No. 11

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To Members of the Association . . .

THE AMERICAN FORESTRY ASSOCIATION will hold a meeting in Washington, on the morning of Wednesday, December 12. The meeting will be primarily a business meeting. The Board of Directors will make its annual report and officers will be elected for the ensuing year. Members who are in the neighborhood of Washington are urged to be present. The place of meeting will be announced later.

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Courtesy of Chief Fire-Warden of Minnesota.

THE FORESTER.

VOL. VI.

NOVEMBER, 1900.

NO. 11.

FOREST PROBLEMS IN MICHIGAN.*

BY CHARLES W. GARFIELD.

President of the Michigan Forestry Commission.

It may be a matter of some interest to the members of our association to know what we are doing in Michigan looking toward the solution of our forestry problem. The first movement was made by the State Horticultural Society when I was secretary twenty or more years ago. We had a forestry program arranged for one of our annual meetings, and there was brought out, through some able papers, the best judgment of some of our most progressive and public-spirited citizens upon the necessity of prompt measures to increase the interest in forest preservation with reference particularly to the preservation of conditions that would promote the horticulture of our State.

For a number of years following this meeting, some phase of forestry was discussed annually in connection with the meetings of the State Horticultural Society. The agitation resulted finally in a bill, largely the work of Dr. W. J. Beal of the Agricultural College, which was presented by one of the vice-presidents of the society after he became a member of the legislature. This bill was modified somewhat and became a law. It provided for the organization of an independent Forestry Commission, and named such Commission, the names being those of the Michigan Board of Agriculture. A small appropriation was made for expenses, and the Board of Agriculture selected Dr. Beal and myself as directors. We did what we

could to awaken an interest throughout the State, held a convention which was a great success, and issued a bulletin; and this was practically the end of the first skirmish, for the Legislature refused to appropriate any further money, and discontinued the Commission. A little more than two years ago, a few of us who were still interested in the work, somewhat hopefully took the preliminary steps for the organization of a body to consist of representatives of the Board of Regents of the Michigan University and the Board of Agriculture of the Agriculture College, as a voluntary commission to open again the question of legislation, hoping to revive the Forestry Commission. We held a number of very interesting meetings. Professor V. M. Spalding of the University was made chairman of this gathering, and I. H. Butterfield of the Agricultural College was made secretary. The final result of the deliberations of this voluntary commission was the formulation of a bill which was presented to our last Legislature, somewhat modified by that body, and finally passed.

The following is the text of the law.

AN ACT, To provide a permanent Forestry Commission for the State of Michigan, to define its powers and duties and to provide for expenses.

The People of the State of Michigan enact:

Section 1. A commission to consist of three members is hereby constituted, one the Commissioner of the State Land Office, and two to be chosen by the Governor by and with the advice and consent of the Senate; one of whom shall hold his office for the term of two years and one

* Read at the meeting of the American Forestry Association in New York, June 26th

for four years. The appointment shall date from July first, eighteen hundred ninety-nine. The term of the Commissioner of the State Land Office as a member of this commission shall be coextensive with his term as Commissioner of the State Land Office. At the expiration of the terms of the appointive members their successors shall be appointed, each for a term of four years. Such commission shall elect one of its members president, another member secretary. It shall maintain its office and records in the Capitol at Lansing in the State Land Office, and shall serve without compensation, but shall be entitled to traveling and other expenses while on business relating to the work of the commission. Also all necessary cost of postage, stationery and printing and other incidental expenses: Provided, That the secretary may be paid such amount as the commission may determine, not to exceed three hundred dollars per annum: And Provided Further, That all accounts shall be audited by the State Board of Auditors.

Sec. 2. It shall be the duty of such Forestry Commission to institute inquiry into the extent, kind, value and condition of the timber lands of the State; the amount of acres and value of timber that is cut and removed each year, and the purposes for which it was used; the extent to which the timber lands are being destroyed by fires, used by wasteful cutting for consumption, lumbering, or for the purpose of clearing the land for tillage. It shall also inquire as to the effect of the diminution of timber and wooded surface of this State in lessening the rainfall and producing droughts, and the effects upon the ponds, rivers, lakes and the water power and harbors of the State and affecting the climate and disturbing and deteriorating natural conditions. It shall also examine into the production, quantity and quality of second growth timber and note and report upon all facts, improvements and changes in reference thereto, also as to the condition, protection and improvement of denuded, stump, swamp and overflowed lands, and what means it may deem expedient in carrying into full effect the intent and purpose of this act. The commission shall recommend to the Legislature, in the year nineteen hundred one, within ten days from its opening, their findings, in the form of a bill or bills to carry out the objects for which this commission is appointed.

Sec. 3. It shall be the duty of the Commissioner of the State Land Office to furnish the commission any and all data concerning lands of all classes in which the State is directly or indirectly interested, that may be valuable in formulating a method of managing State lands suitable for the growing of forests. He shall also as far as possible aid the commission in its investigations and render all the assistance in his power in preparing a report which shall embody a definite forestry policy for the State of Michigan.

Sec. 4. Upon the recommendation of the said Michigan Forestry Commission the Commis-

sioner of the State Land Office shall withdraw from sale two hundred thousand acres of lands known as State Tax Homestead lands and Swamp lands belonging to the State, and withhold the same until after the adjournment of the Legislature after such reservation. The commission shall be authorized to receive by deed to the State, from the owners, any tracts of land which in its judgment may be suitable as forest reserves, to be kept by the State: Provided, however, That this act shall not be construed so as to effect in any manner the rights or interests of any person to or in any lands which such person may have acquired previously to the day on which this act shall go into effect.

Sec. 5. Said commission shall make an annual report to the Governor, on or before the first day of December in each year, of such facts and statistics as it may deem of public interest, and recommend such legislation as may be necessary for the preservation and restoration of the timber and forestry of the State, or any portion thereof, and cause such number of reports, not exceeding two thousand copies, to be printed each year for public use and distribution, which report shall be printed by the Board of State Auditors. The expense of the commission, as provided in section one of this act, shall be paid on vouchers certified by the president of the commission to the Auditor General and paid by the State Treasurer, out of the general fund, upon the warrant of the Auditor General: Provided, That not more than two thousand dollars shall be expended by the State in any one year under the provisions of this act.

Under a provision of this law the Governor of the State appointed as members of the Commission, Mr. Arthur Hill of Saginaw, and Charles W. Garfield of Grand Rapids, the third member being the Commissioner of the Land Office, Mr. William A. French, who became a member of the Commission by virtue of his office. The Commission organized by the election of Mr. Garfield as president and Mr. French as secretary. Mr. Hill has been absent from the State a greater portion of the time since the organization of the Commission, and I have been reaching, as far as my time would permit, for data upon which to base recommendations for future legislation. I have kept a running fire in the newspapers of the State, and our friends of the press with hearty unanimity, grasp any facts that are brought out by the Commission and are glad to give them to the people. By this means we are awakening a good deal of interest in the work of the Commission.

I have communicated with the women's clubs of Michigan, and they are taking up the matter in earnest. From lumbermen and land owners and woodsmen I have been gathering testimony with regard to the most desirable line of action, and I have come to the conclusion that we are more in need of expert counsel upon the legal side of the forestry problem than we are of expert assistance in the business of forestry. Beyond any question we must straighten out some of our legal difficulties before the State can properly take hold of the business of growing forests with any safety. The State now owns ostensibly more than three million acres of land that have come into its possession as the result of delinquent taxes. There is another million on its way, but the titles to these lands procured by the State in this way are very imperfect, and it cannot afford to take the chance of growing forests upon them until the titles cannot be successfully attacked.

There has not, in the history of the State, been such flagrant thieving upon State lands as during the last year. Timber has been stolen by the millions of feet, not by poor men who take an occasional tree, but by corporations which have cleared up large areas, and, under our trespass laws, have afterward settled with the State, this being a cheaper way to get timber than by buying the land; so that the Commission has become satisfied that our trespass laws must be modified and perfected and enforced in a different way before there will be any safety in growing new timber. If the state is unable to take care of its own now, we can never expect to awaken a sufficient interest in forestry to secure legislation that will provide for growing more forests to be the prey of trespassers.

Then we have no method of controlling forest fires. While there have been more acres devastated by thieving than by fires during the last generation, the destruction by the fire element has been enormous, and we have no system which gives us any protection either upon State lands or upon those held by individuals; so that we shall have to frame legislation with reference to protection from fire before we go into the forestry business in earnest.

Then there is the problem of taxes. I found in my preliminary investigation of the conditions in Michigan that I was at once in the midst of the great problem of taxation, as affecting timber lands. The men who own large tracts of growing timber are actually driven to cutting off the timber and getting their money out of it because of the excessive local taxation—made especially heavy on the lands of non-resident owners. The theory of the assessors is not without reason, for they claim that with the demand for timber, these lands will actually sell for more money than adjacent farm lands. On the other hand, there is a stronger argument in favor of arranging taxation so as to induce the owners of tracts of forest to maintain them as forests in the interests of the very lands which are contiguous and given up to agriculture and horticulture. In some cases on lands upon which timber has matured and been cut off by lumbermen, assessments have been maintained at the same figure as before the timber was removed, and this has resulted in the land's going back to the State for taxes. The owners maintain that when they are so exorbitant they cannot afford to keep the lands for growing timber again, even with the best of promise in the young growth. On the other hand, the assessors say these owners have reaped a great harvest, and unless the assessments are maintained upon their lands, the burden of continuing the expenses of the government will be thrown upon agricultural lands which barely afford the owners a living. But no matter what the theory of either party may be, the fact stares us in the face that under existing laws the State is acquiring tremendous areas of land, immature timber is being slaughtered, and nothing has as yet been accomplished to stay the hand of the destroyer.

The attention of the Commission has been called to a remarkable lack of foresight shown by the owner of a large tract of timber land near Grand Rapids. This tract contains something over four thousand acres, and what to-day is probably the finest block of hardwood timber in the State of Michigan. The timber has been

sold under a contract which provides that everything shall be cleared from the land within the next six years. The tract is remarkable for its fine growth of young wood, and the soil is a rich clay loam, so that this has great promise in it. There is no doubt but if the timber should be taken off gradually and with care, the tract would pay ten per cent. interest on a large valuation, still growing more valuable as an investment for a long period of time. The adjacent residents are very much agitated over this method of disposing of this tract, but of course are helpless in the matter. The influence of the woods upon the agriculture and horticulture of the vicinity can scarcely be estimated, especially as fruit growing is a leading industry in this region. I presume their owner, who lives somewhere out in New York, has never heard of the offer of the Department of Agriculture to assist in the management of tracts of timber upon modern forestry methods that shall insure a continuous and valuable investment. The chances are that when this tract of land shall be turned into money, it will be dissipated or invested so as to add very little to the general value in the vicinity where it is invested. One thing is certain, that Michigan will be a great loser; the owner of the land will not be a gainer, and as a piece of mismanagement the case is an object lesson that should have influence to awaken among people a higher sense of obligation with reference to timber holdings. It is not a great satisfaction to the State of Michigan to have some wealthy lumberman who has become enriched through our forest heritage, invest his means in some benevolent enterprise in a distant city or State. A man's conscience may be eased somewhat, but such an act does not meet our view of the obligation. No man who has attained great wealth from Michigan's timber has yet seen fit to endow a

piece of forest land. This would seem to be the most logical method of showing an appreciation of the conditions which have assisted to the accumulation of wealth.

Our Forestry Commission will try to obtain some statistical information that, at any rate, will be valuable in connection with the rapid removal of the trees from this fine tract. Our plans are not matured but we shall try, either through the Michigan University or the State Experiment Station, to arrange for a continuous line of observation with reference to temperature, air moisture, winds, crops, streams and springs, that shall extend for at least six years beyond the time when the timber shall have been entirely removed. In this way we shall hope to have some accurate information that will be of value in the prosecution of our work and in the awakening of public opinion to the important effects of timber areas on the industries of the region in which they are situated.

In gathering information the Commission finds it difficult to get an unprejudiced opinion or observation from woodsmen, because they have always been on the wrong side of the question from our standpoint; and, on the other hand, if we import somebody to make the observations for us, be he ever so expert, he is handicapped by his lack of knowledge of the country and its conditions, and progress in securing information by this means must necessarily be very slow. We are trying to work both ways, and hope, in whatever progress we make, to take advantage of the experience in other States and other countries, and shall be glad to utilize the valuable assistance of the Department of Agriculture and of the American Forestry Association, and of the counsel of public-spirited citizens who have special knowledge that can be useful in the solution of our problem.

THE LEGISLATIVE OUTLOOK FOR FORESTRY IN WISCONSIN.*

BY ERNEST BRUNKEN.

Although the problem of legislation for the establishment of an adequate forestry policy differs in detail in the various States of the Union, yet the essential conditions are so nearly alike in all parts of the country, that an outline of the present state of affairs in Wisconsin will not be without interest to citizens of other commonwealths. It is with this confidence that I have accepted the invitation to present to the Association a bird's-eye view of the outlook for forestry legislation in my home State.

It is a little humiliating to confess, at the very outset, that a State like Wisconsin, which is second to none in regard to the economic importance of its forest interests, is far behind several other States equally situated, as far as their legislative recognition is concerned. Although it was one of the earliest to appoint a commission with purely advisory powers, no definite step to protect its forests was ever taken beyond the enactment of a wholly insufficient fire warden law. The first commission of inquiry submitted a report to the Legislature as early as 1867. It consisted of a somewhat amateurish discussion of the climatic and physical effects of forest destruction, some well-meant advice on the subject of planting shade trees, and a description of the principal native forest trees. It made no propositions for legislative action. For nearly thirty years thereafter, no laws relating to forest matters were passed, except those designed to further the ordinary destructive lumbering. But in 1895 a law was adopted making town supervisors and road superintendents fire wardens *ex-officio*. The towns were restricted, however, from expending more than \$100.00 a year in fighting forest fires. Even in this first attempt at legislation, the important principle was recognized

that there must be a central authority to supervise the execution of this law. But the means taken for this purpose were utterly inadequate. The chief clerk of the Land Office was made the State Forest Warden, and all local fire wardens were to report to him on fires in their districts. As a matter of fact, few ever did report, and not many more of these *ex-officio* fire wardens ever paid the slightest attention to forest fires, unless these burned up their own premises, and not always then.

The Legislature of 1897 took a few very small steps in advance. It provided for the appointment of special fire wardens, instead of conferring the duties of that office on officers elected for entirely different purposes; and it authorized the chief clerk to spend a small amount for the posting up of warning signs. Still, the chief clerk, being kept very busy with other duties, was unable to exercise even a faint supervision, and a majority of the fire wardens paid no more attention to preventing or extinguishing fires than the *ex-officio* wardens had done before them. This state of a desuetude by no means innocuous still prevails with regard to the forest fire law of Wisconsin.

At the same session of the Legislature, a law directing the appointment of another commission of inquiry was adopted. The new commission obtained the advice and coöperation of the United States Forestry Division. One of the results of this coöperation was the excellent account of the forest condition of the northern half of the State, by Prof. Filibert Roth, with which most members of this Association are no doubt familiar. To the Legislature of 1899 this commission submitted a bill which, if adopted, would have put Wisconsin in advance of every other State in regard to the treatment of its forest resources. A determined effort was made to push the bill through the two Houses, but it failed

* Read at the meeting of the American Forestry Association in New York on June 26.

on the last day of the session for reasons quite unconnected with its merits.

The vicissitudes which this measure underwent before the Legislature may be interesting as an illustration of the complications which in the nature of things must arise when an attempt to enact a law of this nature is made. Friends of forestry reform, unacquainted with the methods of legislative business, are apt to imagine that when a good bill has been introduced and the reasons for its enactment have been effectively laid before the committee to which it is referred the work is done. As a matter of fact, this is but the beginning, and that this is so does by no means reflect discredit either on the understanding or the integrity of members of the Legislature. To understand the history of the forestry bill of 1899, a few words on certain conditions prevailing in Wisconsin must first be submitted.

Wisconsin still possesses some 400,000 acres of land which was granted to the State by the general Government under various laws. In addition there are within the limits of the State, outside of Indian reservations, about an equal number of acres of government land. The State lands are but a small remnant of what the State once owned. It has been the policy up to this date, to dispose of these lands as rapidly as purchasers could be found, and at prices considerably below their real value. For a number of years, the transactions of the land department were of considerable magnitude and required a considerable number of clerks and other employees. For some time however, these transactions had shown a steady decrease, and the feeling was wide-spread that an employment in the land office was a sinecure, given by leading politicians as reward for political services. When the Legislature of 1899 met, it was universally expected that an attempt would be made to practically abolish the land department, and naturally the beneficiaries of the old system were ready to fight for self-protection.

The forestry bill was proposed to still further reduce the work to be done in the Land Office, by suspending the sale of State lands, pending an investigation as to what

parts of it were to be included in a permanent State forest reserve. It was anticipated, therefore, that on the whole those legislators, who were disposed to cut down the establishment of the land office, would look favorably on the forestry bill, while the friends of the Land Office employees could not be reckoned on.

The promoters of the bill succeeded in having the measure referred not to one of the regular standing committees, but to a special joint committee of both Houses, composed of its known friends. The chairman of this committee was a prominent lumberman, one of the most influential men in the Senate, and an energetic and well-informed friend of forestry. Although, in the light of after-events, this reference to a special committee proved a tactical mistake the reasons for doing so were undoubtedly valid ones. It was unknown what the attitude of the members on this question would be, and to let it go to a standing committee would have meant incurring the risk of having it pigeon-holed by a hostile committee, even though a majority of the members of the Legislature might be in its favor.

Under the rules every measure carrying an appropriation must, after it has been favorably reported by the committee in charge, go to the joint committee on claims. It being the business of this committee to keep a check on expenditure, many a meritorious measure suffers death at its hands, because the funds in the State treasury are not limitless. For reasons which need not be discussed here the Claims Committee of 1899 was unusually liberal in passing appropriations. This was true especially during the early part of the session, and if the forestry bill had gone to this committee early it would have passed without difficulty and this would have made its becoming a law practically certain.

But here became apparent the drawbacks to the policy of having a special committee. The members of it were kept very busy by the work of the various standing committees to which they belonged. The chairman had difficulty in getting his special committee together.

When it finally reported the session had progressed pretty far and the Claims Committee had become a little scared at its own liberality. So when the forestry bill, with its call for an annual expenditure of \$15,000, came before it they refused to recommend the appropriation. Thereupon the bill was amended so as to devolve a portion of the work on the Land Department and cut the appropriation down to \$5,000 a year. In this shape the Claims Committee recommended it for passage and the Senate adopted it without a dissenting vote.

Up to this time, the only opposition the bill had encountered, aside from the reluctance of the Claims Committee to pass further appropriations, had come from friends of the old Land Department. This opposition had not shown itself upon the surface, but in secret certain individuals busied themselves by telling members that the proposed forest department "would be an elephant on the hands of the State, and would eat up millions of dollars." The amended bill, by giving work to the Land Department, and therefore furnishing plausible reasons for retaining most of its employees, was well calculated to pacify this kind of opposition. But by the time the bill, after adoption in the Senate, reached the Assembly, the closing days of the session had come. Then came a message from the governor, calling attention to the fact that the appropriations already passed by the Legislature were in excess of the estimated income of the State. This made the passage of the forestry bill highly improbable. Still its friends did not give up the fight. During two hours, on the last day of the session, they fought for it on the floor of the Assembly, but at the final vote the nays had it by a small majority.

Among the lessons to be learned from the history of the forestry bill of 1899, one of the most important is this: that there is no longer much danger of opposition to the principle that it is the duty of the State to provide for the permanency of forests by appropriate legislation, even to the extent of going into the business of conservative lumbering. Ten years ago,

such a proposition would have met with not a little hostility and ridicule. It would have been called impracticable, socialistic, and un-American. In 1899, not a single member of the Legislature but admitted the desirability of such legislation, with the exception of one gentlemen who thought that forest fires were a good thing because they made it easier to clear the ground for farming. It is said that this statesman is engaged in selling sand hills to innocent foreigners and laborers from the cities, on the pretense that they are agricultural lands. Even those who voted against the bill did so avowedly on the ground of expediency for the time being.

Even less opposition than within the Legislature is to be met with among the people of the State. Of course there is a great deal of indifference, and not a little misunderstanding of the aims and objects of forestry reform. In a state situated like Wisconsin, where the question of maintaining a water supply and preventing over-erosion is of subordinate importance, the great body of people cannot be expected to feel the same direct interest in forest preservation as for instance in Southern California, where the existence of agriculture is dependent on the maintenance of the mountain forests. In Wisconsin, the class most directly interested are those engaged in forest industries, and manufacturing enterprises deriving their raw material from the woods. It is very gratifying to state that as a general rule men of this class are staunch friends of improved forestry, and some of the most energetic promoters of this cause are among the great lumbermen.

Of course it cannot be expected that entire unanimity should exist as to the best means of reaching the desired end. In particular, the policy of placing considerable areas of forest land under the management of the State is apt to encounter objections from the residents of the counties in which these forests will be necessarily located. They fear on the one hand that the reservation of these tracts will hinder the progress of settlement, and on the other hand they desire to see all the land in private hands, so that it may be

taxed for the support of local government and improvements. Both these objections are, to be sure, based on imperfect knowledge, and short-sighted enough. Yet they are made in good faith by men of intelligence, standing and influence. They must be overcome by practical reasoning and the spread of correct information.

Perhaps the most serious problem to be solved in Wisconsin as well as its neighboring States is what shall be done with the immense areas of denuded timber lands, which are now growing into vast wildernesses of worthless scrub, subject to the ravages of fire and a constant menace to the standing timber adjoining. There are no physical obstacles to the reforestation of these tracts. But the financial and political difficulties are enormous. Most of these lands are still the property of the lumber companies which harvested the timber. Not a little of it, however, has been sold for taxes and bid in by the counties. These do not know what to do with such lands, and from time to time sell them to speculators at nominal prices, sometimes for less than a dollar a "forty." Now there can be no question that much of the land of this kind is fairly good for agricultural purposes, although it cannot be compared in quality with the hardwood lands where the timber is still standing. But the greater portion is barren sand, just enough to bear a fair crop of Pine, but unfit for field crops after the slight accumulation of humus is exhausted. To persuade ignorant settlers to locate on such lands and try to make them into farms, is little short of a crime.

The great mass of the people of northern Wisconsin are well-meaning, upright folk, and they know well enough that much of this land is unfit for settlement. But as it is not possible to draw a hard and fast line between the fit and unfit tracts, the temptation is great to find invariably that the really unfit land is just beyond the boundaries of the next township. So the settlers continue to take up these sand barrens, with disastrous results to themselves, and

no permanent benefit to the community. The only feasible way of putting these lands to the use for which they are adopted, and by which they can ultimately yield a profit, would be to place them in the hands of the State for rational forest management. But this will require the sinking of a large amount of money in an enterprise that cannot yield appreciable returns for a number of decades. If the State is to acquire title by purchase, a very considerable amount of cash will be required, or else payment must be made in bond or scrip. The latter would seem the most economical means, but unfortunately the State of Wisconsin is prohibited, by its constitution, from incurring an indebtedness except for a few narrowly defined purposes. A number of owners of large tracts of land of this class have expressed their willingness to cede their holdings, which are practically valueless to them, to the State if it will take proper care of them. It is probable that the solution of the problem will be approached from this direction. But in order to make this possible, some legislation will be needed, and for that purpose the friends of forestry in Wisconsin look forward to the meeting of the Legislature during the coming winter.

There is the best possible reason to believe that a bill for the establishment of a rational forestry system will be passed by the next Legislature. It will be devised substantially on the lines laid out in the bill that failed of passage at the last session, with certain modifications required by the rise of a new factor since the Legislature adjourned. The State University of Wisconsin has now under consideration a plan for the establishment of a forestry school, as nearly as possible on the model set by the schools at Cornell and Yale. For this purpose the express authority and aid of the Legislature will probably be sought, and it is obviously proper to bring the State Forestry College into as close relations with the forest department, as the difference between administrative and educational functions will permit.

THE MINNESOTA FORESTRY PLAN.*

BY JUDSON N. CROSS,

President of Minnesota State Forestry Board.

At the January, 1896, annual meeting of the Minnesota State Forestry Association, probably the oldest in the country, the writer suggested a plan for an inexpensive forestry system, under State control, which won the instant adoption and earnest and unflagging support of the Association. The press gave the scheme most generous indorsement, and urged the passage, by the Legislature, of the bill which was drawn on the lines suggested to the Association. All of the allied societies and boards, agricultural, horticultural, etc., discussed the plan fully, and by resolutions urged the Legislature to crystallize the suggestions into a law. The Legislature of 1897 considered the bill, the Lower House passed it, and it was recommended for passage by the Committee on Forestry in the Senate, but there was not time to reach it. All the features of the plan were adopted except one, which the writer believes vital to the success of the plan and which is referred to below. The Legislature of 1899, passed the law as passed by the Lower House in 1897. In 1897 the members of the Legislature, or rather some of them, had to be urged, and committees had to be convinced, but by 1899, a great educational work had been done through a system devised by the late J. O. Barrett, the then enthusiastic Secretary of the State Forestry Association, and after his death ably carried forward by Geo. W. Strand, his successor.

The popular educational system, inaugurated by Mr. Barrett, has brought such excellent results, that it can be commended to every Forestry association in the country.

An article on some forestry subject, written for plain people, was furnished, gratis, to about eighty weekly papers, mostly in Minnesota, but to some in northern Iowa and western Wisconsin, every

two weeks. These articles were read by the farmers, and discussed. The daily papers kept the subject before the people in editorials and in news articles, as well as in scientific articles about the principles of forestry, so that when the Legislature of 1899 convened, the members had become posted and educated about forestry, and understood the importance to the State, and to the next generation, of their creating the beginning at least of a system of forest preservation.

Our State still has thousands of pioneers who had to destroy the forests to make homes, and to these an expensive system of reforestation could not be presented. Such persons must be persuaded by arguments, which the articles furnished, to look ahead for the benefit of their children.

In a general way the northern half of Minnesota, except the Red River valley, on the eastern side, is or was a timbered region, as was the northeasterly third of the southern half. East of the Mississippi River and north of the Northern Pacific Railroad were the great Pine forests. The Pine forests are often found on sandy or rough lands. In the northern part of the State there is a great deal of ridgy, rocky and stony land. Much of the so-called cut-over lands, especially the Pine lands from which the Pines have been removed, is practically worthless for agricultural purposes; yet throughout all this region, there are interspersed large and small bodies of good agricultural land, which are being rapidly settled by hardy farmers, who prefer the woods over the prairies for homes. A Pine forest, first cut over, or logged, then burnt over, is a most desolate region.

The writer's suggestions to the State Forestry Association, the principal features of which, with one exception, have been enacted in the law creating the State Forestry Board and designating State forests were,

* Read at the meeting of the American Forestry Association in New York on June 26th.

1. That any person having denuded or other lands, worthless for agricultural purposes, deed them to the State, if the Board of County Commissioners acting as a county board of forestry recommend them and the State Forestry Board accept them; that the State protect these lands from fire, and exempt them from taxes, as State lands, and to a certain inexpensive extent reseed them with useful and profitable varieties, depending, however, principally on the small timber which might be left and on natural reseeded.

The principal expense would be the protection from fires, which the State, to save its wealth in its forests, ought to undertake at all events; and the loss of taxes to State, county and towns.

2. (Omitting many necessary minor provisions) that when an income is realized, it should be divided into three parts to be distributed as follows :

(a) One-third to be retained by the State to reimburse it for fire protection and loss of taxes, of which one-quarter should go to the State, one-half to the county, and one-quarter to the town.

(b) One-third to go to any educational system or institution in the State which the donor might designate by the deed of conveyance, by a separate recorded instrument, or by will; but if he failed to designate, to go then to the common school system ($\frac{3}{4}$), and the State University ($\frac{1}{4}$).

(c) One-third to go to the donor and his heirs or those designated by will—and possibly his assigns, unless it might be good public policy to make it inalienable and exempt from debt as an *incentive*—but this one-third to be limited to, say, seventy-five years, and then this third to go to the educational institution or system designated by the donor for the *b* third.

The plan contemplated the creation of small permanent State forest tracts all over the State, using only tracts not desirable for agricultural purposes (except around the sources of water courses), and not the creation of vast pleasure parks. Thus forests would be reproduced near those who would use their products. The Hon. Ignatius Donnelly was a member of the

1897 Legislature, and the leading anti-monopolist, and fearing that to give the donor and his heirs one-third of the income for a limited period (which would not be for more than two crops of timber at most) would favor the wealthy Pine land owners, he opposed this feature of the bill.

The friends of the measure, among them Ex-Governor John S. Pillsbury, the father of the State University and a large Pine land owner (who said he desired to give the whole income to the University, keeping nothing for himself), thought it would be better to get the system started than to stand out for the *incentive* clause. Ex-Governor Pillsbury cited the case of Dartmouth College, in his native State, which now draws a nice income from the timber on a tract of mountain land in the northern part of New Hampshire, which, when it was given to the College, was considered worthless.

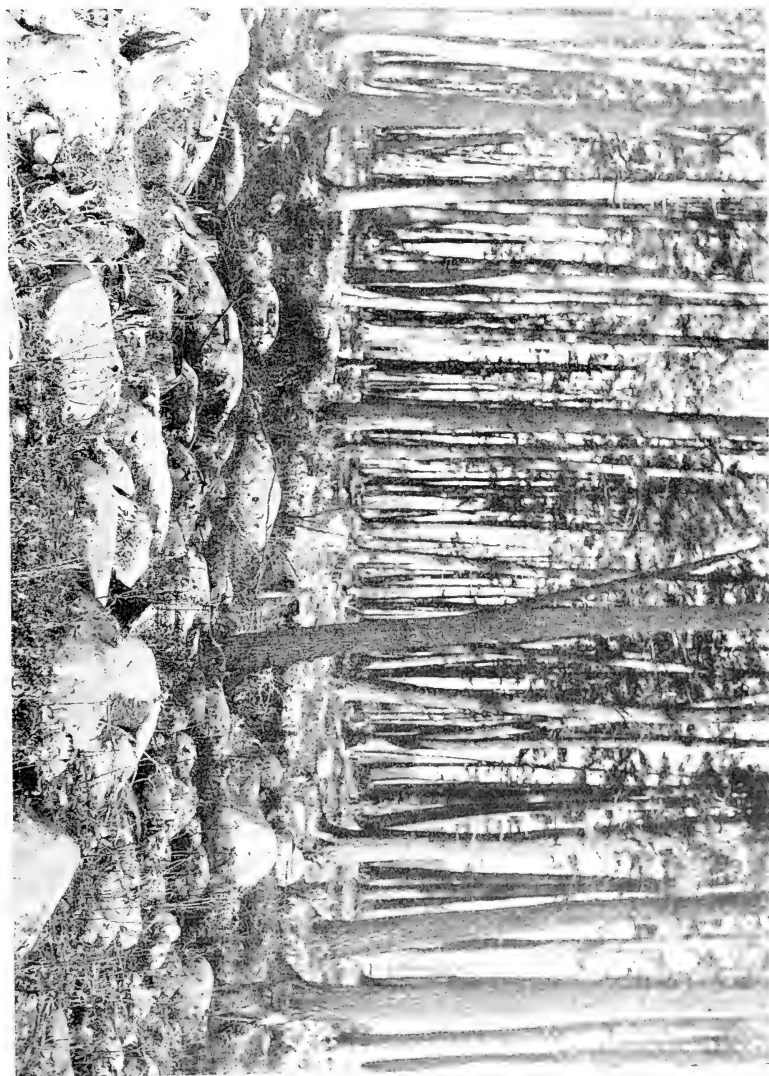
The 1899 Legislature followed the bill passed by the Lower House in 1897, under the Donnelly trimming.

The writer believes that the plan cannot be fully successful until the State offers the owners some adequate inducement to deed their lands to it. He has always thought that this incentive of giving the donor and his heirs a part of the profits from the lands for one or two generations, was essential to the plan's success; and although it may be that the denominational colleges may induce such gifts in time he does not expect that the State will receive donations of lands, except from a few wealthy and benevolent men. Neither does the writer believe that a harmful monopoly would be created by holding out so reasonable an inducement to the owners of cut over Pine lands, worthless for agriculture.

The Legislature can turn over to the Board for administration on forestry principles any of its timbered school and University lands and even Itasca park.

Some people have already tendered some lands to the Board and a start has been made. The Board is conservative and expects to feel its way—go slowly.

The four years which have elapsed since the plan was proposed have been most beneficial years to the whole State as



PRIMEVAL WHITE PINE ON NON-AGRICULTURAL LAND IN MINNESOTA.

Courtesy of Chief Fire-Warden of Minnesota.

regards forestry. The incessant discussions by the press, by the allied associations interested in agricultural matters, by commercial clubs, chambers of commerce, boards of trade, the Board of University Regents, college trustees, medical associations, the various women's clubs, the Minnesota National Park and Forestry Association, of which Dr. Cyrus Northrop, President of the State University, is President, the dean and professors of the Agricultural College, the Legislature, its individual members, and the great lumbermen have wrought an educational work and change in Minnesota greater, I believe, than that in any other State. All of these

bodies, boards and associations, and the people generally, have become alive to the necessity of preserving what can be preserved of our great wealth in our forests, and of keeping forests on the sandy, rough and rocky lands in the interests of our children.

I believe the people of Minnesota will, from the splendid educational campaign of the past four years, go on and work out the problems of the preservation and re-growth of their forests, which so largely concern their agricultural, manufacturing and commercial interests. The writer has reason to be grateful for the results of his crude suggestions made to the Association.

CUTTING, BURNING AND FIRE PROTECTION.*

BY H. B. AYRES,

United States Geological Survey.

It may seem time that agitation about cutting, burning, and fire protection should cease but the waste has not ceased. Perhaps if it were better known there would be less of it.

Our difficulty in understanding the amount of waste lies in the differences between the different regions. One accustomed to the moister climate of northern New England, where Spruce and hardwoods thrive and fires are rather exceptional, finds himself surprised at the general burning of stump lands and the frequent heavy losses by fire in the untouched coniferous forests of the drier Lake region and the often parched western mountains. One judging of what should be done in the drier regions by what he sees in the East is apt to make mistakes. We have been too apt to think that a forest, being a forest, is simply a forest; but we learn in time that there are variations and complications in forests, and upon the understanding of their differences their successful management depends.

Lumbermen in moving from Maine to

Read at the meeting of the American Forestry Association in New York, June 26th.

Michigan, have made their plans in Michigan as they had in Maine. "We'll cut this over, take out the best of it, and in a few years have a nice second growth when prices will be better." But the fires surprised them, and they learned to cut clean the first time and let the land go.

It became customary to burn the tops (I mean to set fire freely in the stump land) to protect the remaining timber. "Let her go" has been the word ever since, and she has gone.

In moving on westward to Minnesota, a climate even more subject to drought and fire was found and a forced rush began in order to get the timber cut before the fire killed it. The amount of timber thus killed no one can know. Professor Winchell in 1878 "estimated that annually ten times as much Pine is thus destroyed in the State (Minnesota) as is cut by all the mills."

Most of such losses have passed without estimate. The fractions that are known amount to a great deal. The U. S. Geological Survey during the past season's work has found fourteen townships in which \$36,000,000 feet of White and Norway Pine have been lost by fire. This to-

day would have been worth about three and one-half million dollars on the stump.

Farther west on the eastern slope of the Rocky Mountains in the Lewis and Clark Forest Reserve 1,000 square miles out of the 1,600 have been so severely burned that only a few trees have survived and the mountain sides are grey with dead trees.

Cut-over lands are of course more liable to fire.

In Minnesota about 90% of the stump lands have been overrun by fire which has killed most of the trees left and destroyed seeds, seedlings, and seed bed with all prospect of a near future forest crop.

The prevention of this waste lies not so much in putting out fires as in preventing their start.

The fires set to burn tops are unnecessary. (Do not misunderstand me. There is no such thing in practice among lumbermen as burning tops without injuring the remaining forest; by "burning tops" lumbermen mean setting fire in the winter's slashing and letting it burn all over.) Much of the clearing that is done by fire is unnecessary, but these cases cannot be decided at a distance. They must each be studied and decided upon according to the varying circumstances.

The method of prevention is the puzzle. The best state of affairs would be to have every one in the woods in a proper state of mind regarding fire; but we cannot hope for this yet.

The present system in Minnesota is good, but it is too far in advance of the times. It is too ideal. It depends too much upon the will of people who are often interested in setting fires and the jurisdiction is too much under local influence. Local interests in preventing fires are often small, frequently the residents are in favor of burning the country over regardless of the non-resident owners, or of State or federal ownership, or revenue.

There is urgent need of more thorough keeping of the fire laws and this can be done only by a patrol above local influence. Such a patrol should not antagonize but should be able to overrule improper, especially the flagrant, misuses of fire. The patrol of the Lewis and Clark Forest Reserve has proved the efficiency of the system adopted for the forest reserves. It only needs good men to carry it out.

Let that system be modified to suit localities where individual as well as public interests exist and the next step in forest protection will be made.

"During the past summer Mr. Morris K. Jesup made a valuable and instructive addition to the museum of the (N. Y. Botanical) Garden. It consists of a block representing the wood of each of the different North American trees. The specimens are duplicates from the great collection of North American Forestry preserved in the American Museum of Natural History. *

"The collection has been temporarily installed in the east hall of the economic museum, in the space previously set aside for woods and timbers, and their products. Each specimen is provided with a label indicating, first, the common or local name of the tree, second, the name of the species, and third, the geographical distribution. The distribution of our trees is interesting from several standpoints, and this collection as it is now labelled emphasizes the following facts which seem worthy of notice:

"The specimens represent about 66 natural families, and 500 species, which fall into about 173 genera. A few of the species are generally distributed over nearly the whole of North America, but the great majority are considerably restricted in their geographical ranges. Leaving out of consideration such species as are widely distributed, we find that the area east of the 100th meridian produces fully twice as many different kinds of trees as the area to the west of it. There may be many more trees in the northern regions than in the southern from the standpoint of quantity, but the south surpasses the north in the variety of species; the southwest possesses over twice as many different kinds of trees peculiar to itself as the northwest, while there are but seven species peculiar to the northeast as against the one hundred and eighty-one peculiar to the southeast.—*Journal of the N. Y. Botanical Garden.*

The Forester,

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Regarding the
White Pine North.

In this issue of the FORESTER appear four articles which deal with the problems of the White Pine regions in Michigan, Minnesota, and Wisconsin. In these states forestry is much needed, but before it can be practised to any extent a great deal of legislation will be necessary. Some laws now on the statute books are such as to discourage, not to facilitate the maintenance of the forests. These must be repealed or amended and new ones must be passed. The public must be educated to a sense of the needs of the case in order that timber stealing and fires may be checked. In these three States the details of the difficulties which Forestry Commissions and Associations are thus trying to settle are slightly different. But at bottom the problems are so much alike that even in their differences they are instructive. They are problems in tax legislation, protection against fire, and the management of State lands which each State must take hold of by itself. Until a few years ago they were entirely new to the country, but sooner or later every State in the Union will have to deal with them. The way in which the Lake States are grappling with them is most instructive and their progress is being watched with interest.

Recent Progress
in Minnesota.

This month come two fresh assurances of the progress which is being made by the friends of forestry in Minnesota. One, a letter from an enthusiastic but practical friend of the Minnesota Park project living in St. Paul, reports plainly that forestry is being better appreciated daily and that the interest in it is growing rapidly. The other, even more welcome, is the news reported in a number of clippings that in Duluth, on October 19th, two men were convicted of starting fires in the timber on the Chippewa Indian Reservation in Itasca county.

It was alleged in this case that the defendants—one of them had been prominent as a lumberman in the region for some years—had set the fire in order to create dead and down timber which might then be secured from the Indians under the "dead and down" timber act. For some time there has been good reason to believe that this kind of timber stealing has been far from uncommon in northern Minnesota. Delegates of the State Federation of Women's Clubs who visited the park country some months ago, found trees which showed signs of having been fired intentionally, and were assured by residents that such was often the case. The State Fire Warden has shown that he also is of this opinion, for though he makes no definite charges he assumes several times in his last report, either expressly or by implication, that the malicious firing of timber in order that the "dead and down" timber Act may apply to it is not uncommon. Hitherto, however, no case has been brought into court. Considering that the penalty is three years imprisonment, or a fine of \$5,000, this successful prosecution ought to have a good effect.

It will be remembered that the Chippewa Indian Reservation in which the burning was done is within the proposed boundaries of the Minnesota Park.

Possibilities of
Forestry in New
Hampshire.

Although it is easy to say that the owners of woodland in New Hampshire have been neglecting their opportunities

woefully, it is hard to see the nature of their mistakes until the reasons for them have been taken into account. The farm wood lots, except where they contain groves of good-sized White Pine, heavy stands of hardwood or Maple orchards, are little cared for; but the course of events during the last two generations shows many reasons for this. In the first place the original forest, which the New Hampshire farmer cut to good profit, disappeared from all but the White Mountain region years ago, and since then many townships have had no connection whatever with profitable traffic in lumber. The couple of dozen or more trades which used to be carried on in every community, when country towns had little communication with the rest of the world, have also died out, and with them have disappeared a once steady local demand for wood and woodwork of many sorts. High hills and bad roads have made the hauling of cord wood to a market or to a railroad difficult and costly in many places. Railroads and the supply of cheap coal have altered the demand for fuel even in the villages. For decades, too, the tide of life has drawn strongly away from the rural districts, and in the parts of the State where farms have been deserted, firewood has been all too cheap. So that it is not strange that for a long time the New Hampshire farmer has considered his woodlot simply as a part of the farm from which fire-wood may be cut when needed, but for which he has otherwise no use.

But although the indifference to forests is no more to be wondered at in New Hampshire than in many other parts of the country, this does not necessarily imply that their neglect is not shortsighted and mistaken; and even disregarding for a time the non-agricultural regions, and the considerations touching the water supply, and attractions to the summer tourist, is not such really the case? An illustration will answer most clearly. Groves of White Pine or of useful hardwoods, like Oak or Maple, when well grown, are considered the most valuable part of many of the farms on which they are to be found. From almost any such grove may be seen

woods which, though similar in all conditions of soil and environment to that in which the good timber is found, contain only an irregular, weedy growth in which trees of a dozen different kinds are interfering with each other and getting along but poorly themselves. When the reason for this difference is sought it turns out that it is unnecessary to assign any cause for the relative poorness of the second stand of trees which it would not have paid to get rid of. Indeed the difference is no other than that usually to be found where things are left to luck; and the neglected condition of the woodlot is without warrant. For where as many useful trees grow as freely as in New England, a little sowing or planting in places where seed does not fall; a judicious use of the ax to remove undesirable growth at the right time; and care and economy in cutting wood for use on the farm; will often make the difference in fifteen or twenty years between a stand of trees which is of little use, and one which adds a good amount to the value of the farm and pays its taxes. Even in remote townships it is as great a mistake to act as if the first growth supplies the only marketable wood, as to assume that a good second growth will more than occasionally grow up without care or attention. The truth is that almost everywhere in New Hampshire and other parts of New England the conditions are so favorable to forest growth that a small outlay of labor and money will make the woodlot on almost any farm increase in value at the same time that it yields its owner a good per cent. on what it was originally worth. This being the case there is no reason why a field should go to wood exactly as it goes to "waste." It is quite wrong that this census definition of all farm land not either "tillage" or "pasture" should apply so literally.

Importance of Forests to New Hampshire.

But turning now to the effect of the forest on the water supply and the beauty of the country, it is clear almost at a glance that though no State has taken less care of her forest interests than New Hampshire, none could profit more by attending to them as

they deserve. New Hampshire's prosperity is no longer founded on her agriculture, but on industries to which the continued existence of her forests is of the first importance. The factory towns along the Merrimac—which has been called the main artery of the State's economic life—and on some of the other streams in the lower part of the State, are the communities which are flourishing and growing in population. To their well being it is of the greatest importance that the flow of the rivers should be regular, and should not go on increasing its fluctuations as during the last three or four years. In other regions the plentiful presence of the summer visitor, who has of late been bringing New Hampshire between seven and ten millions a year, is the one condition of prosperity; and this summer business, which centers very largely around the White Mountain region, would be wiped out entirely if either fire or wasteful lumbering should sweep the forests from the mountain sides generally, as they already have in several regions now well-

nigh deserted. Finally, the lumber business itself is one which the State would not willingly see disappear. But if the State is not to come near seeing it do this, if it is to see the lumbermen go on happily and prosperously without working harm to other industries it must regulate their operations. With this end in view it will frequently be enough to point out to timber owners, what some of them have already discovered, that methods of cutting which perpetuate the forest are really to their best interest. In other cases moderate legislation will be all that is needed. But in a few places the State will undoubtedly have to take charge of the forest lands herself. This may seem a grave step, and the task of awakening public interest in forestry generally may seem a heavy one, but when manufactures, summer business, and in the long run lumbering, are all vitally interested, and when the agricultural regions are all so well supplied with wood and so perfectly fitted for its production, New Hampshire cannot afford to remain officially inert any longer.

CORRESPONDENCE.

The Spreading of Timber Areas and the Sprouting of White Pine Seed.

TO THE EDITOR OF THE FORESTER.—Facts and truths from nature are what are needed in forestry. The article by Charles E. Bessey in the October number of the FORESTER is useful because it is full of facts found by observing nature. In general I had observed the same facts in the West and some corresponding ones in New England. In our section Pine seed seldom sprouts and produces trees on a close grass sod, and this is especially true if the ground is hard and dry. I have known land to moss over till the Pine seed would grow in the moss, but weeds, blueberry bushes, sweet fern, hardback and similar growths in open lands generally form the beds in which the young Pines start. One of the most beautiful groves of White Pine within my knowledge is on land covered with

sweet fern when I was a boy. Plowed land, in the vicinity of Pine trees, left to weeds is a good bed for Pines to start in. I have sometimes wished for blueberry or similar seed to sow on land near Pines so as to form a bed in which the Pine seed would sprout and grow.

I concluded years ago that fire was the great reason why the western prairies were treeless, and that the thick laminated bark of the Post Oak and of our Pitch Pine caused those trees to stand the fire better than others, and consequently were the trees respectively found on western prairie and northern sand plains. I thought the same kind of bark had much to do with the Hard Pine of our Southern States.

Let us preach that forests increase or equalize rainfall, change the climate, pre-

vent freshets and drying up of streams when we know such to be the facts. It is extremely unfortunate "to know a great deal that is not so." I dislike to have to unlearn so much as I have had to even from official reports.

One of the great difficulties in getting land holders to plant the seed of timber trees is the fact that so much of the cheap land is covered with Grey Birch, Alders, Red Cherry and other weed trees. Last week I looked over four unoccupied adjoining farms on a highway, only five or six miles from a large village and two miles from a railroad station, all excellent land for White Pine and Oak, but they were largely covered with young trees nearly all of worthless kinds. These with their two quite good sets of buildings could be bought, I presume, for about two dollars per acre. One of them containing three

hundred acres with quite good buildings had been offered for five hundred dollars. It is worth much more than this to grow Pine and other timber but for the bushes. The great fact is stated in your October number on page 249 as a quotation from *The Lumberman's Review*. It "is a demonstrable fact that by treating the tree as a crop, planting it under proper conditions and harvesting" at proper time, "a permanent and adequate return from the investment may be secured and the integrity of the forest preserved." This is a vastly important fact yet in little New Hampshire the United States Census Report of 1880 says that there are 116,000 acres of land lying idle, producing neither farm or forest crop. O, the neglected opportunities!

J. D. LYMAN.

EXETER, N. H., Oct. 24, 1900.

NEWS, NOTES AND COMMENT.

The following letter from the Hon. Wayne MacVeagh to the Secretary of Agriculture, explains itself:

WASHINGTON, D. C., Sept. 18, 1900.

DEAR MR. SECRETARY: I have received a notice from Mr. Newell stating that you had suggested my name as one likely to be interested in the work of the Forestry Association, and suggesting my becoming a member of it. I therefore take the liberty of sending the enclosed check for life membership through you to Mr. Newell, as it gives me an opportunity of saying to you that I appreciate the great value of the movement in this country for the preservation of what forests are left us and for the renewing of those which have been unwisely destroyed. I know of hardly any work likely to be more fruitful of advantage to the future of our country. Sincerely yours,

WAYNE MACVEAGH.

HON. JAMES WILSON.

The New Crow Creek Forest Reserve. On the 10th of October President McKinley signed a proclamation setting apart a new national forest reserve in Wyoming to be known as the Crow Creek Forest Reserve.

This reserve contains 56,320 acres, or about two and one-half townships, and is situated in Albany County at the head of the stream from which the reserve takes its name. Crow Creek, of which the upper drainage basin is thus reserved, is the principal source of water supply to Fort D. A. Russell and to the city of Cheyenne. It also supplies water for irrigating purposes to a number of ranches—but only to a limited extent, for at present it is necessary in summer time to close the irrigating ditches in order that the supply for the city of Cheyenne may not run short.

The Crow Creek Forest Reserve is about 8,000 feet above sea level. The land which it contains is poor and almost everywhere quite unfit for agriculture. Only about two and one-half of the eighty-eight sec-

tions formed within the reserve have been settled on. From most of the land the forest was cut about thirty years ago when the Union Pacific was constructed. A fire also burned over the region at that time. Only the small amount of old timber which remains is merchantable. In the rest of the reserve reproduction has been but slow and scanty. It is of great importance that this new growth should not be left without protection.

The Struggle for Water in the West.

The "Struggle for Water in the West" is the title of an article in the November *Atlantic*, in which Mr. William E. Smythe considers the importance of having the water supplies treated as public property and saved from the selfish enterprise of private interests. Mr. Smythe begins by saying:

"Mount Union in Wyoming might be called the Mother of Civilization in the western half continent where water is King. The melting snows of this peak in the Wind River Range, south of Yellowstone Park, give birth to three rivers which, in the course of their long journeys to the sea, control the industrial character of a region which will ultimately be the home of more people than any nation of Europe, and probably of twice as many people as now dwell within the United States. These rivers are the Missouri, the Columbia, and the Colorado. The first waters the eastern slope of the Rocky Mountains, including the Great Plains; the second, all of Idaho, much of Montana and the larger portions of Washington and Oregon, which constitute the Pacific Northwest; the third, the Intermountain Region of Wyoming, Utah and Colorado, and of those parts of Arizona and California that make the extreme Southwest.

"In striking contrast to the familiar conditions of the East, it may be said that upon the fate of these precious waters hangs the destiny of many millions of people who shall live in vast districts now mostly vacant and undeveloped, but certain in future to support a complex and far reaching economic life. By no possibility can these future millions escape the

dominating influence of these three great rivers and their systems of tributaries. It is not merely that the arid land cannot support human life without irrigation, and that the extent of this industry is, therefore, the necessary measure of settlement. The more important fact is that upon the manner of control under which irrigation shall do its work depends the industrial, social and political character of the institutions to be erected upon this indispensable foundation. The people will be bond, or free, tenants or proprietors; will cooperate in the orderly development and equitable distribution of the first necessity of their existence, or clash in the greedy struggle for its exclusive possession; will prosper or languish, create high conditions of social life, or lapse into semi-barbarism, in sure response to the manner in which the water supply is owned and administered. In the future life of the immense region which constitutes the true field for American expansion and domestic colonization, questions of tariff and currency and foreign dominion are as nothing compared to the overshadowing importance of the struggle for water and the social and economic problems to which it is inseparably related.

"The history of Eastern settlement and the experience of English-speaking men in other lands furnish little light for this problem of the West. It is a new question for our race and country, but its importance to the future of our civilization cannot be exaggerated, nor can it be longer ignored."

Sharing in the importance of this question is the problem of saving from waste and deterioration the forests on the mountains whence the waters of these rivers flow. Wherever questions of irrigation and of forest preservation have any significance they mingle and are inseparable.

Later when speaking of the Irrigation Congress Mr. Smythe reminds us of the work of the American Forestry Association. "Its (the Irrigation Congress's) most difficult task is to show the American people that there are distinctly two spheres of action. One of these the Western States must manage for themselves. They

must divest their institutions of old laws and customs, and make them over to fit their local conditions. They must grapple with the problem of reclaiming their lands and making them ready for the settlers of the future. But only the nation can legislate as to the forest, the grazing lands, and the many important streams which flow across State and national boundaries."

Endorsed by
National Business
League.

The Executive Committee of the National Business League endorsed the plans of the Irrigation Association at its meeting in Chicago on September 26th. Resolutions were drawn up in which the following were the four points dwelt upon:

"A trusteeship of all the public lands remaining by the government and a reservation of the same for actual settlers, with no grants to States or corporations for any purpose."

"The preservation of forests and the reforestation of denuded areas, for the preservation of existing water supplies."

"Federal storage reservoirs to conserve flood waters that now go to waste, as recommended in the Chittenden government report, under the established policy of river control."

"Reservoirs, dams and main-line canals, to be built by the government where necessary to reclaim the arid government lands."

It was resolved to send a copy of the resolutions to all the commercial organizations in the United States, and to ask for their endorsement and coöperation in securing for the policy the support of Senators and Congressmen. Among the local and national organizations that had already given the program of the Irrigation Association their support were the Commercial Club of St. Paul, the Chamber of Commerce of St. Paul, the Commercial Club of Omaha, the Missouri River Hardware Jobber's Association, the Trans-Mississippi Commercial Congress, the St. Louis Manufacturer's Association, the Na-

tional Board of Trade, the National Association of Merchants and Travellers, and the Missouri Press Association.

Stealing Wood
After a Fire.

In the *Revue des Eaux et Forêts* the following notice appeared some months ago:

"After several fires in the Montagne Noir comes the announcement of fire in the Landes, spreading from the region of Laborheyre and Parentis-en-Born to Mimizan over thousands of hectares of Pine lands. An innocent man amused himself burning the herbage in the midst of a country baked by the heat of dog days near forests of Pine. Hatred and ill-will incited criminal hands to imitate this example. The fire traversed thousands of hectares of forest, as in America, destroying everything in its way. It is astonishing, considering the slight attention accorded to the laws or restrictive regulations, that such disasters should not have occurred earlier



STEALING WOOD AFTER A FIRE IN THE LANDES.

during the great heat of August. At last it rains!"

Such a statement and such a picture surprises an American who has been taught

to believe that forest fires never occur in the Old World, and that everything in connection with the forests of Europe is as nearly perfect as is possible for human hands to make it.

The truth is, fires do occur in the Pine lands of France and often, as the note quoted above says "as in America." The cause of this fire was carelessness and the size of it was due to negligence in the care of firelanes.

This fire was a grand harvest for the natives who began at once to help themselves to the charred wood. The illustration shows a typical cart of the Landes. The roads are sandy so that the tires are wide. The mules have no harness except a bridle and leather collar. The collars fit in the wooden yoke to which they are firmly bound. The yoke is fastened to the end of the wagon tongue. This seems to be a cheap and efficient sort of rig for this level sandy country. It leaves the hind parts of the mules free to escape holes and stumps.

Forestry in Spain.

"On my way to Brazil, in 1882, I went through France and Spain, and was especially struck by the great contrast between those countries in respect to forests. It was a source of delight in France to see the lofty, crowded and splendid forests, and particularly on approaching the Pyrenees mountains, which separate the two countries, to observe how the thin, sandy soil, unfit for agriculture, was made to yield a good profit in Pine forest. On crossing into Spain, how great was the change! A vast area of hilly land was passed which once must have been covered with forest, but which then was naked and sterile. The Spaniards had cleared the forest from land that was only fit to bear forest, and had done nothing for its reproduction, just as we Americans have been doing for two centuries and are still doing. There was, apparently, the same ignorance of forestry in Spain that there is in this country.

"That I may not be thought prejudiced, I will state that I was attracted to the Spanish people. The Spaniards are behind in some things, because of their iso-

lated situation—off at one corner of Europe. They have not kept in touch with the most advanced countries, and this they show in a marked manner by their neglect of forestry."—C. C. Andrews, in *Forest Leaves*.

Forests and the New England Landscape.

"There are other matters relating to forests which I should not pass entirely by, although time forbids more than mere mention. For example, the relation of forests to the beauty of the landscape. This may seem like mere sentiment, but this too has a practical business side and in some portions of New England, it is the most practical of business matters. I spent two weeks last month on a little hill among the lakes of southern New Hampshire. It had formerly been merely a farming region and a poor one at that. Now it has become a favorite summering place because of its natural beauties. Bits of a rocky hillside, which a few years ago were not worth ten dollars per acre for either agriculture or timber, are now sold at fancy prices as sites for summer cottages. A couple of acres to-day are worth as much as the whole farm would bring thirty years ago for merely agricultural uses. But what would it be worth if the landscape was despoiled of its forest beauties? Strip the hillsides of their trees, let blackened stumps and straggling bushes adorn the despoiled slopes and what would the land then be worth? We often hear estimates made as to how much money is brought into this or that region by summer visitors from the cities. Do you know of any place inland in New England that attracts lovers of nature that is without woodlands? I do not.

"* * * A better knowledge and practice in the management of our woodlands is one of the factors in maintaining the prosperity of New England, of perpetuating its beauty and making its citizens cling to it with loving hearts.

"The beauty of New England is one of her natural resources, it is an important part of her capital and brings in a greater income in proportion to what it costs to maintain them than any other investment.

Even the beauties of the ocean are enhanced by a forest-clad shore. This may seem like a low view to take of nature's beauties, but inasmuch as woodlands are an essential feature in every beautiful landscape, I use it as another argument why forestry should interest us." Professor Wm. H. Brewer of Yale, before the Washington County (Conn.) Agricultural Society.



**Lumber Worth
More in the Trees.**

In his address at the recent meeting of the Michigan Hardwood Lumber Association, Mr. D. H. Day, the President, expressed his belief that the cutting in southern Michigan is excessive as follows:

"The hardwood lands from which we are getting our Maple, our principal wood, are fast being depleted. We have the best Maple in the world; I do not know where it is to come from when our stocks are gone. Under these circumstances it looks foolish to me that we should waste our patrimony, getting nothing for it, and deliberately destroying the 'goose that lays the golden egg.' Certainly, we all must do a reasonable amount of business to keep our plants in good shape and our localities employed, but there are gentlemen here whose mills cut from ten, twenty to thirty millions of hardwood. I say to these men especially, you are the ones to lead off in this movement. A reasonable reduction in such plants will have the desired effect. I do not say the smaller mills should not coöperate; they should; but, as I said before, we all want to keep in operation, and must cut a fair amount and do so at a reasonable price; but to these large plants—these night and day operators—I say, gentlemen, go slow; your lumber is worth more to you in the trees."

In commenting on this the *American Lumberman* said:

"A heedless activity in production is doubly dangerous in that it hazards present profits and unnecessarily sacrifices an asset which is growing more valuable every year. A certain rate of production must be maintained in order that there may be economy in manufacturing cost, but many mills are being crowded to their utmost

capacity when a distinct saving could be made by a more moderate rate of output. Doubtless there are many mills which would better shut down and pocket a definite present loss rather than an indefinite but larger prospective one.

"Conservatism is particularly important and certain to bring good results in the lower peninsula of Michigan because in that territory the timber is fast disappearing. The Maple timber of that district is probably the finest in the world, and it is as certain as anything can be that the trees will increase in value more rapidly than in size, and that both combined will handsomely pay for holding them. And yet the Maple producers are cutting them away as rapidly as possible and in excess of the market demands."



**Recent Canadian
Legislation.**

"The Ontario Government has passed an Order-in-Council requiring tanbark cut on Crown lands in Ontario to be consumed in the country. In other words, the exportation of tanbark cut upon the lands mentioned is prohibited. In taking this step the Government has adopted the policy urged upon them by the tanners of Ontario. These gentlemen waited upon the Provincial Cabinet some time ago and pressed for some measure that would restrict the shipment of tanbark from Ontario. They stated that the supply in the United States was limited compared with that in Ontario, and American tanners were supplying themselves from this Province and conserving their own resources. The run upon Ontario bark was therefore so great that it would exhaust the material in a short space of time unless a stop were put to the drain. Canadian tanbark, it is argued, is superior to the raw material used by tanners in any other part of the world, and if preserved for the use of the manufacturers of this country will enable them to turn out more finished products. The present Order-in-Council went into effect on May 1st, but does not affect tanbark on the lands of settlers.

"The usual methods of obtaining tanbark are so wasteful that any effort to check the waste should be heartily approved. In

general the bark is stripped from the tree, which is left to rot on the ground, useless itself, and in case of fire a menace to standing timber.—*Rod and Gun in Canada.*

New legislation was also passed providing for more effective prevention and suppression of fires on crown lands.—*Rod and Gun in Canada.*

REVIEW OF AMERICAN AND FOREIGN PERIODICAL LITERATURE.

The following is a list of the most important foreign journals of forestry which will be reviewed from time to time in this department: There are two Russian journals not mentioned below, also a Norwegian journal (*Tidsskrift for Skovbrug*). Other foreign journals such as *Det danske Hedeselskab*, a Danish periodical which treats of the cultivation of heatherlands, and *Tijdschrift der Nederlandsche Heidemaatschap*, a Dutch journal with the same purpose, are also not mentioned although they contain considerable forestry information.

The principal European journals of forestry are either in German, French, or English, with the exception of two. These two although seldom read outside of the countries in which they are printed are of interest for several reasons.

The first is the Danish journal called the *Tidsskrift for Skovvaesen*, edited by C. V. Prytz, professor of forestry in the Royal Agricultural and Forestry Academy in Copenhagen. It is unfortunate for outsiders that this journal is published in Danish, for the Danes are up-to-date, wide-awake foresters, and many things in the journal would be of interest to Americans. We shall endeavor to review this journal in future issues.

The second journal referred to is the Spanish one called *Revista de Montes*. The address is Calle del Duque de Alba, num 17 segundo en San Lorenzo de Escorial, Madrid. The cover of this journal is tastefully adorned with a Spanish coast scene showing to good advantage *Pinus pinea*, the classic Pine of the Mediterranean, which is a common accompaniment of old piazzas, fragments of temples, etc., in pictures.

Monte in Spanish means both "forest" and "mountain." Forests are no doubt so rare in the villages of Spain that forests and mountains have been so long unassociated that the terms are actually synonymous.

This reminds us of the Italian term "forestiere" which means a stranger, that is a man from the forest, and that of course means a man from another country, because of the scarcity of forests in Italy.

The Spanish journal is mainly a rehash of the contents of other European forestry journals. The fact that there is strong effort to support a journal of the kind in Spain is a surprise to most people who are not familiar with this publication.

One journal which is published in Bern, Switzerland, was, prior to 1900, printed in both French

and German; that is, the same article appeared both in French and in German in the same number. Two separate editions are now printed, one in each language. The German edition is known as the *Schweizerische Zeitschrift für Forstwesen*, and the French edition as the *Journal forestier Suisse*. This journal is the official organ of the Swiss Forestry Association. It is edited by Dr. F. Fankhauser who is one of the most distinguished foresters in Switzerland, if not in Europe, and one of the most genial of men. He is an expert in the *reboisement* of mountain districts and his journal always contains matters of wide interest.

Another journal which should be more extensively read is the *Bulletin de la Societe Centrale Forestiere de Belgique*, address, Secretariat de la Societe, 38 rue de Louvain, Brussels, Belgium. This is the best forestry journal in the French language.

There is a paper in France called *Le Bois*, another *L'Echo Forestier*, and a little journal called the *Bulletin Trimestriel de la Societe Forestiere Francaise des Amis Arbres*. The principal forestry journal of France, however, is the *Revue des Eaux et Forêts*, 13 Rue des Saints Peres, Paris, France. Considering the fact that this is the only monthly forestry journal in a country which is supposed to be one of the leaders in the science and art of forestry, one pays well for the information which he gets out of it at the rate of twenty francs per year. Jules Rothschild, the publisher of this journal and of many French works on forestry, died in France last summer.

Germany is the land of forestry journals. I shall only mention in this connection the monthly publications, of which the principal ones are the *Allgemeine Forst- und Jagd-Zeitung*, edited by Dr. Tuisko Lorey, a professor of forestry in the University of Tubingen, and published at Frankfort-am-Main by J. D. Sauerländer, and the *Zeitschrift für Forst- und Jagdwesen*. To the first of these journals there is a valuable supplement, which costs extra however, but contains a "review of the publications and important events in the spheres of forestry, forest botany, zoölogy, agricultural chemistry, and meteorology." All who cannot afford the journal should purchase the supplement. The *Zeitschrift für Forst- und Jagdwesen* is the official organ of the forestry experiment station at Eberswalde. It is edited by Dr. jur. B. Danckelmann, Royal Prussian "Landforst-meister"

and Director of the Forestry Academy at Eberswalde. It is of interest to note that the first mentioned German journal (*Forst- und Jagd-Zeitung*) is in its seventy-sixth year and the second mentioned is in its thirty-second year.

A journal in the German language called the *Centrblatt für das gesamte Forstwesen* is published in Vienna. This is the official organ of the royal forestry experiment station. It is edited by Joseph Friedrich, Director of the forestry experiment station at Mariabrunn. It is published by Wilhelm Frick of Vienna.

In England there is no journal of forestry, although the *Indian Forester*, which is published in India, is a very valuable production. It is edited by J. W. Oliver, Conservator of Forests and Director of the Forest School at Dehra Dun. Valuable supplements are often attached to this journal (without extra cost) by forest officers in India, either descriptive of conditions in India, or resulting visits to the continent of Europe.

In addition to the above there are several very valuable English colonial periodicals which now and then contain articles relating to forestry. These journals are of special value to all students of tropical conditions. They are *The Agricultural Gazette* of New South Wales, Sydney; *The Tropical Agriculturist* of Ceylon; *The Bulletin of the Botanical Department of Jamaica*, edited by Wm. Fawcett, Director of Public Gardens and Plantations. The last mentioned journal contains much that is applicable to both Cuba and Porto Rico.

Foresters should read with care the "Experiment Station Record" of the U. S. Department of Agriculture. This contains reviews of forestry articles, also reviews of articles on kindred subjects, of great value. This publication is a boon to the man who lacks time to read all the current literature in agricultural and allied subjects.

The *Swiss Journal of Forestry* announces the publication by the Department of the Interior of a "Tree Album of Switzerland" which contains twenty-five illustrations of the largest, most beautiful and most noteworthy trees in Switzerland. The motive of the publication is to encourage visits to these giant trees, to cultivate the appreciation of beautiful specimens and the desire to protect them. The descriptive text is in both French and German. The October number of the *Swiss Journal* gives a reproduction of one of these famous trees. It is a Mountain Maple of large size, 1,350 meters above sea level. Another interesting specimen is *Welingtonia* (Sequoia) in Lugano, one of the largest in Switzerland and a striking example of extraordinary growth. It was planted only forty years ago and is already twenty-two meters high.

The *Queensland Agricultural Journal* for September contains a description and photograph of an interesting chopping contest at Bowen Park.

In Queensland the chop is usually made with a slanting upper cut and a horizontal lower cut. In New South Wales and Tasmania the upper and lower cuts are both slanting. This cut won and the reason is clear. Although it is at first more fatiguing to make a slanting under cut the axe penetrates deeper. It was an exciting and interesting contest which might be practiced to advantage in this country.*

I might also add that the second system is better than the first for another reason: it leaves the stump with a roof shaped top which is of great advantage in the case of reproduction by coppice. Water does not collect on the top of the stump, and decay is therefore longer in beginning.

A series of six articles on "The Forests of Java and their Management," by Forstassessor Seibb of Heissenstein, has been appearing in the *Allgemeine Forst- und Jagd-Zeitung*. These articles should be of special interest to Americans, because of the similarity of the conditions to those which exist in the Philippines. Now that the Government has a forestry bureau in Manila and that efforts are being directed toward the proper exploitation of the rich woodlands of our new Eastern possessions, we should study with great care the work of the Dutch in Java and profit by their mistakes as well as by their successes. Americans should emulate the Dutch and English and have somewhere in the tropics an extensive Botanic Garden where northern students may go for study.

The writer of these articles, Mr. Seibb, served five years as a forester in Java.

The Island of Java is generally considered the most beautiful, richest and best cultivated of Holland's vast colonial possessions. One-fifth of the island or about 2,500,000 hectares is in forest at all degrees of altitude even reaching to the tops of most of the volcanoes.

Tertiary limestone and lime sandstone forms the geological foundation of the island, running from east to west in the form of a mountain chain about 1,000 meters in height. The soil is alluvial along the flat shores of the sea bays and rivers. There are forty-four volcanoes. The rivers and streams flow down steep declivities into gorges and beautiful valleys.

Owing to the fact that it is a long island the heat is moderated by the sea breezes. There are two distinct seasons—dry during the East monsoon from April to November, and wet during the west monsoon the rest of the year. In the dry season there is a continuous blue sky with dew at night. In the wet season the west monsoon brings torrents of rain. As one ascends a volcano the air becomes thinner and the sun's rays more intense. Under such conditions there is naturally produced a great variety and a great luxuriance of vegetable growth. At about 500 meters above sea level the great

* Such contests are held in Canada, and in at any rate one of the United States—Washington.—Ed.

timber tree of Java, *Teclona grandis*, commonly called Teak, forms large stands in company with bread fruit and numerous species of the genus *Ficus*. The higher one goes the more similar to European types the vegetation becomes until even Oaks, Chestnuts and Maples are reached. The *Casuarina* and *Podocarpus cupressia* remind one of northern conifers. The highest regions above the clouds show stunted trees, *Vaccinium*, *Myrica*, *Ranunculus*, *Geranium*, etc. There are 75 families of forest trees, over 200 genera, and over 800 species. For several years a botanical specialist has been engaged in studying the *sylva* of Java.

The Dutch government very early realized the great importance of forests to Java. Here there is little doubt that they exercise a great influence on the climate, and in preventing floods. In 1890 the forests in the high mountains were proclaimed protection forests. As early as 1880 reforestation on a large scale began on the sides of certain volcanoes, the forests of which had been devastated by the natives.

Of all the varied forest products of Java, Teak wood is the most important. It is used in ship construction, cabinet work, wagon construction, railroad ties, bridges and pavements. The Chinese while still living make their own coffins out of it. It is one of the hottest of fuel woods and produces good charcoal.

The natives who were driven out of trade by more intelligent emigrants of Buddhist and Brahman descent, and later Mahomedan, adopted agriculture as a profession and cherished their rights to the forests. Although the soil is of fabulous fertility and although it has produced millions of dollars worth of chocolate, coffee and tobacco, the time comes when it must return to forest in order to gain the humus which is essential to the successful production of these crops.

In spite of government regulations there were of course, in consequence, robbery and illegal land clearing. The native is a valuable laborer and even a good leader. His senses are sharp and he knows the forest. The interests of the Japanese forests are centered in Teak because of its great usefulness and abundance. This tree belongs to the *Vervain* family. Its nearest relative in this country is the *Verbena*. With the beginning of the rainy season it begins to blossom. The flowers open gradually from October to May. The seeds ripen in July and germinate the following rainy season. The tree has enormous leaves and the crown varies in shape according to the situation in which it grows. It loses most of its leaves during the dry season. This depends upon the quality of the soil and the exposure. The tap root dies when the tree is in the pole stage. The root system adapts itself to the position the tree occupies. It finds a sure footing even in very thin soil. The stem up to the age of four years is square but becomes round later. The wood is distinguished from most other tropical woods by the sharply defined rings.

At eighty years the tree yields very useful

timber. It is a light demander but in youth endures some shade. A closed Teak forest does not fulfill one's ideal of a tropical forest. Its dense shade in the rainy season and sudden almost complete loss of foliage in the dry season do not favor the growth of underbrush. The seeds and superficial roots are frequently burnt over in dry seasons so that the forest floor is swept clean.

There were fears of Teak exhaustion as early as the second half of the eighteenth century. When Java became a Dutch possession the exploitation of Teak became a State monopoly. Although well meant these restrictions failed and the woods were plundered to supply the sugar, indigo and tobacco plantations with wood. The government itself used immense quantities of choice timber in an extravagant and wasteful manner of culling. Things went from bad to worse. Forced labor was abolished and new methods were finally adopted.

Then surveying, mapping and road-making began. Parcels are consecutively cut as roads and bridges are built. The whole is done according to a comprehensive plan to ensure the continuity of the Teak supply. The woods are exploited with the aid of private industry under the supervision of the government.

In this work the ax is used exclusively. This must be a clumsy implement in that the head of iron is fastened to the handle with leather thongs. The logs are sawn into planks by hand. In Java every man is his own builder and labor is cheap. Sawmills however will come in time.

The process of cultivation is what the Germans call "waldfeldbau," a combination of forestry and agriculture. The Teak seeds are planted in rows three meters apart at the beginning of the west monsoon when the soil is wet and soft. Then the soil between the rows is worked and sown to field crops. The superfluous plants are weeded out and the earth is heaped up around the plants, and several field crops are grown between the rows for a period of 18 or 20 months until the Teak reaches a height of five meters, when it is left to its fate.

The natives who do the work are allowed all the field produce, which is usually corn or rice, and a premium of about 35 florins per hectare on condition that they furnish all seed for the crops. This is payable however in proportion to the growth and prosperity of the Teak.

Fires are not uncommon. Heavy rainfall is injurious, and often lightning causes whole groups of trees to sicken and die.

The wonderful development of Java which is still undeveloped and under populated, in spite of her 20,000,000 of people and of the hundreds of fortunes which she has already produced, gives one an idea of the almost limitless possibilities of a fertile country in the torrid zone, where nature is most lavish with her gifts. It reassures us of the wisdom of acquiring lands in such regions where the main difficulty is malarial fever which we hope the doctors may at any moment devise a means of completely con-

rolling. The discovery of the use of the bark of the Cinchona tree as a febrifuge has already made possible the exploration of these tropical

wildernesses. Further discoveries in this line we hope will soon completely remove this troublesome barrier.
J. G.

RECENT PUBLICATIONS.

Forest and Water. By Abbot Kinney, with articles on allied subjects by eminent experts. Pages 247. Illustrations from photographs, 53. The Post Publishing Co., Los Angeles, California.

The appearance of a book on any of the many problems in American forestry must necessarily attract the attention of many thoughtful Americans. There never was a time when so much attention was given to forest matters in this country as now. Moreover, interest in our forests looking forward to their conservation and practical management is increasing rapidly. There is much need for good books on forestry, more particularly in its application to the conditions existing in this country.

Mr. Kinney in "Forest and Water" has given us a large amount of information regarding the mountain forests of southern California in their relation to water conservation, much of which it is to our interest to know. Unfortunately, however, very little of the text bearing upon this important question is substantiated by actual experiments or measurements.

As a whole the book is given to the cause of agitation in the interests of forest preservation. It is founded upon observation rather than experimentation. It consists for the most part of a series of more or less independent essays on forest protection, water supply and irrigation in southern California and of a brief descriptive account of the more important forest trees of that region. Considerable space, however, is given to an account of how, in the author's opinion, the present management of the forests of the southwest can be improved.

Like many of the reports of commissions, horticultural societies, and associations, that have published bulletins on forestry in this country, "Forest and Water" has its place in convincing the public that forest protection is necessary.

Mr. Kinney is the author of something less than two-thirds of the book, nine chapters being supplied by as many different writers. These chapters deal with the following subjects: Fish and Game of the Forest Reserves, Some Relations between Forests and Water Supply, Practical Irrigation, Irrigation in the Southwest, The Underground Waters of Southern California, Forest Reservoirs, Relation of Stream Flow and Suspended Sediment Therein to the Covering of Drainage Basins, and The Reclamation of Drifting Sand Dunes in Golden Gate Park.

Of these independent papers by other authors the work of J. B. Lippincott demands special attention, as he has given us in his short paper

the results of actual measurements and experiments in showing the relation of stream flow and suspended sediment to the covering of drainage basins.

In a book of this nature intended to instruct the public on an important economic problem, the greatest attention should be given to accuracy in the presentation of facts and to precision in expression. In discussing the effect of forests on rain fall on p. 23, the author says: "This is still an open question," while a few pages later, viz., on p. 35 it is stated that "the certain diminution of rain fall, following the destruction of forest covering, means the failure of crops."

In the table of contents we notice the expression: "Trees and the Pines." Careless and meaningless expressions of this sort are unfortunate, particularly so when they are given as headings of chapters.

In the opinion of the reviewer such positive statements as the following require qualifications: "There is no possible excuse for fires in our mountains" (page 36); "Torrents are only found where mountainous watersheds are in part or wholly without adequate covering of forests" (page 93).

Digressions, some of which are of a semi-political nature occur at not infrequent intervals and detract from rather than add to the book. For instance, on p. 77 we find the following: "Those who engage in promoting this great work have strenuous efforts before them; they deserve the garlands of reward as civic patriots as much or more than those who foment distant foreign wars."

The chapters dealing with supplies and dietary deserve special mention. The photographic reproductions are good as a rule. Those illustrating forest fires are exceptionally fine. A few, as those on p. 88, are foreign to the text and add nothing to its value.

Although the book shows no well defined plan of conception and execution and is entirely without unity, it contains a large fund of information, derived largely from observation, in regard to the water and forests of the mountains of southern California and should be read by all persons interested in the forest problems of the southwest.
J. W. F.

Some Business Problems of American Forestry.
C. A. Schenck, Ph.D. French Broad Press, Asheville, N. C. Paper cover.

The wording of the above title and the form and appearance of the "Seventeen Problems of American Forestry" contained in the title of the book would at first lead the reader to believe that

here forestry shows what it can do with questions that are now actually vexing lumbermen in the Yellow Poplar region, Oregon, the Adirondacks, and other places. The precise and simple way in which the problems are stated and worked out will doubtless come like a revelation to some readers, and shows well in what way accurate calculations in regard to the forest crop can be made under certain conditions. Unfortunately, however, for the effect of the book the conditions which Dr. Schenck has assumed in these examples are often not those which exist in the very real world of the lumber regions. It is for this reason that many of the calculations lose all interest except that which used to attach to the feats of the famous swimmer X. who, in the school algebra, was wont to race the steamboat Y against a current 20; for after all equations have probably been used for calculation on even modest lumber operations and their appearance in forestry is nothing new.

The Red Fir problem is a case in point. It is based on the supposition that 200,000 acres of "splendid Douglas Fir" in the Cascade backwoods are purchased for \$0.40 an acre. The regular price for good Fir land, however, is nearer \$5 an acre.

Another example in which a premise is entirely at variance with the existing state of things is on page 20, where it is assumed as a basis for calculation that in the southern Alleghanias nature can restore a burned forest to its former value and productiveness in twenty years.

Again, in the first Yellow Poplar problem Dr. Schenck bases his calculations on assumptions which quite disagree with the habits of growth of the tree. He generalizes about its rate of growth as if the trees now standing in North Carolina were found in pure stands and had been planted and cared for from earliest youth as scientifically as any forest in Germany. As a matter of fact however, Yellow Poplars stand singly, or in scattered groups, and grow under such different conditions that generalizations like those made on page 10 would be unsafe even if based on thousands of measurements. Dr. Schneck of course knows this and it seems therefore as if he might better have used a plantation of White Pine, say, to illustrate the sort of calculation here exemplified.

It may seem unnecessary to find fault with these problems on such grounds, but they will attract the attention chiefly of people who judge the forester by the way in which he grasps their difficulties; and the extent to which they have already been quoted in lumber journals shows that, whether Dr. Schenck meant them to be or not, they are accepted as what might be called "a forester's solution of some representative problems."

The Second Biennial Report of the New Hampshire Forestry Commission.

The reviewer labors under the great difficulty of finding nothing in this report to review. But

considering New Hampshire's needs in the way of forest protection and better care of her woodlands, considering that one is now hearing from many quarters complaints of no uncertain tone about the neglected state of her forest interests, and considering finally that the report is supposed to cover a period of two years, this is certainly worth noting. Twenty of the twenty-four pages which the Secretary of the Commission has managed to fill are devoted to reprints of two circulars published some time ago by the United States Department of Agriculture, and by selections from one of the previous New Hampshire Reports and from State laws. All these are doubtless interesting and worthy of being reprinted, but one would prefer to find in their stead something relating definitely to New Hampshire. As it is, the only information which one carries away from a perusal of the well-bound little pamphlet is that the Commission has made "numerous contributions to newspapers and periodicals" and has given lectures and addresses; and further that "Perhaps the most active agency in the dissemination of forestry intelligence in New Hampshire at present is the State Federation of Women's Clubs."

Insects Injurious to Forests. By E. P. Felt, D.Sc., State Entomologist. Extract from the Fourth Annual Report of the N. Y. Commissioners of Fisheries, Game and Forests. Pp. 31, colored plates 3, figures and illustrations from photographs.

On account of the necessary differences in methods of controlling insects in the forest and on shade trees, this report confines itself to insects which are injurious to shade trees, and chiefly among these to the Maples. But some of these insects are as much to be feared in the forests as in city parks. For the owners of Maple orchards especially, there are many valuable hints in this report.

BOOKS RECEIVED.

The Stave Trade in Foreign Countries. Special Consular Reports, vol. XX., part III.

School Gardens in Europe. Special Consular Reports, vol. XX., part II.

Two Diseases of Red Cedar. Caused by *Polyporus Juniperous* n. sp. and *Polyporus Carneus* Nees. A preliminary report. By Hermann von Schrenk. Pp. 22, pls. 7, figs. 3. Bulletin No. 21, Division of Vegetable Physiology and Pathologie of the Department of Agriculture. Price, 10 cents.

Annual Report of the Commissioner of the Land Office (Department of the Interior) for the year ended June 30, 1900.

(To be reviewed next month.)

Report of the Royal Commission on Forestry Protection in Ontario.

(To be reviewed next month.)

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Vol. VI

DECEMBER, 1900

No. 12

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A MONTHLY MAGAZINE

devoted to the care and use of
forests and forest trees and
to related subjects



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THE PLATFORM OF THE FORESTER

In order that the good will of its readers may become as effective as possible in aiding to solve our present forest problems, the FORESTER indicates five directions in which an effective advance is chiefly needed.

1. The forest work of the United States Government which is now being carried on by the Department of Agriculture, the General Land Office, and the Geological Survey conjointly, should be completely and formally unified. The division of authority between the three offices involves great waste, and consolidation is directly and emphatically pointed to by the present voluntary co-operation between them.

2. A system of forest management under the administration of trained foresters should be introduced into the national and state forest reserves and parks.

3. Laws for the protection of the forests against fire and trespass should be adapted to the needs of each region and supported by the provisions and appropriations necessary for their rigorous enforcement.

4. Taxation of forest lands should be regulated so that it will encourage not forest destruction but conservative forest management.

5. The attention of owners of woodlands should be directed to forestry and to the possibilities of applying better methods of forest management.

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Courtesy of the Chief Fore Warden of Minnesota.

NORWAY PINE AND YOUNG WHITE PINE ON THE ISLAND IN CASS LAKE

THE FORESTER.

VOL. VI.

DECEMBER, 1900.

No. 12.

THE PROPOSED MINNESOTA NATIONAL PARK.

BY JOHN S. COOPER.

THE REGION OF THE PROPOSED PARK.

If you draw a line on the map of Minnesota, due west from Duluth about 200 miles to a point almost directly south from the westernmost shores of Red Lake, then north to our northern boundary at the Lake of the Woods, and thence, following the boundary line through that Lake, north, and thence east and east by south through the immense wilderness of waters which marks the dividing line between the United States and Canada to where Pigeon River empties into Lake Superior, about 150 miles northeast from Duluth, and then back along the western shore of that lake to the starting point at Duluth, you will have designated a territory which, in its natural state, for its forests, lakes, rivers, streams, climate, game, and fish, and at present for its accessibility, should be the wonder, delight, and happiness of the modern world.

The territory is vast enough to provide space for all our people who enjoy their vacations in the wilds of nature, even when our population shall have trebled and quadrupled its present numbers. Devoted to such uses, that country would be performing its greatest service for mankind. With inconsiderable exceptions, it is not suitable for profitable agriculture. It was of commercial value principally for its merchantable pine in the forests and iron ore in the earth. But both of those could have been taken without the ruin and destruction of the forests remaining.

But alas! all of the region is not in its natural state. The lumbermen have been

very busy up there for twenty years and more. The Mesaba and Vermillion iron mines have also been a matter of dollars. The railroads have worked their way through those beautiful forests, and amongst the lakes and streams.

Here and there will be found a poor excuse for a farm, originating at a time when the Pine in that neighborhood was being cut, and the mines being opened, and when hay for the lumbermen's and miners' horses and oxen, and potatoes and other vegetables for their employees bore a high price.

There are also a few villages and towns, whose prosperous days were contemporaneous with the cutting of the Pine forests, or the opening of the iron mines in their neighborhood. Some of those towns, particularly those depending on the mines, or those located in places where there is still Pine to be cut, are even yet, prosperous for lumbering and mining towns, whose early decay and ultimate ruin have been surely predestined by what has overtaken all similar communities in America for nearly a century, once the forests have been destroyed or the mines exhausted. But for the most part, all the country whence the forests have been stripped, presents a dismal scene, with blackened stumps, shrunken lakes, rivers and streams left as the ruins of what was once a dream of Nature.

The reason is plain. The soil for the most part is light and sandy, and unfit for profitable agriculture. Where once stood the great forests of the lower Mississippi

and St. Lawrence Valleys, in New York, Pennsylvania, Ohio and Indiana are now productive farms and prosperous cities and towns. The forests there were cut for the sole purpose of preparing the soil for agriculture, for which it was fitted in the highest degree. It was part of Nature's plan that those regions should be devoted to those uses; but up in northern Minnesota, the forests have been and are being destroyed for the sole purpose of turning the trees into money, and when the trees are gone, the land is comparatively worthless for the uses of man.

In the southwestern part of the designated territory, lies a region about 1,297 square miles, or 830,000 acres, in extent, which yet remains in its primeval condition, save as the railroads have penetrated it from the East, West, and South within the past few years. The forests are substantially intact. Within its borders are the three large lakes of Leech, Winnibigoshish and Cass, the first having a shore line of 576 miles, as measured by the surveyors of the general government. There are, in addition, about ninety smaller lakes, while seven rivers and many smaller streams thread their way through the forests. The total surveyed water-surface is 325 square miles, or one-fourth of the whole area.

The Mississippi river, rising in Lake Itasca about 25 miles to the southwest, flows northeasterly and easterly through nearly the center of the tract, and through Cass and Winnibigoshish Lakes. The Turtle River, rising away to the northeast of Cass Lake, empties into that lake.

Leech Lake, into which the Kabekona, Steamboat, and Little Boy rivers empty, finds its outlet through Leech Lake River, and joins the Mississippi east of Winnibigoshish Lake. In the northeastern corner is Bowstring Lake, whence flows the river of that name northward, to a junction with the Big Fork of the Rainy River.

The lakes, rivers, and streams, comprising 325 square miles, out of a total area of 1,297 square miles, swarm with fish—muskallonge, great-northern pike, wall-eyed pike, bass, pickerel, white fish, and all the smaller kinds of fish native to the

inland lakes and rivers of the upper valleys of the Mississippi and Hudson Bay.

In the forests are moose, caribou, bear, deer, foxes, otter, lynx, wolves, and other smaller game found in that latitude.

The region is remarkable for its wild fowl, both those which make it their home during the whole year, and those which are migratory. Several kinds of wild ducks which fly to a warmer climate in the winter seek this region as their nesting-place in the summer.

The average elevation of this territory is about 1,300 feet above sea level. The shores of the lakes are, for the most part, high, and the general topography of the land is of the same character.

The forests are white and Norway Pine, Jack Pine, Birch, Aspen, Fir, Oak, Maple, Linden, Elm, and Ash. In the lowlands are Tamarac, Cedar, and Spruce. The matured Norway and White Pine trees have been examined by some of the most distinguished foresters of the country, and pronounced to be about 300 years old. There are miles of such forests, where one can drive amongst the great trees, over the Pine needles, as comfortably and safely as over the best roads in our cities.

The climate from May until November is so perfect, that within a year after the region had been made accessible by railroad, a sanitarium had been established on the western shore of Leech Lake just off the western boundary of the proposed park.

The Minnesota Medical Society appointed a committee to visit personally and report upon the region. That report was of such a commendatory character that the Society at once took the matter up, and petitioned the Legislature of Minnesota, as a result of which, that body applied to Congress, to have the Pine lands in that region withdrawn from sale.

In brief, that territory lying as it does at the head of Mississippi Valley, and the Valley of Hudson Bay, is ideal for a National Park. Neither the Adirondack nor Catskill Preserves of New York, the White Mountains of New Hampshire, the Rangeley Lake Region of Maine, the Green Mountains of Vermont, or the Yellowstone



WHITE AND NORWAY PINE ON THE SOUTH SHORE OF CASS LAKE.

Photograph for the Report of the Chief Fire Warden of Minnesota.

National Park of the United States present such ideal conditions of primeval forests, and pure lakes, rivers and streams, with magnificent climate and great accessibility, as a great play-ground for the plain people

of America, who love to enjoy their annual respite from toil among the woods and waters of Nature.

One can take a small party to the park there and spend three weeks in the

the beauties of the region and behold new scenes every day. One could go fishing in a row boat, or hunting through the forests, and camp amidst new surroundings every night for three months.

For accessibility, within the last three years, the railroads have brought the region within 24 hours ride of over twenty millions of people. It is 597 miles from Chicago, by way of Duluth, to the eastern boundary of the proposed park. From Chicago to its western boundary, by way of St. Paul and Minneapolis, is 600 miles.

Two railroads extend from the Twin Cities to the town of Walker on the western shores of Leech Lake, the western boundary of the proposed park. From there one reaches Cass Lake, about the center of the region, due north at a distance of 20 miles. The other diverges from Walker northwest to Bemidji, situated on the lake of that name about 17 miles west from Cass Lake. The Mississippi river flows through that lake on east to Cass Lake.

INDIAN RIGHTS IN THE REGION AND THE NELSON LAW.

All this territory formerly belonged to the Chippewa Indians of Minnesota. They are the beneficiaries of it yet. But in January, 1889, Congress enacted a law, called the "Nelson Law," by the terms of which, in brief, the lands in question, together with all the other Indian Reservations in Minnesota, were, with the exception of those comprising the White Earth and part of the Red Lake reservations, to be surveyed and divided into 40-acre tracts. Each tract containing no merchantable Pine was to be classed as "Agricultural Land," and to be opened for settlement at \$1.25 per acre, under the homestead laws. Each tract containing merchantable Pine was to be classed as "Pine Land."

The Pine on each tract of 40 acres was to be estimated in the tree, and afterwards each tract was to be sold at public auction at not less than \$3.00 per thousand feet, board measure, for the Pine timber thereon, which also includes the fee of the land.

The proceeds of all these lands, agricultural and Pine, were to be paid into the

United States Treasury, and credited to the Chippewa Indians of Minnesota. The government was to pay them five per cent. per annum, on the principal, for a period of 50 years.

That law also provided for the removal of all the Chippewa Indians of Minnesota, who should choose to move, to the White Earth Reservation, except those already living there, and except those living on Red Lake Reservation.

All the Indians, removing to the White Earth Reservation were to have individual allotments there of 80 acres to each Indian. It was also provided that any Indian, not choosing to remove to the White Earth Reservation, might take an individual allotment of 80 acres on the reservation where he then resided.

The law required that a treaty must be negotiated with the Indians, and the latter must cede the lands to the United States, as a condition of the law's going into force.

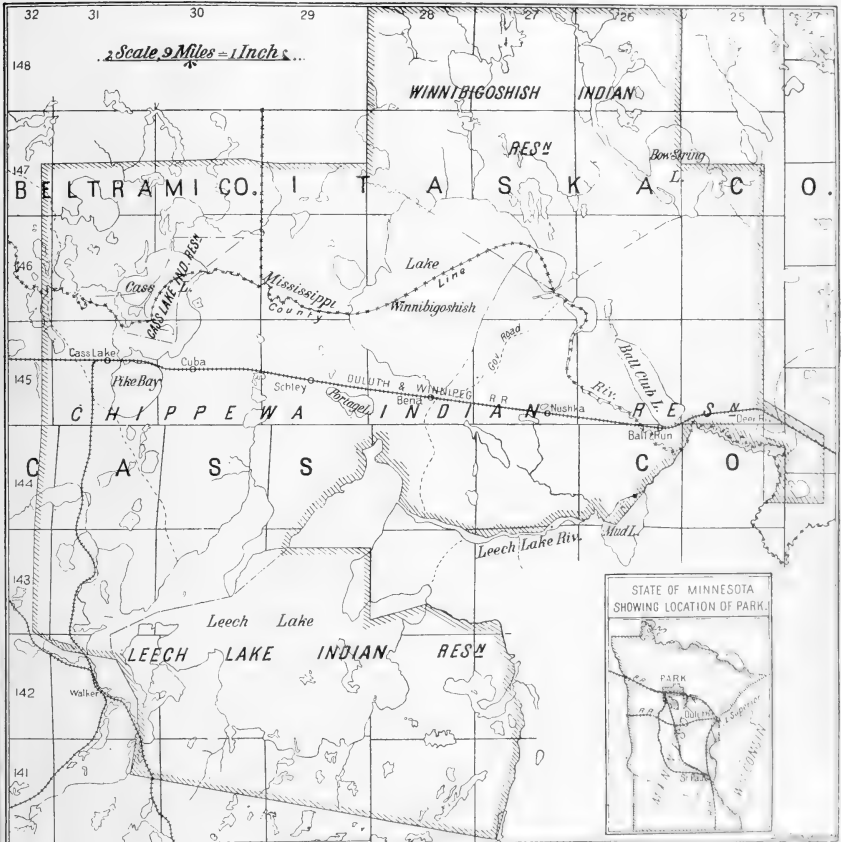
That treaty was made and the lands were ceded by the Indians to the United States in that same year, 1889, over eleven years ago. The total area of all the reservations was 1,984,297 acres. The surveys of the different reservations were promptly made.

But when it came to determining which forty-acre tracts contained merchantable Pine, and if on a given tract merchantable Pine was found, to estimating the amount thereof, trouble began. The new system (for this was the first time the United States ever sold Pine lands on the basis of the amount and value of the Pine) was put in operation, first, on the Red Lake Reservation. All the reservations were surveyed; but it was on the above reservation that the first effort was made to select the tracts which were to be classed respectively "Agricultural" and "Pine" lands, and to estimate the amount of Pine timber on each of the latter class of tracts. For over ten years (involving the discharge by two different administrations of the general government of two different corps of estimators, and the indefinite furloughing of a third corp by the present Administration), the matter went on.

It was found that the estimates of the

amount of Pine by the government estimators was absolutely unreliable; and it was remarkable that, in the case of nearly every tract, they showed much less Pine

timber-estimators over the same tracts, with such results that the amounts of Pine on many tracts were estimated by the timber cruisers of the government at one-



THE PROPOSED MINNESOTA NATIONAL PARK.

Boundary of the Park Shaded.

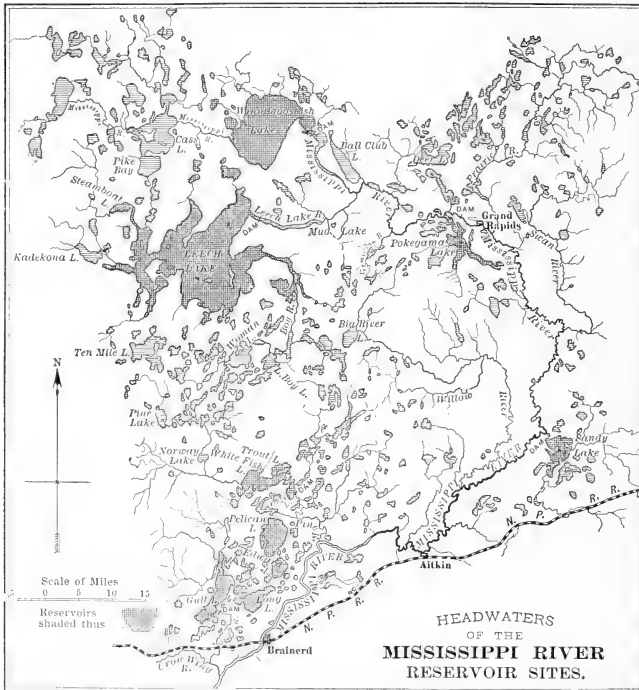
than was actually there. But the prospective purchasers, the lumbermen, were not deceived thereby. They had, in anticipation of the public sale, sent their own

seventh of the actual amount thereon; and those tracts were so reported to the government, and sales made on that basis. None of the purchasers was agreeably surprised,

however, at their good fortune in getting seven times the amount of Pine bought and paid for, because they, knowing well the utter unreliability of the government estimators, had sent their own reliable cruisers to estimate every tract on which they were going to bid at the public sale.

and from the last of March, 1899, until now, no further steps have been taken by the Government under the Nelson Law and Rice Treaty.

Sales of Pine and so-called agricultural lands had been made on the Red Lake reservation amounting to \$1,060,456.85 at an expense to the government, to be



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After two corps of estimators had been successively discharged, and a third had been engaged for some time in estimating the Pine, Congress, on March 1, 1899, amended the "Nelson Law" by granting the Secretary of the Interior power in his discretion to stop any further work in estimating those Pine lands. The Secretary promptly exercised his discretion;

charged to the Indians, under the Nelson Law of \$435,000.

MOVEMENT IN FAVOR OF THE PARK.

Meanwhile a movement was started in Minnesota and elsewhere to save a part of those beautiful forests in northern Minnesota. The Medical Fraternity and the women of the State, aided by others

were instrumental in having the general government suspend the cutting of the Pine on the reservations. A plan was put forth to secure a great tract of those lands for a National park. At once the cry went up that the area was too great. State pride and local and personal interests arrayed themselves against it. Finally, the plan was narrowed to an effort to secure for that purpose the four reservations containing the 1,297 square miles in question. An organization was formed called the Minnesota National Park and Forestry Association. This was done in July, 1889. In the autumn of that year, a Congressional Expedition consisting of twenty-one Congressmen from eleven different States and about eighty other friends of the movement went by special trains from Chicago and the Twin Cities up into the heart of the region.

The result of that expedition soon began to bear fruit. The thousands of women of Minnesota through their local organizations of League Clubs and their central body took the matter up. They secured aid from all over the country.

On account of the Nelson Law and Rice Treaty, and the lamentable failure of the government to discharge its obligations thereunder to the Chippewa Indians of Minnesota, and from the fact that the 1,580 Indians comprising the Cass Lake, Winnibigoshish, Leech Lake and Mississippi-Chippewa Tribes, had nearly all elected to take their separate allotments of 80 acres each on these reservations where they respectively resided, it was deemed necessary that a commission composed of members of both Houses of Congress, should investigate the whole matter and report their conclusions.

Accordingly, on April 11th, of this year, a joint resolution was introduced in both the Senate and the House, and by each body referred to its Committee on Indian Affairs. This measure provided that a joint commission, to be composed of the chairmen of the Committees on Public Lands and Indian Affairs of the Senate and House, respectively, with five other members of the Senate and five from the House, making fourteen in all, should

inquire and report whether it is practicable and desirable to create a national park upon the four Indian reservations in question, with power to subpoena and examine as witnesses, experts in forestry and others; to visit the reservations and confer with the Indians, etc. The measure contained an appropriation of \$10,000 for the expense of the Commission.

The Joint Resolution passed the Senate unanimously, precisely as it was introduced, on the 10th of last May.

The Committee on Indian Affairs of the House unanimously reported the Joint Resolution back to the House, recommending its passage, with the number of the Joint Commission reduced from 14 members to 6, and the appropriation for expense cut down to \$5,000.

The measure is now on the House Calendar, awaiting the determination of the Speaker as to when it shall be brought before the House for consideration and action. The friends of the proposed park, both in and out of Congress, have high hopes that the measure will be brought up and passed at the present session.

WHAT MAY BE HOPED.

If this Joint Commission shall be created under the authority of law as contained in the resolution passed by the Senate, an opportunity will be afforded to all the friends of forestry, to have an official record made up, and later, to have a test taken of the practical utility of modern forestry as applied to the forests of this country. No better site could be selected than the region of this proposed park. It is the opinion of some of the most eminent foresters in the country, that the matured Pine trees can be cut from year to year, and by clearing up the slashings and keeping out the forest fires, the Government can very nearly, if not quite, pay, out of the net proceeds of the Pine, the same rate of interest on its present value which it has bound itself to pay to the Indians, and still have a splendid National park for the people. More than that: surrounding those reservations on all sides are millions of acres, from which the merchantable Pine has been mostly

cut, and which (these same foresters say) can be reforested with White and Norway Pine, if the forest fires are kept out, and the young trees are otherwise protected, and allowed to grow. Very little of that land is fit for profitable agriculture. Its value is only nominal.

It is confidently believed that if the four reservations shall be converted into a National park, and the General Government, while protecting those forests from fires and spoliation, just as it is doing in the Yellowstone and other National parks, will extend its protection to the surrounding and contiguous tracts belonging to private owners, the latter will gladly transfer their lands to the Government, upon being protected in their right to the merchantable Pine, and to cut and remove it upon the principles of forestry, when and as the trees shall come to maturity in the years of the future.

But those of the friends of the Park who are not foresters, but simply plain, loyal citizens of the United States, having their homes in the Valleys of the Mississippi and St. Lawrence, ask their Government for this park, because they and their neighbors and friends, in all these treeless regions sorely need some easily accessible country like this, where they and their children can enjoy respite from toil, and regain health and strength in its primeval forests and on the bosom of its living waters.

It is pointed out that whilst the General Government has created five National parks, containing 5,434 square miles, and 38 forest reservations, embracing over 73,000 square miles, not an acre of either is in these two great valleys, but all in the far West, too remote to be visited by most of our people, who now comprise the majority of the inhabitants of the United States proper, raise the bulk of its

food products, and pay most of its taxes.

More than that: The magnificent water scheme within the boundaries of the proposed park, forms no insignificant part of the water supply for our great river, the Mississippi. So important a part has it played, that for over 20 years the government has been maintaining immense dams within this very territory, for the avowed purpose of reservoiring these waters, to aid navigation in that river below St. Paul and Minneapolis, and protect its volume, and the regularity of its flow.

That region will not only furnish a grand play-ground for those in search of recreation, but an ideal sanitarium for those needing its balsamic atmosphere.

Judging by the experience of New York with its Adirondack Park, which over a quarter of a million people have visited each season for the past two years, and which contains nearly twice the area of this proposed park, I have no doubt, that shortly after the latter shall have been thrown open to the public, it will be found ridiculously small, for the accommodation of the thousands who will throng it.

Then will come, year by year, its enlargement, until even the City of Duluth (which is the center of about all the concerted opposition made to the Park) will be found clamoring, through her Representative in Congress for more and more land for the Minnesota National Park, which is destined, we (the friends of the Park and of Duluth too) believe, to be for all the future the greatest boon and blessing to Duluth which she has had, outside of her commanding natural situation, her railroads and palatial steamers; and that certainly her whole population will get more direct benefit from it, than any city or town in the country.

THREE LETTERS TO THE NATIONAL IRRIGATION CONGRESS.*

THE LETTER FROM GOVERNOR ROOSEVELT.

ALBANY, N. Y., NOV. 16, 1900.

TO THE NATIONAL IRRIGATION CON-
GRESS,

Chicago, Illinois.

Gentlemen:

It is with very real regret that I find my engagements here prevent my attending the meeting of your body. I believe to the last point in the vital necessity of storing the floods and preserving the forests, especially throughout the plains and Rocky Mountain regions. The problem of the development of the greater West is in large part a problem of irrigation. I earnestly believe in the national government giving generous aid to the movement, for it is not possible, and if it were possible, it would not be wise to have this storage work done merely through private ownership; and owing to the peculiar necessities of the case, much of the work must be done by the National and not by any State government.

Moreover, it is not only necessary to establish a great system of storage reservoirs to prevent the flood waste of the waters; it is also necessary to preserve the forests on the mountains and among the foothills. This means that, in the first place, there must be a wide extension of the existing system of forest reserves, and, in the second place, that these forest reserves must be managed aright. They cannot be so managed while there is the present division among federal departments of the duties, and, therefore, of the responsibilities, of their management.

We are just getting to understand what is involved in the preservation of our forests. Not only is an industry at stake which employs more than half a million of men, the lumber industry, but the whole

* These three letters were read before the recent session of the National Irrigation Congress held in Chicago from Nov. 21st to Nov. 24th.

prosperity and development of the West, and indeed ultimately of the entire country, is bound up with the preservation of the forests. Right use of the forests means the perpetuation of our supply both of wood and of water. Therefore we cannot afford to be satisfied with anything short of expert and responsible management of the national forest reserves and other national forest interests. The forest reserves must be cared for by the best trained foresters to be had, just as the storage reservoirs must be built and maintained by the best engineers. There is the same need of trained skill in handling the forests in your best interests as there is in building the great dams which will some day bring population and abounding prosperity to vast stretches of so-called desert in the West.

Any man who has ever dwelt on the great plains knows what a serious matter not only the water supply but the wood supply is to the farmer, and of course every miner knows the same thing. Not only does the farmer need the water which the preservation of the forests itself also preserves, but he needs the wood too. So does the miner, so does the manufacturer, and so does the railroad man. The reservoirs cannot last if they fill full of silt, and the only way to prevent this filling with silt is to preserve the forests themselves. The forest is a great sponge for absorbing and distilling water. It is the great preventer of erosion, and erosion is always the danger point in any irrigation system.

Without pretending to outline definitely a working scheme, I venture to point out that without the attainment of the following objects your plans must measurably fail:

First. Government study of the streams upon which your plans depend.

Second. Government construction and control of great irrigation plants.

Third. The preservation of forests by

the extension of the forest reserve system, and hence of government control of the forests.

Fourth. National protection and use of the forests under expert supervision.

Fifth. I urge you to see to it that private owners of forests in the West and East alike understand that timber can be cut without forest destruction (the Department of Agriculture will tell them how) and that the ownership of water rights in the arid country, and of forest lands anywhere, entails public as well as private duties and responsibilities.

The East is interested in the commercial development of the arid lands of the West, just as the West is interested in the proper development of our harbor system and of our commerce on the high seas. No part of this country can be permanently benefited without a reflex benefit to the other parts. As Americans we are all interested in the progress of any part of our common country, and while your movement is of immediate benefit to the West, its ultimate benefit will be shared by the East as well. I earnestly hope that all far-sighted citizens, whether they dwell on the Atlantic or on the Pacific seaboard, or in the great Mississippi valley, will appreciate this, and that Congress will give to your efforts the substantial backing that they deserve.

Sincerely yours,

(Signed.) THEODORE ROOSEVELT.

THE LETTER FROM SECRETARY WILSON.

NOVEMBER 20, 1900.

TO THE NATIONAL IRRIGATION CONGRESS, Chicago.

Gentlemen:

The pressure of official duties stands in the way of my presence at your Congress, and I am exceedingly sorry it is so. It would have given me very great pleasure to meet you, and to discuss with you the two great agricultural problems of the West—wood and water. But the necessity of setting rightly before the President and the people the work of the scientists of the Department of Agriculture in my annual report keeps me in Washington, where I hope I shall not be less useful to your cause

than I should be if I came to Chicago. As it is, the Department will be represented by several of its scientists, and to what they will have to say I invite your special attention. Through its search for economic plants that will thrive with little water, through its studies in the use of water for plants that need more, through its soil investigations, its forest work, and in many other ways, the Department of Agriculture is working at the problems which you are met to consider. These problems are national in their scope, and it is most fitting that they should be studied by the agencies of the National Government.

The water problem, like the forest problem, is essentially and primarily one of conservation and use. The waste of water in floods and the waste of forests by fire are parallel losses, each utterly hostile to the best interests both of the farmer and of the nation at large, and each preventable by perfectly well-known means. Enlightened public opinion and the use of expert skill are the two forces which are indispensable if we are to "save the forests and store the floods," in accordance with the admirable motto of your Congress. The creation of public sentiment will be immensely forwarded by your meetings, and you may safely look to the National Government for some part at least of the trained skill to study the water problems which confront the irrigator, and to make the forests of the Great West, and of the East as well, yield their products year after year and decade after decade in unbroken abundance. The vast developments which you are planning can become permanent only by the junction of wise conservatism with energy; and the natural resources which have cost you nothing must be protected and husbanded with the same trained care which you are making ready to bestow upon vast systems of artificial works for irrigation. The chief dangers which threaten your plans—one the failure to secure the building of these great works, the other the failure to protect the forests from which your waters come—are best met, like most of the dangers which threaten our country, by the broad diffusion of wise principles

and ways of thought among the people. The two sister organizations which are striving for the objects you have in view, the National Irrigation Association and the American Forestry Association, are perhaps the most useful agents at your command for this purpose. Use and support them to the full, and see to it that in every city, town, and village, East and West, the people understand the vital interest of the whole nation in the protection and wise use of the forest and the stream.

JAMES WILSON,
Secretary of Agriculture.

THE LETTER FROM GENERAL MILES.

NOVEMBER 20, 1900.

THE NATIONAL IRRIGATION CONGRESS,
Chicago, Illinois.

Gentlemen:

It is a personal disappointment to find myself at the last moment unable to join you in this year's Congress and fulfill my part in the discussion of a question of such mighty import as that of the reclamation of arid America.

My interest in the subject of irrigation began some three decades ago when, in the performance of official duty, I had occasion to explore more or less thoroughly that vast extent of sparsely settled or unoccupied land bounded on the east by the one-hundredth meridian, on the north by the 49th parallel, on the south by the Rio Grande, and extending to the Sierra Nevada and Cascade ranges on the west. The thought often occurred to me then—and the thought has grown into a conviction as the years have gone by—that it was not a part of the economy of nature to have this enormous expanse of land lie inert and waste. Millions of acres were apparently desert, where the coyote starved and only the cactus and sage bush could live; yet the soil held within itself the elements of productiveness, the air was pure as heaven, scenery inspiring as a beautiful picture, the application of the vivifying water being the only thing lacking to arouse its rich potential energies.

Since those early days I have, from time to time, with voice and pen done what I

could to advocate the conservation of the water supply of our arid lands and the preservation of the trees, which are the guardians of the fountains at the waters' source. Ten years ago I responded to an invitation to express my views in public print on the subject of our unwatered empire. I would refer you to those views now, as I have had no reason to materially alter them.

Since the foundation of our Government the center of population has been steadily moving westward, the pioneer spirit of the east seeking homes and independence far away from the stifling atmosphere of the large over-crowded cities. This united desire of our people to own a home rather than to rent one—to be their own landlord rather than some landlord's tenants—assures the vitality of the great American Republic. The American farmer is sovereign to-day, and the dignity and independence engendered by his free environment, the healthfulness of mind and body resulting from the pure air he breathes, the love of country which home-owning stimulates, make him the preserver of those beneficial institutions under which we live. It would be a sad day, full of evil portent to the republic, if homebuilding should become unpopular, if gravitation towards the cities should overcome the outward march into the expansive country, if tenantry in an over-crowded alley should be chosen in preference to a free quarter section in valley or upland. Therefore, I say, the devising of means whereby the public domain is made available for home-seekers and the arid lands are made habitable and productive, is now one of the most important lines of American endeavor. I reiterate the saying of the keen satirist and wise philosopher: "That whoever could make two ears of corn, or two blades of grass, to grow upon a spot of ground where only one grew before, would deserve better of mankind and do more essential service to his country than the whole race of politicians put together."

The utility of irrigation ceased to be questioned thousands of years ago, and we have the records of successful methods-

which are as old as the first pages of written history itself. We have evidence that the aborigines of the southwest had perfected a system of irrigation, and the natives of New Mexico, and Arizona, who brought their methods from Mexico and Spain, handed down their skill to posterity. These methods are at once simple, inexpensive and effective, and can easily be adapted to the needs of a large proportion of our great arid country.

I am not optimistic enough to believe that the ingenuity of men can encompass the redemption of the six hundred millions of acres which comprise the nation's vacant public lands, but if, as has been claimed, there is water enough for the irrigation of one hundred millions of acres (providing the supply is economically used), I can easily imagine ten millions of good citizens finding homes on farms which are self-supporting. In the State of Texas there are still many millions of acres of unclaimed areas which would lend themselves readily to irrigation methods and become valuable to settlers. The area of this great State may be appreciated by remembering the fact that if it were populated as densely as the State of Massachusetts there would be over ninety millions of souls within its borders. But it is the immense tracts that embrace a large part of Arizona, New Mexico, Utah and Nevada, much of Wyoming, Colorado, California and Oregon, and the basin of the Columbia in interior Washington, which comprise mainly the public domain, the reclamation of which you are strenuously advocating. Whether this great work is to be left to private or corporate enterprise, whether it shall be turned over to the States in which the land is situated, for such treatment as is thought best by those most interested, or whether the national government, the owner of this vast arid region, should perform the duty of reclamation, are questions which you are no doubt now ably discussing. It appears that private or corporate enterprise cannot be trusted to control the improvement with justice and equality for all concerned. The States themselves are as yet not financially strong enough to undertake

the task. It seems to me, therefore, that the plan proposed by one of the members of your Association is the most feasible and just. It is: "Let the government build the storage reservoirs and the main line canals, and the settlers provide the smaller distributing system by banding themselves together in cooperative organizations."

I believe that Congress is awakening to a sense of the importance and propriety of lending national aid to the movement. Already considerable sums have been appropriated for the purpose of investigating hydrographic conditions, measuring streams, making reservoir surveys, etc., and I believe that before long the policy of national aid in the building of storage reservoirs will be established. The government has spent over eleven millions of dollars in improving the navigation of the Missouri River, and, as its middle course is through an arid or semi-arid region, and as the necessity for water transportation increases in direct ratio to the productiveness of the land through which the river flows, it seems logical and right that the attention of the Federal authority should now be given to the conservation, for irrigation purposes, of its surplus flood, which does such great damage along its lower course when, swelled by melting snows, its mighty volume bursts through its expensive confines.

The national government has appropriated, to June 30, 1900, for expenditure by the Mississippi River Commission, \$37,647,780.17, of which \$15,403,901.87 were expended for levees. There must be added to this latter item over 15 millions of dollars contributed by the States, making 30½ millions expended in efforts to confine the surplus wealth of vitalizing fluid contributed by mountains until it is lost in the great ocean. Think of the thousands of farms that could be made productive by the judicious expenditure of only a part of this great sum. There are able engineers who even question the wisdom of constructing artificial banks, claiming that sooner or later the resistless flood will break through, and when it does the damage done will be a

thousand-fold greater than it would were the waters allowed to spread as nature permitted. But there is no question as to the utility of storing up a portion of the flow of water that runs away in non-irrigation seasons that it may be available for use during the growing periods. As a distinguished United States engineer, referring to the arid region of the west, reports, "In no other part of the United States, nor anywhere else in the world, are there such potent and conclusive reasons, of a public as well as a private nature, for the con-

struction of a comprehensive reservoir system."

I congratulate you, gentlemen, on the patriotic and efficient work you are doing in promoting a national irrigation movement, from which I feel confident will be achieved substantial results of immense interest and importance to the country.

I remain, with best wishes for a successful and profitable Congress,

Yours faithfully,
(Signed) NELSON A. MILES,
Lieutenant General, U. S. Army.

LUMBERING IN THE SEQUOIA NATIONAL PARK.

BY WILLIAM R. DUDLEY,
Stanford University, California.

In the September number of the *FORESTER*, page 209, reference was made to the mill on the Atwill claim, along the Mineral King road in the Sequoia National Park. Revisiting this cutting this summer, I find that considerable lumbering has been accomplished since my last visit, in 1897, and that the otherwise beautiful forest along this road is wofully marred by what appears to be a very wasteful process, leaving a large amount of refuse material on the ground.

Six photographs were taken * and I ask the privilege of saying a few words to emphasize what they show.

These seven townships forming the Sequoia Park, if better known, would be the play-ground for summer outings of a large number of California people, and ought to be a source of national pride. Upon the Park's mountain benches and brooks stand thousands of the noble Sequoia, forming collectively the finest groves that have been discovered, and soon to stand out in still greater superiority over smaller groups of the species through the complete destruction of the King's

River groves. The Park, moreover, includes all the streams of a considerable river which pours its floods forth to water and make fertile the great Visalia Delta district in the San Joaquin Valley below.

The writer joins, therefore, most earnestly with Major West, the present military superintendent of the two National Parks, who has recently recommended in his annual report the extinguishing of the private claims within the park boundaries.

In the first place the milling at Atwill's is not a very profitable business to those engaged, those managing it not having great experience. The mill cannot handle the big *Sequoias* without blasting and destroying a great deal of sound timber; it cuts probably only a little over 5,000 feet a day, and supplies only a very local market.

In the second place the Sequoia Park is a public one, and it is wrong in principle to have lumbering going on within its borders, among the very trees it was established to protect. From what I have learned I believe the owners of private claims within the Park could be bought out for reasonable compensation.

I am a strong advocate, moreover, of Major West's proposition to extend the

* Owing to lack of space, it has been possible to reproduce only three of these photographs—ED.

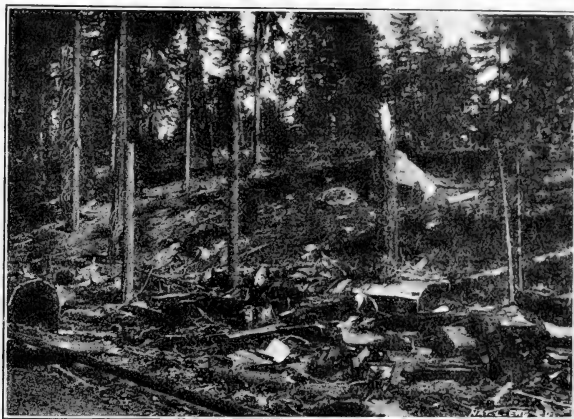


ATWILL'S MILL AND A SCENE ONE QUARTER OF A MILE FARTHER UP THE ROAD.

boundaries of the Sequoia Park, taking in, among other tracts, the great "high Sierras" back of the Park and establishing a game preserve, within which could be

other mountain animals might also be introduced to its fastnesses.

I call attention in photograph No. 2 to the bush-like young *Sequoias*, in the mid-



IN THE UPPER PART OF THE CUTTING. THE LOG SHOWING ITS SECTION IN THE LEFT OF THE PICTURE IS 6 FEET IN DIAMETER AT THE CUT. IT IS SOUND FOR MANY FEET ABOVE THE CUT. THE WASTE IN THE FOREGROUND IS FROM THE SAME TREE.

brought back to these peaks, the long since exiled big horn sheep, and much decimated bands of deer. The chamois and

dle ground. These have sprung up naturally since a cutting five or more years ago.

NORWAY SPRUCE FOR PROFIT ON THE PLAINS.

BY HAROLD B. KEMPTON.

Division of Forestry.

The Norway Spruce, so well-known in the East, has as yet been planted very little on the plains. It has been introduced sufficiently, however, to establish for itself a wide range of successful growth. One plantation at Conroy, Iowa, has been treated in an admirable manner, and shows many points of interest which are equally valid throughout Iowa, a large part of Nebraska and Kansas, as well as many other Central Western States. The plan which was here employed may be used in

economic planting throughout the entire country.

Eighteen years ago the seedling trees were sent from Mount Carroll, Ill. in boxes, packed closely with wet sphagnum moss. The young trees were still moist when received and were then immediately heeled-in preparatory to being set in nursery rows. For several years they were screened by the partial shade of laths. After transplantation they were set four feet apart in twelve-foot rows, and were

interplanted with corn. This interplanting and the consequent frequent cultivation was performed at no expense, as the corn produced paid for the necessary cultivation. It is a notable fact that not less than 95 per cent. of the planted seedlings are alive now, and in good thriving condition.

Growing nearby in plantations similarly managed are Green and White Ash, Box Elder, Soft Maple, Honey Locust, Red Cedar, White Pine and Scotch Pine. Under the conditions found here, the Norway Spruce makes a more rapid growth than the other trees, at least so far as timber value is concerned. Red Cedar makes a more valuable fence post or telegraph pole, but it requires a very much longer period for growth. It can, however, be made as profitable as Norway Spruce, or more so, if closer planting be practiced (not greater distances being used than 4 by 6 feet). White Ash, also, is more valuable as a post timber and may be planted to advantage 4 by 4 feet. The Norway Spruce in the Conroy plantation have averaged a growth of 1 foot 9 inches per year for the last fifteen years. The present average height is 29 feet, while the diameter is 4.7 inches.

As an ornament this Spruce is surely of great value. Its graceful drooping branches and luxuriant foliage make it a favorite among evergreens. The tree is hardy and grows thriftily from Central Kansas (Vinland, Douglas County, has some magnificent specimens) northward through Iowa and Nebraska, South Da-

kota and into Minnesota, Wisconsin and Illinois.

For profit, the Iowa plantation, which was measured by Members of the Division of Forestry is a fair example of the value of the Norway Spruce in any of the above mentioned States. The estimate values each first class post at 12.5 cents (Red Cedar sells for 15 to 20 cents, and Ash for 12.5 to 15 cents). The trees average two good sized posts each. Of two typical areas measured, one was rated at \$145.62 per acre and the other \$144.04 per acre. This is an average annual gain of \$8.045. The trees are now large enough for small telegraph poles, and as such they would bring at least one-third more, which is \$10.726+ per year. At the present rate of growth, in ten years the trees will triple as telegraph poles their present post value. This raises the average value to \$16.22 per acre per year for the entire period of growth.

The great portion of land in this region is planted to corn. An average price is \$.20 per bushel. This is an annual gain of \$7.00 per acre. The estimate includes neither annual cost of seeds, nor cultivation, which must occur at least three times per year. Thus, at the present time, selling the trees as telegraph poles they would bring a net gain over corn of \$3.726 per acre per year, or a total in the eighteen years of \$67.068 per acre. In ten years the trees as poles will bring a gain over corn of \$9.22 per acre, which in the twenty-eight years is a total over corn of \$258.16.

Farmers have therefore had to undertake tree planting in order to keep themselves supplied with fence posts and wood for various uses on the farm. The conditions in these now treeless portions of Indiana are, however, very favorable to the establishment of plantations, especially in the regions where the originally marshy lowlands have been drained off. Besides this, the recent law which practically exempts tree plantations from taxation will decidedly reduce their cost.

Tree Planting in Indiana.

The Division of Forestry of the Department of Agriculture has during the last summer examined the sites of a number of plantations in Indiana, in response to the applications for tree-planting plans which have been received from that State. Although four-fifths of Indiana was originally well timbered, as much of the State is now practically treeless, with the exception of narrow strips along the rivers. In some places the available timber has all been cut off, even down to the streams.

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Forestry in
America.

We have been surprised to find the following in a brief paragraph entitled "American Forestry" in the November issue of *Meehan's Monthly*: "American forestry has not yet gone beyond the preservation of our own forests, for general reasons. Tree culture for profit, which forestry signifies in the 'old world,' is here not thought of." These remarks though dropped in a casual way as undeniable truths, no longer require express correction here. But unfortunately there are still many people who, having made the discovery that European forest methods cannot be imported bodily into this country, and having got no further, would be satisfied to believe such utterances. To these it is instructive to put the two following questions: If you were charged with the management of a tract of land bearing only trees—even in America—is it not probable that you could find use for a forester's knowledge and experience? What would the application of this knowledge and experience to your difficulties be? These queries usually suffice to make it clear that the growing of timber from the seed, as in Germany, is no more the be-all and the end-all of forestry than the construction of Cunard liners is the whole of the business of a naval architect. The

conditions may not be as favorable to tree culture for profit in this country as abroad; but the forester can easily justify his presence, and is daily finding opportunities for work of the most practical kind.

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The Ninth Session of the Irrigation Congress.

The ninth annual session of the National Irrigation Congress, held last month in Chicago, was not only pleasant and profitable to the large number of members and delegates who attended it, but a cause of congratulation also among all who are interested in irrigation and forestry. "Save the forests and store the floods" was the motto stretched across the platform in the Central Music Hall, and the moral, more than all others, which could be drawn from every paper and address was that the program of the National Irrigation Association is not a Utopian scheme backed by people of more enthusiasm than common sense, but a very practical one which appeals to, and deserves the support of, business men in the East as well as of farmers in the West. It is true that at the last minute three of the sincere and influential friends of irrigation and forestry—Governor Roosevelt, now Vice-president-elect, General Miles, and Secretary Wilson—were prevented from being present, but their absence though regretted was partly atoned for by the letters which they sent, and the meeting as a whole went off most successfully.

Outsiders who were present during part of all the four days through which the session lasted must have been convinced that the obstacles which delay the "annexation of arid America," and the establishment of proper irrigating works in the states not spoken of as arid, are in no way insurmountable. Consisting chiefly of bad laws, a great lack of reservoirs, of surveys indispensable to their establishment, of estimates of the flow of water in different streams, etc., they can, and would doubtless ultimately be overcome in any case. But the Irrigation Congress sees no good reason for waiting for blessings which can be obtained more cheaply and better now than fifty years hence, and for this reason

is going about the work of bringing to the attention of farmers, manufacturers, investors, the public generally, and lastly, but also first and always, the politicians, the true state of the case; of making them realize that liberal appropriations for surveys, and a revision of the laws regulating the ownership and use of water and of the forests at the streams' sources, will mean the possibility of filling with a thriving agricultural population, demanding the manufactures of the East and supplying the country with products of which many now have to be imported from abroad, fully seventy million acres of land that are still desert. The Congress has carried on its work of arousing and educating public opinion in regard to these facts by holding meetings in those parts of the country where irrigation was being practiced or introduced since 1891, but this autumn it was thought possible to hold a session farther east. Chicago will be one of the chief gateways to the arid region when it is reclaimed, and it was found last month that the business men of that city, as well as other people, fully understood and appreciated the value and importance of the program which the Irrigation Congress is advocating.



Work of the American Forestry Association and the Membership. Although the importance of a proper care and use of the water supply and of the preservation and maintenance of our forests is obvious to many men and women in all parts of the country, a great deal must still be done before the average voting citizen has here a definite conviction of his own. And yet nothing short of this will suffice in the long run. The problems that may be brought under the heads of forestry and irrigation strike too deep among our habits, ideas, and laws concerning the

management of public and private property, for this to be denied. Fire laws may be passed, but until the people generally not only understand but feel, and are ready to make others understand and feel, that fires are nothing short of a curse, fire wardens will surely find excuses for not prosecuting, and the laws will remain as dead letters on the statute books. Until the land owners in every State and on every watershed realize that forestry is what is called a practical proposition, the woods will continue to be mismanaged and wasted as heretofore, and the streams will continue to suffer.

To build up and educate a widespread and sturdy public interest in these matters is more than any other the object of the American Forestry Association. Its successful activity in the work in which it is engaged is bounded only by the limits of the funds at its disposal, and by the number of people with whom it is in touch. It is accomplishing a great deal, and yet, compared to what might and should be, very little. If every member of the American Forestry Association would undertake to add three or four members to its list during the next couple of months he would do his share in much more than quadrupling its efficiency for the year 1901. The Association needs one thousand a year more to distribute properly literature which it is now unable to make effective use of, and should also have another thousand to defray the expenses of lectures. The Association has no strength or power apart from its members. It and the different State Associations can do no more than express in the most effective way the efforts of those who believe in its objects. What the Association accomplishes will be in proportion to their enthusiasm and efforts.

NEWS, NOTES, AND COMMENT.

A Correction.

In the FORESTER for October there appeared in this department (p. 248) a quotation from a paper in New York State about "Gypsy Moth Colonies" in Massachusetts. In the course of this it was said that a flourishing colony had been found in an evergreen hedge on a neglected farm in West Medford, and that this hedge was in the care of a man who opposed an appropriation for the Gypsy Moth Commission. We have been informed that the hedge is on an estate which is well cared for, and that, as far as the gypsy moth is concerned, the hedge was until a year ago under the care of the Gypsy Moth Commission. Our correspondent writes that recently one hundred egg clusters were found which could have been seen by the inspectors in 1899, and that over twelve hundred have been discovered which have been laid since.

Conference with
Massachusetts
Tree Wardens.

On November 23d, the Massachusetts Forestry Association held a meeting in Boston to discuss the workings of the so-called tree warden act which went into effect last spring. The tree wardens from the different towns had been invited to attend the meeting and over fifty of them were present. Their verdict seemed to be that the law was a good one, that public sentiment was surely behind it, and that it would and would be rigidly enforced. It must further have been most encouraging to the Forestry Association as the author of the Act to note the high class of men who had been chosen for this post by the fifty or more towns represented at the conference. Two of the wardens for instance, one from the eastern the other from the western part of the State, were among the most eminent members of the legal profession. Both of these wardens spoke in high commendation of the law. On the whole the meeting was not only exceedingly gratifying to the Forestry Association but proved of the greatest value to the Associa-

tion's committee on legislation and, it is hoped, to the wardens present as well.

This tree warden law (Chapter 330, Acts of 1899) obliges every town in the State to elect annually an officer known as a tree warden. Cities do not come under this Act. Separate provision will probably be made for them later on. The warden has exclusive care and control of all public shade trees in the town outside of such grounds as may be under the control of a board of park commissioners. The law also specifies that all trees within the limits of the highways are deemed to be public shade trees. No tree on the highways can be cut down without the warden's consent, and this consent he cannot give without first posting notice upon the tree in question and in two other public places in which he calls a hearing. Even after a hearing the warden's decision is final. Adequate penalties are provided in the shape of fines and imprisonment for all violations of the provisions of the law. The law is specific as to the duties of the wardens, and under it every root and twig is protected from mutilation. No posters are permitted on the trees, and electrical companies are required to run their wires in accordance with the warden's wishes. When it is absolutely necessary that wires should pass through the tops of street trees, and trimming is required to give free passage, the warden's men do the cutting under the direction of that officer but at the expense of the corporation thereby accommodated.

A Society
of American
Foresters.

During the last week in November a Society of American Foresters was founded in Washington. It has not yet been fully organized; but its character and objects are definitely scientific and only professional foresters will be eligible for regular membership. An associate membership will make possible the election of men who, though not foresters, make notable contributions to American Forestry.

Regular meetings will be held more or less frequently throughout the winter, at which papers will be read and discussed. Some of these meetings will be open to all who are interested in forestry; others will be closed to all but members of the Society.

The fact that there are now enough people in the country who have had technical training and experience in forestry to feel that they need a formally appointed meeting ground, is significant of the growth of interest in the subject.

**The Philippine
Bureau of
Forestry.**

On April 14, 1900, the military governor in the Philippines placed Captain George P. Ahern, 9th U. S. Infantry in charge of the Forestry Bureau at Manila. The reports which have been received from Captain Ahern, outline briefly what the Forestry Bureau has done, and what Captain Ahern's program is.

From various sources of information it appears that the public forest lands comprise from one-fourth to possibly one-half of the area of the islands or from twenty to forty million acres. In the country close to Manila much timber has been cut, but in other parts of the island of Luzon, and other islands, there has been very little lumbering. In the forest regulations three hundred and ninety-six tree species are mentioned, and Capt. Ahern says that it is safe to state that the total number of tree species is nearer five hundred than four hundred and fifty, the great majority being probably hardwoods. There are many valuable Gum, Rubber, and Gutta Percha trees, but owing to adulteration and fraudulent practices the trade in these is in a bad condition. The Bureau knows of seventeen dye woods which, if properly exploited, should yield enough revenue to pay the cost of the forest service. There are probably many trees possessing valuable medicinal qualities. The blossoms of the Ylang Ylang tree, which is very common, produce an oil which is the basis of many renowned perfumes. In all parts of the southern islands Coconut Palms, which yield a yearly revenue of from \$1 to \$2 per tree, grow without any effort of care.

At present a great obstacle to the proper

use and care of these forests is the almost total lack of roads and river driveways, worth mentioning. The lumber methods in the island are also rudimentary and unpractical. The Philipinos seem to have followed their own customs almost entirely, and the Spaniards to have done but little with the lumber business.

Captain Ahern's first task was to straighten out the records of the former Spanish Bureau, and to get the office into working order again. It was found that the records were very scanty, and that under Spanish rule the forest service had done little except collect the tax where lumber was cut. There had been almost no attempt to enforce regulations, nor any observance of system in cutting on public lands. The old regulations have been revised and in some details altered.

As the regulations now stand they classify the timber of the islands into six groups, and, using as a unit of measure a cubic foot, prescribe a tariff on each of the six groups as follows:

Superior Group.....	14 cents per cubic foot.
First "	10 " " " "
Second "	8 " " " "
Third "	3 " " " "
Fourth "	2 " " " "
Fifth "	1 " " " "

The State sells its trees standing, and excludes the bark in measuring the trees. In the first groups are the Ebony, Mahogany, Teak and other valuable timber species. The woods of groups, 3, 4, and 5 only, may be cut for fuel. The regulations next proceed, after giving a list of the different trees under each group, to specify rules for (1) the utilization of timber in the forests, (2) the gratuitous use of State timber, (3) cutting of firewood for the market, (4) the procuring of Caoutchouc, Gum Arabic, Gutta Percha, etc., etc.; (5) the obtaining of licenses, etc.

The present employees of the Forestry Bureau have not been well trained; the public lands are unsurveyed; and the amount of standing timber is unknown. The success of the Bureau's work depends, of course, largely on its personnel. Men who are acquainted with the country, people, language, and with the conditions which existed under the Spanish govern-

ment, are indispensable; but it is now important that the Filipino graduates of the native colleges should be instructed in scientific forestry, and be induced to enter the service. Some men who have already had scientific training are also needed from this country. An application has been made to the School of Forestry at Cornell for such men, and Judge W. H. Taft, of the Philippine Commission, recently cabled to the Division of Forestry for four foresters. The men who go out will be employed both in instructing the Philipinos and in practical work under the Bureau of Forestry.

Among the applications for advice and assistance in managing woodlands which have recently been received by the Division of Forestry of the U. S. Department of Agriculture is one from the Great Northern Paper Company of Maine. This company owns a tract of 300,000 acres on the Penobscot and Kennebec rivers, chiefly spruce land. It is undertaking to lumber in such a manner that the same acres can be cut over repeatedly with good profit, and is making use of the aid and advice of trained foresters in order that its estimates and the plans and methods which it adopts may be reliable and best adapted to the ends in view. The surveys and measurements in which the Division of Forestry will base the working plan to be submitted to the company will probably be begun next spring.

The field work of the Division of Forestry of the Department of Agriculture, which has been carried on

in many parts of the country by parties of different sizes since last May, has now been largely completed for 1900. This summer's work was carried on in New York, Tennessee, Missouri, Colorado, South Dakota, Arkansas, Arizona, Washington, Oregon, California, a number of the tree-planting States of the Middle West, and, in a small way, in other States besides. Much new and valuable information has been collected, and a very large number of surveys have been made, of the

results of which it will soon be possible to make practical applications.

The work which has thus been going on in the field consisted of making forest surveys and of gathering measurements and information about growth, stand, reproduction, etc. Much of it, as that in the Black Hills Forest Reserve, in the Adirondacks, and on the tract of the Sawyer & Austin Lumber Company in Arkansas, is preparatory to the preparation of what are called "working plans," or plans for the management and utilization of given tracts of timber. The rest of the work of the field parties has been more of the character of investigations—as, for instance, the examination of the influence of forest cover on waterflow which was made on the watershed of the Arrowhead river in southern California, the studies of the habits of growth and reproduction of the two most important lumber trees of the Pacific coast—the Red Fir and the Redwood, and the survey of the results of tree-planting enterprises which have been undertaken in the northern part of the Mississippi Valley.

During the coming winter the agents of the Division will spend most of their time in working up the results of the summer's surveys and in preparing reports on them, although there will doubtless be some field work as well.

“Colorado business men recognize the benefit that attaches to their State

through the work of the Government along the lines of irrigation investigation and surveys for reservoir sites. The Denver Chamber of Commerce and Board of Trade last month adopted vigorous resolutions calling attention to the great development possible in Colorado, through irrigation, and to the generally accepted opinion that only by the storage of flood waters can the future problem affecting successful farming in the arid region be solved, and pledging support to the United States Geological Survey in securing large Congressional appropriations for carrying on their work of surveys of reservoir sites, and other preliminary irrigation work.

"Every dollar expended by the National Government for the building of storage reservoirs and great irrigation works to reclaim the millions of acres of western aridity will return to the Federal treasury six-fold in the form of increased taxes on increased land values and population. Every Congressman knows this, now that his attention is being called to the subject by eastern manufacturers who want a larger market in the West for their goods, and all that is required for his favorable action is a strong and aggressive demand from every western State and Territory and Congressional district."—*National Advocate* for November.



The Results of Tree Planting in the Middle West. The Division of Forestry has just completed the first extended survey of the results of the early tree planting enterprises which has ever been made in the Middle West. Hitherto there has been no attempt to digest on any considerable scale the experience which might have been gained from these plantations. The result has been that though plantations of trees are everywhere needed as windbreaks and ready sources of supply for fence posts, fuel, etc., they have hitherto been established chiefly according to rules and customs which were founded only on loose generalities and scanty experience. Since last July, however, two field parties from the tree-planting section of the Division of Forestry have been examining large numbers of plantations in Kansas, Nebraska, South Dakota, Iowa, Missouri, and Oklahoma, with the purpose of observing the effects of the soil, location, and methods of planting on the growth of trees in as great a number of plantations as possible.

The summer's work was begun near Wichita, Kans., and under the direction of Mr. W. L. Hall, Assistant Superintendent of Tree Planting in the Division of Forestry was carried on by two parties. One of these traveled northward as far as South Dakota and then back again through Iowa and Missouri. The other, with Mr. Hall in charge, made a thorough survey of

the plantations in southern Kansas, eastern Arkansas, and the southwestern corner of Missouri. Both of these parties lived under canvas and were thus able to visit almost all the plantations in the regions through which they passed. The surveys which they made proved most instructive as regards the influence of methods of planting, soil conditions, exposure, etc., on the growth of the trees, and their results will greatly facilitate the preparation of planting plans in the future.

Among the plantations which were visited were the well known ones of the Kansas City, Fort Scott and Memphis Railway, of Mr. H. H. Hunnewell at Farlington, of Mr. George W. Munger at Eureka, and of Mr. George W. Tincher near Council Grove. The natural timber growth in western Arkansas was carefully examined, in order to make a comparison between the supply from these native forests and the need of posts, fuel, telegraph poles, etc., in the adjacent tree-planting States.

Most of the localities visited showed great interest in the subject of forestry. Frequent meetings were held in order to give Mr. Hall and Mr. Clothier, who had charge of the work in the northern states, opportunity to discuss publicly the tree planting work, and to give opportune instruction on methods of establishing and developing forest plantations. Such meetings serve, beside the purpose of instruction, to stimulate a livelier interest in the work of timber growing and to create a keener appreciation of trees and forests.



A Working Plan for the Black Hills Reserve. Mr. E. M. Griffith, a field assistant in the Division of Forestry of the Department of Agriculture, with a large body of assistants, has just finished making a forest survey of the Black Hills Reserve in South Dakota. The summer's work, which has thus been completed, is preliminary to the preparation of a "working plan" for the forests of the Reserve, which was undertaken at the request of the Secretary of the Interior. It will be submitted to him by next spring, and, if adopted, will result

in the first application of scientific forestry to our national lands. The Black Hills Reserve, on which this examination has been made, contains 1,211,680 acres. No other tract of its size in this country or abroad presents more favorable conditions for forest management than this Reserve. Markets are accessible on all sides, and there is a large and steady demand for timber. The forest, too, reproduces itself easily and grows with great rapidity, so that, although cutting and burning have gone on in some places, the problem which is presented is not, as in southern California, that of fostering a scanty growth and creating forest conditions, but rather of utilizing and caring for an already well-established forest.

In the course of the summer's work a large part of the Reserve was examined, and on 12,000 acres exact figures were collected regarding the size and kind of all standing trees. From such measurements estimates of the present stand and future yield of timber can be compiled, and on these the recommendations for the management of the reserve will be based.

After leaving the Black Hills Mr. Griffith and his student assistants went to southern Missouri, where they are now beginning similar field work on a large tract of hardwood land belonging to the Deering Harvester Company. This company, which applied for a working plan last spring, has undertaken the raising of timber for its own use.

AMONG AMERICAN AND FOREIGN PERIODICALS.

A very interesting and valuable publication has just been received in the form of a reprint from the *Vierteljahrsschrift des Bayerischen Landwirtschaftsrathes* on *The Influence of Plant Cover upon the Waterflow of Rivers*, by Prof. Dr. E. Wollney in Munich. Although so many observations and theories are in existence on this subject, the opinions of many distinguished individuals widely differ. The cause of it, says Professor Wollney, is mainly due to unreliable methods of investigation. Little information of value has resulted from noting the changes in the rate of waterflow in connection with the extent and nature of wooded surfaces. It is clear that, owing to the many factors involved, the problem can never be thus satisfactorily solved. Other factors than forest cover effect the waterflow, such as the nature of the soil, incline, shape of basin, waterfalls, etc. In comparing bare with forested surfaces, regions have often been rated as naked which were covered with weeds and other growths.

Professor Wollney states that in this discussion single causative influences will be studied from which to draw conclusions which are not absolute data but helps in affording acquaintance with the different phenomena connected with the problem of waterflow.

He speaks with right of the immense importance of the subject especially to agriculture.

The great desideratum is to know how it may be possible to decrease floods and prevent extreme low water. Whatever is done to diminish high water fortunately acts favorably in reference to low water. As a rule agriculturists and foresters believe that slumby and forest

growth keeps the soil moist since the covering shades the ground and protects it from the drying effects of wind and sun. This is only so in so far as it relates to direct evaporation by sun and wind from the surface. A process of drying out occurs through the action of vegetation so that a region covered with plants during vegetative activity contains less moisture than a naked soil. This is due to the large consumption of water by plant growth. Although the surface of a forest soil may be moister, the actual water content of a naked soil is greater. The soil under a forest cover dries out down to a much greater depth than bare soil.

An unplanted soil covered with litter is during dry seasons of the year much moister than bare ground. Litter however stimulates the growth of trees, which causes greater demands for moisture. The value of litter diminishes as the growth and transpiration increase. Evergreens transpire throughout the year, deciduous trees for a shorter period of more intense growth. By the year, however, the conifers transpire more than deciduous species.

In short, Professor Wollney concludes that for ests do not in any way actually increase the amount of water in the soil by producing rain or by preventing evaporation; that in fact the beneficial influences in these matters are more than counter-balanced by the immense amount of water transpired by the leaves.

Next he considers the influence of plant cover on the debris-carriage of flowing water. Grass-covered slopes assist in preventing erosion but in less degree than a forest cover. He concludes that slides of earth and debris on steep slopes are

diminished to an extraordinary degree by forest cover, and that the roots of trees hold the soil and debris in place. Also by affording mechanical barrier in the form of a network of roots and soft surface cover the rapidity of run-off is hindered. *A forest cover therefore has the least, if any effect, on the amount of the run-off, a much greater effect on the rapidity of the run-off and the greatest effect as to the amount of debris carried.*

The booklet is worthy of careful study on the part of those interested in the effects of forests on stream flow.

The Bulletin of the Botanical Department, Jamaica, for October contains an interesting note in reference to Kola. Dr. P. Preuss, Director of the Botanical Gardens at Victoria, German Cameroons, West Africa, says that the species grown in Jamaica is *Cola vera*, which yields a finer grade of nut than is produced in West Africa. It would be well for Americans who contemplate planting this tree in the tropics to bear this in mind. For those not familiar with Kola, I should add that it is extensively cultivated for its seeds, which are used like chocolate. It is used as a medicine, nutrient, and stimulating beverage; in fact, if it possesses half the virtues claimed it is one of the most wonderful of all vegetable productions. I should add also that the production of many tropical products, such as coffee and chocolate, belongs more to forestry than to horticulture or agriculture, because most of them require shade and this shade is or ought always to be of some species fit for timber or yielding other valuable materials. Many of these tropical plants are *shade-demanders* and grow better under forest conditions than in open cultivated orchards or groves.

The U. S. Consular Report for October contains three interesting communications on the market for lumber in Germany, France and Greece.

The first is from the Consul at Lyons, France. In this he says: "Only White Oak will find a market in this part of France. Red Oak is objected to on account of its lack of uniformity in tint and color. The wood must be first-class to meet the demands of the market. It is not worth while to attempt to export Poplar or any soft white woods to France." He then quotes a large proprietor whom he consulted on the subject as follows: "A boy can plant 1,000 Poplars in a day along a brook, a river, or a roadway. It costs nothing to grow them and their roots add firmness to the earth. They can be trimmed twice or three times in twenty years, and at each trimming the branches bring one franc (presumably per tree). The branches are dried and sold to bakers. They furnish the quick intense heat which gives the thick crust to the bread. There is always a market for them. At the end of twenty years, the tree will always sell for a franc."

The Consul at Athens seems to think that owing to the scarcity of wood in Greece, timber of various kinds might be profitably exported to that country.

The Consul at Eibenstock, Germany, is of the opinion that there is a great demand for hardwoods in the log in Germany. He says "The sawmills of the Empire can not get enough hardwood logs. The brush factories of Schönheide and the musical-instrument factories of Klingenthal and Markneukirchen consume annually great quantities of imported woods."

The most interesting article in the *Allgemeine Forst und Jagd-Zeitung* for November relates to the forest conditions of Hungary. The entire forest area of Hungary including Croatia-Slavonia is 9,074,121 hectares which is 27.16% per cent. of the total area. The minister of agriculture at Budapest is the chief forest official. The present forest government dates from a general law of 1880. In the case of private forests, not declared to be protection forests, there exists the requirement to reforest land which is suitable for nothing but forest growth.

There is an academic training of three years for foresters with a supplementary year for engineering studies. Two years of practice are required and then a State examination in Budapest. One annual scholarship for foreign study is granted to the most deserving aspirant. There is also a two-year course for training forest guards. Only a limited number of sound, able-bodied men are accepted in these schools which are supported in part by the State. The lowest salary for a forest guard is \$1.40 per year the highest for the *Oberlandforstmeisterministerialrath* is \$2,100—a salary wholly incommensurate with the length of his title.

On *absolute* forest soils the State can compel a private owner to reforest within six years after clearing; otherwise he suffers a severe penalty. Protection forests regardless of ownership must be managed according to State prescriptions.

Reforestation of desert places is furthered by the State by furnishing young plants gratis and by reducing taxes on such land. Large sums are spent every year for water-regulation chiefly in reforestation for the prevention of floods.

Our American Locust is highly esteemed in Hungary, owing to its rapid growth. It is used for fuel, vine props, and light construction.

It is interesting to note that the government regulations are based on the object of securing a fixed proportion of *surface* covering and not of *mass* amount.

In Hungary, as in this country, the question of pasture is a very important one. The author contends that the bad condition of many forests is due to excessive pasturing. The practice of selling on the stump widely prevails even in government forests which results naturally in much destruction to the young growth.

Many minor forest industries are extensively developed in Hungary, especially the collection of Oak-gall. These galls are produced by a fly

which lays its eggs in the young wood. They are collected and used extensively in the manufacture of ink, dyeing and tanning. These are encouraged by sowing the galls containing the eggs in places where they may be desired.

A translation in full of the articles in the *Forst und Jagd Zeitung* on the teak forests of Java by Forst-Assessor Seibt, a review of which appeared in our last issue is now running in the *Indian Forester*, beginning with the September number.

The "Revista de Montes" for November contains an interesting announcement in reference to arbor day. It is called in Spanish "La Fiesta del arbol," or the festival of the tree. It is the text of a circular issued by the Provincial Council of Agricultural Industry and Commerce of the city of Valladolid. It covers five pages and is signed: *El Gobernador, Presidente, José Díaz de la Pedraja; El Ingeniero, Secretario, Oleario Gutiérrez del Olmo*. The circular contains in brief the following: "There is no agriculture possible without forests, nor forests without a popular love of woodlands." "Trees are the beauty of the country, the safe-guard of water sources and the providence of the mountains." "One of the symptoms which clearly reveals the civilization of a district is the respect in which trees are held and the constant care of their regeneration." The advantages of such a

festival are set forth. It gives occasion to teachers to show explanatory maps of forests and agriculture, to teach how and why to respect trees, to condemn the killing of birds and the robbing of nests since the insectivorous birds help to exterminate pestiferous insects.

It would be easy, at least possible, in every municipality to acquire some uncultivated or desert place on which such trees as the Locust and Ailanthus might be planted; also shade trees along sunny roads. In these and many other ways, however humble, it can be shown how to retrieve the errors of the past and remedy what ignorance and vicious customs have engendered.

It is of interest to note the favor with which the idea of the American Arbor Day has been received in the countries of southern Europe where they are fond of festivals and where the addition of another holiday for merry-making is always received with more or less delight. In preceding numbers of the *Revista* there have been articles in which the author has endeavored to show that the idea of an arbor day—that is tree planting by school children—is after all an old thing in Spain. He concludes, however, that this importation is not wholly identical with such customs in Spain. A translation of these articles would make interesting reading.

JOHN GIFFORD.

RECENT PUBLICATIONS.

Forestry in British India. By B. Ribbentrop, C.I.E., Inspector-General of Forests to the Government of India. Calcutta: Office of Government Printing, India, 1900. Pp. 245. Maps, 4. Price, three rupees or 4s. 6d. Not only to foresters the world over will this little book prove of interest, but also to those who have their country's welfare in mind; it shows in a brief and concise way how a system of forestry has been built up step by step since the conquest of India by the British, and in what manner that country has profited from such a system.

The author's preface explains the object of the work most excellently:

"The end of my career in the Indian Forest Service is drawing near. It has extended over 33 years, and though I was not in the country when regular forest conservancy was first introduced under the auspices of Mr. (now Sir Dietrich) Brandis, I arrived when it was still quite a small sapling, and I have seen it grow to the mighty tree it is at present, under the wide-spreading shadow of which I have grown old. This is my excuse for preparing a general description of the forests, and a résumé of the in-

roduction and growth of forestry in the British Indian Empire, to the publication of which I have obtained the consent of Government. I am, however, solely responsible for the matter, the form, and the opinions expressed."

The present forests are divided into various types according to locality, and each of these types is discussed at some length.

Indian epics give accounts of the density of the forests at the time of the Arvan invaders, 2000 B.C.; from that time on denudation by man took place; later, the Mohamedan conquerors created great havoc by wholesale burning of the forests for pasture lands.

There is no doubt but that the climate has suffered from these ravages, and the rainfall was also probably influenced.

Officers of the Canal Department can now trace the source of floods coming from streams flowing through denuded areas, in distinct contrast to the much more steady flow of streams running through protected forests.

In 1805-6 something was done to protect the Teak forests of Burmah for the use of the British Navy; and in 1847 in Bombay, and 1856 in Madras "conservators" of the forests were ap-

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