DEPARTMENT OF AGRICULTURE

THE UNITED STATES FOREST SERVICE

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TO THE BRAZIL CENTENNIAL EXPOSITION

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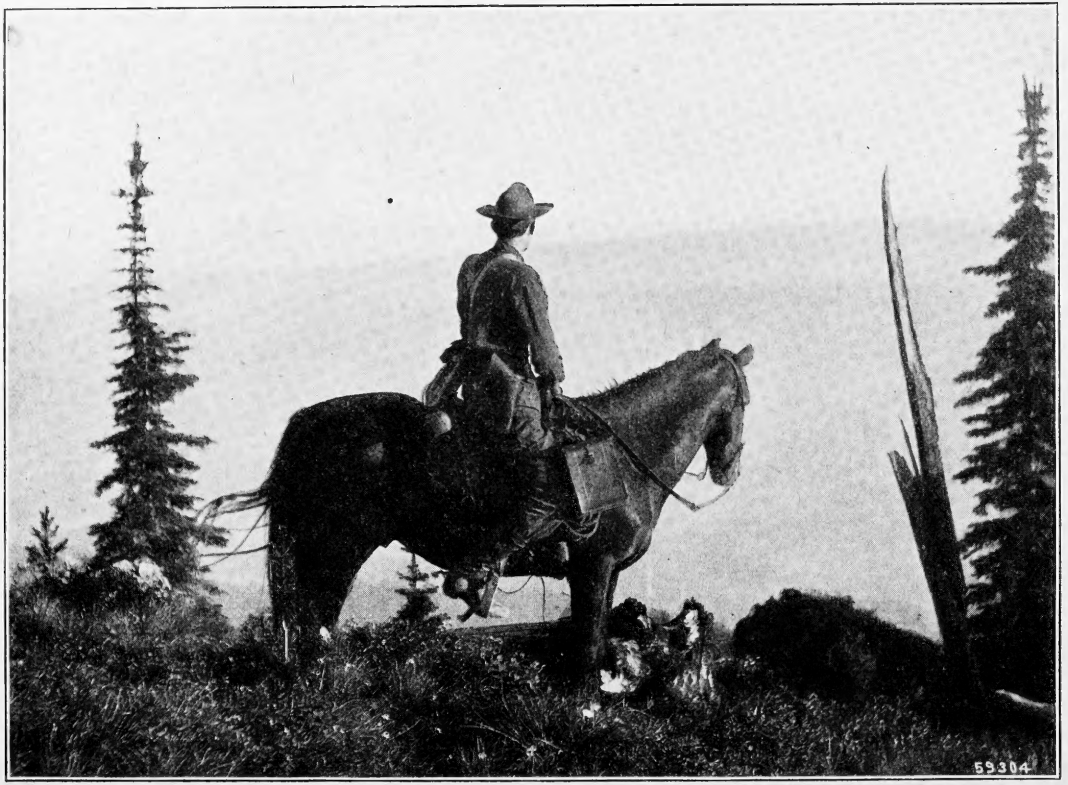
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Supplementing Exhibit
of the
UNITED STATES FOREST SERVICE
at the
BRAZIL CENTENNIAL EXPOSITION
Rio de Janeiro, Brazil
1922–1923

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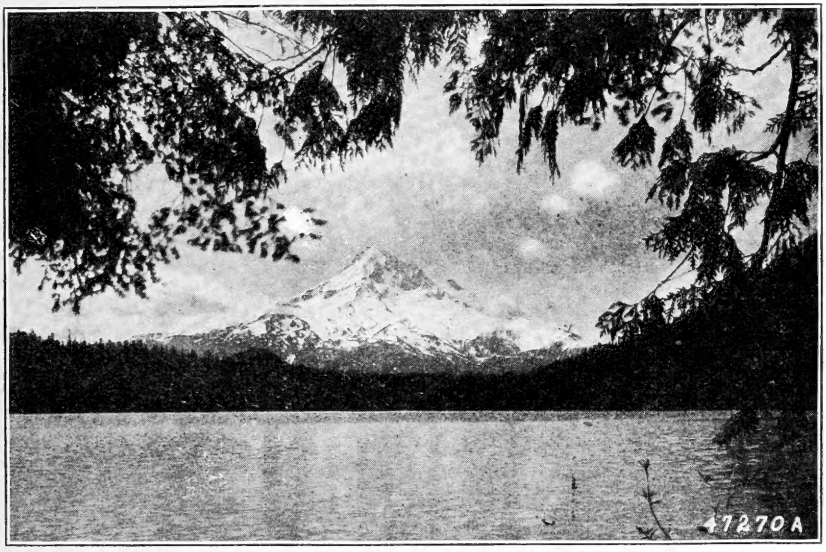
By
Herbert A. Smith
United States Forest Service

THE UNITED STATES FOREST SERVICE.

The chief forest work of the Government of the United States of North America is in charge of the Federal Department of Agriculture. This is because the science of forestry is essentially a branch of agriculture, for it has to do with the growing of successive crops of timber from the soil. It is also closely related to other lines of work in the same department, particularly entomology and plant diseases.

The administration of the national forests is directly in charge of the Forest Service, which is a bureau of the Department of Agriculture.



Wood and water at Nature's source of supply.

Its chief is designated "The Forester." Besides administering the the national forests, the Service also makes investigations in the interest of the best use of the forests and forest products of the country generally. The problems involved in the administration of the national forests are fundamentally agricultural. When forestry is practiced, timber becomes a crop produced from the soil under methods which must be developed scientifically, as other branches of agriculture are developed. In all countries where forestry is an important governmental activity it is grouped with agriculture. Right handling of the forest ranges is a problem of animal husbandry and forage-plant production. Grazing on the national forests is already largely supplemental to ranching,

through its provision of summer feeding grounds for local farm live stock; and under the administration of the Department of Agriculture it will grow more so as settlers increase in number. The present grazing policy and the agricultural lands policy of the Forest Service promote settlement. Water conservation has in view the interests of irrigation farmers. Forestry and agriculture are interwoven and akin.

The keynote of national forest administration in the United States of North America is service. The object aimed at is best use of the many resources of the forests in the interest of the public welfare. From the standpoint of material wealth the forests have their greatest importance as sources of supply of wood, water, and range forage. Because they are largely confined to the mountainous areas where there are streams and lakes, and oftentimes wild life, the national forests have also a great and growing value to the country as places of recreation. Not only are they open to all persons for all lawful purposes; the prime object always held in view is to make them more useful to more people. Naturally they are of greatest benefit to the local residents near them and to the States in which they lie, but they are useful also to the whole Nation in ways that are not always realized.

Most of the national forests are located in the mountainous regions of the country, where the preservation of tree growth is of great importance. From the hardwoods of the southern Appalachians to the spruces of the White Mountains in New England, from the piñon and juniper stands where tree growth begins in the southern Rocky Mountains of New Mexico to the pine and fir forests of the Canadian line in Montana and Idaho, from the brush-covered foothills of the San Jacinto and San Bernardino Mountains in southern California to the vast softwood stands of the Olympics and Cascades in northern Washington, the national forests lie mainly on the mountain slopes. Even along the Alaskan shore, where the Tongass and Chugach Forests form a tattered ribbon 600 miles long from the southern tip of the territory to within sight of Mount McKinley, the valuable Sitka spruce and hemlock growth clothes the lower flanks of the coastal mountains. In these rugged regions of the country permanent forests will make the land of highest service.

The timber, water, grazing, recreational opportunities, and other resources of the national forests are for the use of the people of the United States. They contribute largely to industrial enterprises through their yearly cut of about one hundred million cubic feet of timber, mostly used by sawmills and mines, protect watersheds of about one-third of the water-power resources of the Nation and the pure and abundant water supplies of a thousand towns and cities, furnish pasturage for nearly 15,000,000 head of sheep, cattle, horses, and hogs of all ages. The forests also afford playgrounds for millions of recreation seekers, to whom these vacation places are made accessible by the building of roads and trails.

The following pages tell in a general way of the work involved in making them of fullest use to the public. It tells also something of other activities of the Forest Service conducted to bring about better use of North American forests and forest products generally. More detailed information concerning the use of these national forests and their resources may be obtained by applying to the Forest Service, United States Department of Agriculture, Washington, D. C., U. S. A.

FOREST SERVICE ORGANIZATION.

OFFICE AT WASHINGTON, D. C.

The administration of the national forests and the conduct of all matters relating to forestry which have been placed upon the Department of Agriculture by the United States Congress are, under the direction of the Secretary of Agriculture, in charge of The Forester and an Associate Forester. The work of the Forest Service is organized under the Branches of Operation, Forest Management, Grazing, Lands, Research, Engineering, and Public Relations.

The Branch of Operation has general supervision of the finances, personnel, equipment, quarters, and supplies of the Service, and of all fire control and permanent improvement work on the national forests.

The Branch of Forest Management supervises the sale and cutting of timber on the national forests and reforestation of denuded land, and cooperates with States in protecting forest lands from fire under the Weeks law.

The Branch of Grazing supervises the grazing of live stock upon the national forests, allotting grazing privileges and dividing the ranges between different owners and classes of stock. It is also charged with the work of improving depleted grazing areas and of cooperating with the Federal and State authorities in the enforcement of stock quarantine regulations.

The Branch of Lands examines and classifies lands within the national forests to determine their value for forest purposes; conducts the work in connection with claims on the national forests prior to proceedings before United States registers and receivers; and has general supervision over the use and occupancy of national forest lands under special-use permits, the development of recreational resources within the national forests, the exchanges of national forest lands and timber for lands in private ownership within the national forests, and the administrative work connected with the purchase of forest lands in the eastern United States.

The Branch of Research has supervision over the investigative work of the Service, including silvicultural studies, studies of State forest conditions, investigations of the lumber and wood-using industries and lumber prices, and the investigative work carried on at the Forest Products Laboratory and the forest experiment stations.

The Branch of Engineering administers water-power permits and easements granted prior to the passage of the Federal water power act, and makes such power investigations and reports as are requested by the Federal Power Commission. It is also charged with the making of such surveys and maps as are necessary to the national forest work. It administers for the Forest Service the provisions of the national forest road appropriation acts and supervises the construction of such roads and trails as are handled by the Forest Service. Practically all civil-engineering work in the Service is now handled by this branch.

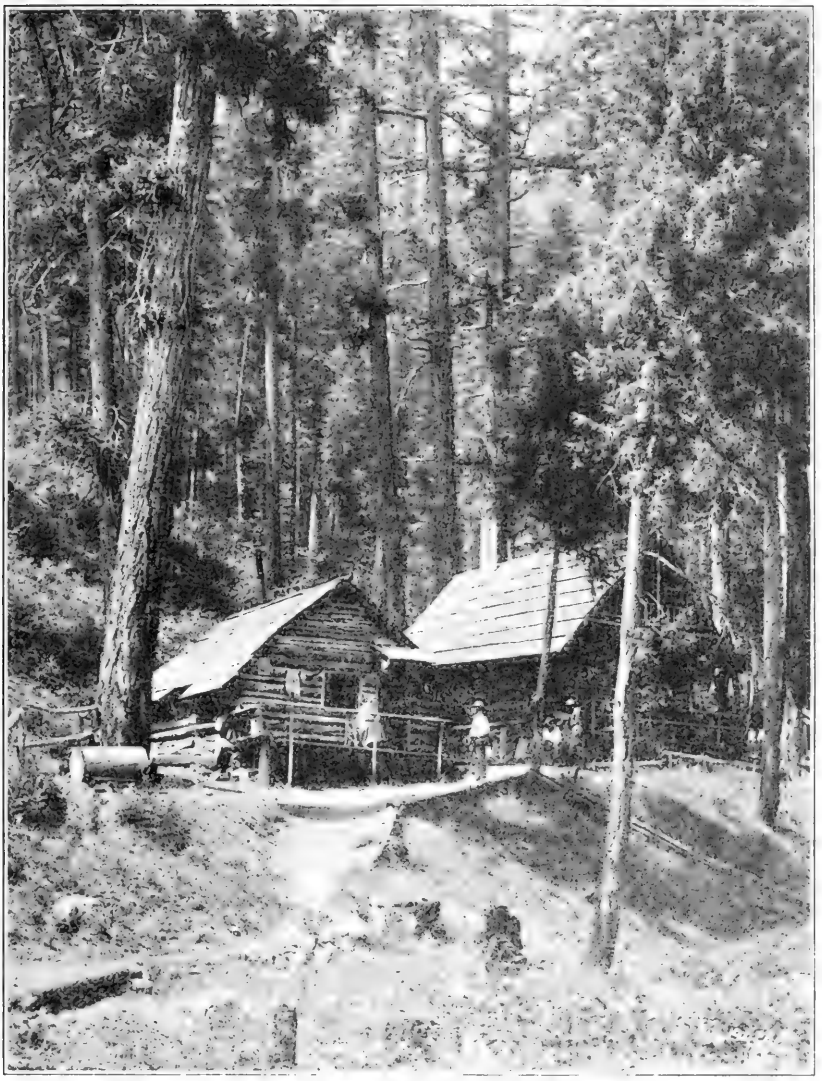
The Branch of Public Relations devises and develops means of contact with the public, to the end that the services which the Forest Service is prepared to render may be better known and more generally made use of. These means include official publications, information for the press, information and material for use in schools, and forestry exhibits and motion pictures. The branch gives particular attention to enlisting the cooperation of the public in the prevention and control of forest fires.

To facilitate the administration of the national forests, eight field districts have been established, with a district forester in charge of each.

THE FORESTS FOR USE.

The policy under which the national forests are administered by the Department of Agriculture through the Forest Service is to make them of the most use to the most people, but especially to the man of small means and the local farmer and settler. They were meant, first of all, to enable the people to build homes and to maintain them. This policy was laid down by the Secretary of Agriculture in a letter to The Forester, dated February 1, 1905, in which he said:

"In the administration of the forest reserves it must be clearly borne in mind that all land is to be devoted to its most productive use for the permanent good of the whole people and not for the temporary benefit of individuals or companies. All the resources of the forest reserves are for use, and this must be brought about in a thoroughly prompt and business-like manner, under such restrictions only as will insure the permanence of these resources. * * * You will see to it that the water, wood, and forage of the reserves are conserved and wisely used for the benefit of the home builder first of all, upon whom depends the best permanent use of lands and resources alike. The continued prosperity of the agricultural, lumbering, mining, and live-stock interests is directly dependent upon a permanent and accessible supply of water, wood, and forage, as well as upon the present and future use of these resources under business-like regulations enforced with promptness, effectiveness, and common sense In the management of each reserve local questions will be decided upon local grounds, the dominant industry will be considered first, but with as little restriction to minor industries as may be possible; sudden changes in industrial conditions will be avoided by gradual adjustment after due



TENANTS OF MOTHER NATURE AND UNCLE SAM.

Recreation ranks among the major services performed by the national forests. Each year several million health and recreation seekers visit them, summer-home sites are leased, camping is free and generally requires no permit.

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notice, and where conflicting interests must be reconciled the question will always be decided from the standpoint of the greatest good to the greatest number in the long run."

Lands which are more valuable for agriculture than for forestry purposes have been excluded from the national forests either by changes in the boundaries of the forests or by being opened to settlement and entry under the Forest Homestead Act of June 11, 1906. The act of August 10, 1912, which directed that the national forest lands be classified for the purpose of determining those which are chiefly valuable for agriculture, has resulted in practically all agricultural lands within the national forests being listed for homestead entry in the United States land offices.

To the camper, sportsman, and seeker after health, rest, and recreation, the national forests offer unrivaled opportunities for outdoor life and enjoyment. The popularity of these great mountain playgrounds of the United States is evidenced by the fact that several million people visit them each year. Roads and trails, marked by signs, make the forests reasonably accessible. There are countless secluded spots along the banks of streams and lakes where the camper may pitch his tent. Camping is free and generally requires no permit. The camper may choose his own camp ground and help himself to dead wood for fuel and to forage for his camp stock. In localities frequented by large numbers of people "recreation areas" are being established by the Forest Service, and log shelters, camp fireplaces, and comfort stations constructed for the convenience of visitors as fast as the funds made available by Congress permit. Big game is to be found in the more secluded parts of the mountains, and there are many excellent trout streams and lakes, yearly restocked with young fish, which offer keen sport to the angler. The only restrictions for sportsmen within the national forests are those imposed by the fish and game laws of the States in which the forests are located, and all that is asked of the visitor is that he look to the proper sanitation of his camp and be careful with fire.

Many people who visit the national forests desire to return year after year to the same locality for an annual vacation. To meet this demand Congress, by the act of March 4, 1915, authorized the Secretary of Agriculture to issue term permits to "responsible persons or associations to use and occupy suitable spaces or portions of ground in the national forests for the construction of summer homes, hotels, stores, or other structures needed for recreation or public convenience, not exceeding five acres to any one person or association."

The Forest Service wishes to accommodate as many people on the national forests as practicable. For this reason tracts desirable for summer-home purposes, except in unusual instances, are limited to one acre or less in area, and term permits run for a period of from 5 to 15 years, with privilege of renewal. The annual rental charge for lands occupied for summer homes varies from $5 to $25, depending on the location.

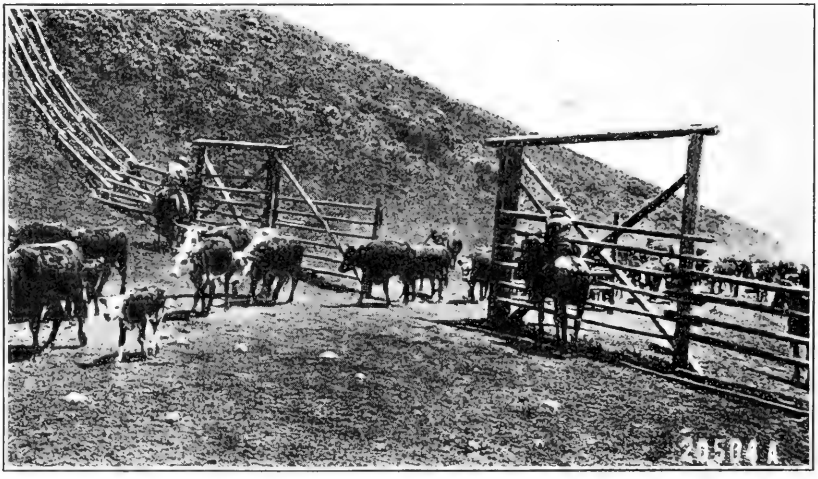
THE RANGER'S FINISHING TOUCH.

Lodgepole pine ties piled for shipping. The ranger is stamping the ties with the Forest Service marking hatchet, which bears the impression "U. S." and indicates the official count.

HARVESTING THE FOREST CROP.

The Government sells ripe timber on the national forests. Trees to be cut are marked in advance by a forest officer. Enough of the younger trees are left for a later cut or to seed the ground for a new crop. Logging slash must be piled and burned in favorable weather.

When the grazing season opens on a forest, the ranger counts sheep and cattle as they come up out of the valleys to use the national forest range.



FOR PASTURES NEW.

Timber is not the only crop of the national forests. Their ranges afford pasturage for nearly 15,000,000 head of stock of all ages.

On a few of the smaller national forests no permits for private summer homes are granted because of the limited amount of Government land available and because there are private lands near by which may be leased or purchased. General use, through the reservation of open camp grounds, is always given first consideration. Special use by individuals who pay rental has been made secondary to the needs of the public.

Permission to occupy national forest land for residential, commercial, or industrial purposes not inimical to the protection and management of the national forests may be secured under special-use permits obtainable upon payment of moderate fees.

Closely related to the development of recreational facilities is the use of the national forests as the habitat of fish and game. Wild life adds materially to the enjoyment of the national forests by the public, and the preservation of game animals, birds, and fish is a public duty. Game protection is one of the regular activities of the field officers of the Forest Service. Cooperation with the State and local authorities in enforcing the game laws has contributed in no small degree toward making the national forests more attractive to visitors and conserving one of their valuable resources.

Special acts of Congress have designated several national game preserves, situated wholly or in part within national forests, for the protection of wild life.

By act of June 8, 1906, the Congress of the United States provided for the protection of cliff dwellings, pueblo ruins, ancient rock paintings, unique topographic or geologic features, historic landmarks, groves of rare trees in danger of destruction, and other objects of historic and scientific interest on lands controlled by the Goverment, and authorized the President to create, by proclamation, national monuments for their preservation. When a national monument is created within a national forest, it is under the jurisdiction of the Forest Service, which cooperates with the Bureau of American Ethnology of the Smithsonian Institution in protecting it and securing information regarding such objects. The following national monuments are situated within national forests:

Name.	National forest.	State.
Bandelier	Santa Fe	New Mexico.
Devil Post Pile	Sierra	California.
Gila Cliff Dwellings	Gila	New Mexico.
Jewel Cave	Harney	South Dakota.
Lehman Caves	Nevada	Nevada.
Old Kassaan	Tongass	Alaska.
Mount Olympus	Olympic	Washington.
Oregon Caves	Siskiyou	Oregon.
Tonto	Tonto	Arizona.
Walnut Canyon	Coconino	Do.
Wheeler	Cochetopa Rio Grande	Colorado.

Ripe standing timber on the forests, of which there is a large amount, is sold at a fair price. Anybody may purchase timber, but no one can obtain a monopoly of it or hold it for speculative purposes. The Government is anxious to sell the mature timber on the forests, because it is no longer growing at a profitable rate and should give way to young trees and seedlings which will insure continuous production. The fewest possible restrictions are imposed upon purchasers of timber, only such as will insure cut-over areas being left in the best condition for future growth. Experienced Government woodsmen estimate the quantity and quality of the standing national forest timber and its approximate value as a basis for the price to be charged. Bids are then obtained through public advertisement, unless the amount is small enough to come within the limit which can be sold without advertisement. The trees to be cut on a Government sale area are marked in advance by a forest officer, the object being to leave enough of the younger trees to seed the ground and form the basis of a second crop of timber to be cut on the same land. This is merely applying the principles of practical forestry to make sure that there will always be timber on the national forests to cut. Timber on the watersheds of streams is not cut to an extent that will impair the protective cover that the forests affords, because one of the chief objects of the national forests is to regulate stream flow.

Small sales of timber for use nearby the national forests are encouraged. This is one of the ways in which the national forests are made to serve the small lumberman and consumer. Though single sales have been made for as much as 800,000,000 board feet (roughly 100,000,000 cubic feet), over nine-tenths of the sales are for $100 worth of timber or less. Of the 12,570 timber sales on the national forests in the fiscal year 1921, 12,236 were of this latter kind.

Homestead settlers and farmers may obtain national forest timber for their own use at the actual cost of making the sale. No charge is made for the timber itself. This is one of the ways in which the national forests are made to serve local residents.

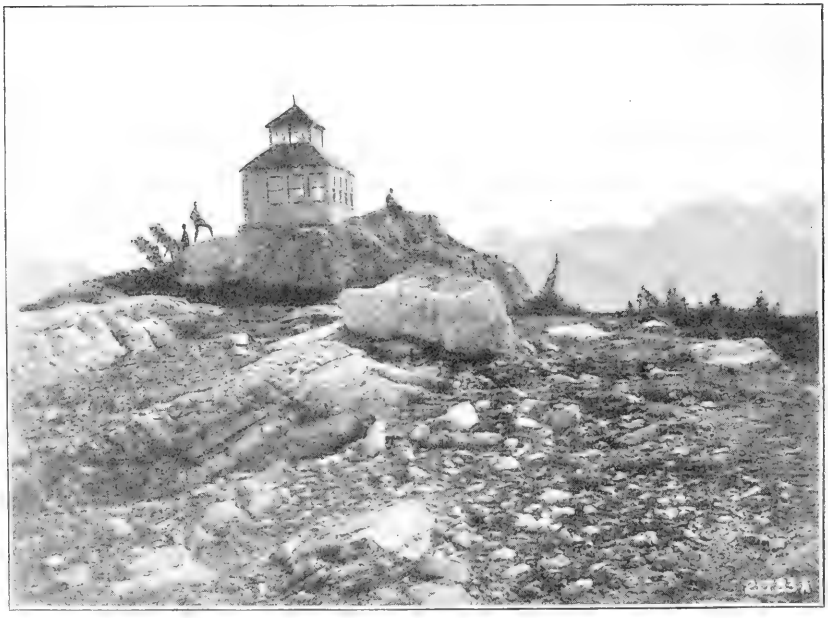
Along with the timber on the national forests there is a great deal of grazing land, and this is used at present by over 7,000,000 sheep and goats and 2,000,000 cattle, horses, and swine every year, in addition to their natural increase. Local settlers and stockmen have the first right to the use of the range, just as in the case of the other resources, and every man who grazes stock on the forests under permit is allotted a certain area for the grazing season. Unfair competition between the big man and the little man, which in the earlier days of the western United States worked so much harm, is done away with. A good supply of forage year after year is insured by not allowing the land to be overcrowded with stock. Under regulation overgrazed range is improved, instead of being further run down or denuded, as has been the case with many of the outside public lands.

THE HOSPITABLE ROAD.

The United States Forest Service has cooperated in the construction of approximately 5,000 miles of roads and has built nearly 20,000 miles of trails during its administration of the national forests.

THE BIRD'S-EYE VIEW.

The airman often locates a fire before the smoke betrays it to the lookout beyond the intervening ranges.



THE MAN ON TOP.

From the top of some lofty peak the lookout keeps watch for signs of smoke in the far-away valleys. A telephone connects him with the nearest ranger station.

Mineral deposits within national forests, except such forests as were purchased under the act of March 1, 1911, are open to development exactly as on unreserved public land. A prospector can go anywhere he chooses and stake a claim wherever he finds any evidence of valuable minerals. Prospectors may obtain a certain amount of national forest timber free of charge to be used in developing their claims, and in other ways the Forest Service gives the mining man all the help it can. As to deposits of coal, oil, and gas, permits to prospect for and leases to develop must be secured through the United States Department of the Interior.

Along the streams within the national forests are many sites suitable for development of electricity. These areas are open to occupancy for such purposes and have the advantage of being on streams whose headwaters are protected. The Government does not permit the monopolization of power in any region or allow power sites to be held without prompt development. Utilization and development of water powers in the national forests are encouraged. The Federal Power Commission of the United States is by law permitted to issue licenses for periods of not to exceed 50 years, and such licenses may be renewed under certain conditions.

The law authorizes the commission, other factors being equal, to give preference to applications by States and municipalities, and between other applicants the commission may give preference to the project which is best adapted to develop, conserve, and utilize the navigation and water resources of the region.

To make the national forests fully useful to the public, and also to facilitate their administration and protection as Government properties, it is necessary to build on them various classes of improvements. Some of these are primarily for official use, as, for example, fire lookout stations, ranger stations, and telephone lines. Incidentally, many of the improvements of this class are of material service to the public. Other improvements are purely for the benefit of specific forms of public use, as, for example, drift fences, stock-watering places, and public camp grounds. Still others are put in both to facilitate the task of administering and protecting the forests and to promote use and serve the interests of the public generally.

Roads and trails are of course necessary for efficient protection of the forests against fire, to enable forest officers to get about in the performance of their tasks, and to open up the forests for users; but they are also a great public convenience and necessity. The Forest Service cooperates with State and county officials, good-roads organizations, and private individuals in the location, survey, construction, and maintenance of roads in the national forests. The road and trail construction work is financed from appropriations under four different acts of Congress.

These funds may be expended within the national forests without requiring cooperative contributions from the States or counties, but if part of the work lies outside of the forest boundaries it is necessary that the cooperative funds be provided. Through cooperative arrangement the road projects which require the supervision of engineers intensively trained in highway engineering and construction are handled by the Bureau of Public Roads. The numerous road improvement and repair projects required primarily for administrative and protective needs on the national forests, together with trail building and maintenance, are handled directly by the Forest Service and coordinated with fire control as far as possible so that construction crews may be available in remote areas of great fire hazard as part of the fire-suppression organization. Twenty-five per cent of all receipts from national forests are returned by the Federal Treasury to the counties in which they lie, to be used for schools and roads. Under one of the acts of Congress 10 per cent is expended by the Secretary of Agriculture upon roads and trails constructed primarily for the benefit of settlers within the national forests.

For the complete and economical use of the forage on the forests it is sometimes necessary to develop water or to construct drift fences, bridges, trails, or other works. The Forest Service allots funds for their construction only when the benefit to the forest plainly warrants the expenditure. The use of funds for these purposes can often be made more effective if the assistance and cooperation of interested stockmen can be secured.

PROTECTION OF THE NATIONAL FORESTS.

FIRE DANGER.

Fire is an ever-present danger on the national forests. The great size of the national forests compared with the number of the regular patrol force, the difficulty of reaching remote areas across miles of wilderness, the dry atmosphere and light rainfall in parts of the West, the prevalence of lightning in the mountains, and the constant use of fire in the daily life of the people and in the industries all combine to make the hazard exceptional.

Among the chief causes that start forest fires are lightning, campers, railroads, slash burning, incendiarism, and steam sawmills.

A small fire may spread into a conflagration. Fires, matches, and burning tobacco should be used as carefully in the forest as they are in a house. Carelessness in this respect may mean the loss of lives, houses, stock, and forage, and of a vast amount of timber which belongs equally to all citizens.

Fires may start in a region remote from supplies and water and reach vast proportions before a party of fire fighters can get to the scene, no matter how promptly the start is made. By far the best plan, therefore,

A MILLION SPARK POWER.

You can prevent the conflagration requiring hundreds to fight. Break your match in two. Stamp out pipe ashes, cigar butts, cigarette stubs. Quench your camp fire before you leave it. Burn your brush in favorable weather.

A SOURCE OF "WHITE COAL" AND "LIQUID GOLD."

The forest cover has a very decided influence on the purity and abundance of water supply for power, for irrigation, for domestic use. Many communities have entered into cooperative agreements with the United States Forest Service for the better protection of the watersheds from which they get their supplies.

is to prevent fires rather than to depend upon fighting them once they start. This subject has been given the most earnest attention by the Forest Service. During the danger season the main attention of supervisors and rangers is devoted to preventing fire. Extra men are employed, the forests are systematically patrolled, and a careful lookout for fire is maintained from high points. Roads and trails are being built so that all parts of the forests may be quickly reached. Tools and food for the use of fire fighters are stored at convenient places. The ranger stations and lookout points are connected with the offices of the supervisors by telephone, so that men may be quickly collected to fight dangerous fires which the patrolmen can not put out alone.

During the fire seasons of 1919, 1920, and 1921 the Air Service of the United States Army and the Forest Service cooperated in the experimental use of the airplane as a supplement to the lookout system in the prompt detection of forest fires. Flying definite routes over the national forests, the airplane observer scanned the country within view looking for the tiny wisp of smoke which denotes the outbreak of fire. If a forest fire was discovered, the alarm was then wirelessed to the nearest fire-fighting headquarters, from which men were dispatched immediately. It has been found that with the airplane supplementing the lookouts the period of time between the origin of the fire and the arrival of the crew of fire fighters is in many cases greatly reduced, resulting in smaller burned acreages and consequently a smaller loss.

The cooperation of all forest users is earnestly sought in the work of preventing and controlling fire. This can be accomplished by exercising all care not to cause fires and by informing the nearest forest supervisor or ranger of any fire which may be discovered.

The following simple rules for the handling of fire in the mountains are suggested to all users of the forests which, if followed, will very materially assist in the protection of the forests:

1. *Matches.*—Be sure your match is out. Break it in two before you throw it away.

2. *Tobacco.*—Throw pipe ashes and cigar or cigarette stumps in the dust of the road and stamp or pinch out the fire before leaving them. Do not throw them into brush, leaves, or needles.

3. *Making camp.*—Build a small camp fire. Build it in the open, not against a tree or log or near brush. Scrape away the trash from all around it.

4. *Leaving camp.*—Never leave a camp fire, even for a short time, without quenching it with water or earth.

5. *Bonfires.*—Never build bonfires in windy weather or where there is the slightest danger of their escaping from control. Do not make them larger than you need.

6. *Fighting fires.*—If you find a fire, try to put it out. If you can not, get word of it to the nearest United States forest ranger or State firewarden at once. Keep in touch with the rangers.

Since practically 60 per cent of the forest fires of known causes in the United States are due to human agencies, the most energetic efforts have been made to bring home to the American public the importance of care to prevent fires in the forest. The Forest Service is earnestly seeking to lessen the number of man-caused fires in this way. As recreational use of the forests by the public increases and the local population and activities of all kinds on and near the forests become greater, man-caused fires are bound to become more numerous unless educational methods can be made effective. The observance of forest fire-prevention week has become general throughout the United States during the past three years and is bringing to public attention the importance of preventing fires and the precautions which it is necessary to observe in order not to cause fires.

PROTECTION OF WATER SUPPLY.

Undoubtedly the greatest value of the mountain ranges of the country, most of which are within national forests, lies in their influence upon the regularity of the water supply. In many of the States the mountains afford the main water supply for domestic use, for irrigation, and for the development of power. The future development of the entire United States, therefore, will depend upon the amount of water and the manner in which it flows from the mountains.

The vegetal covering has a very decided influence on run-off. For this reason Congress made the preservation of conditions favorable to stream flow one of the principal objects in the establishment and administration of the national forests of the United States.

PROTECTION OF THE PUBLIC HEALTH.

Precautions are taken by forest officers to protect the public health. All persons on national forest lands are liable to trespass proceedings if insanitary conditions result from their presence. Forest officers enforce compliance with regulations on the part of all campers, stockmen, permittees, and other persons traveling through or occupying national forest lands.

RECEIPTS FROM NATIONAL FORESTS.

The total net receipts from the national forests on account of sales of timber, fees, for grazing of live-stock and for privilege of using Government land during the fiscal years 1916 to 1921, inclusive, were as follows:

1916	$2,823,541
1917	3,457,028
1918	3,574,930
1919	4,358,415
1920	4,793,482
1921	4,468,940

It could not be expected, of course, that rugged, inaccessible mountain lands, such as constitute by far the greater part of the national forests, would soon yield a revenue to the Government over and above the cost of administration. Many of the forests are meant to supply the country's future needs for timber, after the more accessible lands have been cut over, rather than its present needs, while others are chiefly valuable for watershed protection, which, though of the greatest importance to the people and industries of the country, do not yield the Government a return in dollars and cents. In the case of almost every forest, moreover, a great deal of money must be spent for roads, trails, bridges, and telephone lines before the resources can be used. Nevertheless, 91 of the national forests paid their local operating costs in 1920.

QUALIFICATIONS AND DUTIES OF FOREST OFFICERS.

All permanent positions in the Forest Service are in the classified civil service. Vacancies are filled through selections from eligibles certified by the United States Civil Service Commission and by promotion in rank.

Each national forest is in charge of a forest supervisor, who plans the work on his forest under the instructions of the district forester and supervises its execution. When the amount of business on a national forest warrants it, the supervisor is assisted by a deputy supervisor, who has such duties and authority as may be delegated to him by the supervisor.

Forest supervisors and deputy supervisors have to be men of experience in woods work, road and trail building, the stock business, and in all other lines of work carried on in the national forests; so the positions are always filled by the promotion or transfer of experienced men from other classified positions in the Forest Service. Supervisors' headquarters are located in towns conveniently situated with regard to the forests.

Forest assistants are employed in the various subordinate lines of technical and administrative work on the forests under the direction of the supervisor. The position of forest assistant is filled through a technical examination.

After a probationary period of not less than two years, forest assistants who have rendered satisfactory service are given the designation of forest examiners and assigned to such work as examining and mapping forest areas, designating timber to be cut in sales, surveying boundaries, and conducting nursery work and forest planting.

Every national forest is divided into ranger districts, with a district ranger in charge of each. Rangers perform the routine work involved in the supervision of sales of timber, use of the range by live stock, and the free use of timber, and use by private persons of Government land. The ranger also helps to build roads, trails, bridges, telephone lines, and other permanent improvements on the forests. Physical soundness and endurance are essential on account of the heavy labor and exposure involved

in such work as building improvements and fighting fire. The forest ranger must also know how to pack supplies and find food for himself and his horse in a country where it is often scarce. The position of forest ranger is filled through a civil-service examination, in which applicants are rated on the basis of a written test and also according to their experience and fitness.

In addition to the different classes of forest officers mentioned, logging engineers, lumbermen, scalers, and planting assistants are employed on the forests in the work of timber appraisal, cruising, scaling, and forest planting. Like all other permanent employees they are appointed only after a civil-service examination.

Forest guards are temporary employees appointed during the seasons of greatest fire danger.

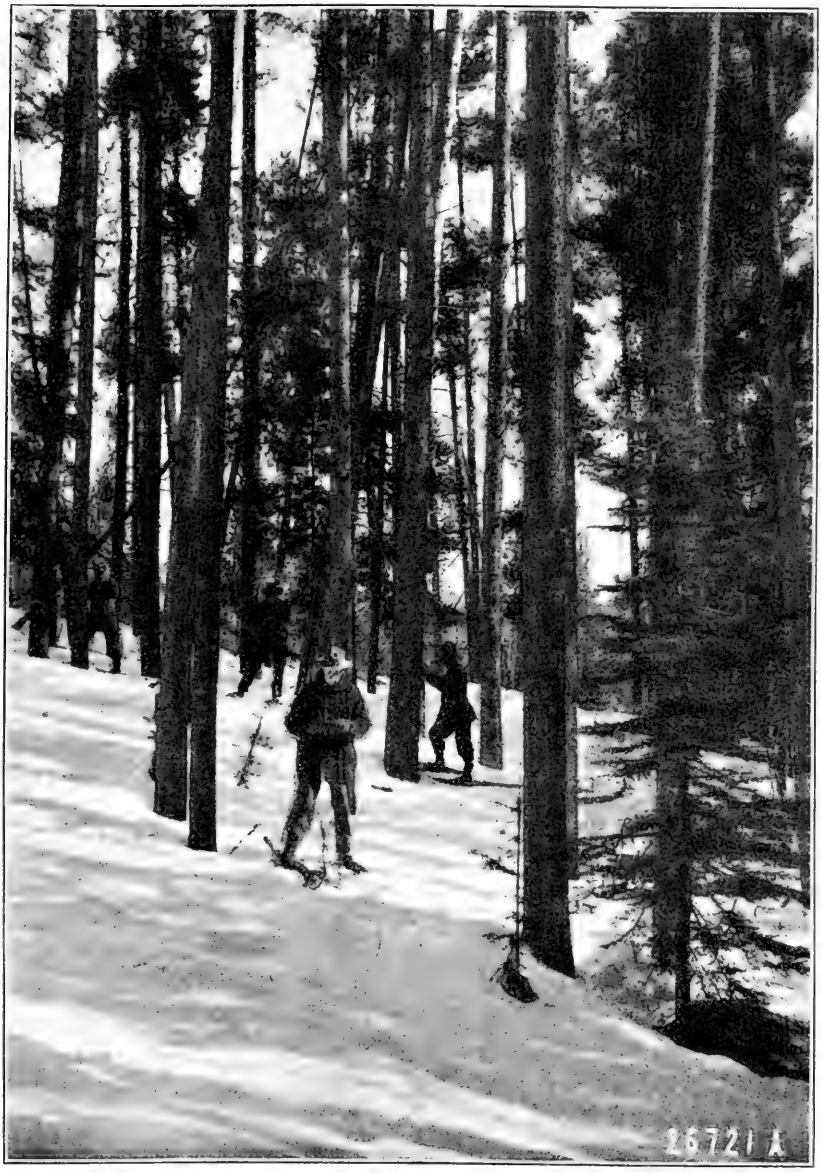
On July 1, 1921, the force employed by the Forest Service numbered 4,238. Of these, about 3,289 were employed upon the national forests as supervisors, deputy supervisors. rangers, guards, etc., and 949 were engaged in administrative, scientific, and clerical work at the Washington and the eight district headquarters and the Forest Products Laboratory.

FOREST OFFICERS AND THE PUBLIC.

When one wishes to make any use of the resources of the national forests for which a permit is required he should consult the nearest forest officer. Supervisors, rangers, and other forest officers carry out the administrative policy prescribed for the national forests by Congress, as embodied in the regulations made by the Secretary of Agriculture. Forest officers of the United States are agents of the people and their duty is to assist the public in making use of the resources of the forests. They aim to prevent misunderstanding and violation of forest regulations by timely and tactful advice rather than to follow up violations by the exercise of their authority. Forest users aid greatly in the efficient performance of the public business by according to forest officers the same frankness, consideration, and courtesy which the forest officers are expected to show them.

THE EXTENSION OF FORESTRY PRACTICE.

While the greatness of the national forest enterprise of the United States and the prominence accorded its accomplishments have been unusual, there still remains much to be accomplished before the problem of forestry in North America is solved. The Government-owned national forests contain only about one-sixth of the forest area of the United States, and little more than one-fifth of the standing saw timber. Private owners hold seven-tenths of the timberland of the United States. The amount of material which is actually placed on the market from the national forests amounts to only about 3 per cent of the entire consump-



A JOB FOR EVERY SEASON.

The overflow from summer work, as well as the tasks appropriate to the winter weather, keep the forest officer busy in the snow-carpeted woods.

tion of the country. The remainder comes from private lands. While the proportion will be altered in the future, the country must still look to private lands for a large part of its forest supplies.

The public forestry in the United States has made vast strides; but the forests of the country that are in private hands are being depleted with very great rapidity, and almost everything without effort to renew them. A grave situation is becoming manifest in various ways, and the problem presented is one that can be solved only by public action. The general practice of forestry on privately owned lands in the United States will not take place through unstimulated private initiative.

A study made in 1920 by the Forest Service, in response to a Senate resolution calling for a report on timber depletion, lumber prices, lumber exports, and concentration of timber ownership, showed that over two-thirds of the original forests of the United States have been culled, cut over, or burned, and that three-fifths of their merchantable timber is gone. The country is losing about 26,000,000,000 cubic feet of wood annually from its forests and is growing but 6,000,000,000 feet. Every class of timber is being cut, even trees too small for the sawmill, much faster than it is being replaced.

There are still large supplies of timber in the United States, but they are not in the right place. Sixty-one per cent of what is left lies west of the Great Plains, far from the bulk of the population, agriculture, and factories. The distance between the average sawmill and the average home builder is steadily increasing, and the United States shall soon be dependent for the bulk of its construction lumber upon the forests along the Pacific coast.

FOREST RESEARCH.

Besides administering the national forests, the Forest Service conducts many investigations relating to the protection, growth, and management of forests, to the utilization of their products, and to their place in the economic life of the Nation. The research work is not limited to problems which directly concern the management of the national forests. Its object is to promote the best use of the forest resources of the United States, whether in public or private ownership. This means both the general practice of forestry and the most intelligent use of forest products of all kinds, especially wood products. The investigations concern forest management, grazing, forest products, and forest economics.

Investigations in forest management aim at obtaining more thorough knowledge of the forest resource and its benefits. At various forest experiment stations intensive studies are made of such things as the rates of growth and requirements of the different tree species, what methods of cutting will be followed by the best reproduction of the most desirable kinds of trees under varying conditions, the best methods of nursery practice and of field sowing and planting, and how best to protect the

forests from fire and other damaging agencies. The relation of forests to climate, stream flow, and erosion are also investigated. The forest experiment stations are so located as to afford a wide range of conditions in different parts of the country. They are supplemented by diversified field studies which round out a systematic search for the basic knowledge required to make our forests fully productive.

Similarly, the investigations in forest economics furnish information promotive of forestry and the best adjustment of supply and demand through inquiries that throw light on market requirements, prices, and tendencies, and on probable future needs as the country grows. Statistics are collected on the prices of lumber and other important forest products, and on the use of the products by the various industries. Studies are made of current economic conditions in the wood-using industries, including such factors as production, consumption, stocks on hand, exports and imports, labor problems, and transportation. Data are secured on the forest resources of North and South America and other countries, the effect of timber depletion on industrial and community development, the relation between forest taxation and the practice of forestry, and similar economic problems.

Grazing investigations have to do with improving the annual crop of grasses and forage plants and securing the fullest and best use of this resource. Studies are made of artificial and natural reseeding of the range; of the feed value of the various forage plants, and where they grow; of the best methods of handling stock on the range; of water development for stock and the relation between the frequency of watering places and the welfare of the range and the stock; of the eradication of poisonous plants; and of the effect of grazing on forest reproduction, on erosion, and on stream flow. These investigations are both experimental and general. Experimental work is carried on mainly at the Great Basin Forest Experiment Station on the Manti National Forest in Utah, the Jornada Range Reserve in New Mexico, and the Santa Rita Range Reserve in southern Arizona. The general studies concern the actual management of the range, and are made where particular problems come up in connection with grazing on the national forests.

In forestry it is just as important to know what to grow as how to grow, and just as important to make the most of what is produced as to make the forests produce more material for consumption. The investigations in forest products closely interlock with those in forest management. Their object is to bring production and consumption into the most advantageous adjustment, from the standpoint of public welfare, through study on the one hand of the raw material that the forests produce and on the other hand of the requirements of our industries and their processes of manufacture.

The bulk of this work on forest products is centered at the Forest Products Laboratory at Madison, State of Wisconsin, maintained in cooperation with the University of Wisconsin.

PRACTICAL INFORMATION ABOUT WOODLANDS AND FOREST PRODUCTS.

The Forest Service does all that it can to put its information at the service of the public and get what it has found out into practice. Besides publishing its results in helpful, practical form, it furnishes information, advice, and cooperation to the extent of its ability.

Timberland owners, farmers who have woodlands, other small owners, and persons wishing information on tree planting for timber production, windbreaks, shelter belts, and the like are given such data as the Service has available applicable to their special needs. For the benefit of farmers and other small owners, information has been gathered, and may be had on application, concerning the marketing of timber in relatively small quantities. By devoting land of relatively low agricultural value to timber growing, applying intelligent methods of production, and marketing to advantage, many farmers could add substantially to their income. In those States which have State foresters, however, these officers are ordinarily better sources of information regarding local conditions and the best methods of forestry practice for the individual to use than is the Forest Service. Applicants for information and advice who are residents of such States are therefore customarily referred to the proper State official for better attention to their specific needs.

Information on such matters as the properties and uses of wood, wood seasoning, and preservative treatment, and methods of obtaining or utilizing forest products of any kind is obtainable from the Forest Products Laboratory at Madison, Wis., where investigations of this character are centered. Cooperation is sought particularly with the wood-using industries for the solution of their problems and the application of results. Examinations may be made, on request, of the methods of individuals, companies, and corporations in handling forest products, and plans may be prepared for improved methods, if it is judged that this will reduce waste in utilizing forest products and will secure information useful generally in the industry concerned to a degree sufficient to justify the project.

PUBLICATIONS.

To facilitate widespread diffusion of useful knowledge relating to forests, forestry, and forest products, to promote increased use of the national forests, and to obtain the fullest possible cooperation of the North American public in their protection, the Forest Service has issued a large number of publications. Its purpose is to make available as

promptly as possible, through publications, all new results of research work of value to scientists, foresters, timberland owners, farmers, lumbermen, or the woodworking and allied industries. Some of these publications may be had free of charge. Others are sold, usually at a low price, by the Superintendent of Documents, Government Printing Office, Washington, D. C., from whom price lists may be had free on application.

PHOTOGRAPHS, LANTERN SLIDES, AND EXHIBITS.

The Forest Service has a considerable collection of photographs showing forest conditions and illustrative of forest utilization and forestry generally in all parts of the United States of America. This collection is open to the public for consultation. To the extent that the limited facilities for producing photographic work permit, photographic prints, lantern slides, and forest maps are furnished for educational purposes, through loan or sale. When sold the charge made is required by law to be cost plus 10 per cent. Prints are furnished for use in illustrating material to be published in newspapers or other periodicals, and for use in book illustrations. Lantern slides and bromide enlargements may be furnished for use in educational work by lecturers and schools, and for exhibit purposes. The object in every case is to diffuse information concerning forestry.

Advice and assistance is given authors and publishers of textbooks having to do with forests and forestry, if desired.

Traveling exhibits of the following material are lent for short periods of time without cost, except for transportation, to schools, libraries, and other educational institutions:

1. Sets of mounted photographs illustrating the subjects of forestry, nature study, farm woodlands, etc.

2. Specimens of commercial wood species, with maps and other information.

3. Sets of lantern slides, accompanied by lecture outlines, on general forestry, the work of the Forest Service, and forestry in its relation to farm woodlands, nature study, geography, manual training, etc.

The Forest Service maintains a considerable amount of material for use in making exhibits at agricultural fairs and expositions, both in cooperation with other bureaus of the Government and independently. A number of motion-picture films, showing the work on the national forests, are available for loans.

Particular attention is given to enlisting the interest and cooperation of the public in the prevention and control of forest fires and in the extension of the practice of forestry by private owners, and wide use of the national forests is promoted by directing the preparation and diffusion of information having this end in view.

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