MESSAGE

FROM THE

PRESIDENT OF THE UNITED STATES,

TRANSMITTING

A REPORT OF THE SECRETARY OF AGRICULTURE IN RELATION TO THE FORESTS, RIVERS, AND MOUNTAINS OF THE SOUTHERN APPALACHIAN REGION.

WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1902.

LETTER OF TRANSMITTAL.

To the Senate and House of Representatives:

I transmit herewith a report of the Secretary of Agriculture, prepared in collaboration with the Department of the Interior, upon the forests, rivers, and mountains of the Southern Appalachian region, and upon its agricultural situation as affected by them. The report of the Secretary presents the final results of an investigation authorized by the last Congress. Its conclusions point unmistakably, in the judgment of the Secretary and in my own, to the creation of a national forest reserve in certain parts of the Southern States. The facts ascertained and here presented deserve the careful consideration of the Congress; they have already received the full attention of the scientist and the lumberman. They set forth an economic need of prime importance to the welfare of the South, and hence to that of the nation as a whole, and they point to the necessity of protecting through wise use a mountain region whose influence flows far beyond its borders with the waters of the rivers to which it gives rise.

Among the elevations of the eastern half of the United States the Southern Appalachians are of paramount interest for geographic, hydrographic, and forest reasons, and, as a consequence, for economic reasons as well. These great mountains are old in the history of the continent which has grown up about them. The hard-wood forests were born on their slopes and have spread thence over the eastern half of the continent. More than once in the remote geologic past they have disappeared before the sea on the east, south, and west, and before the ice on the north; but here in this Southern Appalachian region they have lived on to the present day.

Under the varying conditions of soil, elevation, and climate many of the Appalachian tree species have developed. Hence it is that in this region occur that marvelous variety and richness of plant growth which have led our ablest business men and scientists to ask for its preservation by the Government for the advancement of science and for the instruction and pleasure of the people of our own and of future generations. And it is the concentration here of so many valuable species with such favorable conditions of growth which has led forest experts and lumbermen alike to assert that of all the continent this region is

best suited to the purposes and plans of a national forest reserve in the hard-wood region.

The conclusions of the Secretary of Agriculture are summarized as follows in his report:

"1. The Southern Appalachian region embraces the highest peaks and largest mountain masses east of the Rockies. It is the great physiographic feature of the eastern half of the continent. and no such lofty mountains are covered with hard-wood forests in all North America.

"2. Upon these mountains descends the heaviest rainfall of the United States, except that of the North Pacific coast. It is often of extreme violence, as much as 8 inches having fallen in eleven hours. 31 inches in one month, and 105 inches in a year.

"3. The soil, once denuded of its forests and swept by torrential rains, rapidly loses first its humus. then its rich upper strata. and finally is washed in enormous volume into the streams, to bury such of the fertile lowlands as are not eroded by the floods, to obstruct the rivers, and to fill up the harbors on the coast. More good soil is now washed from these cleared mountain-side fields during a single heavy rain than during centuries under forest cover.

"4. The rivers which originate in the Southern Appalachians fiow into or along the edges of every State from Ohio to the Gulf and from the Atlantic to the Mississippi. Along their courses are agricultural, water-power, and navigation interests whose preservation is absolutely essential to the well-being of the nation.

"5. The regulation of the flow of these rivers can be accomplished only by the conservation of the forests.

"6. These are the heaviest and most beautiful hard-wood forests of the continent. In them species from east and west, from north and south, mingle in a growth of unparalleled richness and variety. They contain many species of the first commercial value, and furnish important supplies which can not be obtained from any other region.

"7. For economic reasons the preservation of these forests is imperative,. Their existence in good condition is essential to the prosperity of the lowlands through which their waters run. Maintained in productive condition they will supply indispensable materials, which must fail without thorn. Their management under practical and conservative forestry will sustain and increase the resources of this region and of the nation at large, will serve as an invaluable object lesson in the advantages and practicability of forest preservation by use, and mill soon be self-supporting from the sale of timber.

"8. The agricultural resources of the Southern Appalachian region must be protected and preserved. To that end the preservation of the forests is an indispensable condition. which will lead not to the reduction but to the increase of the yield of agricultural products.

"9. The floods in these mountain-born streams, if this forest destruction continues, will increase in frequency and violence and in the extent of their damages, both within this region and across the bordering States. The extent of these damages, like those from the washing of the mountain fields and roads, can not be estimated with perfect accuracy, but during the present year alone the total has approximated $10,000,000, a sum sufficient to purchase the entire area recommended for the proposed reserve. But this loss can not be estimated in money value alone. Its continuance means the early destruction of conditions most valuable to the nation, and which neither skill nor wealth can restore.

"10. The preservation of the forests, of the streams, and of the agricultural interests here described can be successfully accomplished only by the purchase and creation of a national forest reserve. The States of the Southern Appalachian region own little or no land, and their revenues are inadequate to carry out this plan. Federal action is obviously necessary, is fully justified by reasons of public necessity, and may be expected to have most fortunate results."

With these conclusions I fully agree; and I heartily commend this measure to the favorable consideration of the Congress.

THEODORE ROOSEVELT.

WHITE HOUSE,
December 19, 1901.

CONTENTS.

REPORT

ON THE

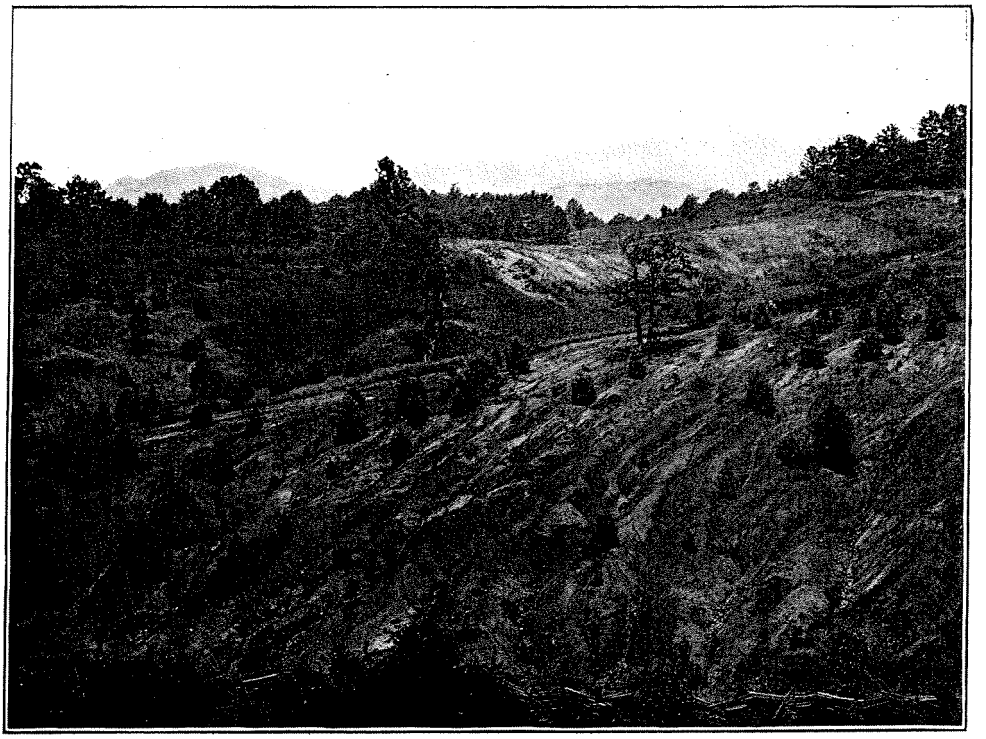
FORESTS AND FOREST CONDITIONS OF THE SOUTHERN APPALACHIAN MOUNTAIN REGION.

To the PRESIDENT:

An interest in practical forestry, notable and commendable, has grown up among the American people during the past few years. There is an evident determination that our country shall profit from its own and the experience of other countries by beginning the preservation of our forest remnants before it is altogether too late.

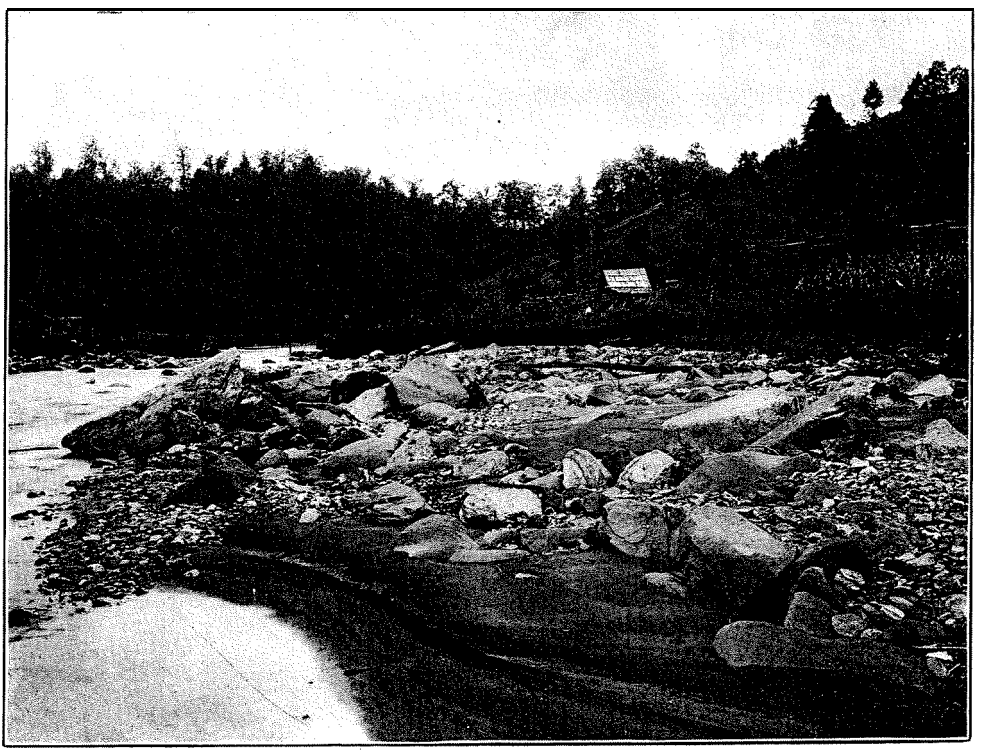
The most important practical outcome of this awakening has been the setting aside by the Government, out of the public domain: in the several Western States and Territories, of some 70,000 square miles of forest-covered lands about the mountains in these regions, to protect the streams and perpetuate the timber supplies. A more recent result is the movement, which has met with the general approval of business and scientific organizations and the unanimous support of the press, toward the preservation by the Government of the hard-wood forests on the slopes of the Southern Appalachian Mountains.

The proposal that the Government shall protect these Appalachian forests by purchasing the lands and making of them a great national forest reserve was first brought directly to the attention of Congress in January, 1900, when a memorial to that effect was presented by the Appalachian Mountain Club of New England and the Appalachian National Park Association of the South Atlantic states. In response to this memorial and in recognition of the importance of the movement, the act making the appropriation for the Department of Agriculture for the fiscal year ending June 30, 1901, provided that a "sum not to exceed $5,000 may, in the discretion of the Secretary of Agriculture, be used to investigate the forest conditions in the Southern Appalachian Mountain region of western North Carolina and adjacent States."



(*A*) LAND EROSION ON THE CLEARED SLOPES OF THE SOUTHERN APPALACHIANS. (See PP. 26–28.)

These steep lands have been cleared, cultivated, abandoned, and ruined, all in a few years. Their reforestation will soon be impossible.



(*B*) FLOOD DESTRUCTION OF AN APPALACHIAN MOUNTAIN VALLEY. (See PP. 32,130.)

The floods have washed away the farm and the home, leaving only the hillside barn. The aggregate damages from Roods along these Southern Appalachian streams from April, 1901, to April, 1902, reached the large sum of $18,000,000.

(Photographed from a model by Howell.)

RELIEF MAP OF THE UNITED STATES, SHOWING BY INCLOSING WHITE LINES THE LOCATION OF THE NATIONAL FOREST RESERVES IN THE WEST AND THE REGION WITHIN WHICH IT IS PROPOSED TO LOCATE THE NATIONAL APPALACHIAN FOREST RESERVE, INCLUDING PORTIONS OF THE TWO VIRGINIAS, THE TWO CAROLINAS, GEORGIA, ALABAMA, AND TENNESSEE. (See p. 16.)

The black curving lines indicate the number of inches of rainfall in the regions they traverse. The dark shading also indicates a heavy rainfall, and the light shading indicates a light rainfall.

NATURE AND EXTENT OF THIS INVESTIGATION.

Acting under this authority I conducted such an investigation during the field season of 1900, and continued it again during the present year. The conclusions to which the results of this investigation have led me will be found at the end of this report (p. 38).

Departments of Agriculture and of the Interior cooperate in the investigation.

By the liberal cooperation of the Department of the Interior, through the United States Geological Survey, I was enabled to make these investigations much broader and more thorough than would otherwise have been possible. The Geological Survey, in timely recognition of the importance of this movement, has, during the past two years, studied the topographic features and the water supplies of the region in relation to its forest development, and has also cooperated in the examination of the forests themselves. The investigations along the several lines have been participated in by the best men available in the Government service. I have myself twice visited this region, and have seen at first hand the destruction of the forests and the consequent enormous damage by floods; have examined some of its largest mountain masses, and have climbed its highest peak. The conclusions reached from this personal experience, as well as from the extensive expert investigations just mentioned, will be found briefly summarized at another place in this report (p. 38).

Nature of the investigation.

The experts in charge of this work examined not only the forests and the general forest conditions as they exist to-day, but also the causes which have led up to these conditions and the possibility of improving them either with or without Government ownership and supervision. They studied the influences of the forests on the preservation of the streams and soils of these mountains and on the preservation of the water powers and the farm lands along these streams, both within the mountain areas and across the bordering lowlands. In particular the region was studied as to its relative adaptability to future development along the lines of practical forestry and practical agriculture.

Forest and agricultural conditions.

The forests were carefully mapped as to their distribution and density and the relative proportion of the forest-covered and cleared lands. The investigation also included a study of the general character and distribution of all the available species of trees and shrubs of the

region, the stand of timber, the extent to which the timber has been and is now being cut or damaged by fire, the nature of the present holdings, and the prices at which these lands can be purchased The agricultural investigation included the study of the cleared lands, methods of their clearing, the crops which they yield, and the extent to which these lands deteriorate by erosion and by the leaching out of their fertility both on the mountain slopes and in the valleys.

The officers of the Geological Survey meanwhile made a careful study of the quantity of water flowing out through the various streams having their sources in this region, and of the effect of forest clearings on the regularity of their flow at different seasons. Fifty-four regular stations were maintained, covering every large stream which rises in these mountains. These streams flow through West Virginia, Virginia, North Carolina, South Carolina., Georgia, Alabama, and Tennessee, and rank among the important rivers of the country. At each station daily records of stream heights were kept, and measurements of the volume of flow were made from time to time. In addition to this, more than 1,000 miscellaneous gagings were made on the tributaries of the James, Roanoke, Yadkin, Catawba, Broad, Savannah, Chattahoochee, Coosa, Hiwassee, Tennessee, French Broad, Nolichucky, Watauga, Holston, and New (Kanawha) rivers. (See Pl. XII).

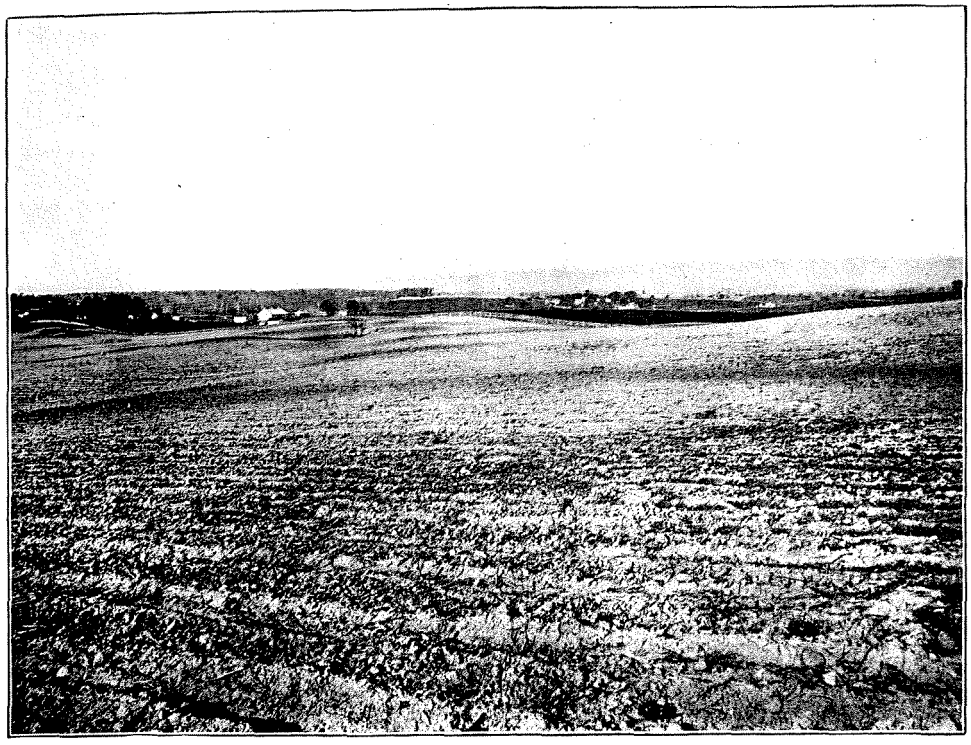
Investigation of the streams.

A brief preliminary report embodying the more salient results of this investigation during the year 1900 was sent to Congress by the President in January, 1901. It was accompanied by a letter from President McKinley commendatory of the plan for an Appalachian forest reserve here suggested anew. The present report will be found to contain the results of the investigations carried on during the past two years, together with some conclusions based upon them. The general statement is followed by a series of supplemental papers, each containing a more detailed account of the results of the examinations and inquiries along some one single line.

Nature of this report.

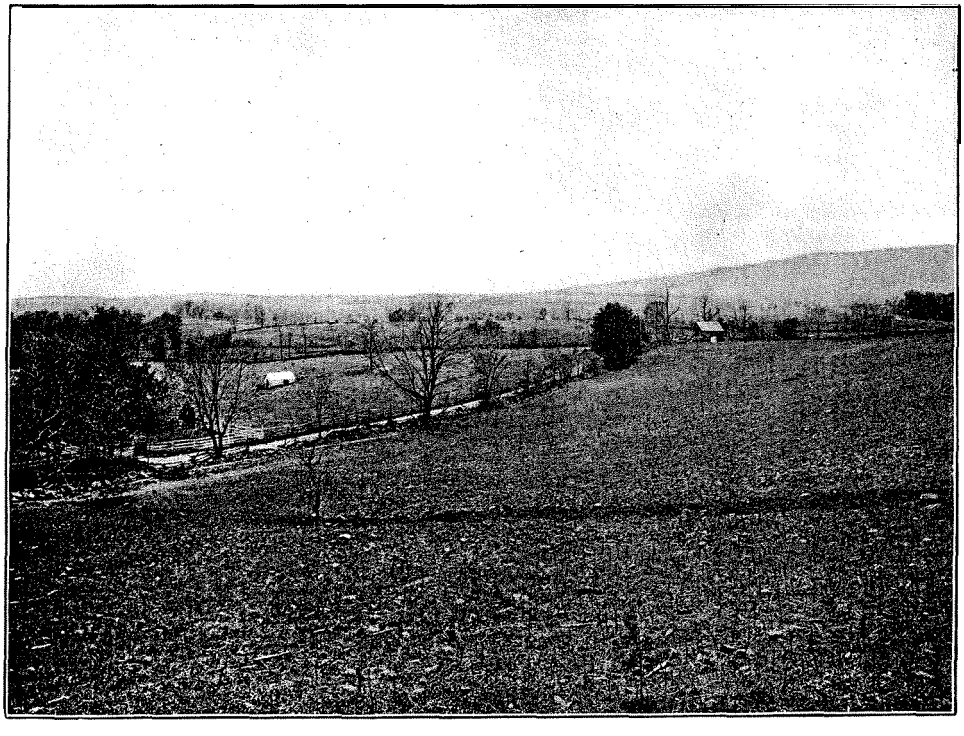
The region examined during this investigation embraces that part of the Appalachian Mountain system which begins in southern Virginia and includes portions of that State, of southeastern West Virginia, western North Carolina, eastern Tennessee, northwestern South Carolina, and northern Georgia, and especially that portion of this region usually

The region examined.



(*A*) **VALLEY OF VIRGINIA.** (See p. 16.)

This is A part of the great Appalachian Valley lying west of the Southern Appalachian Mountains.



(*B*) PIEDMONT PLATEAU IN VIRGINIA. (See p. 17.)

This plateau region lies east and south of the Appalachian mountains from Virginia into Alabama

designated as the Southern Appalachian Mountains. Its general character and relations can be more easily described and better understood after a brief discussion of the Appalachian region as a whole.

THE APPALACHIAN REGION.

Appalachian Mountains.

The map accompanying this report (Pl. II) shows the Appalachian Mountain system extending along the eastern portion of the continent from New York to Alabama, for a distance of 1,000 miles, and having a maximum width approaching 150 miles. These Appalachians constitute, not a single ridge or chain, but a zone or belt of mountains, the maximum development of which is reached south-southwest of Washington. Along the southeastern front, the Blue Ridge Mountains in New Jersey and Pennsylvania are rather poorly defined, and reach an elevation in the latter State, at South Mountain, of about 2,000 feet. South-southwestward they become a more prominent and regular feature in the landscape, the highest peaks reaching an elevation of a little more than 4,000 feet in Virginia (see Pl. XII), and about 6,000 feet in North Carolina. Along the northwestern front of this belt the Allegheny Mountains, starting with the Catskills in New York, cross Pennsylvania and Maryland is a series of well-defined parallel ridges, with a general elevation of 2,000 feet. The maximum development of the Alleghenies, however, is reached along the line between Virginia, West Virginia, and Kentucky, where the elevations range front 3,000 feet to nearly 4,500 feet above the sea. Southward from this point they become less and less prominent, riving but little above the adjacent plateau surface.

Appalachian Valley.

Between the Blue Ridge Mountains and the Alleghenies lies a great mountain valley, or succession of valleys, separated laterally by tnore or less subordinate ridges, parallel to the general mountain courses, and with their ends separated by low divides. This is called by the geographers the Great Appalachian Valley. The more or less separate valleys have local names, such as the Lehigh, Lebanon, and Cumberland valleys, in Pennsylvania; the Shenandoah, or Valley of Virginia (see Pl. III*a*), and the Valley of East Tennessee. (See Pl. LXV.) The floor of this great valley region has an elevation above the sea of from less than 500 to 800 feet in Pennsylvania, and thence, like the mountains, rises southward to its maximum elevation of about 1,700 feet in southwest Virginia. (Pl. III.)

THE SOUTHERN APPALACHIANREGION.

This general Appalachian system is usually separated into its northern and southern divisions in southern Virginia by a line drawn nearly eastward from the most easterly point of Kentucky, and where the New or Kanawha River breaks across the Appalachian Valley and the Alleghenies. New River rises on the Blue Ridge in North Carolina, flows northward and then westward through the Ohio into the Mississippi drainage. It thus violates the rule established by the James, the Potomac, the Susquehanna, and the Delaware rivers, to the north, of rising about the Alleghenies and breaking eastward across the Blue Ridge into the Atlantic drainage; and it here establishes a new rule that controls the drainage of the larger mountain streams to the south, which, following its example, rise on the western slopes of the Blue Ridge and flow across the mountain region to the northwestward and into the Mississippi drainage through the Tennessee. To the southwest of this line which separates the two systems of drainage lie the Southern Appalachians.

Division between the northern and southern Appalachians.

Referring again to the maps (Pls. IV and XII), it will be seen that, bordering these mountains on the east and south in Virginia, the Carolinas, Georgia, and Alabama, is a region which is termed by the geographers the Piedmont Plateau. From the base of the mountains, where it has an elevation of from 1,000 to 1,200 feet, the hilly, undulating surface of the plateau (see Pl. 1116) slopes gently seaward for a distance of from 100 to 150 miles, to where these hills give place to the sandy plains of the coast region. This Piedmont Plateau represents the finest agricultural and manufacturing portions of these States. Across its surface wind the rivers, fed by mountain streams, whose waters furnish power for large and rapidly growing manufacturing interests, and whose bordering lands are among the most productive in the region. The future of these water powers and of these bordering lands depends upon the regularity of the mountain streams, and these in turn depend upon the preservation of the mountain forests.

The Piedmont Plateau.

To the west of these mountains lies the Valley of East Tennessee, which constitutes the southern portion of the great Appalachian Valley. It has an elevation of 1,700 feet in southwestern Virginia and 1,000 feet at Knox-

Valley of East Tennessee.

ville, from which point it extends southwestward across portions of Georgia and Alabama. Into and through this valley drains the larger portion of the water which leaves the mountain region. Along the upper reaches of these streams are numerous valuable water powers, and along their lower courses through the valley are some of the finest farming lands in Tennessee. To the west of this valley lie the southern remnants of the Allegheny Mountains and the better defined Cumberland Plateau.

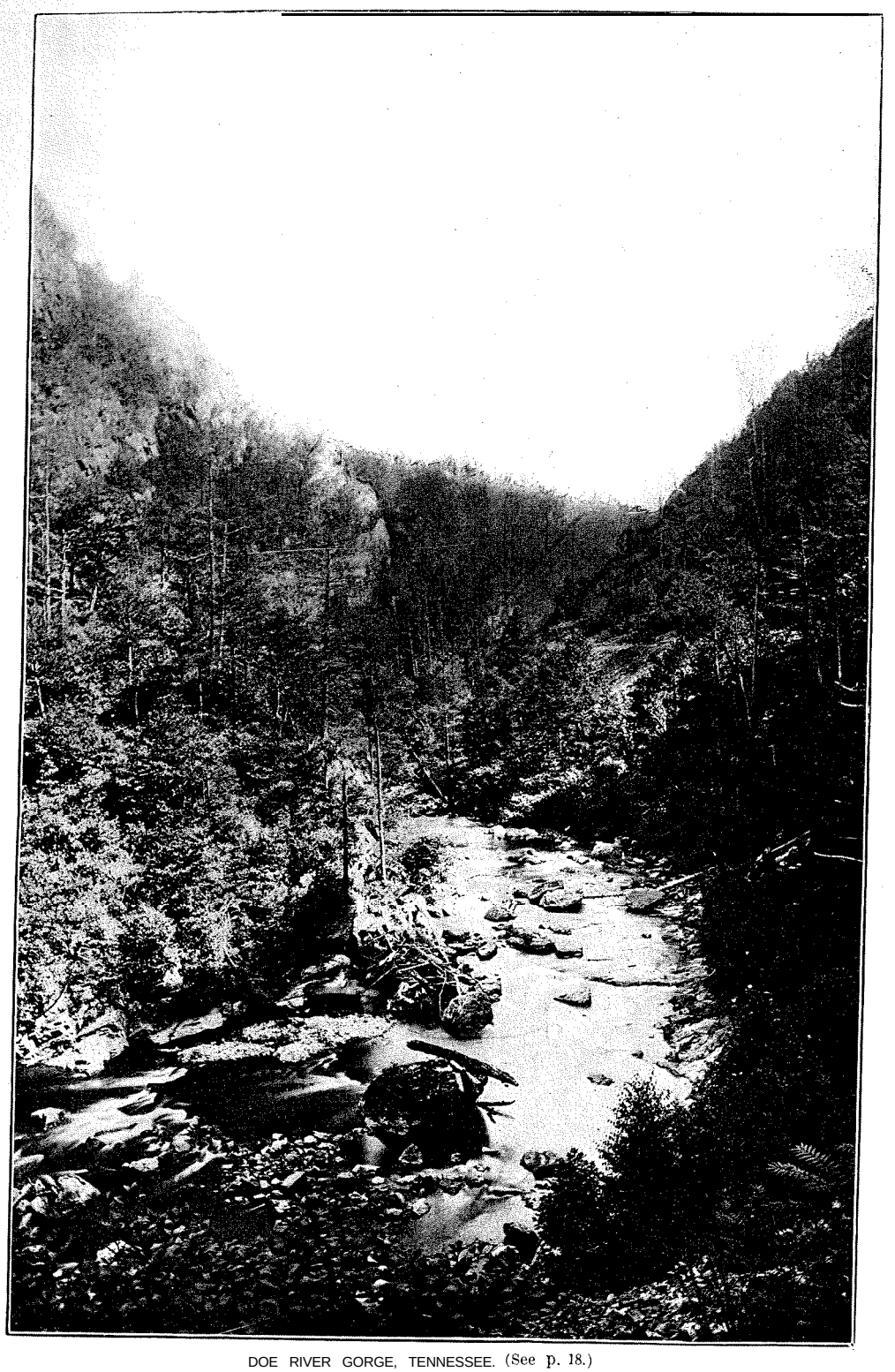
Between this great valley on the west and the Piedmont Plateau on the east and south are the Southern Appalachian Mountains, with which this report has especially to deal.

THE SOUTHERN APPALACHIAN MOUNTAINS.

The accompanying maps (Pls. IV and XII), show that the Blue Ridge, as it crosses Virginia southward, increases and holds its prominence and its individuality. As it passes into North Carolina it enlarges both vertically and laterally, widening out into a complex zone or belt of mountains, with a maximum width of about 70 miles in western North Carolina and east Tennessee, and contracting again toward its southern end. These mountains show none of the regularity exhibited by the Northern Appalachians, but, on the other hand, are composed of massive ranges and cross ridges and more or less isolated mountains, often with rounded, dome-like tops (see Pl. VIII), in striking contrast with the sharp, regular, parallel, rocky ridges of the more northern Alleghenies.

The Blue Ridge and the Unaka Mountains.

Along the southeastern margin of this southern mountain belt is the Blue Ridge proper, which, as it crosses North Carolina, is a fairly well-defined mountain range, standing more than 3,000 feet above the sea and rising in four peaks to more than 5,000 feet, and in one—the Grandfather—to practically 6,000 feet. Bordering this region on the northwest is a mountain range—the Unakas—somewhat higher, and in its southern portion more massive, but less continuous, than the Blue Ridge; less continuous for the reason that its course is cut across by half a dozen rivers, which rise on the Blue Ridge on the east, flow across this intervening mountain region, and cut through the Unakas in wild, deep gorges. (See Pl. V.) Between these river gorges the segments of the Unakas are known by such local names as the Iron Mountains, Bald Mountains, and Great Smoky mountains. In southern



DOE RIVER GORGE, TENNESSEE. (See p. 18.)

The forests on the steep slopes of this beautiful gorge are being destroyed by the fire and the axe.

Virginia the Unakas approach the Blue Ridge and practically merge with the latter: into one irregular mountain range; southward, the two diverge. The Unaka range has 18 peaks rising above 5,000 feet, and S of these above 6,000 feet. The Roan, toward its northern end, Mount Guyot and Clingman's Dome, farther south in the Great Smoky Mountains, reach altitudes, respectively, of 6,313, 6,636. and 6,619 feet.

Southwest of the North Carolina line these bordering mountain chains lose both in elevation and regularity. In northern Georgia they break up into several minor ridges, diminishing in size as they extend southwestward, separated by widening, irregular valleys. Near Cartersville, Ga., between the two principal tributaries of the Coosa River, the Southern Appalachians merge into the Piedmont Plateau, mith its low, isolated hills and ridges, remnants of former mountains. (See Pls. IX *a* and XLV.) They rise again, however, in eastern central Alabama into the short, irregulai ridge of the Talladega Mountains, which reach an elevation of 2,500 feet. The slopes of these ridges in north Georgia are still largely' forest covered, and along them are the countless springs which, with notable constancy, feed the great rivers of that State and Alabama. The scenery of much of this region is exceedingly picturesque, and its attractiveness is increased by the many cascades and waterfalls along the courses of these mountain streams, such as Tallulah Falls (see Pl. XXVIII), with a descent of 335 feet, and the Dukes Creek, Minnehaha, and Ruby falls, with each a descent of nearly 300 feet in short distances.

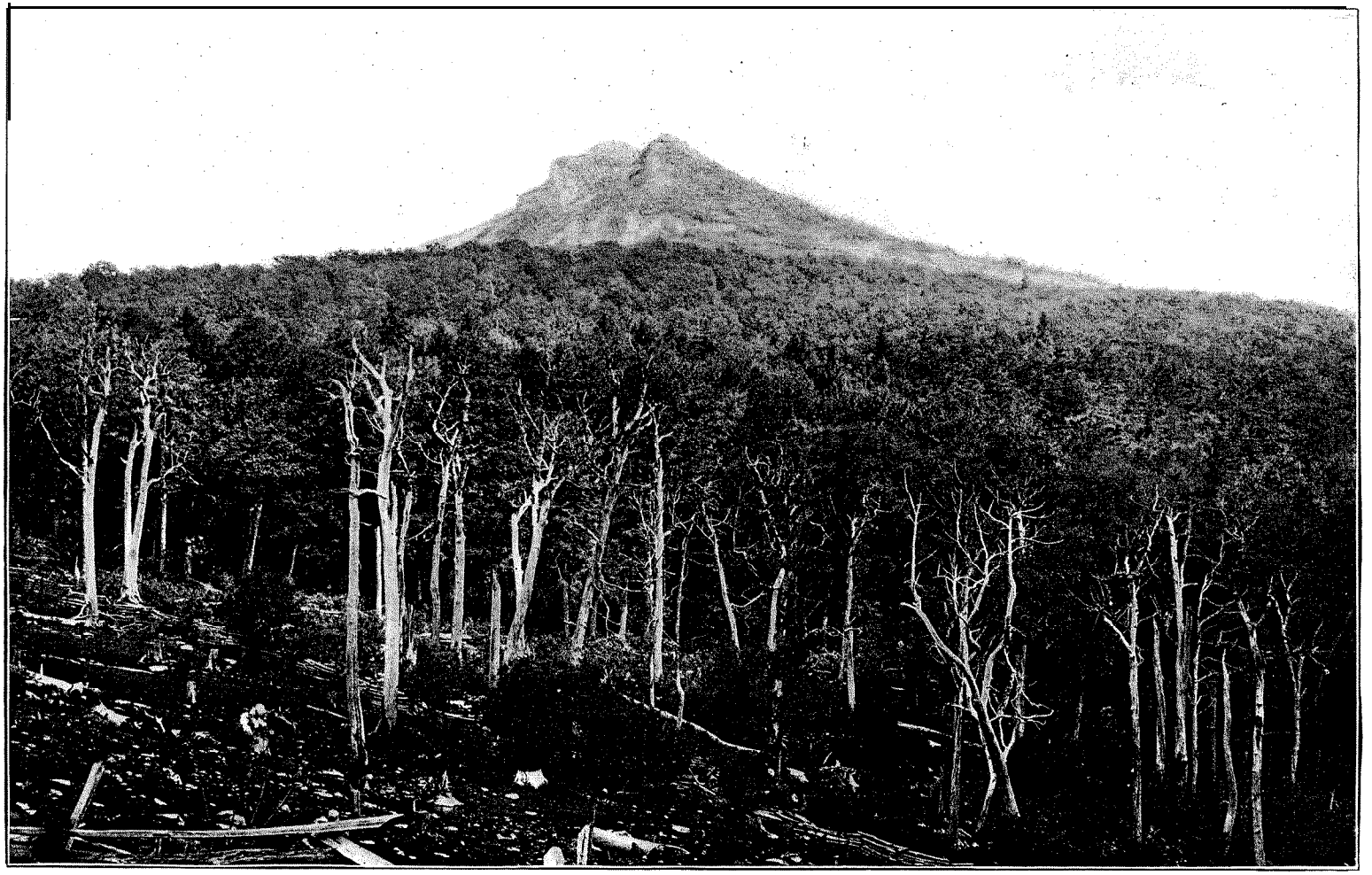
Southern ends of the Appalachians.

Extending out from the two great irregular mountain borders, the Blue Ridge and the Unakas, into the elevated region between them, and connecting them in places, are a series of more or less interrupted cross ridges, which have altitudes comparable to, and in one case (the Black Mountains) greater than, those of either the Blue Ridge or the Unakas. And these interior ridges are separated by high, but deep and generally narrow, irregular valleys.

The cross ridges of mountains.

Standing on any of these elevated mountains, one may see stretching out in either of several directions an endless succession of mountain ridges and mountain peaks. A remarkable succession of these ridges and peaks is seen from the Grandfather Mountain. North Carolina, looking southwest, as shown in the accompanying panoramic view (Pl. VI). Hundreds of such vistas, from as many peaks,

PLATE VII



GRANDFATHER MOUNTAIN, THE HIGHEST POINT ON THE BLUE RIDGE, SHOWING SHARP, RUGGED PEAK, SURROUNDED BY HARD-WOOD FORESTS. (See PP. 20, 114.)

The forest in the foreground, which is being destroyed, has the hemlock spruce interspersed with oaks and other hard woods. About the higher peak (5,500 to 5,964 feet) the trees are mainly black spruce and balsam.

open out. before the traveler through this region. In every direction the splendid hard-wood forests cover and protect the mountain slopes and the countless springs of water which flow from them as the sources of great rivers. There is but one discordant fact-the calamitous destruction of the forests on these mountain slopes.

Some of these ridges, like the Black Mountains, are short, but high and massive and terminate abruptly. Others are longer and lower and slope gradually down to the adjacent valley or rise from a lower gap to another still higher ridge. All are more or less irregular both in their courses and their elevation. Most of them have peaks rising from their tops; but not a few have fairly uniform crests. (See Pl. XVII.) Some of these peaks, like the Grandfather (Pl. VII), are sharp, rugged, and rocky; others, like the Roan or the "Balds" (Pl. VIII a), are rounded domes whose tops are covered only with grass and rhododendron, while still others, equally tall and massive, like the Blacks and the Great Smokies, are heavily forest covered to the summit. (See Pl. VIII *b*.)

Variety of peaks and ridges.

The haziness of the atmosphere, which has found expression in the names "Blue Ridge" and "Smoky Mountain," often limits the distance of distinct vision, but it combines with the forest cover to soften the details and to render this Southern Appalachian landscape attractive beyond comparison. This succession of ridges and peaks, seen through it from an eminence, rising one above and beyond another for 50 or 100 miles or more, impresses upon the observer in a manner not to be forgotten the vastness of this region of mountains. It has 46 peaks, a mile or more apart, and 41 miles of dividing ridges, which rise above 6,000 feet; 288 additional peaks and 300 miles of divide rise more than 5,000 feet above the sea. These are not only the greatest masses of mountains east of the Rockies; they are the highest mountains covered with hard-wood forests in America.

Magnitude of these mountains.

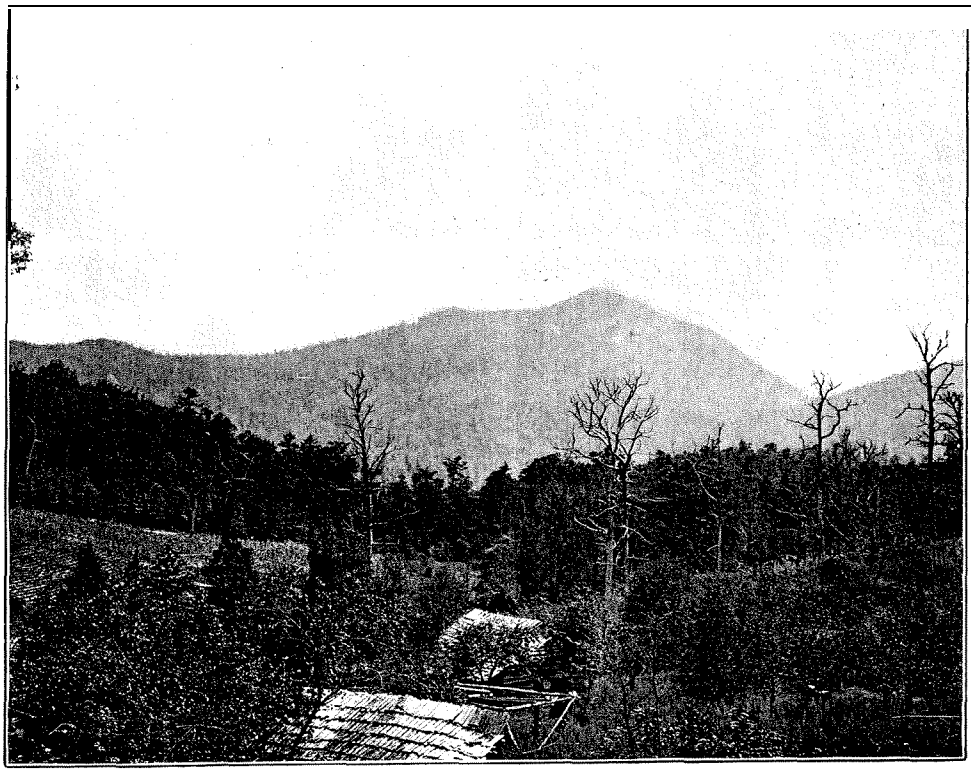
This region, thus unique in its position, in its mountain features, in its forests, and in its *climate*, stands grandly out as the greatest physiographic feature in the eastern half of the continent. (See Pls. II and VI.)

Salient features.

Between these groups of mountains and far below them, though still at an elevation of 2,000 feet or more above the sea, are the numerous narrow valleys of this region. They border the numberless streams and are generally more extensive nearer the sources of these streams, and

Mountain valleys.

(*A*) "BALD" OF BIG YELLOW MOUNTAIN, MITCHELL COUNTY, N. C. (See pp. 18, 20.)
These bald mountain tops are covered with grass, the tree line often being fairly sharp. (See also PI. XXIIa.)



(*B*) A COMMON TYPE OF SOUTHERN APPALACHIAN PEAK IN THE GREAT SMOKY MOUNTAINS. (See p. 20.)

hence nearer to the Blue Ridge than to the Unakas. (Pl. IX.) As a rule, they vary in width from a few hundred feet to as many yards. Some of the most notable of these valleys, reaching a width of 2 to 5 miles in places, are those on New River in Virginia, on the French Broad above Asheville, on the Tennessee River in southwestern North Carolina, and about the headwaters of the Coosa and other rivers in Georgia. As these streams approach and cut through the mountain borders of this region they run in deep gorges, the full width of which is often occupied by the streams. (See Pl. XXIX.)

The slopes of these mountains vary considerably in their steepness. The northwestern slopes of the Blue Ridge are usually gentle and in many places cleared. The southeastern slopes are generally much steeper and usually forest covered. In a few places these southeastern slopes are rocky and precipitous. Especially is this the case along the South Carolina border, as seen in Cæsars Head, Whiteside, and Table Rock mountains (see Pls. X, XI, and XLV), where the bare rock walls rise 600 to 1,000 feet in height. The slopes of the Unakas, like those of many of the interior ridges, are fairly steep on both sides, ranging generally from 20 to 50 degrees. About the interior ridges there is still greater variation. Some of the rocky faces are precipitous, while elsewhere the slopes are gentle, ranging from 5 to 20 degrees. But taking the mountains and the valleys together, the land surface with a slope of less than 10 degrees is not more than 10 per cent of the whole.

Steepness of the mountain slopes.

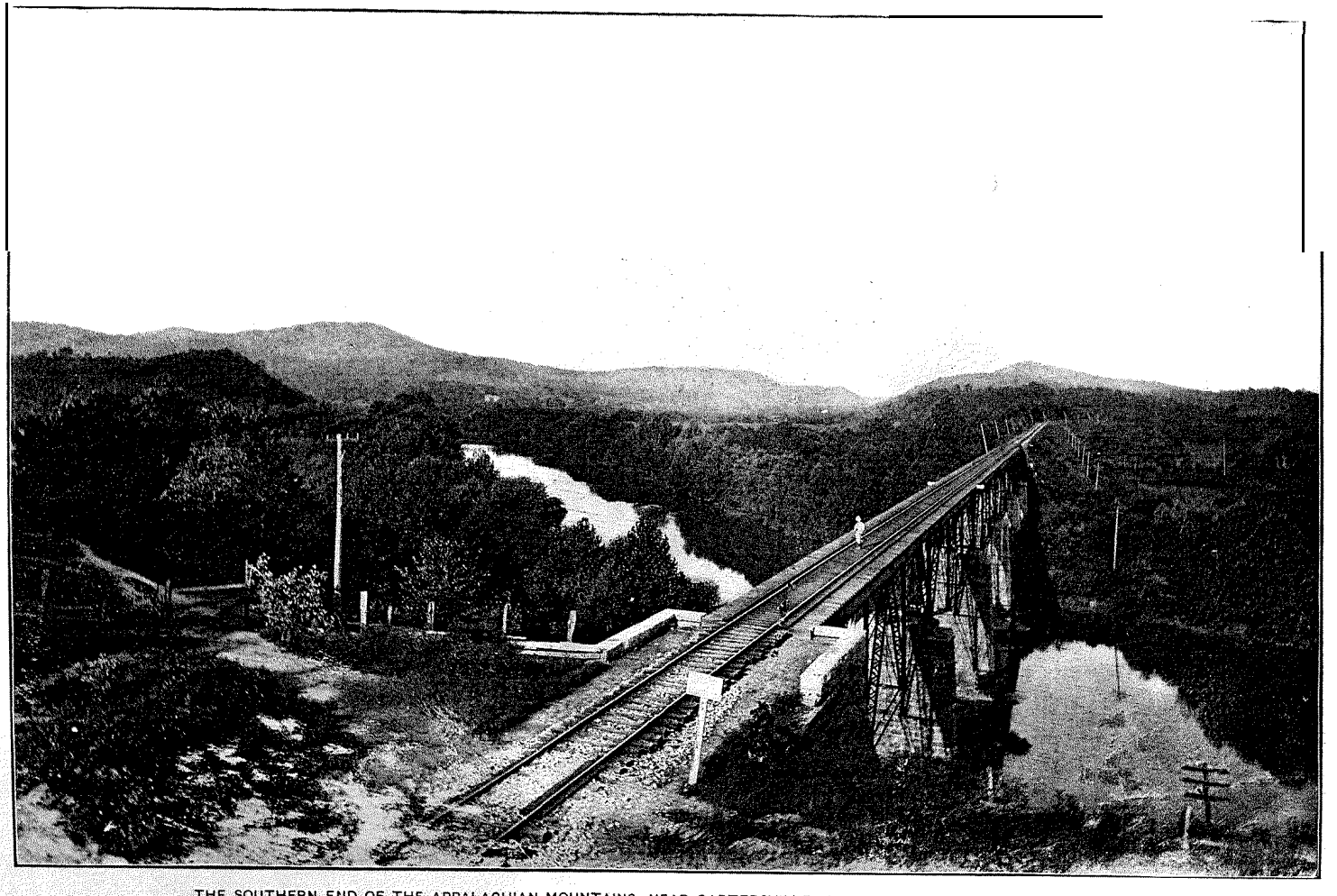
THE FORESTS.

It is the forest covering of these great mountain slopes—a covering that should never be removed-about which interest centers in the present investigation. The results of this examination during the past two years are given at length in a paper published as Appendix A (p. 41). They are stated separately for each of the larger river basins, following a somewhat general discussion of the forest conditions in the region as they exist to-day and of how the forests may be economically protected and improved under Government control.

Method and results of the examination.

These forests have been carefully studied and classified, and over much the larger portion of the area their density and distribution have been indicated on the excellent topographic maps furnished for this purpose by the Depart-

Forest maps.



THE SOUTHERN END OF THE APPALACHIAN MOUNTAINS, NEAR CARTERSVILLE, GA., LOOKING NORTHEAST. (See p. 19.)

ment of the Interior. The length of time required for engraving these detailed forest maps makes it impossible to issue them as a part of the present report, but copies of them in manuscript form are meanwhile available for examination at the Department of Agriculture and the Geological Survey. The distribution of these forests and the approximate relative proportion of the forest-covered and the cleared lands are indicated by the generalized map (Pl. XII). The scattered cleared fields on the mountain slopes are so small that it is impossible to indicate them on a map of this scale, and hence only the larger clearings, only those along the valleys, are shown.

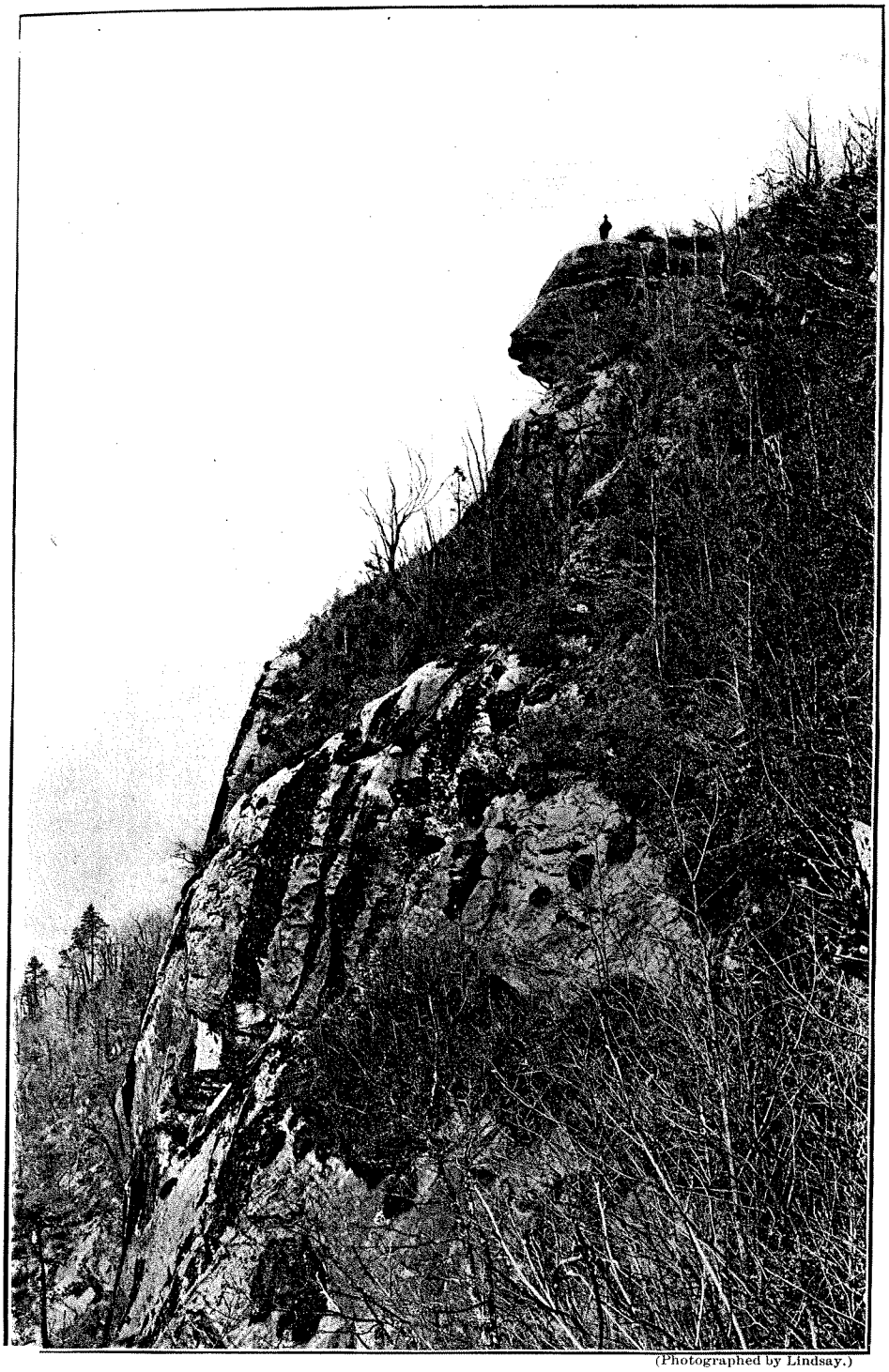
Considering the forests of the region as a whole, there is a striking uniformity about their general features, especially in the valleys and along the lower slopes, and yet everywhere there is variety. This fact is well illustrated by the list (on p. 93) of 137 species of trees and a still longer list of shrubs growing in this mountain region.

Variations in forests on southern and northern slopes.

The forests on the southeasterly slopes are usually less striking, both in size of trees and density of growth, than those on the northwest, and they are usually more damaged by forest fires, because the slopes are steeper and are kept drier by their more direct exposure to the sun. The neighboring forests on the northern and western slopes and in the westerly facing coves exhibit a greater variety of vegetation, a denser growth, and finer specimens of individual trees, because they have not only greater moisture, but greater depth and fertility of soil. Both are protected by the humus which covers the surface and which contributes directly to the luxuriance of this growth. It is in such situations that we find the best examples of the superb hard-wood forests which abound in this region-the finest on the continent. (See Pl. XIII.)

Variations in forests due to elevation.

But the greatest variations in these mountain forests are observed in connection with the differences in elevation. Thus along the southern foothills of the Appalachians in Georgia one finds occasionally scattered colonies of the loblolly and long-leaf pines, trees which are characteristic of the South Atlantic and Gulf coast region, intermingling with the typical hard-wood forests of the Piedmont Plateau and of the lower mountain slopes. (See Pl. XIV.) At the eastern foot of the Blue Ridge, in North Carolina, the typical flora of the Piedmont Plateau abounds, and follows up the river gorges into the mountain valleys, where it associates with more characteristically Ap-



(Photographed by Lindsay.)

CÆSARS HEAD, SOUTH CAROLINA. (See p. 21.)

The fires and the axeare destroying the forest growth on these steep, rocky mountainsides.

palachian species. Thence up to the tops of the higher peaks there is a constant succession of changes-an intermingling and overlapping of the lower species with those which belong to greater elevations or more northern latitudes.

Forests on Mount Mitchell.

Thus in ascending any of the higher mountains, as Mount Mitchell, which? with its elevation of 6,711 feet, is the loftiest of them all, one may penetrate, in the rich and fertile coves about its base, a forest of oaks, hickories, maples, chestnuts, and tulip poplars, some of them large enough to be suggestive of the giant trees on the Pacific coast. (See Pl. XLIV.) Higher up one rides through forests of great hemlocks, chestnut oaks, beeches, and birches, and higher yet through groves of spruce and balsam. Covering the soil between these trees is a spongy mass of humus sometimes a foot and more in thickness, and over this in turn a luxuriant growth of shrubs and flowers and ferns. At last, as the top is reached, even the balsams become dwarfed, and there give place largely to clusters of rhododendron and patches of grass fringed with flowers, many of them such as are commonly seen about the hills and valleys of New England and southern Canada.

Seasons vary with elevation.

In such an ascent one passes through, as it were, the changing of the seasons. Half way up the slopes one may see, with fruit just ripening, the shrubs and plants the matured fruit of which was seen two or three weeks before on the Piedmont Plateau, 3,000 feet below; while 3,000 feet higher up the same species have now just opened wide their flowers. Fully a month divides the seasons above and below, separated by this nearly 6,000 feet of altitude.

General forest conditions.

Remote from the railroads the forest on these mountains is generally unbroken from the tops of ridge and peak down to the brook in the valley below, and to-day it is in much the same condition as for centuries past. (See Pl. XVII.) In the more settled portions of the region, however, a different picture presents itself. Along the narrow mountain valleys are the cultivated fields about the settlements, where they ought to be. When the valleys were practically all cleared the increasing demands for lands to cultivate led to clearings successively higher and higher up the mountain slopes, with a pitch of 20 and 30 and even 40 degrees. From some of the peaks one may count these cleared mountain-side patches by the score. They have multiplied the more rapidly because their fer-

Unwise forest clearings for agriculture.

tility is short lived, limited to two, three, or five crops at most. They are cleared, cultivated, and abandoned in rapid succession. Out of twenty such cleared fields, perhaps two or three are in corn, planted between the recently girdled trees; one or two may he in grain; two or four in grass, and the remainder-more than half of them-in various stages of abandonment and ruin, perhaps even before the deadened trees have fallen to the ground. (See Pl. XVIII.)

Lumbering operations.

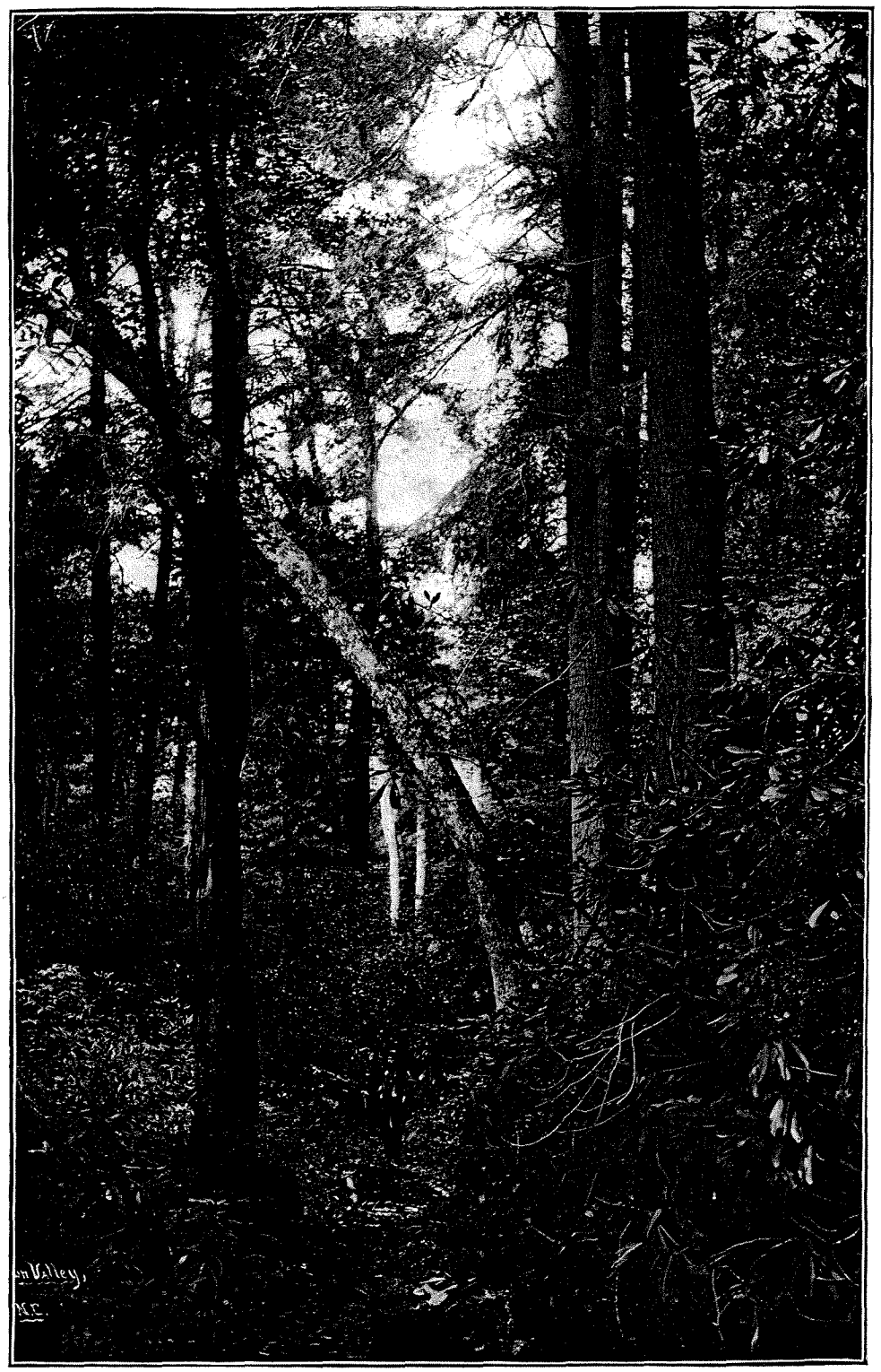
The lumberman attacked this forest several decades ago when he began to penetrate it in -search of the rarer and more valuable trees, such as the walnut and cherry. Later, as the railroads entered the region to some extent, he added to his list of trees for cutting the mountain birch, locust, and tulip poplar, and successively other valuable species. During the past few years he has cut everything merchantable. He is now beginning to extend his operations to considerable distances beyond the main lines of transportation by the construction of tramways and even cheap, short railways. Meanwhile his search for the more valuable trees has extended in advance to most of the more remote mountain coves.

Damages from lumbering operations.

In these operations there has naturally been no thought for the future. Trees have been cut so as to fall along the line of least resistance regardless of what they crush. Their tops and branches, instead of being piled in such way and burned at such time as would do the least harm, are left scattered among the adjacent growth to burn when driest, and thus destroy or injure everything within reach. The home and permanent interests of the lumberman are generally in another State or region, and his interest in these mountains begins and ends with the hope of profit. There is, however, no evidence that the native lumberman has in the past exhibited any different spirit.

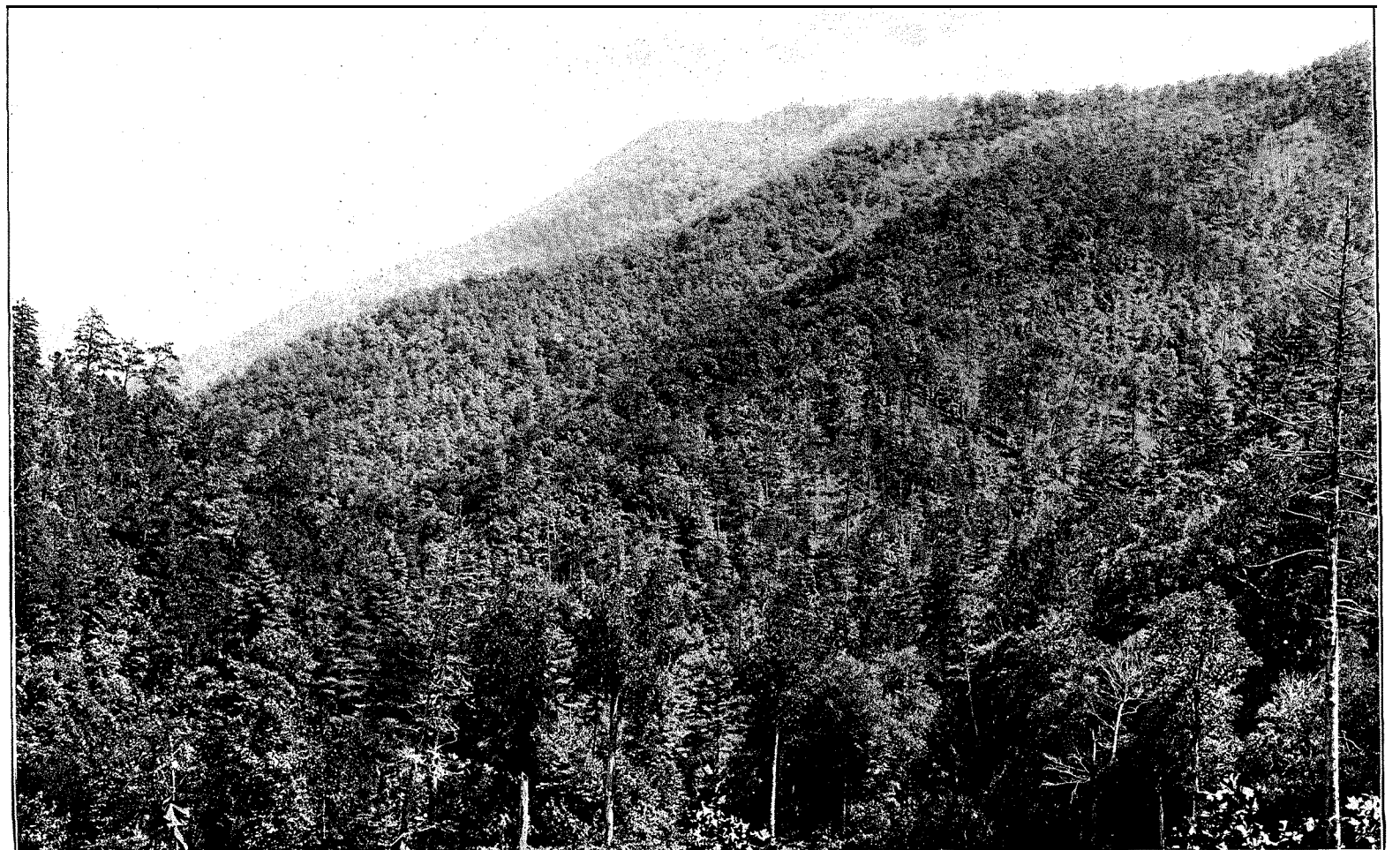
Destructive work of forest fires.

Forest fires have been one of the great curses of this country. From the days of Indian occupation down to the present time these Appalachian Mountain forests have been swept through by fires. Some of these have preceded the lumberman, others have accompanied him, and still others have followed in his wake, and the last have been far more destructive because of the tops and other rubbish which he has left behind him scattered among the remaining growth. (See Pl. L6). The aggregate damage from these fires is great. Over some limited areas they have entirely destroyed the forests. Everywhere on the south



(Photographed by Scadin.)

AN ORIGINAL SOUTHERN APPALACHIAN MOUNTAIN FOREST, TRANSYLVANIA COUNTY, N. C. (See pp. 21–23, 45.)



MIXED HARD-WOOD AND PINE FOREST ON OCONALUFTY RIVER, SWAIN COUNTY, N. C. (See p. 22.)

On the lower mountain slopes and ridges the pines are often mixed with the hard woods. But whatever the nature of the trees, the frequent fires are destroying the undergrowth and humus and thinning out the trees, thus diminishing the commercial value of the forest, facilitating the erosion of the soil, and lessening its capacity for storing water.

ward slopes the damages have exceeded those on slopes toward the north or west. Trees have been burned near the roots, making their bases defective (see Pl. XLVII); the young growth has been burned down (see Pl. XLVI); the grasses and other wild forage plants have been temporarily exterminated, so that instead of pasturage being improved, as some have believed it would be, in the end it has been seriously damaged. This destruction of the humus has always resulted seriously both to the forests and to the soils. In some cases, where the forests covering the steep, rocky slopes were thin, the loss of the humus has resulted in the washing and leaching away of the soils to such an extent as to destroy the forests entirely; and in all cases where the humus is thus removed the work of land erosion among the trees goes on as surely as though the forest itself were gone, though of course the process is far less rapid. Furthermore, the storage of water (in soils from which this humus has been removed) is far less perfect than in the original perfect forest.

Injuries resulting from the burning of the humus.

The rapid rate at which these lumbering operations have extended during the past few years and the still more rapid rate at which they are being extended at the present time, considered in connection with the destructive work of the fires and the clearing for agriculture, indicates that within less than a decade every mountain cove will have been invaded and robbed of its finest timber, and the last of the remnants of these grand primeval Appalachian forests will have been destroyed. Hence the very possibility of securing a forest reserve such as now contemplated is a possibility of the present, not of the future. This great activity indicates, furthermore, in the most striking way possible, the growing anxiety as to the future supply of hard-wood timber. And indeed the time is now at hand when the great interests involved make it imperative that the Government take hold of this problem and inaugurate here in these great broad-leaved forests of the East a new conservative forest policy, as it is already doing for the pine forests of the West.

Imperative need of new forest policy.

FOREST CLEARING AND AGRICULTURE IN THE SOUTHERN APPALACHIANS.

Ordinary farming on these mountain slopes can not exist permanently and should never exist at all. As stated above, not more than 10 per cent of the land of this region has a surface slope of less than 10 degrees (approxi-

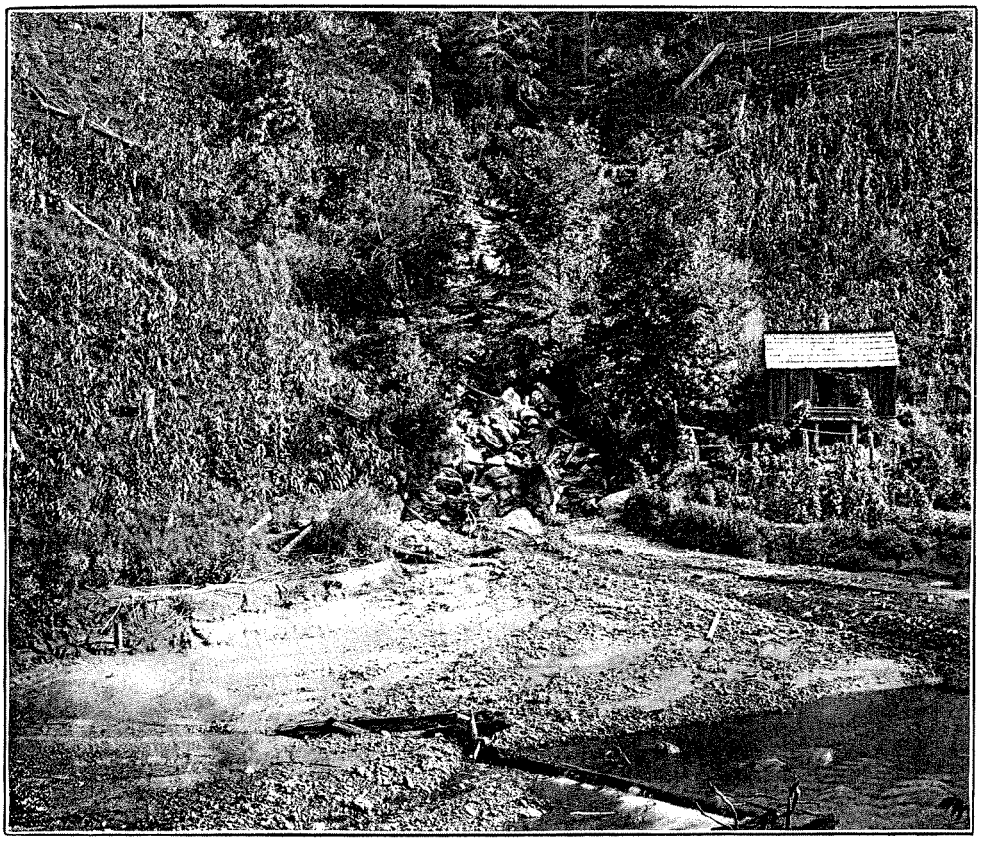
[illegible] (see Pl. 10), while 24 per cent (see Pl. XII) of it has been cleared. In this region land with slopes exceeding this can not be successfully cultivated for any considerable time, because its surface is rapidly washed into the rivers below by the heavy rains, and the same agency rapidly leaches out and carries to the sea its more soluble and fertile ingredients. The valley lands have already been largely cleared, and the farmers are now following up the mountain slopes. In many cases their cleared patches have well nigh reached the mountain summits. This process is going on with greater rapidity, because each short-lived hillside field must soon be abandoned. The underbrush is destroyed, the trees are girdled, and for one, two, or three years such a field is planted in corn, then a year in grain, then one or two years in grass; then the grass gives place to weeds, and the weeds to gullies. (See Pls. XX and XXI.)

Agriculture on mountain slopes short lived in its benefits; permanent in the resulting ruins.

Such a field has usually passed through its cycle in five to ten years and another must be cleared to take its place. A forest which is the growth of several centuries perishes in less than a decade; a soil which is the accumulation of a thousand years has been cleared, cultivated, abandoned, and is on the downward road to the sea within less than a decade. Such is the brief life history of many thousands of small mountain fields in this Southern Appalachian region. But even the native farmer is beginning to realize that the clearing of these mountain slopes is producing floods that wash away the valley farms, and that the time must come when he will have successively cleared and destroyed all his available mountain land. (See Pl. XXXIV).

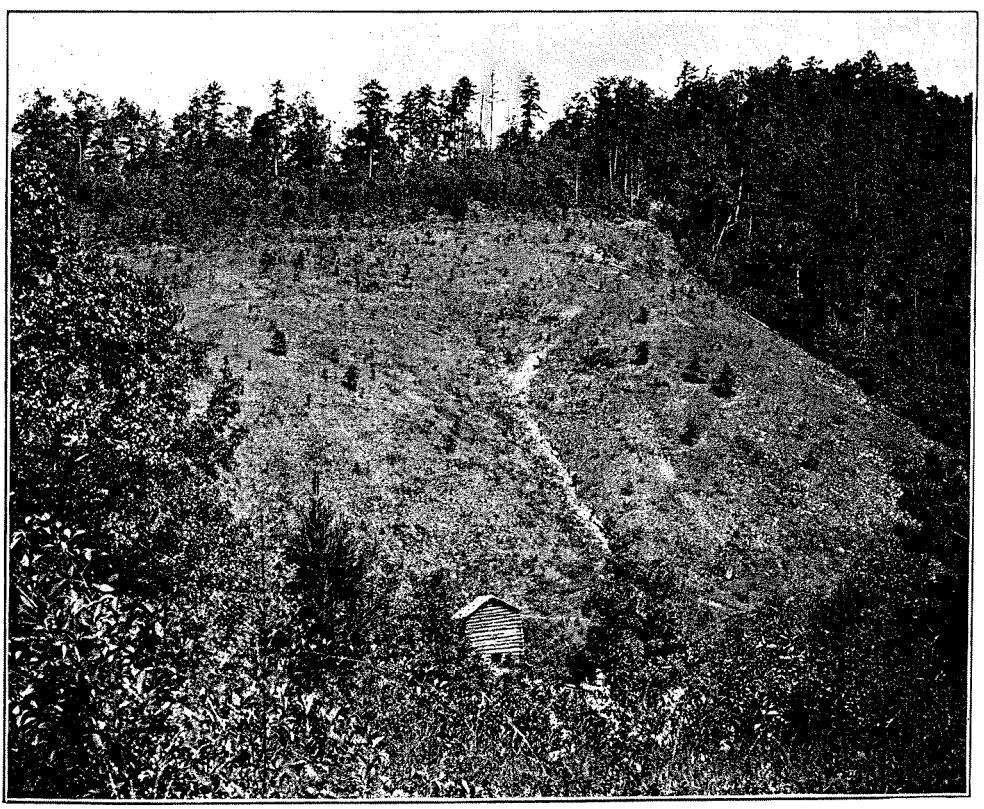
Some serious results from this forest clearing.

Fortunately the intelligence of the country is awakening to other and larger results that are following this policy. The soil thus removed may stop long enough on its way to the sea to silt up the streams as they cross the lowlands or may fill up the harbors as the streams reach the coast. Every acre of mountain slope thus cleared is a step in the more rapid destruction of the forests, of the soils, of the rivers, and of the "eternal mountains" themselves—the destruction of conditions which the combined wealth, intelligence, and time of man can not restore in a region which now possesses infinite possibilities for the benefit of the whole nation.



(*A*) NEWLY CLEARED MOUNTAIN FIELD PLANTED IN CORN, RAPIDLY WASHING AWAY. (See PP. 26-28.)

These steep fields will be ruined and abandoned in less than a decade.



(*B*) RECENTLY CLEARED FIELD IMPOVERISHED AND ABANDONED. (See PP. 26-28.)

Such fields should be forever covered with forest.

Grass does not hold the soil on the mountain slopes.

In the cool climate of New England the native grasses form a dense sod which holds the hillside surfaces in place, so that even where the forests have been removed there is little erosion. In the Southern Appalachians, however, neither the grass, the legumes, nor the other forage plants have been able to prevent this land erosion. and their only safeguard for the future is the protection of the forests. Hundreds of these steep mountain fields where selected grasses were sown have been observed during the past few years, and the results, as indicating a means of permanently holding these soils, have been generally unsatisfactory. (See Pl. XXII.)

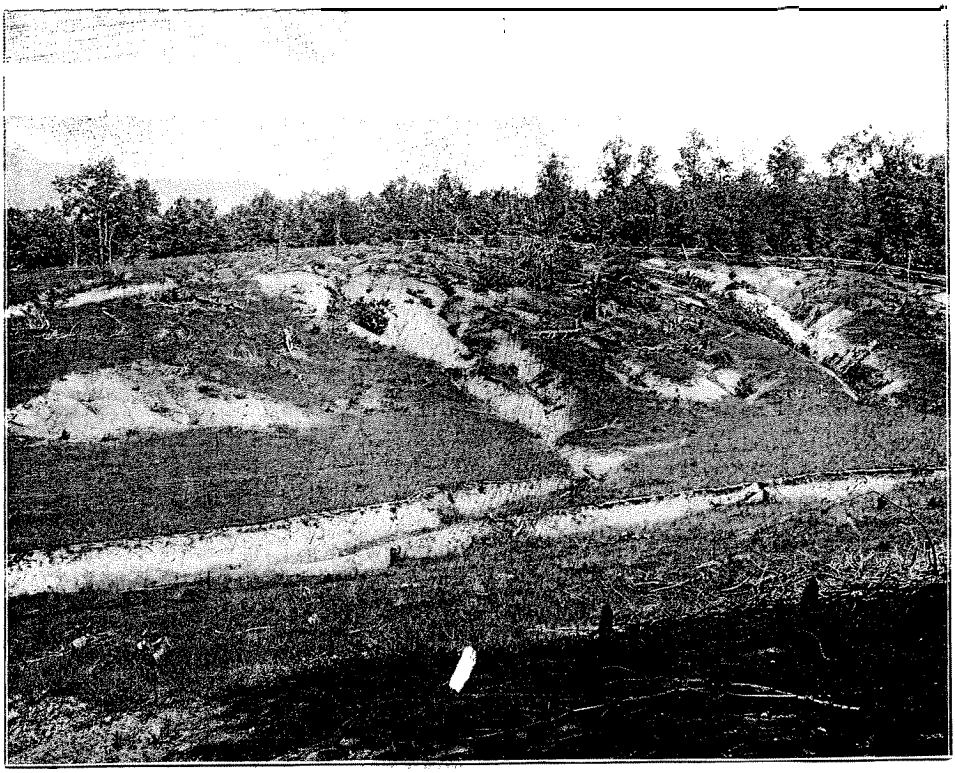
Washing of mountain lands.

This washing away of the cleared mountain fields does not always manifest itself in the formation of deep gullies. The majority of these fields have slopes so steep that the water in its downward course can not always move laterally to a sufficient degree for its concentration and the washing out of such gullies. Each drop of rain does its own work in battering and loosening the surface; and as it carries downward the particles of soil it has captured it is joined by only its closer neighbors. Hence frequently after a heavy rain the surface of such a field looks as though it might have been harrowed or even raked downward rather than plowed in larger furrows. From one of these cleared fields more soil is sometimes removed by a single heavy rain than during the preceding centuries while it was densely forest covered.

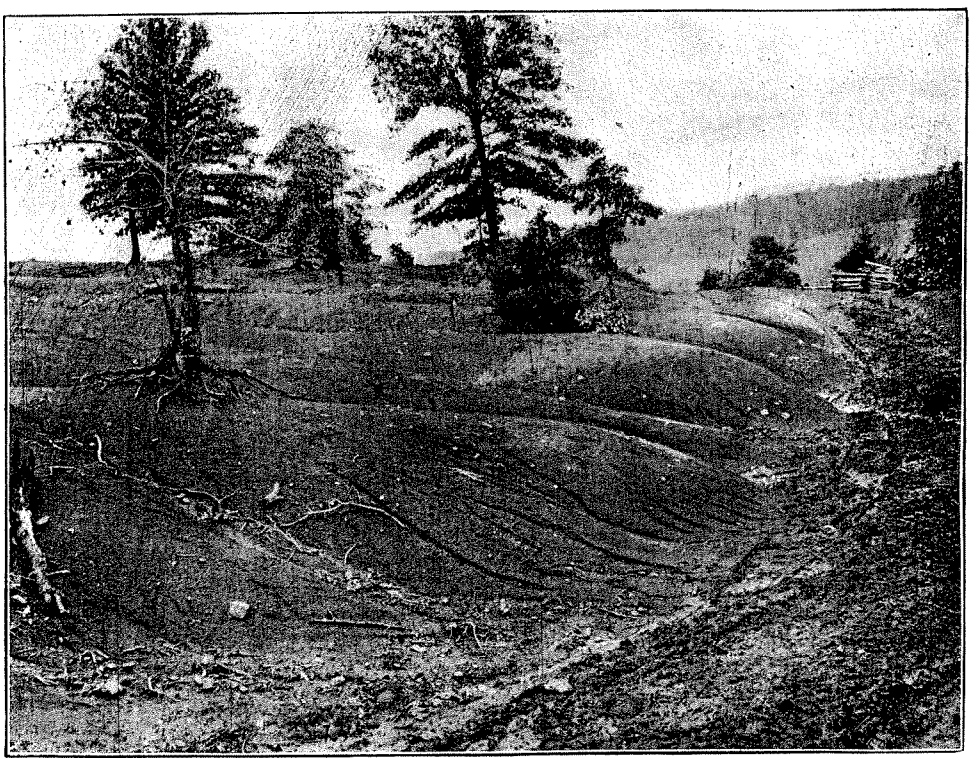
Washing away of valley lands.

But while the rains are removing the soils of the cleared mountain slopes the floods are removing the soils of the valley farms. This is notably the case in the valleys, where the bordering forests have been cleared to the largest, extent. Year by year the channels of the streams are widening and encroaching upon the adjacent farms? and as the magnitude of the floods increases, these mountain streams, transformed into swollen torrents, leave their course and plow new channels across the fields. During the floods of the present year thousands of acres of the most productive valley lands in this mountain region have been damaged or destroyed by one or both of these processes. (See Pls. XXIII and XXIV.)

It is, then, exactly true that the making of farms on mountain slopes is destroying the farms in the valleys, and that unless stopped by some external influence this process will proceed more rapidly as the population of the



(*A*) BADLY WASHED MOUNTAIN FIELD IN THE SOUTHERN APPALACHIAN REGION. (See PP. 26–28.)



(*B*) APPALACHIAN MOUNTAIN FIELD COMPLETELY RUINED BY EROSION. (See PP. 26–28.)

Result of present policy.

region increases. It is therefore only a question of time, to be measured not in centuries but in years, when, unless this policy is changed, there will be no forests in this region except on the small remnants—say 10 per cent of the whole-where the mountain slopes are too precipitous and rocky to make the cultivation of the lands possible, even by an Appalachian mountaineer and his hoe.

Policy under proposed Government management.

If, on the other hand, the policy now advocated is man-adopted, and all these steeper mountain slopes are incorporated into a forest reserve, owned and controlled by the Government, the valley lands will be protected from floods, and to the cultivation of these areas can be added that of the gentler slopes, the whole to be terraced and kept in a high state of cultivation by the native farmer, who will retain ownership then as now. (See Pls. IX *b* and XXIII *a*.)

Guiding principle in Government management.

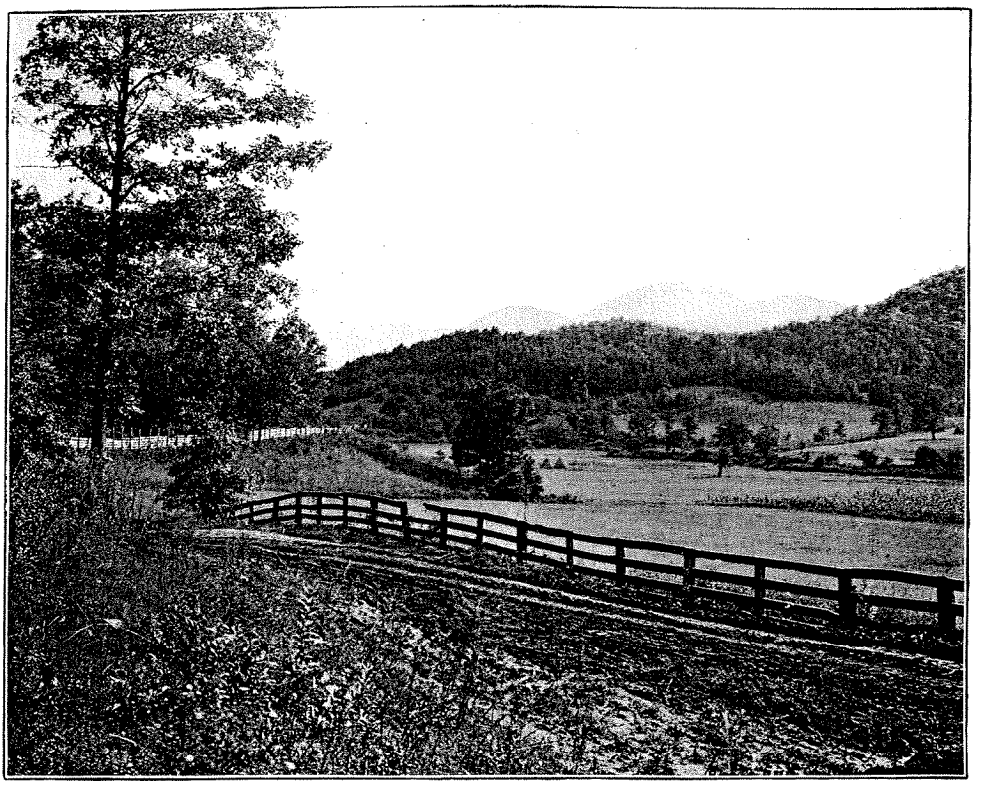
The guiding principle of the Government in the creation of this forest reserve should be to protect the farmer in his occupation and to insure the use of agricultural lands for agricultural purposes; but also, and primarily, to maintain forever the forest cover of these great and beautiful mountains, which can be perpetuated in no other way. Under such a system the agriculture of this region will be maintained on a permanently satisfactory basis. Under the present policy it is advancing to certain ruin.

FOREST CLEARINGS, THE RIVERS, AND FLOODS.

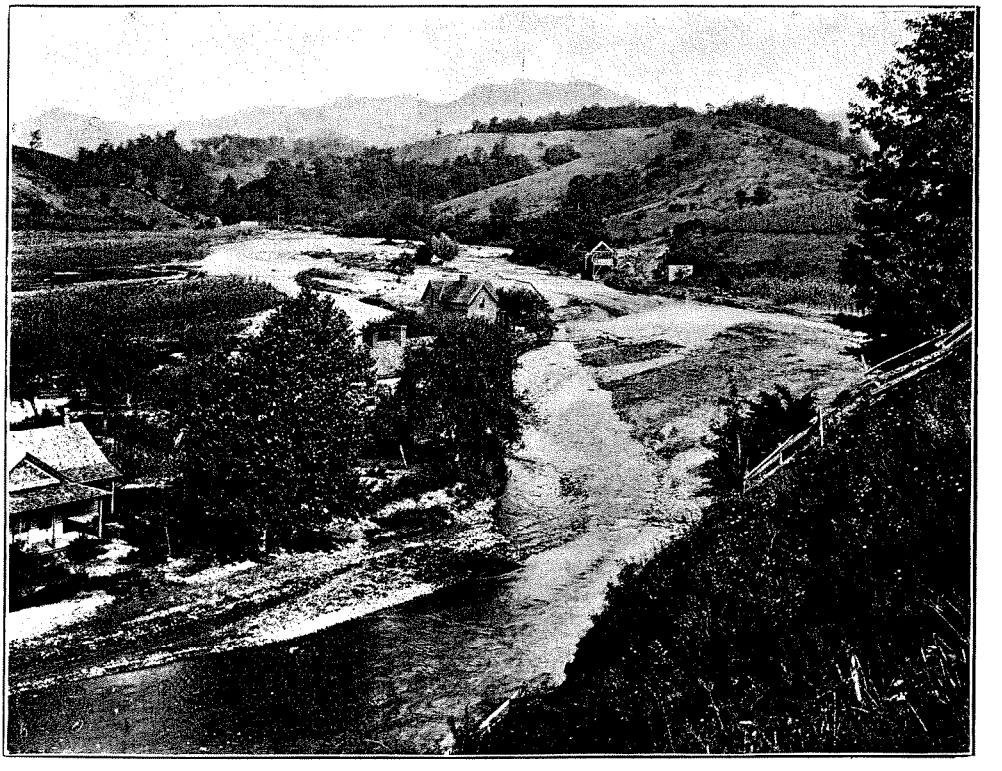
This region is the source of many riven.

Probably no region in the United States is better watered or better drained than this; nor is there any other region which can boast of being the source of so many streams. (See Pl. XII.) From about its northern end the New River (Kanawha) flows northward and westward and becomes a prominent tributary of the Ohio; along its southeastern front the James, the Roanoke, the Yadkin, the Cstawba, the Broad, and the Savannah reach the Atlantic; near its southern end the Chattahoochee and the Alabama flow directly into the Gulf of Mexico; along its western the Hiwassee, the Tuckaseegee, the French Broad, the Nolichucky, the Watauga, and the Holston drain westward through the Tennessee into the Mississippi.

Each of these greater rivers as it crosses the Coastal Plain region toward the sea is navigable for light-draft vessels. Each throughout its lower course is bordered by fertile agricultural lands, which in the past contributed largely to the nation's supply of corn, but during recent



(*A*) UNWASHED VALLEY LANDS SURROUNDED BY FOREST-COVERED MOUNTAINS. (See p. 27.)
(SW, also, Pl. IX *b*, p. 21.)



(*B*) BADLY WASHED MOUNTAIN VALLEY LANDS, BAKERSVILLE, N. C. (See p. 27.)
The lower slopes of the mountains bordering this valley are largely cleared.

decades have begun to suffer seriously from river floods. Each one of these streams along its course through the mountains and across the hill country beyond by its water power is already a contributor to the manufacturing interests of the country (PI. XXV), and with improvement in the electrical transmission of power the possibilities of manufacturing developments in this direction are increasing rapidly every year. The measurements and estimates recently made by the Government hydrographer show the aggregate available undereloped water power on the streams rising in this region to be more than a million horsepower. On these streams water-power developments are constantly in progress, but their value in the future will diminish as the forests disappear.

Value of these mountain rivers crossing the lowlands for water power.

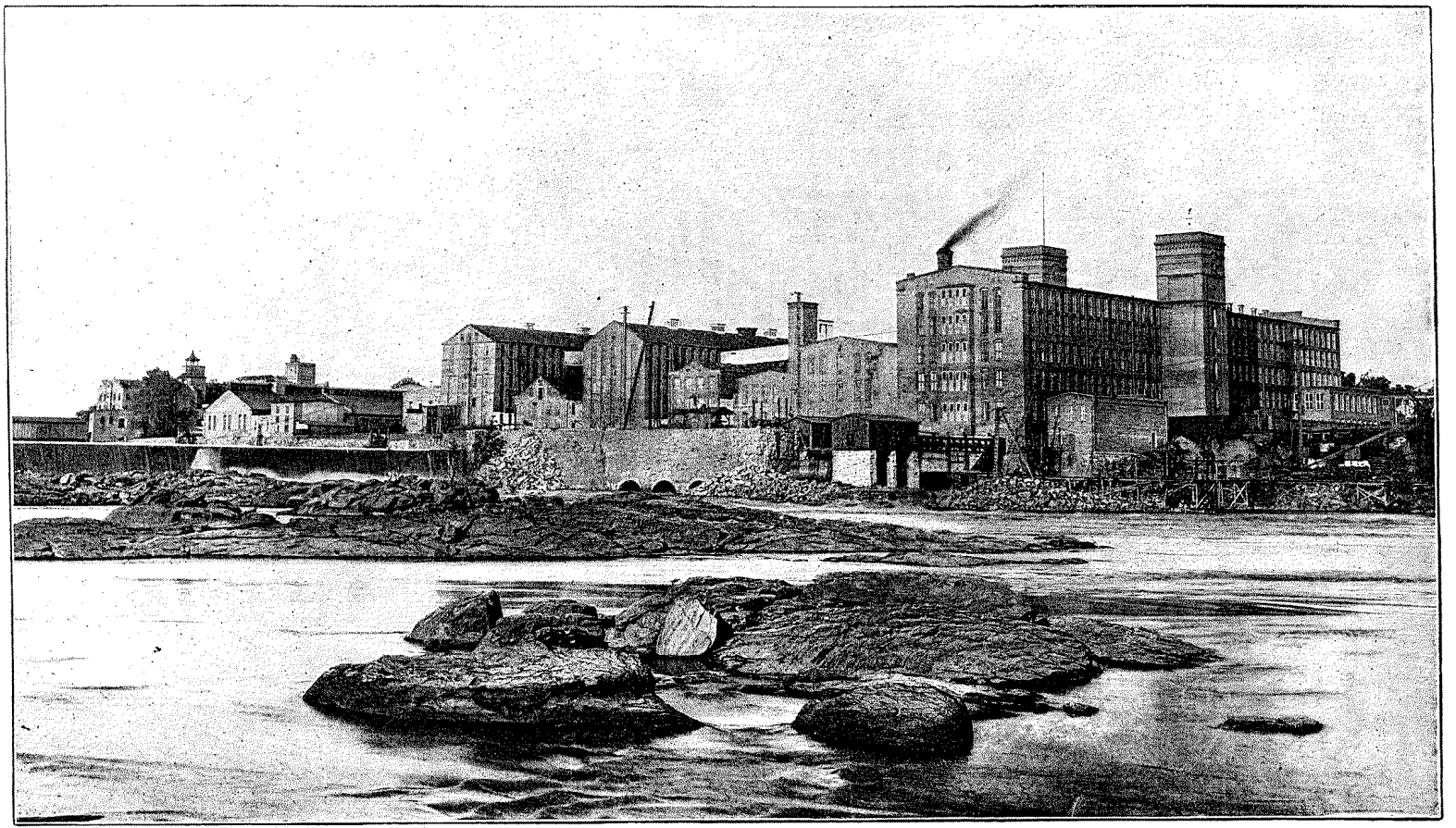
In the mountains themselves these streams have their sources at elevations from 3,000 to 6,000 feet, and before reaching a level of 2,000 feet many of them have reached considerable proportions. They subsequently flow across the mountain region for distances of from 20 to 50 miles before breaking through the horder ranges onto the surrounding lowlands at elevations ranging from 1,000 to 1,200 feet. Along their courses stretches of smooth water are never long, and the descent is often accomplished by numerous rapids, cascades, and falls. (See PI. XXVII; also Pls. LXX and LXXI.) Such cascades, with descent in short distances of from 10 to 50 feet, are abundant, while in some of the smaller tributaries beautiful falls of from 100 to 300 feet are to be found.

Beauty of the mountain streams.

I can not adequately describe the beauty and infinite variety of these mountain brooks and larger streams. Always clear, except immediately **after** the harder rains—for the forests hold back the soil-fed regularly from perpetual springs, they are among the important assets of the South.

No gorges in eastern America can equal in depth and wildness those carved across the Blue Ridge and the Unakas by these streams in making their way through the marginal ranges of the Southern Appalachians. About the headwaters of the Catawba. the Linville River, after flowing for some miles parallel with the Blue Ridge, at an elevation of 3,800 feet, rushes down its eastern slope with a fall of 1,000 feet in less than 3 miles, through a gorge 1,500 to 2,000 feet in depth, a **dozen** miles in length, and with wall so steep and bottom so narrow and rugged that few persons have succeeded in following its course.

The river gorges of the region.



WATER-POWER DEVELOPMENT AND COTTON MILLS AT COLUMBUS, GA., ON THE CHATTAHOOCHEE RIVER. (See pp. 29, 139–142.)

The sources of this and numerous other important rivers are within the limits of the proposed Appalachian forest reserve; and their value for water power and navigation can be perpetuated only through the preservation of these mountain forests.

(See Pl. LXXII.) Almost the same language might be used in describing the gorge cut by the Pigeon River across the Unaka Mountains southwest of Asheville; and there are a number of others cutting the Blue Ridge and Unakas at different points that are worthy of comparison with these. The same may be said of the gorges of the Tallulah and other streams in northern Georgia.

Hut notwithstanding the steepness of the slopes of these gorges, even where the descent is almost precipitous, they are forest-covered except where the trees and shrubs have been destroyed by tire and the soil has been removed by the storms. (See Pls. XXIX and XLII.)

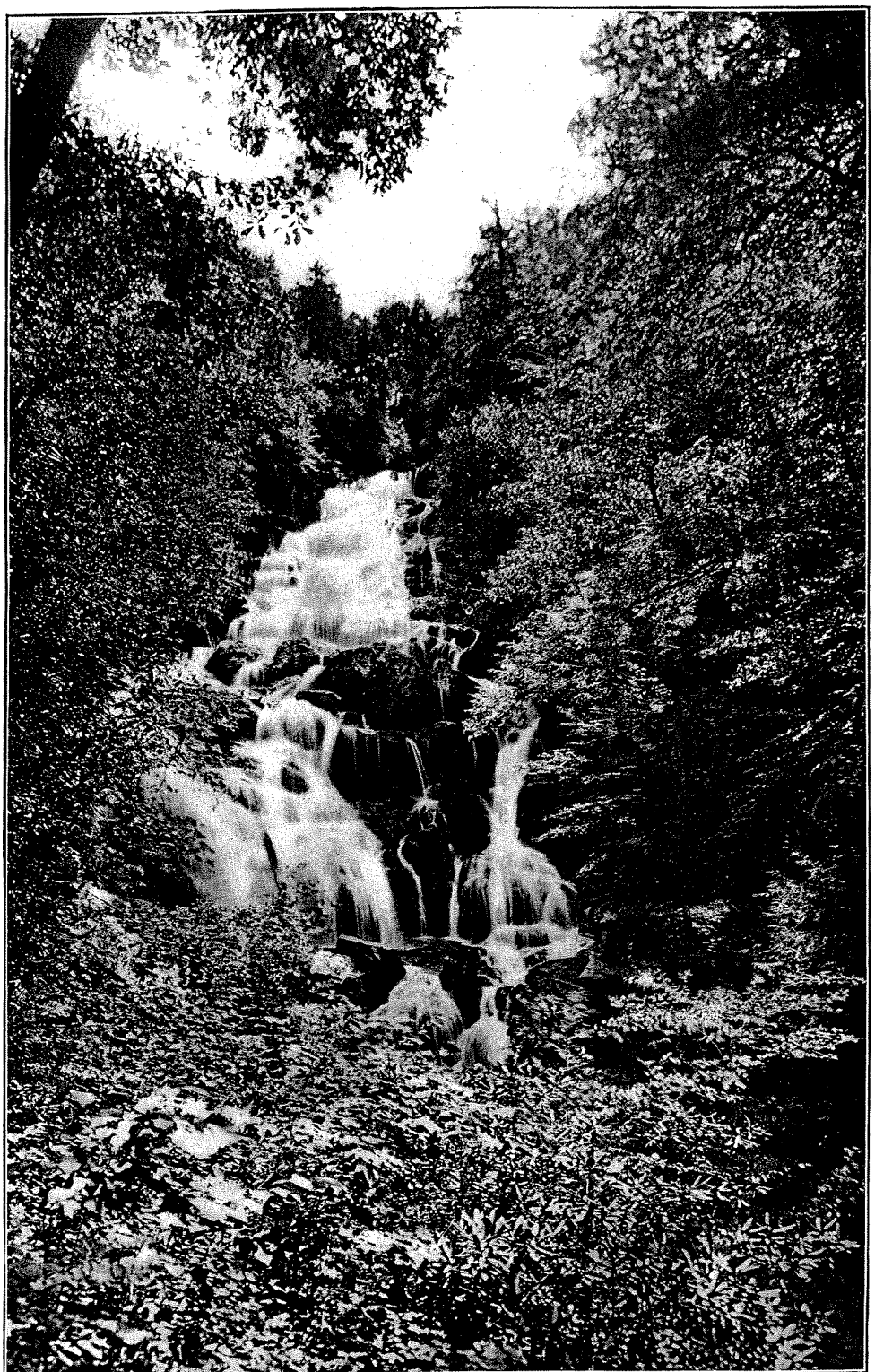
Irregularity of streams in regions largely cleared.

The perpetuation of the streams and the maintenance of their regular flow, so as to prevent floods and maintain their water powers, are among the prime objects of forest preservation in the Southern Appalachians. Nothing illustrates the need of this more fully than the fact that on the neighboring streams, lying wholly within the Piedmont plateau, where the forests have been cleared from areas aggregating from 60 to SO per cent of the whole, floods are frequent and excessive. During the seasons of protracted drought some of the smaller streams almost disappear, and the use of water power along their course is either abandoned or largely supplemented by steam power.

To-day the larger valuable water powers in the South Atlantic region are mainly limited to the streams which have their sources among the Southern Appalachian Mountains; and the waters of these streams show a striking uniformity of flow as compared with the streams lying wholly within the adjacent lowland country, where forest clearing has been excessive. While the rainfall is somewhat greater in the mountain region, it is a question of the regularity rather than the volume of flow, and this depends upon the water storage. The soil in the one region is as deep as in the other, and the slopes being gentler in the low country, other things being equal, the mater would soak into it the more easily. In the mountain region itself the fiow of the streams along which proportionately large clearings have been made has become decidedly more irregular, and the flood damages have greatly exceeded those along other streams where the forests have not been disturbed. The problem resolves itself into one of a forest cover for the soil.

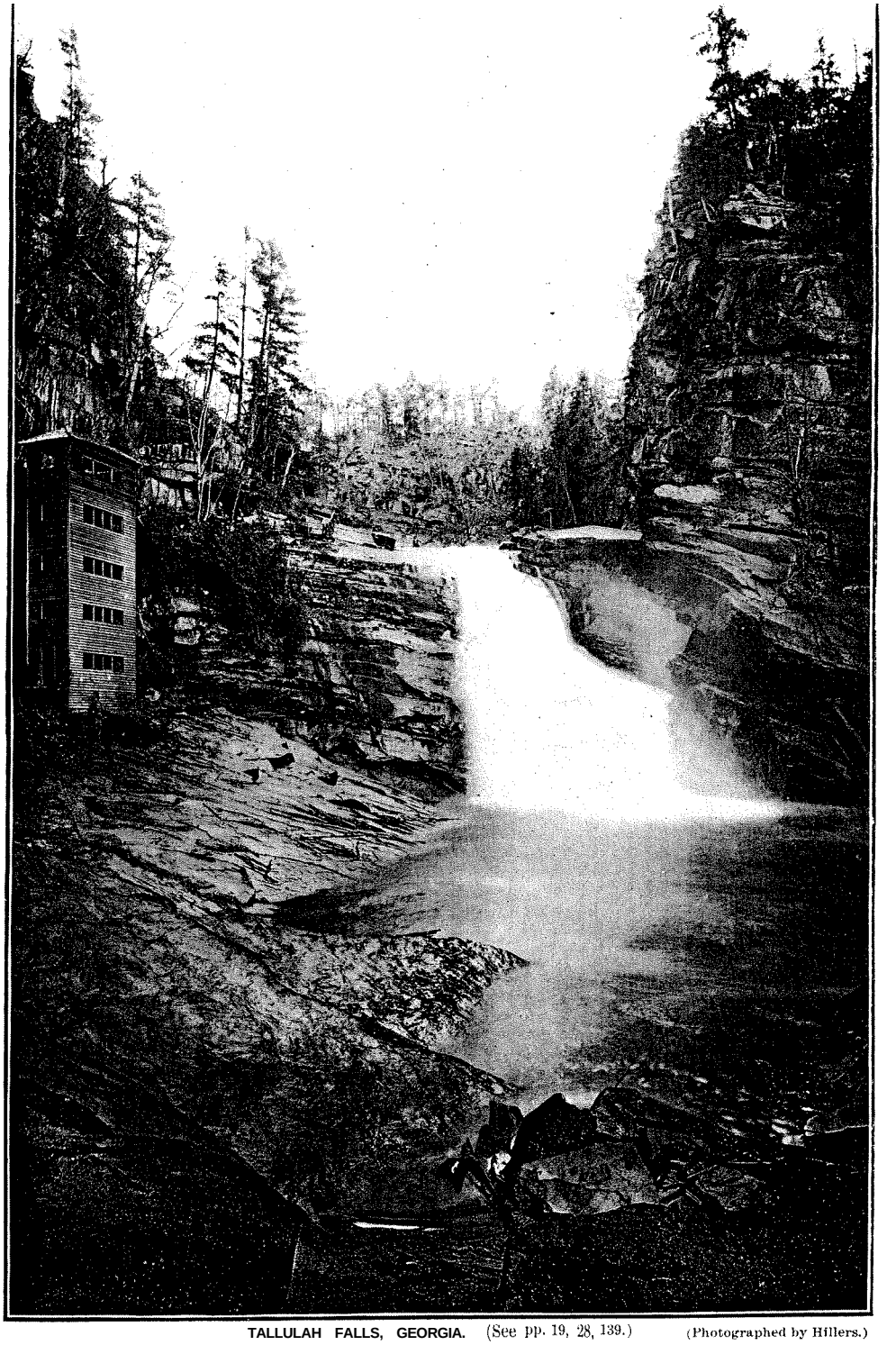
Forests regulate the flow of streams.

This is just what one would expect who has been, during a rainy season, in the heart of a mountain region where



CASCADES NEAR HEAD OF CATAWBA RIVER. (See PP. 29, 116.)

There are hundreds of cascades as beautiful as this in the Southern Appalachians. As long as these mountain forests are preserved these streams have a regular flow; united they furnish the water powers which operate the factories valued at increasing millions.



TALLULAH FALLS, GEORGIA. (See pp. 19, 28, 139.) (Photographed by Hillers.)

There is here a succession of beautiful cascades which have within a short distance an aggregate descent of 335 feet.

the lands have not been cleared nor have forest fires destroyed the humus cover from their surface. The raindrops are battered to pieces and their force broken by the leaves and twigs of the trees, and when their spray reaches the ferns, the grass, and the flowers below, instead of running away down the surface slope it passes into the spongy humus, and thence into the soil and the crevices among the rocks below. As much of this supply as is not subsequently used by the growing plants emerges from this storehouse weeks or months later in numberless springs. (See Pl. XXXI.) The rain must be extremely abundant or long protracted to produce any excessive increase in the flow of the adjacent brooks.

Heavy rainfall renders forest cover necessary.

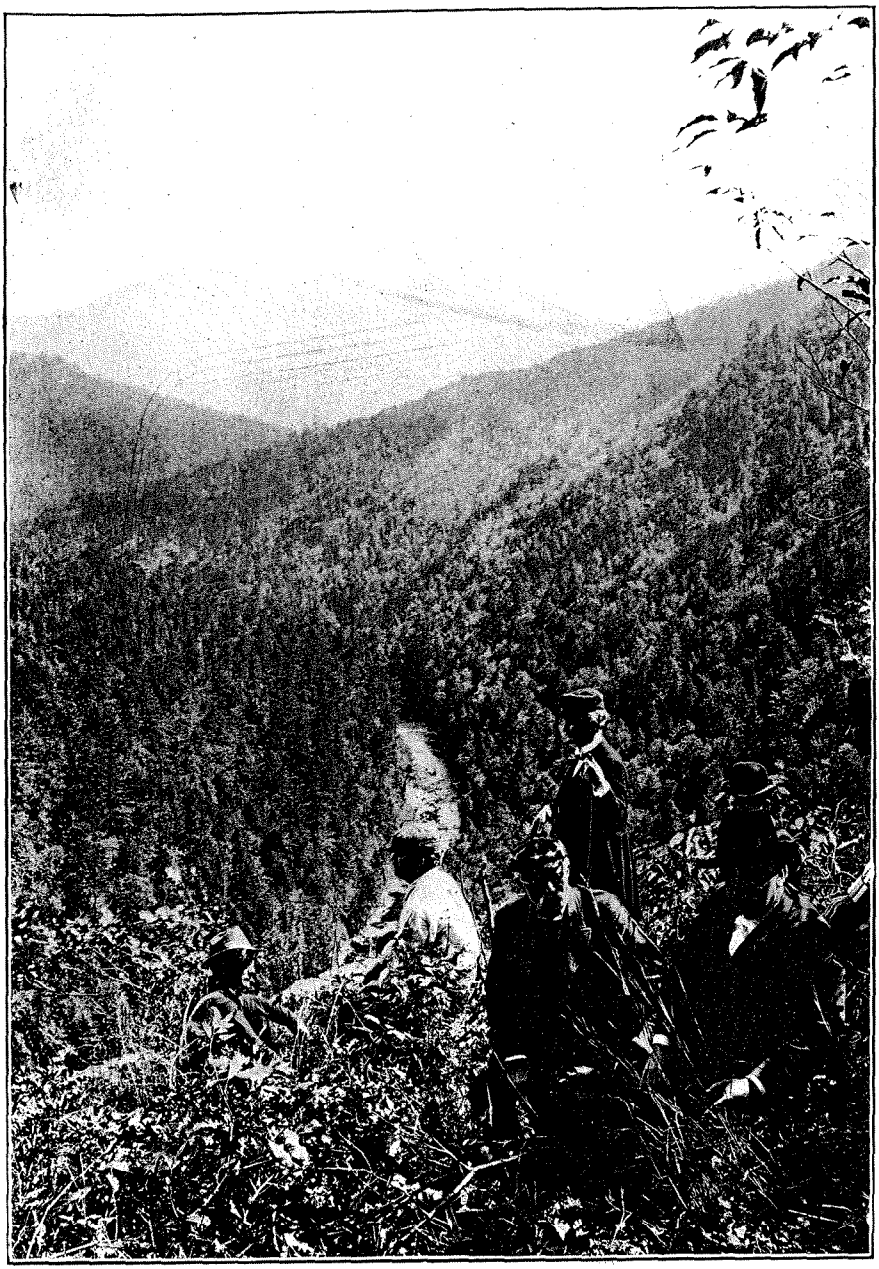
The rainfall in this Southern Appalachian region, as shown in Appendix D (p. 143), ranges from 60 inches for the year in Georgia to 71 inches in North Carolina. Heavy rainfalls during short periods are common. Even in an arid or semiarid region, where the rainfall for the year may be 10 inches or less, the absence of the forest cover results in a slow but sure removal of the soil from the mountain slopes. Much more in a region of heavy rainfall, like that of these southern mountains, when the forest cover has been destroyed, will the soil removal be certainly and rapidly accomplished.

Soil protection and water storage here are both forest problems.

In studying the streams of the more northern States it is seen that the numerous lakes and the deposits of sand and gravel spread over the hills and valleys of that region by the glaciers serve to store the water and to preserve the uniformity in the flow of the streams, and would accomplish much in this direction even were the forests in that region entirely removed. In this southern region the preservation of the soil and the streams is a task which the forests alone must accomplish, and to that end they must be effectively protected.

Proportion of cleared land in Appalachian region increasing.

The proportion of cleared and forest-covered land in each of the great river drainage basins of the region is given on page 69, and as will be seen there, this proportion, though generally small, varies considerably in the different basins. Taking the region as a whole, at the present time about 24 per cent of the area has been cleared. (See Pl. XII.) This proportion is an ever-increasing one—increasing the more swiftly for the reason that new fields are constantly being cleared and the abandoned fields are being eroded so rapidly that they are seldom reforested. (See Pl. XXI.)



FOREST-COVERED SLOPES OF LINVILLE GORGE SEEN FROM BYNUMS BLUFF.

If the forests on these steep slopes are once destroyed they can not be restored, as the soils will be quickly removed by the heavy rains.

Landslides indicating heavy rains in past and necessity of forestcover.

Were and there among the Southern Appalachians a landslide extending over an acre, or several acres, has started, bearing on its surface a section of the forest, but the larger trees below have blocked its course within a few feet or a few yards of its original position. (See Pl. XXXII.) The trees on its surface were tilted, but the subsequent upward bending of their tops shows that the slip took place ten, fifty, or more than one hundred years ago. The abundance of such evidence shows that these rain storms among the primeval forests have been both frequent and heavy, but during the centuries these densely forest-covered slopes have not lost their soils nor the soils their fertility, nor has a furrow been washed. Trees of four centuries stand to-day in the very bottom of shallow ravines and minor depressions (see Pl. XXXIII), eroded before these forests covered the mountains. Had these forests been removed a few of these great rains that started these landslides would have cleaned the mountain slope of its recently formed soil, and would have swept the valley below.

Erosion of the forest-covered mountains exceedingly slow.

The future will have its storms. Forests alone can protect mountains.

These mountains will continue to be the home of storms. Their' heavy rains will continue to drench the slopes, if cleared of their forests, with increasing violence. Whether in the future these rains shall be caught by fern and grass and humus, and received by a deep, porous soil, to be given out as needed to the vegetation above and the perpetual springs below, or whether it shall rush down bare, rocky slopes to fill the gorges and carry destruction through the valleys beyond, depends upon whether or not these forests are preserved.

Damages from recent floods in this region.

The terribly destructive work of the heavy rains in washing away the farm lands on the mountain slopes and in the valleys of this region, especially where the clearings have been greatest, has already been described. It should be understood clearly, however, that the dangers from these floods are not limited to the region about the mountains. The -Hoods from the May storm of the present year on the Blue Ridge, about the sources of the Catawba, swept the best of the farm lands along the course of that stream for upward of 200 miles, and cost the farmers more than a million and a half of dollars. An August storm in the same region added a loss of half a million more by further destruction on the Catawba lowlands. (See Pl. XXXIV.) Similarly, the same May floods swept the valleys of the Yadkin in North Carolina, the New (Kanawha) in Virginia and West Virginia, and the upper tribu-

taries of the Tennessee with resulting devastation, which, when added to that on the Catawba, sums up to more than $7,000,000 damage. Add to this the damages from floods on other streams rising in different parts of this region during the spring and summer, and the total this year approximates $10,000,000. (See Pls. XXXV and XXXVI.)

Such has been the story, on a smaller scale, of other similar but less violent floods about the sources of these mountain-born rivers during the past few years. If we are to continue the destruction of these mountain forests, this story will have to be repeated in successively larger editions in the future.

THE CLIMATE OF THE SOUTHERN APPALACHIANS.

As shown in the accompanying paper by Professor Henry, of the Weather Bureau (p. 143), the climate of the Southern Appalachian region possesses distinctive features of its own, although it partakes somewhat of the main features of the climatic zones both to the west and to the east. Its distinctive features, due to higher altitudes, are a lower temperature, both summer and winter, a drier atmosphere, and at the same time a greater rainfall and snowfall, and higher wind velocity. There are of course local variations in the climatic conditions of the region, owing to its extremely varied topography, but the limited number of stations where observations have been made in this region makes it impossible to discuss these local variations at the present time.

Temperatures in the region not extreme.

It is in temperature that we might expect the greatest variations, but, unfortunately, with the exception of a few months' observation on Mount Mitchell (elevation 6,711 feet), no observations are available at elevations greater than 4,000 feet. The highest temperature observed on Mount Mitchell during May, June, July, and August in 1873 was 72° in July; the lowest, 41° in June. At Highlands, N. C. (elevation 3,817 feet,), the mean temperature of the summer is given by the Weather Bureau records as 65.7°, and the mean winter temperature as 35.4°. The extremes during a period of eight years (1893 to 1900) were 19° below zero in February and 86° above zero in June.

Rainfall heaviest in the Eastern States.

The rainfall along the southern slopes of the Blue Ridge is the heaviest in the United States, with the exception of that on the northern Pacific coast, ranging from 60 inches

in northern Georgia to 71 inches in western North Carolina. The precipitation for the year 1898 in western North Carolina at Highlands was 105.24 inches; at Horse Cove, 99.97 inches; Flat Rock, 78.39 inches, and Linville, 71.05 inches. The rainfall in the warm seasons is often torrential, while in the spring and autumn the rains often continue over several days in succession. During May 21, 1901, the rainfall in twenty-four hours was, at Highlands, N. C., 4.03 inches; at Hendersonville, N. C., 4.91 inches; at Flat Rock, N. C., 6.12 inches; at Marion, N. C., 7.25 inches; and at Patterson, N. C., 8.3 inches. Near Roan Mountain, North Carolina, a rainfall of 8 inches in eleven hours has been recorded. In August of 1901 the total rainfall for the month at, Highlands, N. C., was 30.74 inches.

Special climatic features.

The tables which accompany Professor Henry's paper show the temperatures, rainfall, and other weather conditions at practically all of the stations established within this region. They emphasize two facts of special importance in connection with the present discussion, namely, that the climate is such as to permit travel and lumbering operations in all portions of this region throughout the entire year, while the rainfall, being heavy in the aggregate and often excessive within short, periods, renders it necessary to protect the forests in order to limit floods and prevent the washing away of the land.

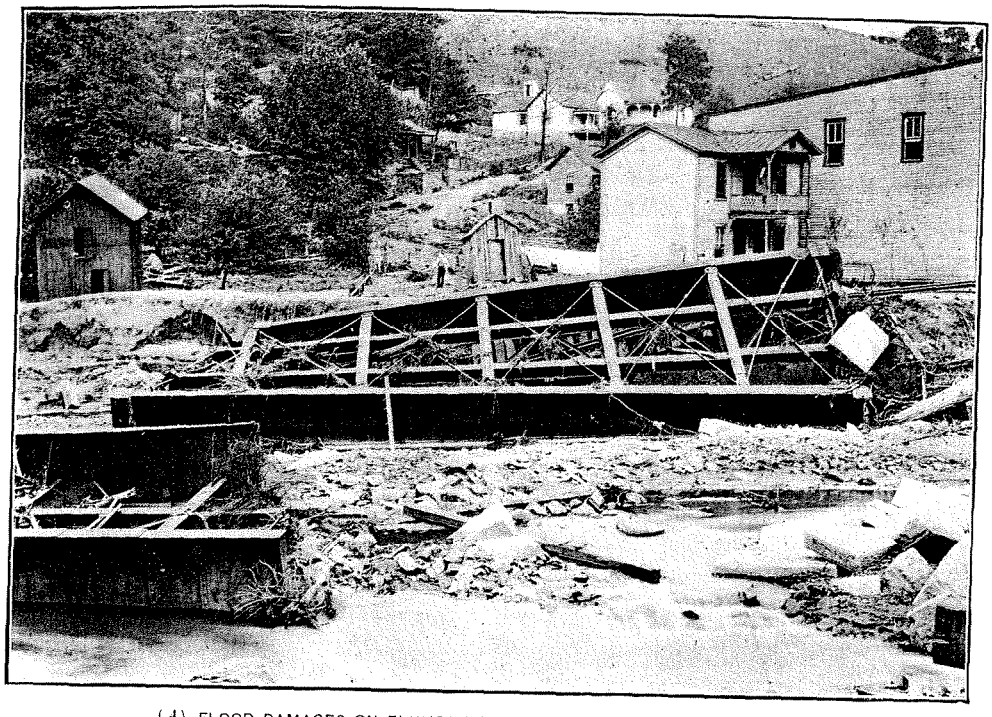
HOW CAN TRESE FORESTS BE PRESERVEDP

Government control the only practical solution.

Having given what I believe to be a fair statement of the conditions existing in the Southern Appalachian region, and considered the danger growing out of the policy and practice now in force, I pass on to inquire through what agency these forests can be preserved. After careful consideration I am able to suggest but one way to solve the problem, and that is for the Federal Government to purchase these forest-covered mountain slopes and make them into a national forest reserve.

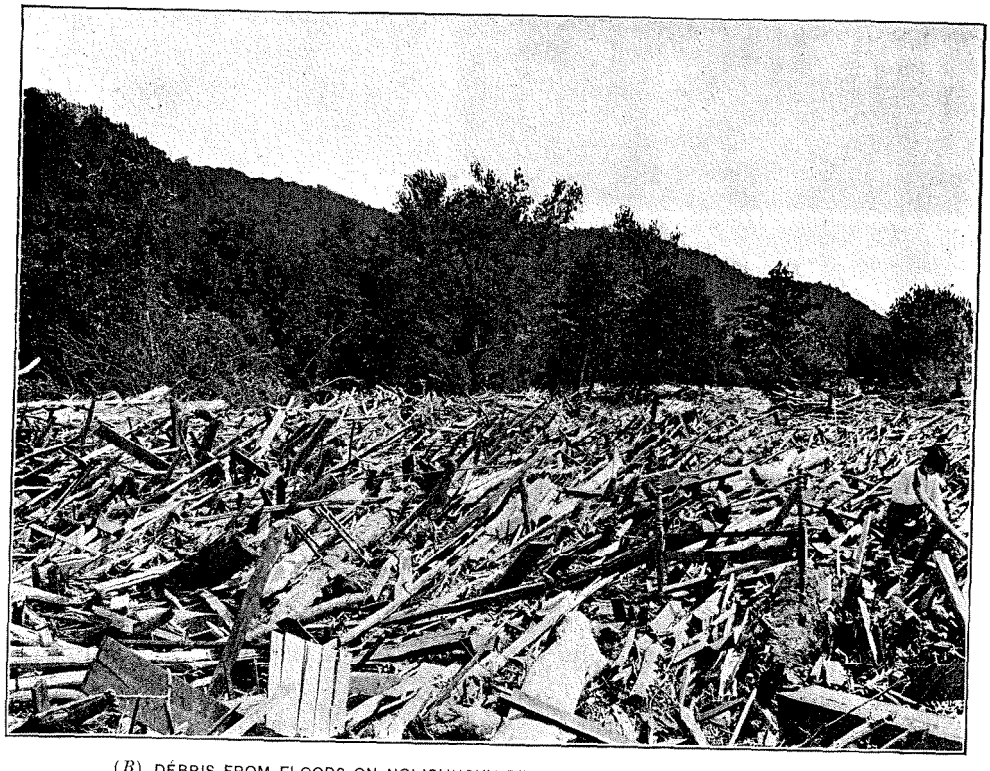
Protection of these forests beyond the agency of private individuals.

Certainly, the lumbermen and the native farmers, who are now pushing the destruction of these forests, can not be expected of themselves to bring about their preservation. Nor can the perpetuation of forest conditions, upon which depend so many national interests, be left to the caprice of private capital, which has no interest beyond the profits in the lumber industry. The restoration of forests already injured, and the reforesting of the steep



(*A*) FLOOD DAMAGES ON ELKHORN CREEK, IN WEST VIRGINIA, JUNE, 1901.

The damages from floods along streams rising in this Southern Appalachian region, from April 30, to December 1, 1901, reached $10,000,000. Between December 1, 1901, and April 1, 1902, they reached $8,000,000 additional.



(*B*) DÉBRIS FROM FLOODS ON NOLICHUCKY RIVER, EAST TENNESSEE, MAY 21, 1901.

This débris consisting of the wreck of farmhouses, furniture, lumber yards, bridges, cattle, and probably several human bodies, covered 6 acres of fertile farm land near Erwin, Tenn.

mountain slopes already cleared, are here properly national functions, for their results will be national in importance and extent. Furthermore, it is perfectly safe to assert that any satisfactory protection and development of these forests for the objects here contemplated is wholly beyond the agency of private individuals; and such persons would have no direct interest whatever in the protection and perpetuation of water-power, agriculture, and navigation along the lower courses of the streams whose headwaters they control.

Ownership and control by the State not practicable.

Nor can the States within whose territory these lands now lie be expected to convert them into a forest reserve. The land is not owned by the States, but by private individuals. It is true that some of the wealthier States, like New York and Pennsylvania, are showing an intelligent and commendable interest in purchasing forest lands pnd establishing forest reserves for the protection of the sources of streams lying within their own boundaries and for the conservation of the forests. But the case is wholly different in the Southern Appalachian region. North Carolina can not, for example, fairly be expected to establish a forest reserve at great expense for the protection of streams which though rising within her borders lie mainly in other States. Nor could Alabama be expected to purchase lands in the State of Georgia for the protection of her great river which reaches the Gulf in Mobile Bay. Nor could West Virginia be expected to purchase lands in North Carolina for the protection of the sources of the Kanawha River, the largest lateral tributary of the Ohio.

Purchase of these forests too costly for the States, but the States willing for Federal control.

Furthermore, even were these States willing to enter upon such a plan, their financial condition is not such as to make the undertaking possible. The combined income for a year of all the States within whose borders these lands lie would hardly be sufficient for their purchase. As shown, however, in the Appendix (p. 172), each of the States within whose borders these mountain lands arc located has by legislative act expressed its hearty approval of this measure and its willingness to cede the control of these lands to the Federal Government.

Protection of these forests a national problem.

This is a national problem. The people of a number of States are directly interested. The dangers growing out of the policy now in force are national in their character, as are also the benefits to be obtained by the policy now advised. This proposal for a national forest reserve has already been discussed and commended by our ablest men

of science, by practical lumbermen, by the forestry associations, by many of the business organizations of the country, and by both the technical and the general press. I earnestly hope that it will meet with favorable action at the hands of Congress during its present session.

National forest reserves in the west.

Congress has wisely provided for the setting aside out of the public domain, and thus withdrawing from sale, many thousands of square miles of valuable forest lands, with a view to protecting the streams and perpetuating the- timber supply about the mountains in our western States and Territories. (See PI. II.) And while the measure now proposed involves a purchase instead of a withdrawal from sale of forest lands formerly purchased, the principle and purpose are the same. In both cases, even if judged simply as a question of finance, the Government's investment will ultimately prove a good one.

Policy recommended not a new one for the Government.

As further illustrating the fact that the proposed purchase will not be a new policy or precedent on the part of the Government, attention may be called to the numerous purchases of lands for military parks, and to the purchase from the Blackfoot Indians in 1896 of more than half a million acres of forest lands at a cost of $1,500,000, which area was subsequently added to the Flathead Forest Reserve in Montana.

Forest reserve more important than a park, but the two not antagonistic.

As 1 stated in my preliminary report of January last, the early movement for the purchase and control of a large area of forest land in the East by the Government chiefly contemplated a national park, but the idea of a national park is conservation, not use; that of a forest reserve is conservation by use, and I therefore recommend the establishment of a forest reserve instead of a park. If, however, the present proposal for the establishment of a national forest reserve is favorably acted upon by Congress, and at some future time it should prove desirable that some considerable portion of this region be set aside and opened up more especially for use as a national park, I can see in advance no objection whatever to the carrying out of such a plan.

CONDITIONS OF PURCHASE AND MANAGEMENT.

Cost of the mountain forest lands.

I stated in the preliminary report just referred to that lands in this region suitable for a forest reserve are now generally held in large bodies of from 50,000 to 100,000 acres, and that they can be purchased at prices ranging

from $2 to $5 per acre. Further investigations during the present year confirm the correctness of this statement. There are also many additional tracts of forest lands ranging from 1,000 to 50,000 acres each that are for sale at reasonable prices. Within the present year a few tracts of from 10,000 to 30,000 acres sold at less than $2 per acre. Within the past decade the larger portion of this area could have been purchased in large tracts at prices ranging from $1 to $2 an acre; but in view of the growing demand for forest lands, prices have already advanced, and they may be expected to advance still more within the next few years.

Titles to the lands satisfactory.

Within the past two decades the titles to many of the large tracts of land in this region have been much in dispute, and the efforts to adjust them involved tedious processes in court; but I am informed by competent judges that in practically all of these cases adjustments have finally been reached. Any appropriation for the purchase of these lands should provide ample time for the searching of titles, although no serious difficulty is anticipated from this source.

Forest reserve self-sustaining, and will ultimately yield a profit.

Referring again to my preliminary report, I may quote a statement which has been further confirmed by the results of the present year that "it is fully shown by the investigation that such a reserve would be self-supporting from the sale of timber under a wisely directed, conservative policy." In the case of many of the European forests under government supervision a net annual income is derived from the sale of timber and other forest products of from $1 to more than $5 per acre. I do not, of course, suppose that under the different conditions existing in this country a national forest reserve such as proposed would yield such a result, yet I confidently expect that the reserve now proposed in the Southern Appalachians will in the course of a few years be self-supporting, and that subsequently, as the hard-wood timber supplies in other portions of the country become more scarce, the lumbering operations will yield a considerable net return to the Government.

Its indirect benefits great.

Meanwhile, the establishment of such a reserve will remedy many of the evils now threatened in this region, and under the efficient management of the practical foresters now being trained in this Department its working will serve as a test and demonstration of the wisdom and success of practical forest operations on a large scale; and

Benefits of this forest reserve as an object lesson will be great.

this will encourage both individuals and States to adopt such methods of forest management on their own lands as will not only protect the forests in existence, but also restore them on lands which should never have been cleared.

Mineral developments not interfered with.

I am informed by the geologists who are familiar with this Southern Appalachian region that the development of its mineral deposits would neither interfere with nor be interfered with by the creation and proper handling of such a forest reserve.

Existing settlements not interfered with.

The settlements now existing within the limits of the proposed reserve would not be interfered with, nor would their existence there, nor their legitimate enlargement, interfere with the purposes to be accomplished in the establishment of the reserve.

Only general boundary now given.

It would not be wise at the present time to make public the exact location of lands which may be thought best adapted for incorporation in such a forest reserve, but the general boundaries of the region within which it is proposed to purchase these lands are indicated on the accompanying maps (see Pls. II, IV, and XII). I am of the opinion that the reserve should ultimately include not less than 4,000,000 acres.

CONCLUSIONS.

The results of these investigations of the forests and forest conditions of the Southern Appalachian region lead unmistakably to the following conclusions:

1. The Southern Appalachian region embraces the highest peaks and largest mountain masses east of the Rockies. It is the great physiographic feature of the eastern half of the continent, and no such lofty mountains are covered with hard-wood forests in all North America.

2. Upon these mountains descends the heaviest rainfall of the United States, except that of the North Pacific coast. It is often of extreme violence, as much as 8 inches having fallen in eleven hours, 31 inches in one month, and 105 inches in a year.

3. The soil, once denuded of its forests and swept by torrential rains, rapidly loses first its humus, then its rich upper strata, and finally is washed in enormous volume into the streams, to bury such of the fertile lowlands as are not eroded by the floods, to obstruct the rivers, and to fill up the harbors on the coast. More good soil is now washed from these cleared mountain-side fields during a single heavy rain than during centuries under forest cover.

4. The rivers which originate in the Southern Appalachians flow into or along the edges of every State from Ohio to the Gulf and from the Atlantic to the Mississippi. Along their courses are agricultural, water-power, and navigation interests whose preservation is absolutely essential to the well-being of the nation.

5. The regulation of the flow of these rivers can be accomplished only by the conservation of the forests.

6. These are the heaviest and most beautiful hard-wood forests of the continent. In them species from east and west, from north and south, mingle in a growth of unparalleled richness and variety. They contain many species of the first commercial value and furnish important supplies which can not be obtained from any other region.

7. For economic reasons the preservation of these forests is imperative. Their existence in good condition is essential to the prosperity of the lowlands through which their waters run. Maintained in productive condition they will supply indispensable materials which must fail without them. Their management under practical and conservative forestry will sustain and increase the resources of this region and of the nation at large, will serve as an invaluable object lesson in the advantages and practicability of forest preservation by use, and will soon be self-supporting from the sale of timber.

8. The agricultural resources of the Southern Appalachian region must be protected and preserved. To that end the preservation of the forests is an indispensable condition which will lead not to the reduction hut to the increase of the yield of agricultural products.

9. The floods in these mountain-born streams, if this forest destruction continues, will increase in frequency and violence and in the extent of their damages? both within this region and across the bordering States. The extent of these damages, like those from the washing of the mountain fields and roads, can not be estimated with perfect accuracy, hut during the present year alone the total has approximated $10,000,000, a sum sufficient to purchase the entire area recommended for the proposed reserve. Rut this loss can not be estimated in money value alone. Its continuance means the early destruction of conditions most valuable to the nation and which neither skill nor wealth can restore.

10. The preservation of the forests, of the streams, and of the agricultural interests here described can be success-

fully accomplished only by the purchase and creation of a national forest reserve. The States of the Southern Appalachian region own little or no land, and their revenues are inadequate to carry out this plan. Federal action is obviously necessary, is fully justified by reasons of public necessity, and may be expected to have most fortunate results.

JAMES WILSON,
Secretary of Agriculture.

DEPARTMENT OF AGRICULTURE,
Washington, D. C., December 16, 1901.

APPENDIX .A.

FORESTS AND FOREST CONDITIONS IN THE SOUTHERN APPALACHIANS.
By H. B. AYRES and W. W. ASHE.

LUMBERING IN THE SOUTHERN APPALACHIANS.
By 0. W. PRICE.

DESCRIPTION OF THE SOUTHERN APPALACHIAN FORESTS, BY RIVER BASINS.
By H. B. AYRES and W. W. ASHE.

TREES OF THE SOUTHERN APPALACHIANS.
By W. W. ASHE and H. B. AYRES.

LIST OF SHRUBS IN THE SOUTHERN APPALACHIANS.
By W. W. ASHE.

FORESTS AND FOREST CONDITIONS IN THE SOUTHERN APPALACHIANS.

By H. B. AYRES and W. W. ASHE.

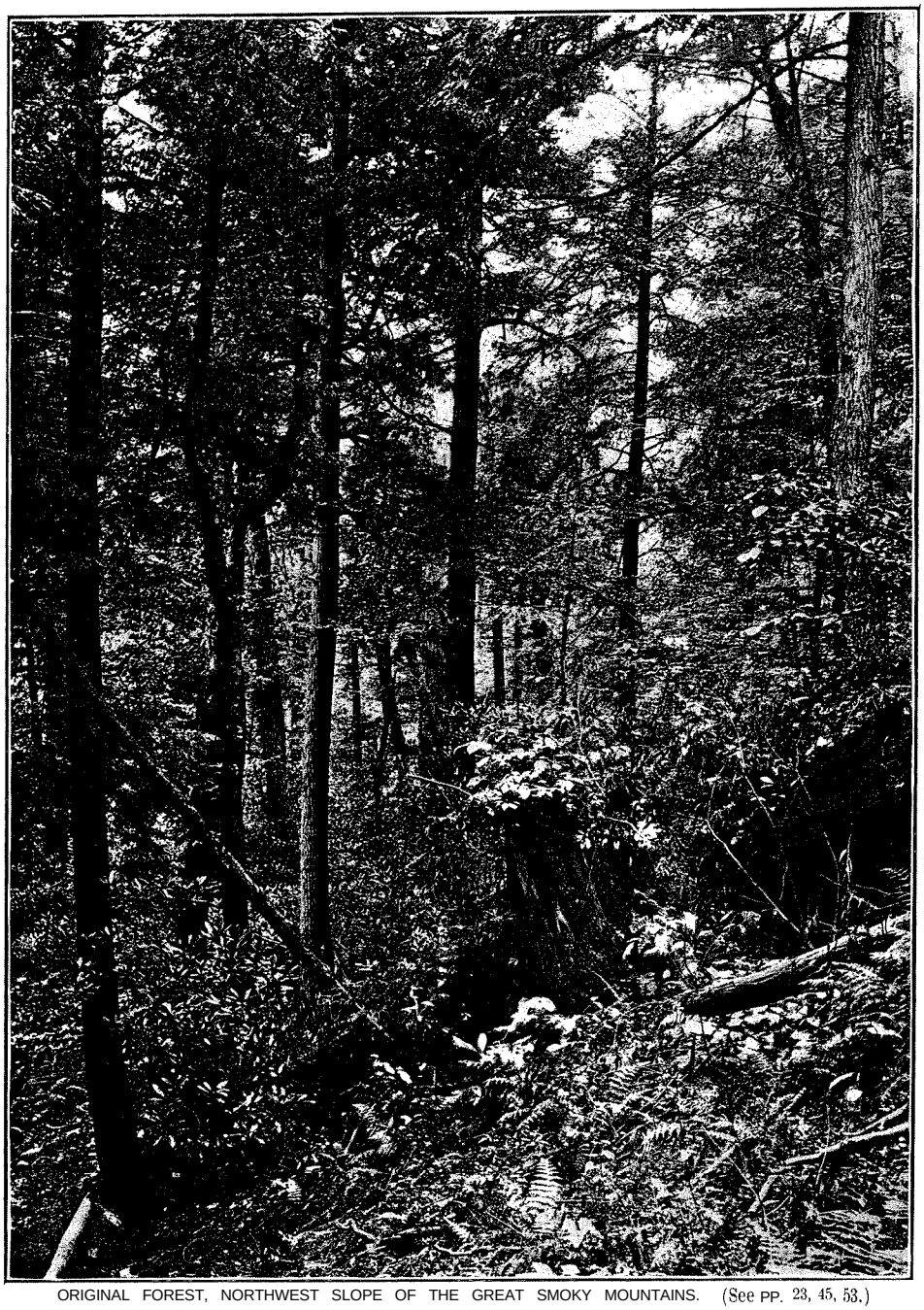
The Southern Appalachian Mountains extend from Virginia southwestward into Alabama, and lie between the Piedmont Plateau on the southeast and the lowlands of East Tennessee on the northwest. That this is preeminently a region of mountains is well illustrated by the fact that the mountain slopes occupy 90 per cent of the total area; and probably the combined area of the valleys and gentler slopes (of less than 10 degrees-about 2 feet in 10) will not aggregate more than 15 per cent of the whole.

Entire mountain region originally forest covered.

Before the advent, of man the entire region, save the tops of a few high mountains-the grassy "balds"—was covered with forest, mainly hard wood. (See Pl. XXXVII.) Then, as now, the forest varied as to density and vigor of growth, but a far larger portion of that existing then is resembled by the best of to-day on such tracts as are found in the most favored situations and have been protected from fire and severe culling.

Nature and extent of the clearings.

A total area of 5,400,000 acres has been examined in connection with this investigation, and of this 4,050,000 acres, or 75 per cent of the whole, are still in forest. Of this total area in forest about 7.4 per cent, or 303,000 acres, is still in primeval condition, i. e., has never been culled at all., The remainder of this wooded area has been culled to a varying extent. (See Pl. XXXVIII.) A limited portion of that near the railway lines has been robbed of nearly everything of commercial value, while the remote areas have had only the walnut, cherry, and figured woods cut. From the intervening areas, far the larger part of the whole, a varying proportion of the most valuable trees have been removed, but large amounts of commercial timber still remain. The clearing and culling of a century have made considerable inroads into these forests. The woodland connected with the farms has been largely



ORIGINAL FOREST, NORTHWEST SLOPE OF THE GREAT SMOKY MOUNTAINS. (See PP. 23, 45, 53.)

There are no lakes or glacial gravels in this Southern Appalachian region, such as abound in the Northern States. Here the forest and the soil alone must catch the heavy ruins and regulate the flow of the streams. If the forests are destroyed the soils will be rapidly washed down into the river channels; and the terrible floods will destroy everything along the great river valleys. (See also pp. 66, 133.)

culled and is in part covered with trees of second growth. In many places, where transportation facilities arc available, the mills have gone into the heart of the mountain region and much of the choicest timber has been sawed there and hauled on wagons to the railroad. (See Pl. XXXIX.)

General character of the forests.

As to composition, generally speaking, it may be said that the forest below the 2,000-foot elevation consists of oaks, hickories, and pines; above that elevation are many hard woods, or hard woods associated with hemlock and white pine. dome spruce and balsam occur on the cold north slopes and around the tops of the larger and higher mountains.

DESCRIPTION OF THE FOREST AND FOREST CONDITIONS, BY MOUNTAIN GROUPS.

Subdivision of forest area.

For the sake of convenience in description the forest area may be subdivided as follows:

(1) The forests of the Blue Ridge.
(2) The forests of the White Top Mountain group.
(3) The forests of Roan, Grandfather, and Black mountains.
(4) The forests of the central interior mountain ridges.
(5) The forests of the Great Smoky Mountains.
(6) The forests of the southern end of the Appalachians.

FORESTS OF THE BLUE RIDGE.

The Blue Ridge from Virginia to Georgia is, on the dryer slopes and crests, lightly timbered with small oaks, chestnut, and pines, while in the hollows mixed hard woods-oaks, chestnut, hickories, etc.-form heavy tin:-ber. The forests are on the ridges and steeper slopes. The narrow alluvial bottoms and often portions of the adjoining slopes have been cleared and are under cultivation or have been abandoned. But excepting these cleared valleys and hillsides, the forests are almostcontinuous from Virginia to Georgia.

While the hardwood forests have been culled along nearly the entire east slope, only the choicest trees of the lighter woods, among which are white pine, have been cut. (See Pl. XXXVIII *a*.) Before any of it was cut the white pine on the Linville River was probably the finest in the Southern mountains. A great part of this has been removed. It is being transported on a narrow-gauge rail-any via Cranberry to Johnson City. Mills at Hickory and

Lenoir are cutting the pine in the Johns River Valley. The other smaller bodies of white pine have been culled of their finest trees.

FOREST OF THE WHITE TOP MOUNTAIN REGION.

This region embraces the northwestern corner of North Carolina, the northeastern corner of Tennessee, and the adjacent portion of southwestern Virginia. In this portion of the Appalachians, the Unaka (here represented by Iron Mountain) and the Blue Ridge ranges approach nearer each other, and the intermediate land retains more of its original character as a plateau lying between the great Appalachian Valley, drained by the Tennessee River, on the northwest, and the Piedmont Plateau on the southeast. The White Top group comprises the mountains along the northern rim of the elevated mountain region.

Topographic features.

To the irregular mountain ridge which in this more northern region forms the boundary line between North Carolina and Tennessee, the name of Stone Mountain is applied. Here and there this ridge rises into peaks of prominence. On one of these, Pond Mountain, which has an elevation of 5,100 feet, the boundary lines between North Carolina, Tennessee, and Virginia corner. Another of these, White Top Mountain, some 5 miles to the northeast, and a far more massive and imposing mountain, rises to an elevation of 5,678 feet. Still another, Mount Rogers, on the Balsam Ridge, about 5 miles a little north of east from the White Top, rises to an elevation of 5,719 feet.

The general course of this Stone Mountain ridge is to the northeast as far as Mount Rogers and then continues eastward as Iron Mountain to New River Gap. Northwest of it, in Tennessee, is another less regular and less prominent ridge known as the Iron Mountains, reaching an elevation at intervals of from 3,000 to 4,000 feet; and 6 to 8 miles to the west of this latter, in Tennessee, is the Holston Mountain ridge, reaching a still higher elevation. These ridges are all approximately parallel, having in East Tennessee a general northeasterly course.

To the northwest of these mountains lies the broad, fertile valley of the South Holston; to the southeast is the more elevated valley of New River, broken into an endless series of steep, round-crested hills, mostly cleared, and producing well in both grass and grain. Broad agricultural valleys lie between the Iron and Stone mountains

(*A*) HAULING LOGS TO THE MOUNTAIN SAWMILL. (See p. 46.)

(*B*) HAULING MOUNTAIN LUMBER TO THE RAILWAY STATION

and between the Iron and the Holston mountains. There are many farms on the southeastern slope of the Stone Mountain, and its northwestern slope is dotted with clearings. Extensive clearings cover the southern foot hills of both White Top and the Balsam mountains. There is, however, in this group an almost unbroken forest, at least 6 miles in width, extending along the mountains from Elizabethton east to Mount Ewing, a distance of more than 60 miles.

Extensive mountain forests.

The portion of this forest to the southwest of Damascus covers the slopes of the Iron and Holston mountains and much of Shady Valley, between them. It is largely composed of hard wood, with which white pine and hemlock are associated. For 8 miles east of Damascus the forest covers both slopes of Iron Mountain. It has been slightly culled, but much burned. It is lightly timbered with oak, chestnut, hemlock, and some white pine. A large area lying east of White Top Mountain, on the upper slope of the Balsam Mountains, is heavily timbered with spruce (see PI. XL) on and near the summits, while hard woods, with some hemlock intermixed, occupy the lower elevations. From the eastern end of the Balsam Mountains the Iron Mountain extends almost eastward to Mount Ewing, a distance of 40 miles. Its summit is dotted with a few farms and pastures, but the forest on the slopes is almost unbroken. It is lightly timbered with small oaks, chestnut, hickories, and black pine. The forest has been severely burned over large areas. A railroad has been built from Damascus southwestward through Shady Valley, and some of the finest white-pine timber in the United States is now being cut there. (See Pl. XXXVIII 6.)

South of this large belt of forest are a few isolated mountains in the midst of the agricultural valley of New River which have their slopes well timbered. The largest of these are Phoenix, Three Top, and Elk mountains, which lie between the north and south forks of New River. Nearly 40,000 acres of this forest is unculled. There are six holdings of 10,000 to 50,000 acres each; the remainder is held in small areas of a few hundred acres. The farming region of both the New and Holston river valleys is dotted with wood lots sufficient to supply the needs of the resident population.

FORESTS OF ROAN, GRANDFATHER, AND THE BLACK MOUNTAINS.

Topographic and forest features.

Roan Mountain stands as a prominent figure in this group of four similar large, isolated mountain masses-Beech, Grandfather, Roan, and Black mountains-in a region which is largely devoted to agriculture. These mountains are alike in the general character of the forests on their slopes, and the agricultural lands about their foothills and intervening valleys. They are all heavily timbered, and, though much of their forest has been partially lumbered, only occasional choice trees have been cut, causing no break in the forest and little change in its condition. Mixed hardwoods form the dominant element, and associated with them are small areas of hemlock. Limited areas of spruce are found on or near their tops. Beech Mountain is the lowest of these four. it has few coniferous trees about it except hetnlock and white pine on its northern slope, while large areas on the summits of Grandfather, Roan, Black, and Craggy mountains are occupied by spruce and balsam forests. These forests are virtually primeval, and trees of all sizes and ages are found intermingled, showing abundant reproduction and an undisturbed forest equilibrium. Along the drier portions of the summits and the ridges leading up to them, especially on the south slopes, fires have in some places done considerable damage. But areas entirely fire killed are small.

Forests and topographic features about Beech Mountain.

(1) The Beech Mountain group, including Sugar Mountain and other smaller peaks near it, lies between Watauga River and Banners Elk Creek and is the most northerly group. It has an area of about 70,000 acres (110 square miles), 20,000 acres (32 square miles) or about 30 per cent of which are cleared. It is the lowest of the four groups, having an altitude of only. 5,522 feet. It is separated from Grandfather Mountain, which is about 15 miles southeast of its summit, by the valley of the Watauga River and from Roan Mountain, which is about the same distance to the southwest, by the valley of Elk Creek, which is partly cleared. Although the south slope of the mountain is steep, the soil is deep and mellow and grass farms extend nearly to the summit. There are also a few farms on the northern slopes.

The original forests of Beech Mountain are now largely confined to the deep hollows on the northern slopes. The

greater part of them have been culled in degrees varying with their ease of access.

Forests and topographic features about the Grandfather Mountain.

(2) The Grandfather Mountain group, including Grandfather and Grandmother mountains, lies on the Blue Ridge, and is the highest point in that range, having an altitude of 5,964 feet. While it is situated on the Blue Ridge, its affinities, so far as its forests are concerned, are with the interior mountain areas and not with the eastern slope of the Blue Ridge.

The agricultural lands of this region lie to the north of the Grandfather along New and Watauga rivers, to the west in the valley of North Toe River, and on the low mountains and round hills, dotted with clearings, lying between the Grandfather and Roan groups. This mountain group contains an area of more than 100,000 acres, only a small portion of which is cleared. The cleared land is located chiefly among the headwaters of Linville and Watauga rivers.

The topography of the entire group is rough, with steep and often rocky slopes. Many of the farms are on land which is too steep for profitable agricultural use. The eastern and southern slopes of the mountains are lightly timbered. The western and northern slopes have been somewhat culled, but are still heavily wooded. A dense mixed forest covers the northern slope and extends across the valley of Boone Fork of Watauga River, which is yet uncleared for a distance of more than 5 miles from its head.

(3) The Roan Mountain group, including Roan Mountain, Yellow Mountain, and Spear Top, lies on the boundary line between North Carolina and Tennessee, between Doe and Toe rivers. It rises from a base of 2,000 feet to a height of 6,313 feet. The area of this group is about 120,000 acres, over one-fourth of which, or 35,000 acres, is cleared. The slopes are slightly more gentle than on any other of the large mountains, and are well wooded, though dotted with clearings. The entire wooded portion of this area is well timbered. The north slope, being nearest to the railroad, has been more culled, but some timber has also been cut on the south slopes at the heads of Big and Little Rock creeks.

Forests and topography about the Black Mountains and the Craggies.

(4) The Black Mountains, which lie just west of the Blue Ridge, a few miles north of where the latter range is crossed by the Southern Railway, are a series of short ridges. The most massive of these is that of Black Mountain proper, which diverges from the Blue Ridge and extends

northward 10 miles to a rather abrupt ending. The larger part of this ridge rises above 6,000 feet, and Mount Mitchell, the highest of half a dozen grand peaks, reaches an elevation of 6,711 feet. From near the southern end of the Blacks the Craggy Mountain ridge extends southwestward for a distance of nearly 10 miles, and from this same point the Yates Knob ridge extends northwestward in a less regular form toward the Unaka range. These mountains lie between Toe River on the north and the Swannanoa on the south. At the southern end of the Blacks they touch the Blue Ridge. They are from 15 to 30 miles south of Roan Mountain and 30 miles southwest of the Grandfather. The group has an area of more than 170,000 acres, about 20,000 acres of which are cleared. Forests cover nearly the entire area of the Craggy Mountains, though they are not so dense: nor so nearly in their original condition as are those on the Black Mountains, as more or less lumbering has been done along both theeastern and the western slopes. Some of these slopes, too, have suffered much from fire and are almost destitute of young trees and undergrowth. The densest and most primitive forests of the region lie on the west slope of the Black Mountains about the headwaters of Caney River. (See Pl. XIII.) Those on the east slope of the Blacks are much lighter and have suffered more from fires.

FORESTS OF THE CENTRAL INTERIOR MOUNTAIN RIDGES.

Topography.

The Balsam Mountains make up the longest of the cross ridges in the Southern Appalachians, extending from Mount Guyot, the highest of the Unakas, on the Tennessee line, in a general southeasterly course to Mount Toxamay (Hogback) on the Blue Ridge, near the South Carolina line, a distance of 40 miles. They reach their highest point in Richland Balsam — 6,540 feet

Northeast of and less prominent than the Balsams are the Newfound Mountains, which form another and shorter cross ridge, extending from Mount Pisgah northward to the Unakas. South of the Balsams, the Cowce and Nantahala mountains each form short cross riclges, rising to less than 5,500 feet, which extend from the Blue Ridge on the Georgia State line northwesterly to the Great Smokies of the Unaka Range.

Agriculture.

These cross ridges are in their general features all much alike, with frequent steep rocky slopes and sharp crests. There is very little land on them suited to agriculture,

except in the narrow valleys and coves. (See Pl. XLIII.) The soils are generally thin and light, in some places sandy, rarely clayey. These mountains, however, are surrounded by agricultural valleys, except near the northwest ends of the Balsam and Newfound mountains, where these join the Unakas. The forests on the northwestern portion of the Balsam Mountains are really a continuation of those of the Great Smokies, and resemble them in the species represented and in the general forest conditions. The forests on the east side of the Balsams and on the Newfound, Cowee, and Nantahala mountains are much alike, but the Balsam Mountains are much more heavily wooded than the others, especially on their northern slopes, and have more of the softer woods, like linn, buckeye, and ash. The southern slopes of all are lightly wooded and have been injured by fire to some extent, so that in places the forest is open and young timber trees are scant. Much of the best timber has been culled from the Newfound and Nantahala mountains. The larger part of the forest land on the eastern spur of the Balsams (about, Mount Pisgah) is under forest protection.

General forest conditions.

Forests about the Newfound Mountains.

The forests of the Newfound Mountains are formed of hard woods, largely oak and chestnut, associated with white pine. As they lie nearer the main line of the Southern Railway, and on account of the topography mere easily lumbered, they have been more culled than those of the other cross chains. Some general lumbering has been done on Wolf and Shut-in creeks, and an attempt has been made to remove all the merchantable timber from some large tracts. At most, however, it amounts to only severe culling. The forests of the Cowee and Nantahala mountains are very much alike. They consist of hard woods, in which oak, chestnut, hickory, and maple form the largest element,. There is almost an entire absence of coniferous growth, the hemlock, which is associated with the hard woods elsewhere, being almost wanting here. Much culling has been done in the forests at the north ends of these mountains, where they are nearer the Murphy branch of the Southern Railway.

Forests about the Balsam Mountains.

The Balsam Mountains are more heavily timbered than the other cross ridges. On both northern and southern slopes there are deep, cool hollows, or coves, with fertile soil, producing vigorous growth, and as there has been very little culling these forests are very nearly primeval. They consist of typical Southern Appalachian harp

(Photographed by Scadin.)

woods, associated with hemlock and spruce. On the northern slopes the softer of the hard woods form the dominant element, as linn, ash, buckeye, and yellow poplar, while the proportion of oak and chestnut is smaller. The hemlock is associated with these in the deep hollows, while spruce crowns the summits of the northern slopes. On the southern slope oak and chestnut form the larger proportion of the timber, and there are less of the lighter woods and of hemlock and almost no spruce. The eastern, or French Broad River slope about Mount Pisgah, is lightly timbered with oak and chestnut and has been much damaged by tire. At present, however, it is under forest protection, and vigorous young growth is springing up. Railroads are now being built into the forests on both the north and south slopes in order to exploit the timber.

The almost precipitous walls of the beautiful Nantahala Gorge, nearly 2,000 feet deep, are forest covered throughout their entire extent. (See Pl. XLII.)

FORESTS OF THE GREAT SMOKY MOUNTAINS.

Topography and forest conditions.

This segment of the Unakas is the largest mountain mass in the Southern Appalachians, and it contains the largest area of continuous forest (see Pl. XVII), with the smallest number of clearings. It includes the Smoky Mountains from the Big Pigeon River on the northeast to McDaniel Bald on the southwest, and that part of the Balsam Mountains which lies west of Soco Gap, with their numerous spurs and subsidiary ridges. The region is rough and rugged on hoth north and south slopes, and rises from a low valley level of about 1,500 feet at the larger streams to more than 6,000 feet along the crests of the highest mountains. The wooded area begins on the western foothills of the Smoky Mountains in Tennessee, covers the northwestern and southeastern slopes of the Great Smokies (see Pl. XLIII) and the slopes of the Cataloochee Mountain.

The broad agricultural valleys of East Tennessee lie against these mountains on the northwest, but elsewhere they are surrounded by a rough country of lower mountains, iith narrow, intervening agricultural valleys. Less than 10 per cent of this area is cleared. The clearings are few and small, and lie chiefly some miles distant fro& the crest of the ridge.

Nature and extent of the forests.

The forests are chiefly of hard woods, with a large amount of coniferous growth around the higher summits and in

In Haywood County, N. C.

In East Tennessee.

BIG CHESTNUT TREES, FROM THE BASE OF THE GREAT SMOKY MOUNTAINS. (See pp. 23, 54.)

the deep, cool hollows. On the drier slopes, and especially on the south sides, oak and chestnut form the greater part of the timber, with some black and yellow pine on the ridges. The timber in the hollows is more varied and the stand is heavier, poplar, birch, linn, and buckeye being associated with the oak and chestnut. The finest and largest bodies of spruce in the Southern Appalachians occur here, along the crest of the ridge and the north slope of both the Cataloochee and Smoky mountains. There are about 20,000 acres of spruce and nearly as much hemlock. There is no spruce on the Smoky Mountains southwest of Silers Meadow.

The forests of the north slope of the Smoky Mountains have been much culled and injured by burning and pasturage. There is yet a great deal of fine timber, however. Fires have also done much injury on the south slope, especially to hard woods, and the growth is often very open on account of the suppression of young trees by burning for a great number of years. The valleys of Cataloochee and Big Creeks are heavily timbered, though they have been culled to some extent, and the ridges have often been burned. A railroad is now being built up Big Pigeon River in order to exploit the timber on these streams. A railroad is also under construction up Oconalufty River to remove a part of the timber from the east prong of that. stream.

FORESTS OF THE SOUTHERN END OF THE APPALACHIANS.

Topography.

South of the Nantahala cross ridge the Appalachian Mountains no longer consist of two well-defined parallel ranges with prominent cross ridges, but break up into a number of small, low mountains, or small ridges, with broad, alluvial valleys or low hills between them, or in some places there are a series of low ridges which are separated by deep, narrow, gorge-like valleys. In northwestern Georgia their identity is entirely lost, and they pass into the hills of the Piedmont Plateau. While only a few of these mountains have an altitude of more than 4,500 feet, the topography is rough, as the stream level is much lower than it is further northeastward, not being more than 1,000 feet. The resisting character of the rock-quartzite, sandstones, and slates—which forms these mountains, which have eroded into sharp-pointed ridges mith deep, narrow intervening val-

leys, has added to the ruggedness of the region and its picturesqueness. Some of the largest of these mountains are the Blue, Flat Top, Shooting Creek, and Valley River mountains.

Forest conditions.

The northern slopes and hollows are often well wooded with hard woods, chiefly with oaks, chestnut, maples, and hickories. The southern slopes are lightly wooded with oaks, hickories, and black and yellow pines, which also form the forests on the spurs and foothills. In very many places the forest is open and thin, and many trees are defective. The undergrowth is often dense, consisting of numerous sprouts from young trees which have been killed by fires, and many shrubs which grow in the partial shade of the thin forest cover. In other places there is almost no underwood and no young growth. Repeated fires have injured much of the timber on the southern slopes and greatly impaired the general forest condition. These fires are far more frequent and severe than in the hard-wood forests northward, on account of the dryer climate and soil and the large amount of inflammable pine, and the resultant injury to the timber is more evident. On account of the thin, dry soil the trees are smaller and less vigorous than farther north, and the constant destruction of the humus by the fires still further lessens their growth and keeps them small. The soils of the mountains are generally thin and sandy and not at all productive agriculturally. In many places they are very rocky, so that tillage would be impossible. The altitude is too low for grass. About three-fourths of the area is at present in forest. Some of it is second growth, but only a small part of it is such. There are occasional clearings, however, around the base of the mountains and in the hollows. Lumbering has been in progress in many places and some of the choicest timber has been removed, especially along and near the Marietta and North Georgia Railroad.

CHANGES IN FOREST CONDITIONS OF THE SOUTHERN APPALACHIANS.

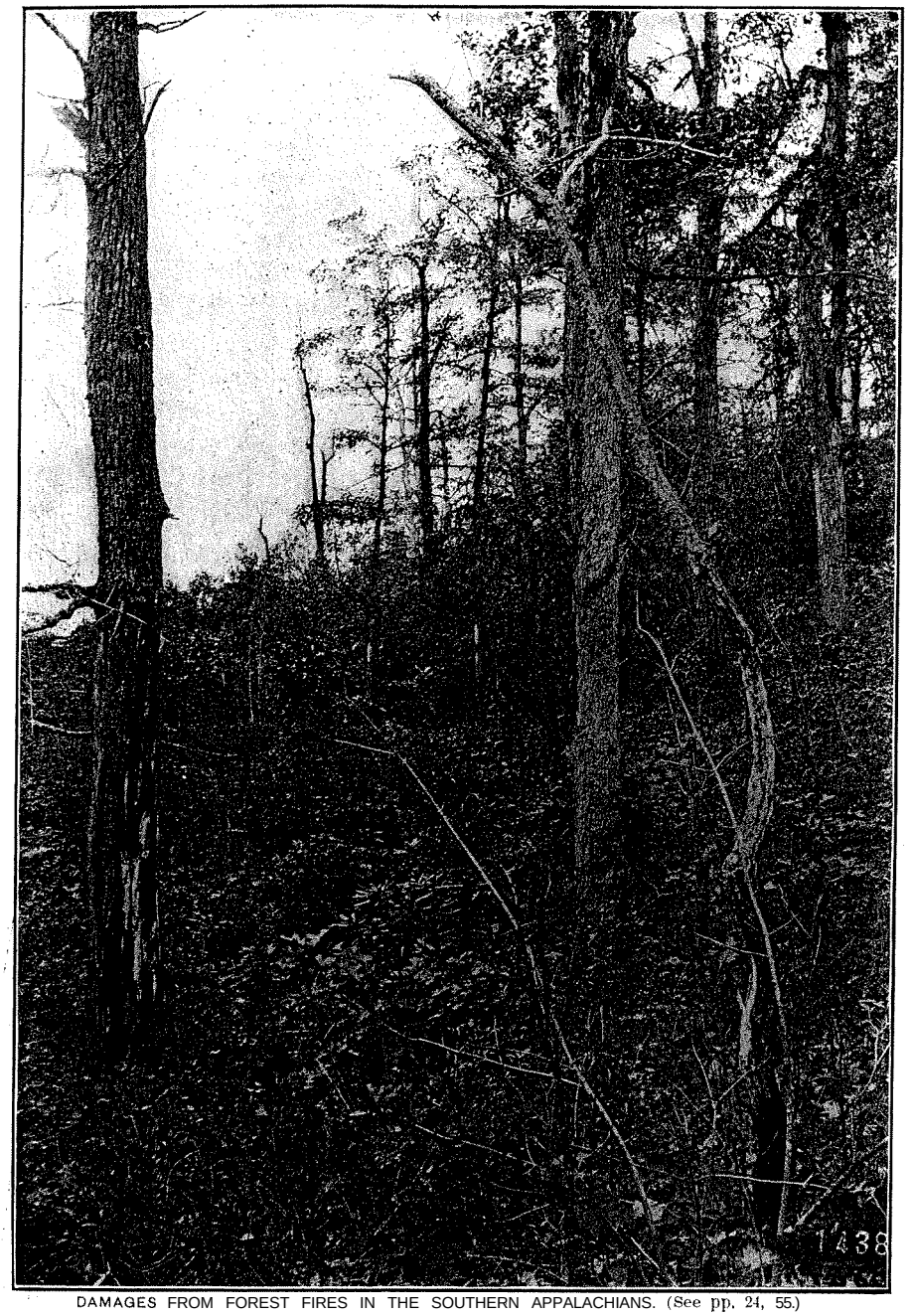
The three agencies that have wrought changes in the forests of the Southern Appalachians are the fires, the lumbermen, and the clearer of lands for farming purposes.

Injury by forest fires.

Fire has come as an oft-repeated scourge since the days of early Indian occupation.

Extent and nature of their damages.

More than 78,000 acres of the region examined have recently been so severely burned as to kill the greater por-



DAMAGES FROM FOREST FIRES IN THE SOUTHERN APPALACHIANS. (See pp. 24, 55.)

The fires do incalculable damage to the forests on the slopes of these mountains, injuring and often killing both the trees and the undergrowth.

tion of the timber, but the greater aggregate damage has been done by lighter fires creeping through the woods year after year, scorching the butts and roots of timber trees, destroying seedlings and forage plants, consuming forest litter and humus, and reducing that thatch of leaves which breaks the fall of raindrops. Evidence of such fires is found over approximately 4,500,000 acres, or 80 per cent of the entire area. (See Pl. XLVI.)

The effect of forest fires is seldom appreciated, especially in this region, where so few timber trees are killed. The killing of mature timber trees is, in fact, from the nation's point of view, the least damage of all; for were only the mature trees killed a dozen saplings would stand ready to fill the place of each, but the fires affect the saplings much more than the large, thick-barked trees, and, too, where spring fires are habitual seedlings can not grow, as they are killed when very small. A forest under such conditions can not reproduce itself. The timber trees die out and are replaced by brush that sprouts from the roots. One who studies these effects can see everywhere the damage by fire in dead trees, scorched butts, hollow trees, dead saplings and seedlings, in clumps of sprouts from roots of fire-killed trees, in the openings, the half-forested land, and in the annual weeds that occupy the burned areas, nature using their humble efforts to cover the nakedness of the misused land.

Reproduction prevented.

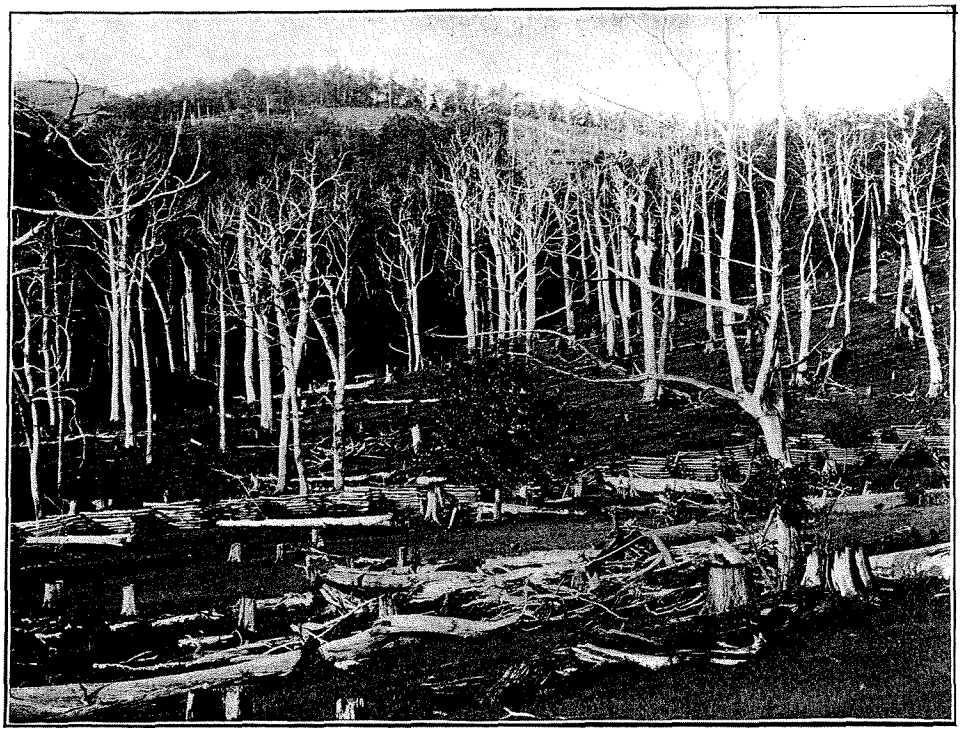
Fires increase violence of floods.

The damage by fire causing a loss of the earth cover does not end with erosion, for it also prevents water from penetrating and being stored in the earth. The roots of trees penetrate deeply into the subsoil, and as they decay leave a network of underground water pipes. The mulch of forestleaves encourages numerous ground-boring worms and beetles that keep the soil of an unburned forest porous, not only favoring the absorption of water, but also retarding the capillary rise of moisture to the surface and its loss by evaporation. The mosses and humus of a well-conditioned forest form wet blankets, often a foot thick, the function of which is so evident that it need not be explained here. The dissipation of the chemical elements of plant food into the atmosphere by fire and the rapid leaching away of the slight residue contained in the ashes is another injurious effect of the forest fires.

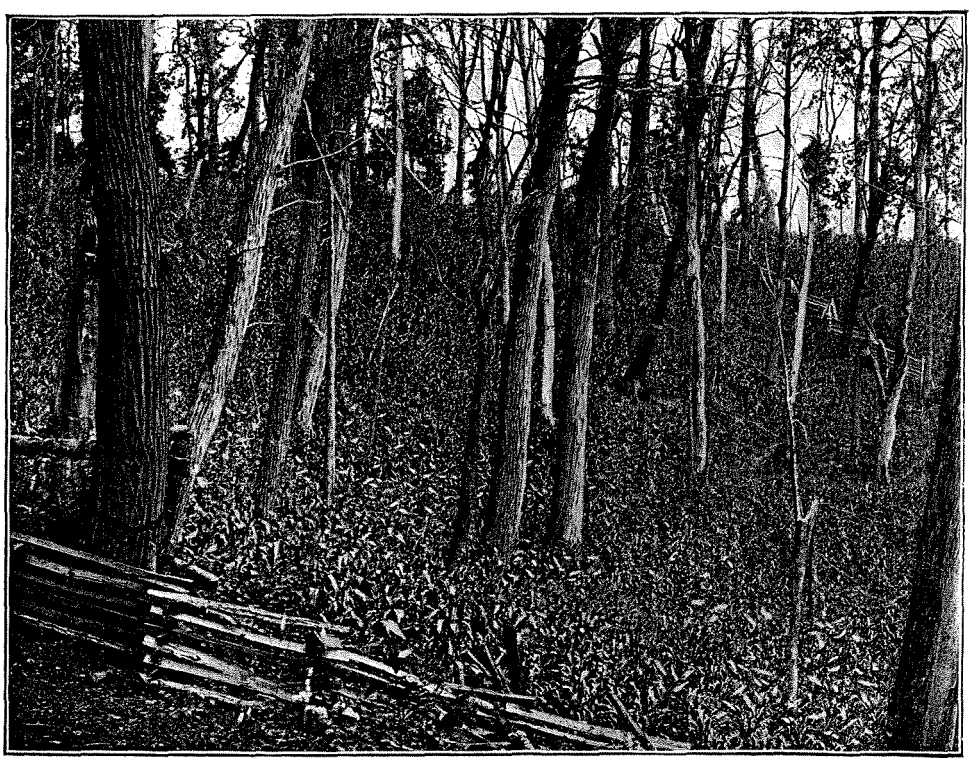
Fires impoverish the soil.

Fires in this region best prevented by Government supervision.

The experience of the older countries should serve us sufficiently to prevent our making a similar mistake of policy concerning our mountain lands. That the same



(*A*) DESTRUCTION OF FOREST ON MOUNTAIN RIDGES FOR PASTURING PURPOSES. (See PP. 26, 57–59.)



(*B*) CORN PLANTED BETWEEN GIRDLED TREES ON APPALACHIAN MOUNTAIN RIDGES. (See pp. 26, 57–59.)

Many of these steep mountain fields are "cleared," cultivated, badly washed, and abandoned, all within less than a decade, and before the girdled trees have fallen to the ground.

effects follow the careless policy of burning mountain land in this country as in Europe is proved by the already desolate condition of large areas in the Rocky Mountains and the plainly legible signs of the coming consequences in the Appalachian region.

The effect of lumbering.

The lumberman has been increasing his activities at a somewhat rapid rate, and he is yearly going farther into the forests. The damages he causes come not so much from the trees he cuts in culling the forest as from the additional trees and seedlings of valuable species which he destroys in his lumbering operations, and the greater destruction from forest fires which follow him, fed by the tops and other brush he leaves scattered through the forest. By his irregular cutting, reducing forest conditions, he renders impracticable the inauguration of economic! conservative forest management.

The effect of clearing steep mountain sides.

Following in the wake of the fire and the lumbering, and surpassing them both in the completeness and permanency of the damage done, is the man who clears for ordinary agricultural purposes mountain lands which should forever remain in forest. The clearing of lands in this region for agricultural purposes has progressed slowly but steadily during the past century as the population increased, until at the present time there are 1,200,000 acres (24 per cent) cleared out of a total of 5,400,000 acres examined. (See PI. XII.) When it is considered that the settlement of this region has been in progress for more than a century the extent of the area devoted to agriculture is small. The reason for this is found in the unprofitableness of cultivating lands with such steep slopes. The cleared lands are mostly limited to the alluvial bottoms along the streams, the rounded valley hills, the lower mountain spurs, and the lower slopes of the larger mountains themselves below 4,000 feet elevation.

Percentage of land already cleared.

In some localities, especially in the region around Roan Mountain and on the Blue Ridge north of Gillespie Gap, there are large areas of cleared land at an elevation of from 3,500 to 5,000 feet; but these are mostly grass farms, are not subject to continuous tillage, as are the corn lands below, and hence do not deteriorate so rapidly. Some of the slopes that are cultivated are very steep-from 30 to 40 degrees--some of them too steep even for the mountain steel and bull-tongue plow, and must be cultivated entirely by hand.

The staple grain produced throughout this region is corn, which yields more heavily than small grain and is more easily managed on the steep slopes. On clearing the land for cultivation the standing trees are girdled to kill them, so that neither their shade nor their growing roots will injure the crops. Some of the trees thus killed are used for fencing and fuel, but the greater number of them fall in a few years and are then rolled into heaps and burned. Corn or buckwheat is usually grown on these newly cleared fields, between the girdled trees during the first season (see Pl. XLIX.) Following this corn may be planted one or two years more; then small grain, either wheat, rye, or oats, for one or two years; then grass for a few years; then follow worthless weeds, and then the gullies. When first cleared most of this mountain-side land is covered with a layer of humus several inches thick, and the soil below is black and porous, owing to the large percentage of vegetable matter it contains; but on cultivation and exposure to the sun and washing rains this organic matter is rapidly dissipated. In this process most of the soil is washed away; the remainder shrinks and consolidates, thus losing much of its power to absorb water rapidly, and loses its fertility by the continued eroding and dissolving action of the rains.

Method of clearing.

The process of erosion.

Hence these cleared mountain lands have a short-lived usefulness, aud new clearings are made to replace the fields which from year to year are abandoned because they cease to be productive. A few years of cultivation for fields on these steeper mountain slopes usually brings them to the end of their usefulness for agricultural purposes. This may be followed by a few years of pasturage, and then come abandonment and ruin. (See Pls. I, XX, and XXI.) Over the eroded foothills, along the eastern base of the Blue Ridge and western base of the Unakas, young pines may slowly cover again the eroded surface of the mountain slope, but over the more elevated portion of the Appalachian Mountain region the erosion? whether it be in gullies, visible for miles, or in the more common form in which the whole surface moves downward, is so rapid that the hard-wood forests, slower to reproduce, do not readily regain their footing, and hence the work of land destruction continues.

Early abandonment and ruin of these cleared mountain slopes.

The limited alluvial or bottom lands in this region being the most productive and easiest cultivated, were naturally the first to be cleared, and the nearly all in cul-

tivation; but with an increasing population the demand for additional fields to cultivate has led to the clearing of these mountain-side patches successively higher up the slopes, until now the area of these clearings considerably exceeds the area of the bottom lands. This process has gone on the more rapidly because of the rapidity with which these steep lands have been worn out and abandoned. There are yet many places where the gentler slopes might perhaps be cleared to meet the agricultural demands of the region, but unquestionably the steeper areas already cleared should be at once reforested in order to prevent their early ruin. All lands in this region remaining cleared for farming purposes should be kept in the highest state of cultivation, and those of even the gentler slopes should be carefully terraced, and as far as possible kept in grass or orchards.

Fields now abandoned should be reforested.

The effect of exposing mountain lands to the full power of rain, running water, and frost is not generally appreciated. The greater part of our population lives on level land and does not see how the hills erode, and even in the hills nearly all the people go indoors when it rains and therefore do not half understand what is going on. In the dashing, cutting rains of these mountains the earth of freshly burned or freshly plowed land melts away like sugar. The streams from such lands are often more than half earth and the amount of best soil thus eroded every year is enormous.

A remedy suggested

The individual owners are to a great extent helpless in preventing these unwise cuttings, clearings, and forest fires. Some of them can care for their own lands, but they can not, owing to their small holdings and small incomes, regulate the policy which controls adjacent areas. Only cooperation on a great scale, such as Government ownership could provide, can stop these forest fires, check this reckless clearing, and preserve these resources to the best advantage.

The two great needs of this mountain region are:

1. The use of the land for the purpose to which it is best adapted, which would require the keeping of 80 to 90 per cent of it in forest, while the cleared land should be kept in the highest state of cultivation for farm products.

2. Efficient and cheap transportation for the forest products.

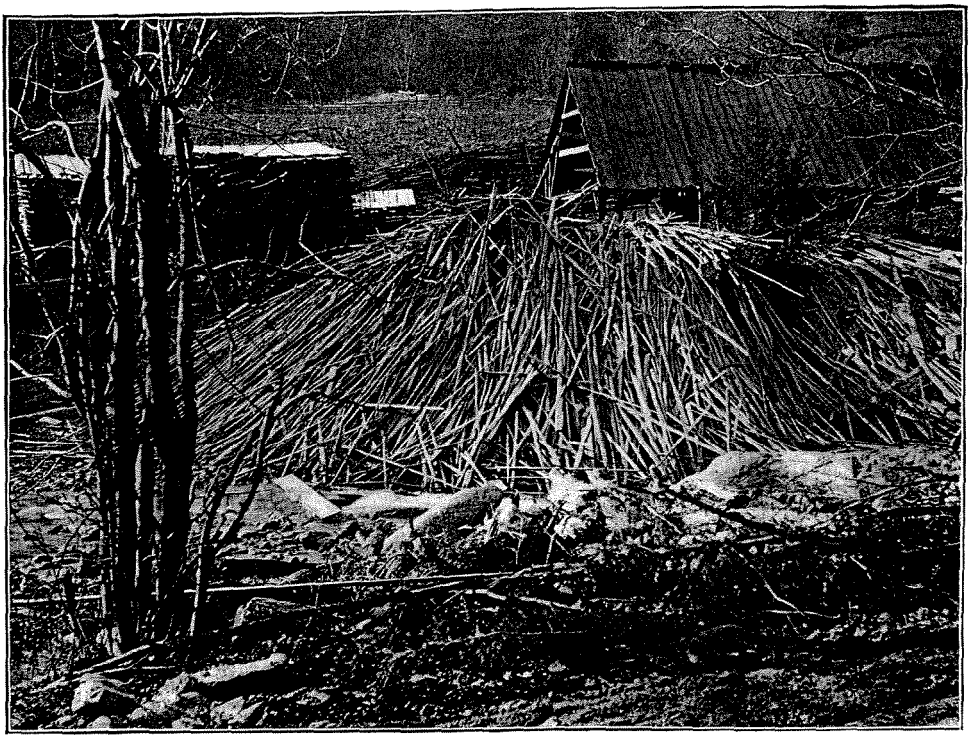
LUMBERING IN THE SOUTHERN APPALACHIANS NOW AND UNDER GOVERNMENT OWNERSHIP AND SUPERVISION.

By OVERTON W. PRICE.

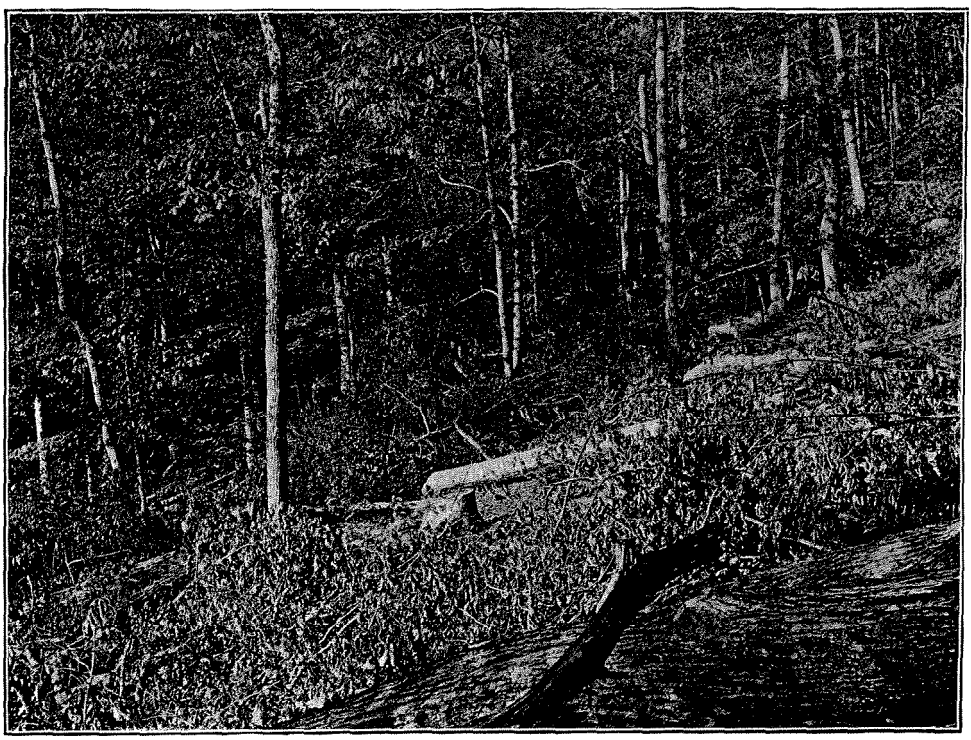
The protection of the headwaters of important streams in order to prevent floods and perpetuate water powers, the preservation of a great natural health resort and of important agricultural resources, are perhaps the most valuable results that would follow the creation and management of the proposed Appalachian Forest Reserve. The application of practical forestry in this region by the Federal Government would bear fruit also in the maintenance of a sustained supply of hard-wood timber, in the production of a steady and increasing income therefrom, and in providing a forcible object lesson to show the advantages of careful and conservative forest management.

Present methods of lumbering and their results.

Lumbering is one of the principal industries of the Southern Appalachians. The agricultural resources of the region must remain limited because of its ruggedness and the low percentage of arable laud. Its development as a grazing country is hampered by the lack of winter forage and the temporary life of the grass covering in the lower slopes. Its main resource of the future will be its hard-wood forests, upon whose maintenance depends very largely the best and most permanent development of western North Carolina and eastern Tennessee. The existing supply of merchantable timber has already been seriously reduced, while repeated fires and unregulated grazing have in many localities greatly impaired the quality and health of the forest, as well as the chance of its successful reproduction. Although there is still enough wood left to fill the local demand, the cost of logging it is constantly growing with the increasing distance between the market and the source of supply. Around each settlement there is a rapidly widening area which has been stripped of all merchantable timber under methods which too often render



(*A*) **WASTE IN SAWING AT A SMALL MILL IN THE SOUTHERN APPALACHIAN MOUNTAINS.** (See p. 63.)



(*B*) **TOPS LEFT AMONG THE TREES IN LOGGING.** (See PP. 24, 57.)

These feed the forest fires so effectively that they sometimes destroy everything in their path

it practically valueless for the production of a second crop. In many localities serious harm has already been done, which only time and care can remove. A continuance of such methods will within the near future destroy this great natural resource of the Southern Appalachians—the lumbering of its valuable hard woods to supply a steady and growing demand.

APPLICATION OF CONSERVATIVE FOREST METHODS TO THIS REGION BY THE GOVERNMENT PRACTICABLE AND PROFITABLE.

The application of practical forestry to the proposed reserve would not only preserve the productive capacity of the forest within its boundaries, but it would also provide a proof of the results of conservative forest management which would be of value in inducing private owners of forest land in this region to adopt the same measures. There is no surer or quicker way of convincing the lumberman of the Southern Appalachians that cottservative lumbering pays better than ordinary lumbering than by an experiment on the ground, based upon a thorough study and effectively carried out.

Government management would yield a profit.

The question of direct returns from the proposed reserve is, front the point; of view of the Federal Government, a secondary one. Its highest benefit will lie in those indirect returns which are of so vital an importance to the best development of this region nttd its resources. However, that the forests of the Southern Appalachians can under systematic and conservative measures be made to yield a profit, from their management is certain. Although local stumpage values are ttot sufficiently good to warrant the application of an elaborate system of forest management, they are high enough to make conservative lumbering a sound business measure. The pecuniary advantage of practical forestry depends naturally upon whether it offers better returns than those to be had from ordinary lumbering. Since it reduces present profits slightly in order to insure a second crop of timber upon the lumbered area, its superiority front a business point of view rests upon the safety and value of the second crop. Serious danger from fires, a poor market, excessive difficulties to overcome in logging, or any other adverse condition which seriously impairs stumpage values, may render the probable future returns from a forest insufficient to justify conservative measures in lumbering it..

Conditions in this region favorable for conservative forestry.

Not only is there no unfavorable condition in the Southern Appalachians which is sufficient to render practical forestry inadvisable as a business measure, but the opportunity offered for good returns from careful and conservative forest management is a peculiarly favorable one. The forest contains valuable timber trees, which not only command a high price at present, but are rapidly increasing in value for the lack of satisfactory substitutes, notably in the case of Black Walnut, Cherry, Hickory, Yellow Poplar, and White Oak. The transport of timber presents some difficulties, as in all mountain countries. These are, however, seldom sufficient to impair seriously the profits from lumbering. Effective protection from fire is practicable without prohibitive expense, while in its rate of growth, readiness of reproduction, and responsiveness to good treatment the forest offers silvicultural opportunities which are seldom excelled in this country.

SOME EVILS OF THE PRESENT SYSTEM OF LUMBERING.

Practical forestry in the Southern Appalachians must comprise those modifications of the present methods of lumbering which will not **only** insure a fair profit upon present operations, but will preserve the productive capacity of the forest and provide for the desired reproduction of the timber trees. Unnecessary damage to the forest and total lack of provision for a future crop is characteristic of the lumbering now carried on in this region. Logging operations have generally shown an inexcusable slovenliness, as foreign to good lumbering as to practical forestry.

Wasteful methods followed.

A clean lumber job is seldom seen. There is great waste of good timber through poor judgment in gauging the log lengths and in cutting stumps much higher than is necessary. Butting off unsound portions of trees is not always done; trees not wholly perfect are sometimes left to rot where they fall. Care is seldom taken to throw trees where they will do the least harm to themselves and to others, and in consequence lodged and smashed trees are very common. Overlooked sound trees are also numerous.

However, criticism of lumbering in the Southern Appalachians must take into consideration the circumstances which led to it. Almost all of the work has been done by the farmers of the region in order to supply their fuel and other household material and to add to the poor living

afforded them by their farms. These men are often hampered by lack of capital, are generally wanting in the knowledge requisite to good lumbering, and have had always to contend with the difficulty of obtaining expert loggers to carry out the work. Nevertheless, the nearness of large bodies of merchantable timber, among which are valuable kinds, such as Cherry, Black Walnut, Hickory, and Yellow Poplar, has usually made a fair profit possible under even the most thriftless logging methods. This desultory cutting has been going on for years, and although the individual efforts have been small, they have removed the merchantable timber from the larger portion of the accessible forests.

RECENT LUMBERING METHODS MORE PROFITABLE, BUT ALSO DESTRUCTIVE.

When the waning supplies of timber in the North and East some fifteen years ago forced the loggers of those regions to the South, the application of skillful and systematic methods of lumbering began in the Southern Appalachians. The newcomers, through the investment of commensurate capital in logging outfits, the thorough repair and extension of logging roads, and the generally businesslike mode of attack characteristic of the trained lumberman, have reaped a profit from their operations entirely impossiblounder the slipshod, desultory lumbering methods of the settler.

Nature of the damages.

The harm done to the forest in both cases is very great in proportion to the quantity of lumber cut. This is due largely to the size of the trees and the fact that little care is taken in the fellings. The damage to young growth is increased by the absence of snow and by the fact that trees are often cut when they are in full leaf.

The breaking down and wounding of seedlings and young trees by the snaking of logs to the roadside or the river is in some degree unavoidable; but the damage is often much in excess of what is necessary. (See Pl. LIII.) There are often, however, many more snakeways, or skidways, than are necessary, and the application of a little system in laying them out would save time and young growth on a lumber job. On the higher and steeper slopes it is often the habit--and one which can not be criticized too strongly, except in those rare cases where it is absolutely necessary on account of the gradient-to roll the logs from top to

bottom, merely starting them with the canthook. A 16-foot log. 3 feet or more in diameter, can gain momentutn enough in this way to smash even fair-sized trees in its path, and when it passes through dense young growth it leaves a track like that of a miniature tornado. The practice is in line with others to be observed in the Southern Appalachians, such as the common habit, for example. of leaving to rot the "deadened" trees which stand over clearings. There are cases in which these clearings have been inclosed with fences built of rails split from prime black walnut, with no other excuse than that the walnut happened to be within easier reach than either oak or pine.

Under such methods, in which there is not only an absolute lack of provision for a future crop but often a marked absence of that forethought, skill, and aversion to waste which go to tnake clean lumbering, most of the logged-over areas in the southern Appalachians are only saved from entire destruction of the standing trees by the generally scattered distribution of the merchantable timber.

OBJECTS AND POLICY OF FOREST MANAGEMENT UNDER GOVERNMENT OWNERSHIP.

In the application of conservative forest management to that portion of the forests of the Southern Appalachians included within the proposed reserve, the first aim should be to protect them from fire. The safety of the forest from tire must form the foundation of any system of practical forestry which is to be permanently successful. Fire has done and continues to do enormous damage in this region. The chief cause lies not in malice or in carelessness of campers or of lumbermen, but in the ancient local practice of burning over the forest in the autumn, under the belief that better pasturage is thus obtained the following year.

Protection against forest fires.

The fires are started by the settlers upon the area which is to serve as a sheep or cattle range the following season, and are permitted to burn unchecked. The result is that, except where confined by roads, streams, or clearings, they often spread from the wood lots of the foothills, in which they are set, to the forests of the higher mountains, there to burn unmolested until rain, snow, or lack of inflammable material puts thetn out.

The hard-wood forests of the Southern Appalachians are by no means so inflammable as the coniferous forests of the North and West. Forest fires in this region are seldom more than ground fires, and only under the influence of exceedingly high winds in a dry season become uncontrollable. With an active and adequate force of rangers and a thorough system of trails, the protection of the proposed reserve would be practicable. The good results of its preservation from fire would be twofold. In addition to the evident benefits of efficient fire protection upon the forest would be the forcible example provided to prove that the forest untouched by fire yields in the long run better and more plentiful pasturage than if it be annually burned over. The modification of present methods of grazing in the Southern Appalachians, like the modification of present lumbering methods, will follow proof of its advantages much more rapidly than it would follow propaganda. The one is no less important to the best development of this region than the other. The advantages of both could in no way be better established than by their practical illustration in the proposed reserve.

The mountain forests of the Southern Appalachians are silviculturally the most complex in the United States. They contain many kinds of trees, varying widely in habit and also in merchantable value, and the forest type is constantly changing with the differences in elevation, gradient, and soil. Their best management is difficult, because the lack of uniformity in the forest renders it necessary constantly to vary the severity of the cutting and to discriminate in the kinds of trees which are cut, instead of following only those general rules which suffice where there are fewer species represented and the forest conforms more closely to a single type.

IMPROVEMENT IN GENERAL FOREST POLICY NECESSARY.

Improvement in method of lumbering.

In order to reproduce these forests successfully and to minimize the damage done by lumbering, first of all it will be necessary to have a radical improvement in the fellings. Such an improvement is entirely practicable without additional cost per 1,000 feet B. M. of timber felled. It often requires no more labor to fell a tree up a slope than down it, or upon an open space rather than into a clump of young growth; aud it is in just such cases as these that unreasoning disregard for the future of the

forest is commonly manifested in the Southern Appalachians.

Culling the forest under old system.

In the selection of trees to be felled the small farmers, who for a long time were the only lumbermen in the Southern Appalachians, hare been governed by the same considerations that govern lumbermen elsewhere. They have taken the best trees and left uncut those of doubtful value rather than run the risk of loss in felling them. Furthermore, the fact that they hare lumbered generally on a very small scale and have often had great difficulties with which to contend in the transport of logs has led them to extremes in this respect. The result is that they have reduced the general quality of the forests in a measure entirely disproportionate to the amount of timber cut. As a rule, only prime trees have. been taken, and those showing even slight unsoundness have been left uncut, except where the stand of first-class timber was insufficient. Diseased and deteriorating trees remain to offset the growth of the forest by their decay and to reduce its productive capacity still further by suppressing the younger trees beneath them, while in the blanks made by the lumbering worthless species often contend with the young growth of the valuable kinds. In other words, the lumbering has closely followed the selection system, but the principles governing the selection have usually been at variance with the needs of the forest.

CONSIDERATIONS THAT SHOULD GOVERN IN THE MANAGEMENT OF THE PROPOSED FOREST RESERVE.

In order to bring about successful reproduction of the desirable species and to maintain the quality and density of the stand, lumbering in the mountain forests of the Southern Appalachians must be governed by the following main considerations:

Removal of faulty trees.

(1) Remove all diseased, overripe, or otherwise faulty trees of a merchantable size where there is already sufficient young growth upon the ground to protect the soil and serve as a basis for a second crop of timber. (See PI. LIV.) In extreme cases, where the condition of the forest is seriously impaired by the presence of a large number of such trees or where they overshadow and seriously retard promising young growth, their removal may be financially advisable when the sale of product no more than pays the cost of the logging.

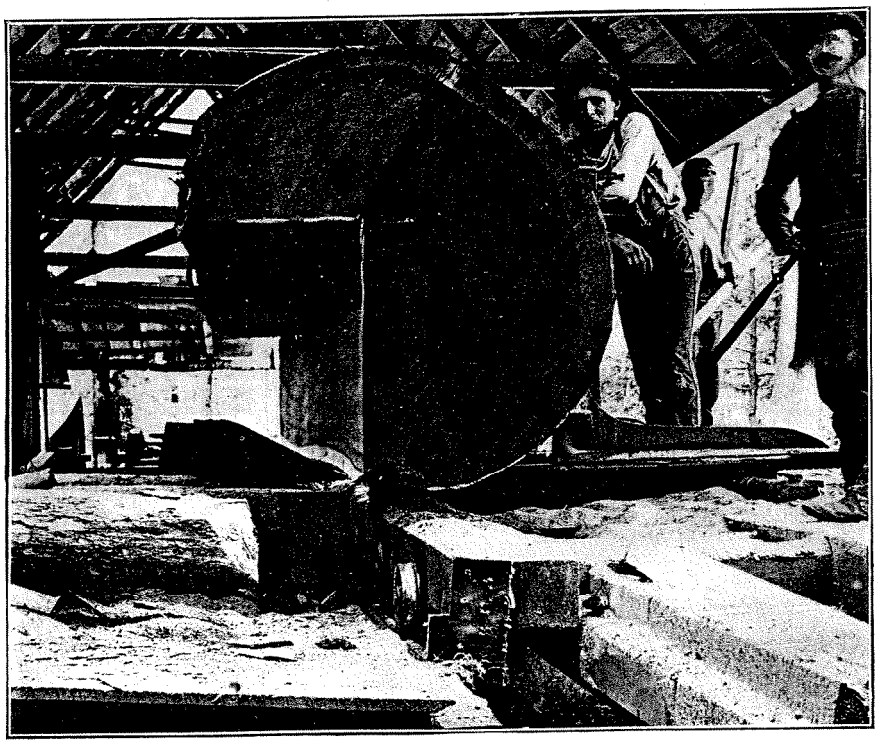
Cut so as to encourage growth of valuable species.

(2) So direct the cuttings that the reproduction of the timber trees may be encouraged in opposition to those of

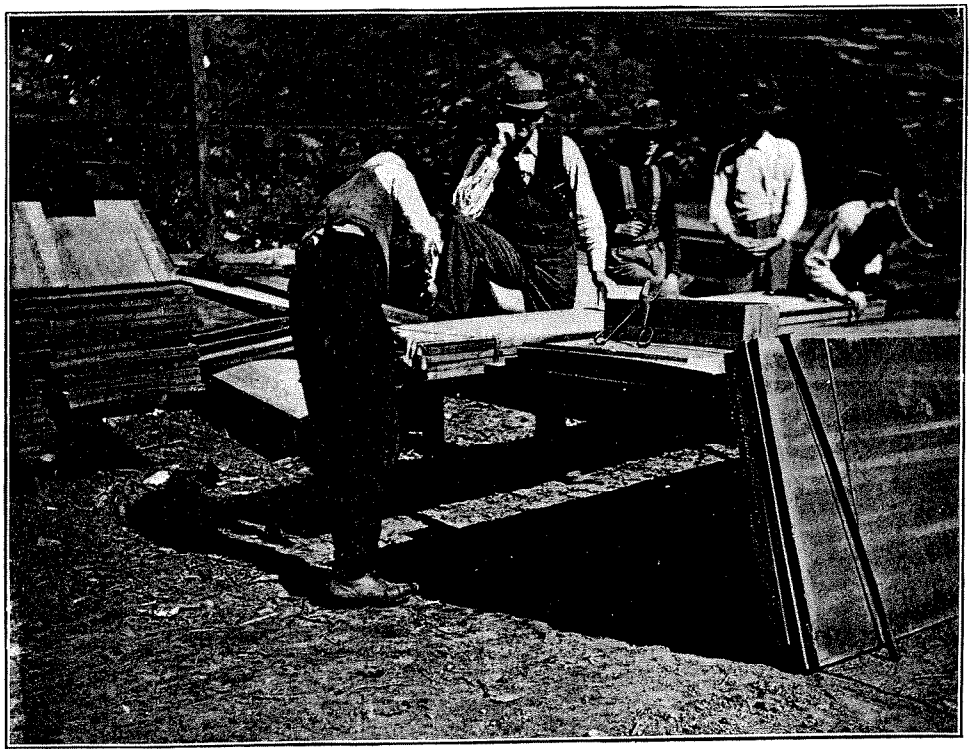
less valuable kinds. This can not be successfully accomplished in the Southern Appalachians by cutting a diameter limit merely. A limit will by all means be advisable for each species, based upon a study of its rate of growth and the proportion which different diameters bear to its contents in board feet. It will be frequently necessary, however, to leave trees of a merchantable diameter where their removal would seriously impair the density or where seed trees are necessary.

Careful selection of seed trees.

In the leaving of seed trees many considerations are involved, only a few of which can be mentioned here. The Oaks, Hickories, Walnuts, and Chestnut should be favored, since their seed is too heavy to be carried by the wind, and much of it is eaten by animals. The marked tendency of the pines (see Pl. LV), Hemlock, and Yellow Poplar to reproduce by groups must be encouraged. On south slopes and in dry localities generally, where Dogwood, Sourwood, and Scrub Oak contend with the timber trees, great care must be taken not to disturb the balance between them. The rich, moist soil of the Poplar coves is particularly likely to produce a luxuriant growth of weeds and brambles instead of tree seedlings if too much light is admitted to the soil, while the Ash, Cherry, and Basswood, which are only sparsely represented in the mature stand and are further handicapped among the young growth by their strong demands upon the light, will require an exceedingly conservative method of management.



(*A*) SAWING LARQE TIMBER AT A SMALL MILL IN THE MOUNTAIN FOREST. (See PP. 62–64.)



(*B*) BINDING POPLAR LUMBER FOR EXPORT, FROM THE GREAT SMOKY MOUNTAINS.

APPENDIX E.

THE PRESENT STATUS OF THE MOVEMENT FOR THE PROPOSED FOREST RESERVE IN THE SOUTHERN APPALACHIANS.

THE PRESENT STATUSOFTHE MOVEMENT FOR THE PROPOSED FOREST RESERVE IN THE SOUTHERN APPALACHIANS.

The necessity for the preservation of the forests in the Southern Appalachian region in order to prevent the washing away of the mountain lands and the destruction of the mountains themselves has for many pears been advocated by the geologists working in that region. Their position in this has met with the hearty approval of the forestry expertsand even the lumbermen who have gone into that region. The growing prominence and recognized suitability of much of this region as a healthand pleasure resort has added this element also to the movement for the preservation of these forests and rivers. The increasing violence and destructiveness of the floods during the past few years, and the general recognition of the fact that the continued clearing of these mountain slopes would soon result in the absolute ruin of all the interests of this region and of the adjacent lowlands in the several States-this has combined and strengthened this movement in the country at large, and has brought it to its present position before Congress.

On November 22, 1899, the Appalachian National Park Association was organized at Asheville, N. C., with a large membership, including citizens from Northern, Southern, and Western States. On January 2, 1900, memorials from this Appalachian National Park Association and the Appalachian Mountain Club of New England were presented to Congress, asking that measures be taken looking to the preservation of the Southern Appalachian forests. In response to these memorials, supported by the unanimously favorable press of the country, Congress incorporated in the bill carrying the appropriation for the Department of Agriculture for the fiscal year ending June 30, 1901, a provision that a "sum not to exceed $5,000 may, in the discretion of the Secretary of Agriculture, be used to investigate the conditions of the Southern Appalachian mountain region of Western North Carolina and adjacent States."

The United States Geological Survey of the Department of the Interior cooperated with the Department of Agriculture in this investigation so as to have it include a study of the geology and topography and rivers of the region.

In January, 1901, the Secretary of Agriculture submitted a short preliminary report [a] setting forth the result of these investigations up

[a] See pp. 166-165.

to that time. This report was transmitted to Congress by President McKinley in a brief commendatory message on January 16, 1901.

On January 10, 1901, a bill was introduced in the Senate by Mr. Pritchard, of North Carolina, which provided an appropriation of $5,000,000, to be expended under the Secretary of Agriculture in the purchase of not less than 2,000,000 acres of mountainlands in the States of Virginia, North Carolina, South Carolina, Tennessee, Georgia, and Alabama. This bill was favorably reported to the Senate by the Committee on Forest Reservations and the Protection of Game, February 12, 1901."

This movement has from its beginning received the active support of both the general and the technical press of the country, and it may be said that this agency has done more than all others to awaken the American people to the importance of preserving the remnants of our forests before it is too late, and of educating them to a knowledge of the fact that these forests are for this generation to legitimately use, but not to destroy.

The list of papers and periodical publications that have contained articles favoring the proposed Appalachian forest reserve is too long to be enumerated here, but it may not be improper to mention especially two such articles which have recently appeared, viz, one by Prof. W J McGee, of Washington, D. C., in the World's Work for November, 1901, and another by Prof. N. S. Shaler, in the North American Review for December, 1901. On page 180 will be found brief extracts relative to the proposed forest reserve from a few papers and magazines.

The following papers, arranged somewhat in the order of their adoption, are here reproduced so as to make them more accessible to those who may have occasion to refer to them:

MEMORIAL OF THE APPALACHIAN MOUNTAIN CLUB.

To the Senate and *House of Representatives of the United States of America:*

The petition of the Appalachian Mountain Club respectfully shows.

That your petitioner is an organization of about 1,200 members, composed principally of residents of Boston, Mass., and New England, with scattering members throughout the Union, organized in January, 18'76, and reorganized and chartered as a corporation by the Commonwealth of Massachusetts in April, 1878.

That its object is to bring together for cooperation all those interested in the mountains of New England and adjacent regions. * * * To combine the energies of all those who are interested in efforts not only to preserve the present beauty and attractiveness of our mountain resorts-and in particular their forests-but also to render them more

[a] See p. 168.

attractive by building paths, camps, and other conveniences, constructing and publishing accurate maps, and by collecting all available information concerning the mountain regions.

* * * In short, the club may be considered the representative in this part of the country of the interests of all lovers of the mountains, in addition to which it has made such substantial contributions to various departments of geography as to gain recognition as a representative of general geographical science.

It having come to the knowledge of this club that there is now on foot a movement for the establishment of a national forest and mountain preservein the southern Alleghenies, to be known as the National Appalachian Park; and further, that there is now before the Congress a petition from an organization known as the Appalachian National Park Association, "praying for such action **as** will result in causing to be forthwith made such examination and surveys as may be necessary to determine the best possible location and the proper area for a national park in the southern Appalachian region, to the end that upon the coming in of the report of the forester, or of such reports as the Congress may desire, appropriate steps may be taken to acquire the title to the land to be comprised within the limits of the park; or that the Congress may take such other action as it may deem proper."

Your petitioners therefore state that they believe the movement is inaugurated at a most opportune time, being well aware of the increased difficulty that will attend the securing of suitable land for this purpose at a later date, when land values increase and timber and land interests combine against such a movement; that they are deeply interested in this movement, which they believe, if carried out, will result in untold health and recreation for future generations, and heartily concur in the above-mentioned petition; and they respectfully pray that the said petition of the Appalachian National Park Association may receive favorable consideration with the Congress.

ALBION A. PERRY, *President.*
ROSEWELL B. LAWRENCE, *Recording Secretary.*
JOHN RITCHIE, Jr., *Corresponding Secretary.*

MEMORIAL FROM THE APPALACHIANNATIONALPARK ASSOCIATION.

To the Senate and House of Representatives of the United States of America:

The petition of the Appalachian National Park Association respectfully shows:

That your petitioner is an organization composed of citizens from many States in the Union, and was formed for the purpose of bringing

to the attention of the Congress of the United States the desirability of establishing a national park at some place in the southern Appalachian region.

That the facts which led to the organization of your petitioner, and which are presented as reasons for the establishment of such a national park, are as follows:

RARE NATURAL BEAUTY OF THE SOUTHERN APPALACHIAN REGION.

In western North Carolina and eastern Tennessee (or, more definitely, in the heart of the Great Smoky Mountains, the Balsam Mountains, and the Black and Craggy Mountains) is found not only the culmination of the Appalachian system, but the most beautiful as well as the highest mountains east of the lofty western ranges. Forty-three mountains of 6,000 feet and upward in altitude, as well as a great number of inferior height, all clothed with virgin forests and intersected by deep valleys abounding in brooks, rivers, and waterfalls, combine to make this a region of unsurpassed attractiveness.

Standing upon the summit of one of these sublime heights the eye often seeks in vain for the bare mountain side-the evidence of the devastating ax-and before one stretches out a view magnificently beautiful.

If the national parks already established have been chosen for their unusual natural beauty, here is a national park conspicuously tine, awaiting official recognition as an addition to the number.

SUPERB FORESTS OF THE SOUTHERN APPALACHIAN SYSTEM.

No other portion of our country displays a richness of sylva equal to that found in the high mountains of the Southern Appalachian region in the variety of its hard woods and conifers. Professor Gray, the eminent botanist, is authority for the statement that he encountered a greater number of indigenous trees in a trip of 30 miles through western North Carolina than can be observed in a trip from Turkey to England, through Europe, or from the Atlantic coast to the Rocky Mountain plateau. Here is the home of the rhododendron and the kalmia; here is the meeting place of the mountain flora of the North and of the South, and the only place where distinctive Southern mountain trees may be found side by side with those of the North. Here, too, are found trees of from 5 to 7 feet, and even more, in diameter, which tower to a height of 140 feet, and, occasionally, much higher, and these patriarchal trees, though innumerable, are but the greatest in a dense forest composed of many other large, beautiful, and valuable varieties. In fine, here is the largest area of virgin forest in the South Atlantic region, and the finest example of mixed forest (by which is meant a forest of deciduous and evergreen trees) in America.

There is but one such forest in America, and neglect of the opportunity now presented of saving it may work irretrievable loss. The forest once destroyed can not be restored. Reforestation is a slow process; it is for subsequent generations. The experience of the old countries in this matter stands as a warning. The increasing scarcity of timber is causing the large areas of forest in this part of our country to be rapidly acquired by those whose one thought will be immediate returns from a system of lumbering utterly reckless and ruinous from any other point of view, and in a few years this forest will be a thing of the past.

The National Government, and it alone, can prevent this destruction, and, by the application of the methods of scientific forestry, preserve the forest as a heritage and blessing to unborn generations.

NECESSITY OF PRESERVING THE HEADWATERS OF MANY RIVERS RISING IN THESE MOUNTAINS.

At this late date the calamities of flood and drought resulting from the wanton destruction of forests are well known. The forest acts as a storehouse of moisture for the dry season, and tends to prevent floods.

Many rivers rise in these mountains, and the same causes which will destroy the forests will work irreparable injury to the sources of the water supply.

It is the duty of the National Government,' as the guardian of the national interests, not the least among which are the rivers, to protect their sources and the water supply of the country.

HEALTHFULNESS OF THE REGION.

It is a well-recognized fact that the plateau lying between the Great Smoky Mountains and the Blue Ridge is one of the most deservedly popular health resorts of the world. The geographical location and the geological formation are peculiarly adapted to the production of those conditions which make for health in general.

Malaria is unknown. It rivals Arizona as a sanitarium for those suffering from pulmonary troubles. No better place could be found for the establishment of a sanitarium for the soldiers and sailors of our country.

CLIMATE IS FINE THE WHOLE YEAR.

By reason of its considerable altitude its summer climate is more agreeable than that of regions farther north. Those living in the South, but in regions of less altitude, and in increasing numbers others from the North and West, are learning to appreciate the advantages

of its summer climate. For many years to those wishing to escape the rigors of a Northern winter this plateau has been a place of favorite resort. It has one of the best all-year climates in the world.

The existing national parks can only be visited in summer; snow and ice bar the way at all other times. If a national park were created in this favored mountain region it could be visited and enjoyed at all seasons of the year.

LOCATION IS CENTRAL.

This part of the Appalachian Range is but twenty-four hours from New York, Chicago, St. Louis, Toledo, and the Gulf States. It is, therefore, within easy reach of millions of people, and a park there could be in fact, as in name, a national park.

EASTERN STATES ARE ENTITLED TO A NATIONAL PARK.

There is no national park of the character of the one suggested east of the Yellowstone, which is considerably more than 2,000 miles from the Altantic coast, nor is there even a forest reserve east of western Dakota, which is but a few hundred miles nearer.

The Chickamauga battlefield, though called, it is believed, a "national park," possesses none of the characteristics of such a park as is now under consideration, and was created because of the historical interest investing its locality and is of very limited area.

PARK WOULD PAY AS A FOREST RESERVE.

It is confidently asserted that no forest reserve of the country, with possibly one exception, would yield a larger return to the Government,.

The forests are very dense; the timber of valuable species, such as tulip (poplar), oak, chestnut, hemlock, and pine, and of great size. The undergrowth is still to a large extent uninjured by fire, and the forest, when made accessible by Government roads and managed in a scientific manner, would yield an immediate, a constant, and a comparatively large revenue.

The Government is now about to institute methods of scientific forestry. No better place in the United States can be found for the institution on a governmental scale of forestry operations, and because of the fine climate, summer and winter alike, it would be the only forest reserve of the country where such operations could be carried on uninterruptedly throughout the year.

The forests and the climate, both incomparable, ordain this as the place for the commencement of forestry operations, and, perhaps, as the location eventually of a national school of forestry.

THE TITLE TO THE LAND CAN BE EASILY ACQUIRED.

A site for the park can easily be chosen where the land is held in large areas and where the settlers are few. The land now sells for about $2 an acre, so that **a comparatively large park** could be secured at what would be greatly less than its value to the nation.

SUGGESTIONS REGARDING LOCATION OF PARK.

That the foregoing are the considerations which your petitioner deems of the most imperative nature and which it respectfully suggests should have the early attention of the Congress.

That your petitioner does not consider that it would be proper for it to suggest in anything more than a general way what should he the area or the boundary lines of a park in the Southern Appalachian region. In the opinion of your petitioner, this is a matter which could well be left to the decision of the forester of the Government.

Your petitioner is, however, of the opinion that it would be proper to express its conviction that whatever may be the decision respecting the area or exact location of such a national park, it should contain the highest mountains and the finest scenery in the whole Appalachian system, and this is found in the heart of the Great Smoky and Black mountains; and that the park should also embrace the largest area of virgin forest and the finest example of mixed forest in America, and this is found in the heart of the Balsam Mountains, and all of these are embraced within the limits of the tract hereinafter described.

The tract of land will be found to comprise two areas of land, each lying partly in Tennessee and partly in North Carolina, connected by a narrow strip extending along the line dividing those States and embracing land in each of them. In the eastern end of this tract will be found, with others, the following-named mountains:

	Altitude in feet.		Altitude in feet.
Mount Mitchell	6,711	Cat Tail Peak	6,611
Balsam Cone	6,671	Black Dome	6,502
Deer Mountain	6,233	Mount Gibbs	6,591
Roan Mountain	6,313	Mount Hallback	6,043
Big Craggy	6,068	Hairy Bear	6,691
Potato Top	6,393	Long Ridge	6,259
Black Brother	6,619		

In the western part of said tract will be found Mount Guyot (altitude 6,636 feet), Clingman's Dome (altitude 6,650 feet), Bald Mountain (altitude 6,220 feet), and many other high mountains, as well as the untouched tract of virgin forest hereinbefore referred to.

Your petitioner therefore states that, in its opinion, by far the best land for the Appalachian national park lies between parallels 35 and 37 of north latitude, and between the lines 82 and 85 of west longitude, and within the tract described as follows:

Beginning at Joanna Bald Mountain, in the State of North Carolina, on the line dividing the county of Graham from Cherokee and Macon

counties, and running thence easterly along said line and the line between eastern Graham County and Swain County to *a* point on the Tuckasegee River near Bushnell; thence up the Tuckasegee River to a point 2 miles west of Bryson City; thence due north 4 miles; thence east about 12 miles to the line dividing Swain and Jackson counties; thence south to the Tuckasegee River; thence east to the Plott Balsam Ridge; then along said ridge, crossing the line between Haywood and Jackson counties, to a point 2 miles west of Waynesville; thence northeastwardly to Pigeon River; thence down Pigeon River to Fines Creek; thence in a northwestwardly direction to French Broad River, at the mouth of Big Laurel Creek; thence due east to the line dividing Madison and Yancey counties; thence due south to a point 2 miles north of the Swannanoa River; thence easterly along a line parallel with and 2 miles north of the line of the Southern Railway Company to a point due north of Old Fort; thence due north to North Toe River; thence down North Toe River to the line dividing the State of Tennessee from the State of North Carolina; thence westwardly in the State of Tennessee to Big Butte, at the corner of Washington, Green, and Unicoi counties, in Tennessee, and of Madison County, in North Carolina; thence southwestwardly along the line dividing the State of Tennessee from the State of North Carolina to Rocky Ridge; thence southwestwardly in a straight line to the French Broad River, at the mouth of Paint Creek; thence down the French Broad river to the mouth of Rock Creek; thence westwardly to the southeast corner of Jefferson County, Tenn. ; thence southwestwardly to Round Top, at a corner in the easterly line of Blount County, Tenn. ; thence in a southwestwardly direction to the Tennessee line at the mouth of Abram or Panther Creek; thence south to the line dividing Cherokee and Graham counties, in North Carolina, and thence along said dividing line eastwardly to Joanna Bald Mountain, the place of beginning.

Your petitioner therefore prays that the Congress will take under consideration the matter herein set forth and cause the same to be examined into, and will take such action as will result in causing to be forthwith made such examination and surveys as may be necessary to determine the best possible location and the proper area for a national park in the Southern Appalachian region, to the end that upon the coming in of the report of the forester, or of such other reports as the Congress may desire, appropriate steps may be taken to acquire the title to land to be comprised within the limits of such park; or that the Congress will take such other action as it may deem proper.

And your petitioners will ever pray, etc.

GEO. S. POWELL,
President Appalachian National Park Association.
Dr. C. P. AMBLER,
Secretary.

ASHEVILLE, N. C., *December 19, 1899.*

RESOLUTIONS.

[American Association for the Advancement of Science, June 23, 1900, New York City.]

Resolved, That the American Association for the Advancement of Science, recognizing the importance of the preservation in its original condition of some portion of the hard-wood forests of the Southern Appalachian region, respectfully petitions Congress to provide for the establishment in that region of a national forest reserve.

[American Forestry Association, December 13, 1900, Washington, D. C.]

Resolved, That the action of Congress in making an appropriation to investigate the forest conditions of the Southern Appalachian Mountains meets with our cordial approval, and that we recommend that further steps be taken for the creation by purchase of a national Appalachian park in the high mountain region of the States of North and South Carolina, Georgia, and Tennessee.

[National Board of Trade, January 23, 1901, Washington, D. C.]

Resolved, That the National Board of Trade respectfully urges upon Congress the establishment of the proposed Minnesota National Park and of the proposed Southern Appalachian Forest Reserve as a just and necessary measure of forest protection to those portions of our country which at present contain no national forest reserves.

[Memphis (Tenn.) Board of Trade.]

Whereas there is a widespread movement in this country looking to the establishment by the General Government in the high forest-covered mountain portions of Tennessee, North Carolina, Virginia, and South Carolina of a national forest reserve, which will perpetuate the forest of this region, forever protect the headwaters of many. important streams in these States, and serve as a pleasure and health resort at all seasons for a large portion of the people of this country; and whereas the proposal that the Government establish such a forest reserve has been approved by the leading scientific societies and forestry associations of this country, and by the general press:

Resolved, That the Board of Trade of Memphis, Tenn., also heartily approves of the establishment of such a forest reserve, and respectfully asks the Senators and Representatives at Washington from this State to urge upon Congress the favorable and prompt consideration of this measure.

Similar resolutions favoring the establishment of the proposed forest reserve or park by the Government have been passed by the commercial organizations in Richmond, Raleigh, Wilmington, Charleston, Columbia, Savannah, Augusta, Atlanta, Mobile, Knoxville, Chattanooga Nashville, Memphis, and in many other of the larger cities of the country.

PRELIMINARY REPORT OF THE SECRETARY OF AGRICULTURE ON THE FORESTSOF THE SOUTHERNAPPALACHIANREGION.

To the Senate and House of Represen tatives:

I transmit herewith, for the information of the Congress, a letter from the Secretary of Agriculture, in which he presents a preliminary report of the investigations upon the forests of the Southern Appalachian Mountain region. Upon the basis of the facts established by this investigation the Secretary of Agriculture recommends the purchase of land for a national forest reserve in western North Carolina, eastern Tennessee, and adjacent States. I commend to the favorable consideration of the Congress the reasons upon which the recommendation rests.

WILLIAM MCKINLEY.

EXECUTIVE MANSION, *January 16*, 1901.

UNITED STATES DEPARTMENT OF AGRICULTURE,
OFFICE OF THE SECRETARY,
Washington, D. C., January 3, 1901.

The PRESIDENT:

The bill making appropriations for the Department of Agriculture for the fiscal year ending June 30, 1901, provides that a "sum not to exceed $5,000 may, in the discretion of the Secretary of Agriculture, be used to investigate the forest conditions in the Southern Appalachian Mountain region of western North Carolina and adjacent States." In accordance with this provision I have made a thorough investigation of the forests in a portion of the Southern Appalachian Mountains, as directed above, including an estimate of the amount and condition of the standing timber, an inquiry as to the suitability of this region for a national park, as proposed by the Appalachian National Park Association, and an examination of the validity of the reasons advanced by its advocates for the creation of such a park. In this task I have received generous and effective cooperation and assistance, through the United States Geological Survey, from the Department of the Interior, which recognized in this way the deep and widely diffused public interest in the plan.

The forest investigation was made to include a study of the character and distribution of the species of timber trees, the density and value of forest growth, the extent to which the timber has been cut or damaged by fire, the size and nature of the present holdings, the prices at which these forest lands can now be purchased, and the general and special conditions that affect the prosecution of conservative forestry on a large scale.

The hydrographic survey of the region, conducted by the United States Geological Survey, includes a general study of its topographic features; of the relation of the soils, forest cover, and rainfall; of the quantity of water flowing out of it through the various streams during different seasons, and of the influence exerted on the regularity of this flow by forest clearings. More than 750 stream measurements have already been made and much additional data of special value has been secured.

In addition to these investigations I have given thorough attention to the arguments advanced by the movers for the proposed park and to those of their opponents, and as a result I am strongly of the opinion that this matter is worthy of careful consideration.

I have the honor to transmit herewith a mounted original copy of a large map, which shows in detail the mapping of forests accomplished during the past summer over an area of nearly 8,000 square miles. A full report of the work and its results is now in preparation and will be submitted for your consideration at an early date. The following preliminary statement is made to bring before you without delay a summary of the facts sufficient to set forth clearly the principal features of the region and the plan.

The movement for the purchase and control of a large area of forest land in the East by the Government has chiefly contemplated a national park. The idea of a national park is conservation, not use; that of a forest reserve, conservation by use. I have, therefore, to recommend a forest reserve instead of a park. It is fully shown by the investigation that such a reserve would be self-supporting from the sale of timber under wisely directed conservative forestry.

Extensive areas of hard-wood forests within the region colored on the accompanying map are still in their primitive condition, and these are among the very best and richest hard-wood forests of the United States. The region in general is better adapted for forestry than for agricultural purposes. It is located about the headwaters of numerous streams, such as the Ohio, Tennessee, Savannah, Yadkin, and Roanoke, which are important both for water power and for navigation. The general conditions within the region are exceptionally favorable for the carrying on of large operations in practical forestry, and the weather is suitable for lumbering operations at all seasons of the year. It contains a greater variety of hard-wood trees than any other region of the United States, since the Northern and Southern species here meet. It is a region of exceptional beauty and picturesqueness, and, although it would not be easily accessible to visitors in all parts at all seasons of the year, by far the greater portion of its area would be easily reached and climatically pleasant throughout the year.

It contains within the forest-covered areas no large settlements or large mining operations which would interfere with the management of such a forest reserve, and yet there is a sufficient population for the working and protection of the forests. Large lumber companies-are rapidly invading the region, and the early destruction of the more valuable timber is imminent. Lands in this region suitable for such a forest reserve are now generally held in large bodies of from 50,000 to 100,000 acres, and they can be purchased at prices ranging from $2 to $5 per acre. It is probable that the average price would not exceed $3 per acre. In explanation of the widespread and urgent demand for the establishment in this southern Appalachian region of a national park or forest reserve, it may be added that it contains the highest and largest mountain masses, and perhaps the wildest and most picturesque scenery, east of the Mississippi River; that it is a region of perfect healthfulness, already largely used as a health resort both summer and winter, and that it lies within a little more than a day's travel of the larger portion of the population of this country.

The rapid consumption of our timber supplies, the extensive destruction of our forests by fire, and the resulting increase in the irregularity of the flow of water in important streams have served to develop among the people of this country an interest in forest problems which is one of the marked features of the close of the century. In response to this growing interest the Government has set aside in the Western forest reserves an area of more than 70,000 square miles. There is not a single forest reserve in the East.

I have the honor to be, very respectfully,

JAMES WILSON, *Secretary.*

REPORT OF THE SENATE COMMITTEE ON FOREST RESERVATIONS AND THE PROTECTION OF GAME.

[Fifty-sixth Congress, second session. Senate Calendar No. 2227. Report No. 2221.]

FOREST RESERVE IN THE SOUTHERN APPALACHIAN MOUNTAIN REGION.

[February 12, 1901.—Report by Mr. Beveridge, from the Committee on Forest Reservations and the Protection of Game, to accompany S. 5518.]

A majority of the Committee on Forest Reservations and the Protection of Game, having had under consideration the bill (S. 5518) to provide for the establishment of a national forest reserve in the Southern Appalachian Mountain region, reports the bill with the recommendation that it do pass and submits the following report:

An investigation of the forests of this region, authorized by Congress at its last session, has been conducted during the past year by the Department of Agriculture, with the cooperation of the United

States Geological Surrey. A preliminary report from the Secretary of Agriculture, transmitted to Congress with a brief commendatory message' by the President, is herewith included. It is preceded by a letter from the Secretary of Agriculture, which declares his full approval of this bill. The plan to purchase a forest reserve or park in the Southern Appalachian Mountains has been favorably considered and is advocated by the National Board of Trade. by the American Association for the Advancement of Science, by the American Forestry Association, and by numerous similar organizations throughout the United States. Resolutions from the bodies named are presented in the appendix as showing that the movement for the establishment of this forest reserve is based not npon local or selfish interests, but upon the widespread, intelligent national appreciation of the importance of prompt and favorable action by Congress.

That such a forest reserve should be established in the hard-wood regions of the East is the general conviction of men of science. experts in forestry, intelligent lumbermen, and of men connected with the great business interests of the country; and this view finds frequent and emphatic expression in the technical and general press. Reckless cutting and the forest fires which follow are now destroying these hard-wood forests at a rate and to an extent which iv already having serious results over wide areas. In addition to its probable effect on climate, it is causing irregularities in the flow of the streams, which are destroying their value for water power and navigation during the dry seasons, and during the rainy seasons are washing away the soils on the steeper hillsides and mountain slopes, filling up the stream beds with sediment, and destroying the agricultural value of the lowlands along the streams. Both the diminishing flow of water during the dry season and the deposit of sediment in the stream beds and harbors during periods of flood are becoming yearly more dangerous to navigation and are leading directly to increased annual appropriations for rivers and harbors.

The establishment of the proposed national forest reserve will tend to remedg these serious and growing evils, will protect the sources of many important streams, and, under the managetnent of trained forest experts, will serve as a demonstration of the method of perpetuating forests and yet making them pay. Such an example will lead both States and individuals to encourage and practice forest management and restoration on all lands which are better suited to forest growth than for agricultural purposes.

The proposed national reserve for the protection and use of hard-wood forests should be located in the Southern Appalachian Mountains for several reasons.

That region contains the greatest variety of hard woods to be found anywhere on this continent, because the northern and southern forest

flora intermingle there. A list of the trees native to the region of the proposed reserve is given hereafter. We find there the largest remaining bodies of these forests in their virgin condition, the largest and highest mountains east of Colorado, and the largest mountain masses covered with hard-wood forests in the United States.

The slopes of these mountains contain the sources of the Tennessee, the Savannah, the Broad, the Catawba, and other rivers, and important tributaries of the Ohio. This fact is doubly significant because this region has none of the extensive glacial gravel deposits which serve in the more northern States as storage reservoirs for water, and so aid the forests to maintain uniformity of flow in the streams. Hence this measure stands on a basis of its own, and need not he regarded as creating a precedent for similar action in other cases.

This should be a national forest reserve, for the reason that the problems and dangers which it is intended to meet are national. It is true that a few States arc now establishing State forest reserves, and it is believed that the measure now proposed will encourage such a movement on the part of other States. In New York large expenditures are being made to purchase reserve forest lands lying entirely within that State, about the headwaters of important streams which also lie within the limits of the State. But the great mountain masses of this proposed national forest reserve lie in several States, and the streams which rise among them flow through and are of importance to more than as many others. The combined annual income of the several States grouped about this region is but little greater than the appropriation carried by this bill.

It may be urged against this measure that it is a new departure for the Government. But the Western forest reserves have been set aside out of the public domain which was purchased by the Government at a time when the nation was composed largely of the Eastern States. Out of the lands so purchased nearly 50,000,000 of acres of forest-covered lands have been set aside as national forest reserves and parks for the purpose of perpetuating a timber supply in the Western States and Territories and for preserving forever the sources of their more important streams. Furthermore, the Government has recently been purchasing lands in the East for military parks and reservations and for other purposes. Hence it may be asserted in all fairness that what is now proposed is new neither in principle nor practice. In view of the importance of the measure now proposed in behalf of the hard-wood forests of the country, and considering the fact that there are no public lands covered with hard-wood forests, and that neither individuals nor the States adjacent to this region can reasonably be expected to establish such forest reserves as are absolutely essential, it is evidently the duty of the General Government to take the present step.

It will be asked how far the management and care of such a forest reserve will prove an annual expense to the Government. Attention

is called, in reply, to the accompanying letter from the Secretary of Agriculture, in which he says: "I am entirely confident that very soon after its creation the proposed reserve would, under conservative forestry, be self-supporting from the sale of timber." Further, it may be said that many European forests, under government supervision, yield a net annual income from the sale of timber and other products of from $1 to $2 per acre or more. While no such income is expected to result from the proposed reserve in the immediate future, yet it is confidently expected that in the course of a few years this reserve will be self-supporting; and that subsequently, as the hard-wood forests of other regions are cut away and the country more thickly settled, the sale of timber and other products from this reserve will yield a considerable net profit.

Other important questions connected with this measure which have been considered by the committee are fully answered in the statement which follows from the Secretary of Agriculture. The memorial of the Appalachian National Park Association and other documents are added.

The legislatures of the several States within which the proposed forest reserve may be located, with a single exception, have already conferred upon Congress the necessary authority to acquire lands within their boundaries. In the case of the exception a resolution which indorses the plan has passed both houses of the legislature, and further action may confidently be expected in due time.

This is a measure which has every consideration in its favor; and, in view of its importance and the beneficent results which will certainly flow from its adoption, it should commend itself to the wisdom of Congress, as it must appeal to the patriotism of every citizen.

APPENDIX.

FEBRUARY 9, 1901.

MY DEAR SENATOR: I am in receipt of your letter of this date, in which you ask for an expression of my opinion regarding Senate bill 5518, which provides for the purchase of a forest reserve in the Southern Appalachian Mountains. After a thorough investigation of the forest conditions of this region, I am heartily in favor of the creation of the proposed reserve and of Mr. Pritchard's bill. The region in which it is proposed to locate this reserve contains the finest hard-wood forests yet remaining in the United States; it is admirably adapted to the purposes of a public resort for health and recreation; the land may be purchased at a reasonable price; the preservation of the forest is essential not only to the well-being of the region itself, but to that of great rivers which flow from it and to the interests they subserve; and I am entirely confident that very soon after its creation the proposed reserve would, under conservative forestry, be self-supporting from the sale of timber.

Very respectfully,

JAMES WILSON, *Secretary.*

Hon. ALBERT J. BEVERIDGE,
United States Senate.

You will find a more detailed statement of my position in my letter to the President, transmitted by him to the Congress January 16. (See p. 166.)

LEGISLATIVE RESOLUTIONS AND ACTS IN THE SEVERAL STATES WHOSE TERRITORY EXTENDS INTO THE REGION OF THE PROPOSED FOREST RESERVE.

VIRGINIA.

AN ACT to give consent by the State of Virginia to acquisition by the United States of such lands as may be needed for the establishment, of a national forest reserve in the said State.

[Approved February 15, 1901.]

Whereas it is proposed that the Federal Government establish in the high mountain regions of Virginia and adjacent States a national forest reserve, which will perpetuate these forests forever and preserve the headwaters of many important streams, and which will prove of great and permanent benefit to the people of this State; and

Whereas a bill has been introduced in the Federal Congress providing for the purchase of such lands for said purpose: Therefore,

Be it enacted by the general assembly of Virginia, That the consent of the State of Virginia be, and is hereby, given to the acquisition by the United States, by purchase or gift, or by condemnation according to law, of such lands in Virginia as in the opinion of the Federal Government may be needed for the establishment of such a national forest reserve in that region: ***Provided,*** That the State shall retain a concurrent jurisdiction with the United States in and over such lands so far that civil process in all cases, and such criminal process as may issue under the authority of the State against any person charged with the commission of any crime without or within said jurisdiction, may be executed thereon in like manner as if this act had not been passed. And ***provided,*** That in all condemnation proceedings the rights of the Federal Government shall be limited to the specific objects set forth by the laws of the United States in regard to forest reserves.

2. That power is hereby conferred upon Congress to pass such laws as it may deem necessary to the acquisition, as hereinbefore provided, for incorporation in said national forest reserve such forest-covered lands lying in Virginia as in the opinion of the Federal Government may be needed for this purpose.

3. Power is hereby conferred upon Congress to pass such laws and to make or provide for the making of such rules and regulations of both civil and criminal nature, and provide punishment for violation thereof, as in its judgment may be necessary for the management, control, and protection of such lands as may be from time to time acquired by the United States under the provisions of this act.

4. This act shall be in force from its passage.

[For resolution of March 21, 1902, see p. 190.]

NORTH CAROLINA.

A RESOLTJTIOS favoring the establishment of a national forest reserve in the Southern Appalachian Mountain region.

Resolved by the house of represen tatives, the senate concurring :

The general assembly of North Carolina hereby expresses its approval of the movement looking to the establishment by the Federal Government of an extensive national forest reserve in the Southern Appalachian Mountain region as a wise and beneficent measure, such as many other nations have already adopted, and which this country should adopt before it is too late, looking to the conservation of its forests and the protection of the sources of important streams; and

Whereas the proposal to establish this forest reserve has been approved and urged by the leading scientific societies and forestry associations of this country, and by the general press; and

Whereas this general assembly has passed an act granting its consent to the acquisition of lands in western North Carolina by the Federal Government for incorporation in such a forest reserve, believing the reserve to be one of great importance to the people of this State; and

Whereas a bill is now before the Federal Congress providing for the purchase of lands for this purpose:

Resolved, That the Senators and Representatives in Congress from this State are hereby requested to urge upon Congress the importance of prompt and favorable action in behalf of this measure.

In the general assembly, read three times, and ratified this the 18th day of January, A. D. 1901.

W. D. TURNER,
President of Senate.

WALTER E. MOORE,
Speaker of the House of Representatives.

AN ACT to give consent by the State of North Carolina to the acquisition by the United States of such lands as may be needed for the establishment of a national forest reserve in said State.

Whereas it is proposed that the Federal Government purchase lands in the high mountain regions of western North Carolina and adjacent States for the purpose of establishing there a national forest reserve which will perpetuate these forests and forever preserve the headwaters of many important streams, and which will thus prove of great and permanent benefit to the people of this State; and whereas a bill has been introduced in the Federal Congress providing for the purchase of such lands for said purpose: Therefore, the general assembly of North Carolina do enact:

SEC. 1. That the consent of the general assembly of North Carolina be, and is hereby, given to the acquisition by the United States, by pur-

chase or by condemnation, with adequate compensation except as hereinafter provided, of such lands in western North Carolina as in the opinion of the Federal Government may be needed for the establishment of such a national forest reserve in that region: *Provided*, That the State of North Carolina shall retain a concurrent jurisdiction with the United States in and over such lands so far that civil process in all cases and such criminal process as may issue under the authority of the State of North Carolina against any person charged with the commission of **any** crime without or within said jurisdiction may be executed thereon in like manner as if this act had not been passed.

SEC. 2. That power is hereby conferred upon Congress to pass such laws as it may deem necessary to the acquisition as hereinafter provided for incorporation in said national forest reserve such forest-covered lands lying in western North Carolina as in the opinion of the Federal Government may be needed for this purpose: Provided, That as much as 200 acres of any tract of land occupied as a home by bona fide residents in this State at the date of the ratification of this act shall he exempt from the provisions of this section.

SEC. **3.** Power is hereby conferred upon Congress to pass such laws and to make or provide for the making of such rules and regulations of both civil and criminal nature, and provide punishment therefor, as in its judgment may be deemed necessary for the management, control, and protection of such lands as may be from time to time acquired by the United States under the provisions of this act.

SEC. 4. This act shall be in force from and after its ratification.

In the general assembly, read three times, and ratified this the 18th day of January, A. D. 1901.

W. D. **TURNER,**
President of the Senate.
WALTER E. **MOORE,**
Speaker of the House of Representatives.

TENNESSEE.

A RESOLUTION favoring the establishment of a national forest reserve in the Southern Appalachian Mountain region.

Resolved by the house of representatives, the senate **concurring:** The general assembly of Tennessee hereby expresses its approval of the movement looking to the establishment by the Federal Government of au extensive national forest reserve in the Southern Appalachian Mountain region as a wise and beneficent measure, such as many other nations have already adopted, and which this country has already adopted in the West and should adopt in the East before it is too late, looking to the conservation of its forests and the protection of the sources of important streams; and

Whereas the proposal to establish this forest reserve has been approved and urged by the leading scientific societies and forestry associations of this country and by the general press; and

Whereas this general assembly has before it a bill granting the State's consent to the acquisition of lands in eastern Tennessee by the Federal Government for incorporation in such a forest reserve, believing the reserve to be one of great importance to the people of this State; and

Whereas a bill is now before the Federal Congress providing for the purchase of lands for this purpose:

Resolved, That the Senators and Representatives in Congress from this State are hereby requested to urge upon Congress the importance of prompt and favorable action in behalf of this measure.

Adopted February 1, 1901.

E. B. WILSON,
Speaker of House of Represen tatives.
NEWTON H. WHITE,
Speaker of Senate.

AN ACT to give consent by the State of Tennessee to the acquisition by the United States of such lands as may be needed for the establishment of a national forest reserve in the said State.

Whereas it is proposed that the Federal Government establish in the high mountain regions of eastern Tennessee and adjacent States a national forest reserve, which will perpetuate these forests and forever preserve the headwaters of many important streams, and which will thus prove of great and permanent benefit to the people of this State.

And whereas a bill has been introduced in the Federal Congress providing for the purchase of such lands for said purpose: Therefore,

Be it enacted by the General Assembly of the State of Tennessee,

SECTION 1. That the consent of the State of Tennessee be, and is hereby, given to the acquisition by the United States, by purchase, gift, or condemnation according to law, of such land in this State as in the opinion of the Federal Government may be needed for the establishment of such a national forest reserve in that region:

Provided, That the State shall retain the concurrent jurisdiction with the United States in and over such lands so far that civil process in all cases, and such criminal process as may issue under the authority of the State against any person charged with the commission of any crime without or within said jurisdiction, may be executed thereon in like manner as if this act had not been passed:

Provided further, That this act shall apply to lands in Tennessee lying within 20 miles of the North Carolina State line; that all condemnation proceedings herein provided shall be limited to lands now

forest covered, and that in all such condemnation proceedings the right of the Federal Government shall be limited to the specific objects set forth in this act and in the laws of the United States in regard to forest reserves.

SEC. 2. Be *it further enacted*, That power is hereby conferred upon Congress to pass such laws as it may deem necessary to the acquisition, as hereinbefore provided, for incorporation in said national forest reserve such forest-covered lands lying in the State as in the opinion of the Federal Government may be needed for this purpose.

SEC. 3. *Be it further* That power is hereby conferred upon Congress to pass such laws and to make or provide for the making of such rules and regulations of both civil and criminal nature, and provide punishment for violation thereof, as in its judgment may be necessary for the management, control, and protection of such lands RR may be from time to time acquired by the United States under the provisions of this act.

SEC. *4. Be it further enacted*, That this act take effect from and after its passage, the public welfare requiring it.

Passed April 16, **1901.**

E. B. WILSON,
Speaker of the House of Representatives.
NEWTON H. WHITE,
Speaker of the Senate.

Approved April 23, 1901.

BENTON MCMILLAN, *Governor.*

SOUTH CAROLINA.

A RESOLUTION favoring the establishment of a national forest reserve in the Southern Appalachian Mountain region.

Resolved by the House of Representatives, the Senate concurring: The general assembly of South Carolina hereby expresses its approval of the movement looking to the establishment by the Federal Government of an extensive national forest reserve in the Southern Appalachian Mountain region as a wise and beneficent measure, such as many other nations have already adopted, and which this country should adopt before it, is too late, looking to the conservation of its forests and the protection of the sources of important streams; and whereas the proposal to establish this forest reserve has been approved and urged by the leading scientific societies and forestry associations of this country, and by the general press; and whereas this general assembly has passed an act granting its consent to the acquisition of lands in northern South Carolina by the Federal Government for

incorporation in such a forest reserve, believing the measure to be one of great importance to the people of this State; and whereas a bill is now before the Federal Congress providing for the purchase of lands for thie purpose:

Resolved, That the Senators and Representatives in Congress from this State are hereby requested to urge upon Congress the importance of prompt and favorable action in behalf of this measure.

Ratified.

AK ACT to give consent by the State of South Carolina to the acquisition by the United States of such lands as may be needed for the establishment of a national forest reserve in said State.

Whereas it is proposed that the Federal Government establish in the high, mountain region of South Carolina and adjacent States a national forest reserve which will perpetuate these forests and forever preserve the headwaters of many important streams, and which will thus prove of great and permanent benefit to the people of this State; and whereas a bill has been introduced in the Federal Congress providing for the purchase of said lands for such purpose: Therefore,

Be it *enacted by the general assembly* of the *State of South Carolina:*

SECTION 1. That the consent of the State of South Carolina be, and is hereby, given to the acquisition by the United States, by purchase, gift, or condemnation according to law, of such lands in this State as in the opinion of the Federal Government may be needed for the establishment of such national forest reserve in that region: *Provided*, That the State shall retain a concurrent jurisdiction with the United States in and over such lands so far that civil process in all cases, and such criminal process as may issue under the authority of the State against any person charged with the commission of any crime without or within said jurisdiction, may be executed thereon in like manner as if this act had not been passed.

SEC. 2. That power is hereby conferred upon Congress to pass such laws as it may deem necessary to the acquisition as hereinbefore provided, for incorporation in said national forest reserve, of such forest-covered land lying in the State as in the opinion of the Federal Government may be needed for this purpose.

SEC. 3. Power is hereby conferred upon Congress to pass such laws and to make, and provide for the making, of such rules and regulations, of both civil and criminal nature, and provide punishment for violation thereof, as in its judgment may be necessary for the management, control, and protection of such lands as may be from time to time acquired by the United States under the provisions of this act.

SEC. 4. That this act shall be in force from and after its ratification.

GEORGIA

A RESOLUTION concerning the ceding of the jurisdiction over certain lands in the State of Georgia to the United States of America for the purpose of establishing a national forest reserve or park.

Whereas there is a widespread movement in this country asking that the Federal Government purchase from the present owners certain forest-covered lands lying within the high mountain regions of the States of North Carolina, South Carolina, Georgia, and Tennessee, about the headwaters of the larger streams flowing through these and adjacent States, for the purpose of establishing in this region a national forest reserve, which will forever protect the sources of the rivers that furnish our water powers and navigation facilities, which will demonstrate to the people of the country how such forest-covered areas can be managed and perpetuated to the best advantage, and which will become a great national resort within easy reach, at all seasons, of much of the larger portion of the population of this country; and whereas this general assembly desires to place on record its interest in, and encouragement of, a movement which promises such great and lasting benefits to the people of Georgia and the neighboring States:

Be it resolved by the general assembly of the State of Georgia, That this general assembly hereby expresses its willingness to cede to the United States of America the jurisdiction of the State of Georgia in and over such of the forest-covered mountain lands in this State as may be needed for the purpose of establishing such national forest reserve or national park, when the land areas of such tract or tracts have been designated, and a plat or plats of the same deposited with the secretary of state in Atlanta: *Provided,* That the State shall retain concurrent jurisdiction with the United States in and over said tract or tracts so far that all civil and criminal processes issued under the authority of the State may be executed thereon in like manner as if this act were not in force: *And provided further,* That said cession of jurisdiction shall not take effect until the United States shall have acquired title to said tract or tracts.

The general assembly respectfully asks the favorable consideration of this measure by Congress.

CLARK HOWELL,
President of the Senate.

CHAS. S. NORTHEN,
Secretary of the Senate.

JOHN D. **LITTLE,**
Speaker of the House of Representatives.

JNO. T. **BOIFEUILLET,**
Clerk of the House of Representatives.

Approved December 18, 1900.

A. D. **CANDLER,** Governor.

AN ACT to give consent by the State of Georgia to the acquisition by the United States of such lands as map be needed for the establishment of a national fores reserve in said State.

Whereas it is proposed that the Federal Government establish in the high mountain regions of Georgia and adjacent States a national forest reserve, which will perpetuate these forests and forever preserve the headwaters of many important streams, and which will thus prove of great and permanent benefit to the people of this State; and whereas a bill has been introduced in the Federal Congress providing for the purchase of such lands for said purpose, the general assembly of Georgia do enact:

SECTION 1. That the consent of the State of Georgia be, and is hereby, given to the acquisition by the United States, by purchase or gift, or by condemnation according to the law, of such lands in the mountain region of Georgia as in the opinion of the Federal Govern ment may be needed for the establishment of such a national forest reserve in that region: Provided, That the State shall retain a concurrent jurisdiction with the United States in and over such lands so far that civil process in all cases, and such criminal process as may issue under the authority of the State against any person charged with the commission of any crime without or within said jurisdiction, may be executed in like manner as if this act had not been passed: ***And provided,*** That in all condemnation proceedings the rights of the Federal Government shall be limited to the specific objects set forth by the laws of the United States in regard to forest reserves.

SEC. 2. That power is hereby conferred upon Congress to pass such laws as it may deem necessary to the acquisition as hereinbefore provided, for incorporation in said national forest reserve, of such mountain lands lying in Georgia as in the opinion of the Federal Government may be needed for this purpose.

SEC. 3. Power is hereby conferred upon Congress to pass such laws and to make, or provide for the making, of such rules and regulations, of both civil and criminal nature, and provide punishment therefor, as in its judgment may be necessary for the management, control, and protection of such land as may be from time to time acquired by the United States under the provisions of this act.

This act shall be in force from its passage.

Passed December 13, 1901.

EXTRACTS FROM THE PRESS.

The few extracts from the press given below will serve as an illustration of the extent to which the proposal that the Government establish a forest reserve or park in the southern Appalachian region has met with public approval:

[New York (N. Y.) Tribune.]

If no steps by the Government of the United States are taken, the entire tree system of these States will be obliterated, leaving the peaks and valleys of six great States of the Union divested of timber and foliage.

[Hartford (Conn.) Courant.]

The Appalachian Park ought in a dozen years from now to be one of the chief attractions of the United States. The decisions in its favor would be unanimous if the matter was left to those who knew the country and its possibilities.

[Boston (Mass.) Transcript.]

We hope the plan will fructify, for it would give us benefit and bring us credit as a people. * * * It is most sincerely to be hoped that this admirable scheme will be quickly and cordially taken up by Congress and carried to success. It is a case of now or never.

[Buffalo (N. Y.) Commercial.]

The United States Governrnent has gone into the forestry business on an extensive scale, and it is believed that the future returns will more than justify the liberal policy adopted in this respect.

[New York (N. Y.) Times.]

The receipts from the French national forests altogether were about twice their expenses in the last year for which the returns are accessible. The urgency in this case is greater than it was in the case of the Yellow&one Park, when it was laid out. Certainly no American citizen now grudges the expense of that public possession.

[Baltimore (Md.) Sun.]

Among the many measures that have come before Congress none merits more thoughtful consideration or commends itself more impressively to the consideration and approval of the two Houses.

[Providence (R. I.) Journal.]

As a mere measure of protection to the material interests which may be affected by the cutting of the timber and the drying up of streams, Congress ought to do something about this as a Federal question.

[Logansport (Ind.) Reporter.]

The General Government ought to step in before it is too late. * * * If the timber is all stripped from these hills the streams will dry up and the ultimate loss will be serious and widespread.

[Springfield (Ill.) Journal.]

It is certainly true that there have been few park projects that have had more to recommend them.

[Cleveland (Ohio) Leader.]

It is claimed with reason that such a park would not only be more accessible to the great majority of the American people than the Yellowstone Park ever can be, but it would also be available as a place of resort all through the year. * * * It is true, further, that the proposed Appalachian Park would contain far better specimens of typical American forest life than any which can be found in the Yellowstone Park. That is an important item to be taken into account.

[Providence (R. I.) Journal.]

There is but one such forest in America, and neglect of the opportunity now presented of saving it may work irretrievable loss. The forests once destroyed can not be replaced.

[New York Lumber Trade Journal.]

The Journal is heartily in favor of such a park and hopes that Congress will give it favorable attention.

[Louisville (Ky.) Courier-Journal.]

I can not believe that the next Congress will fail to allow an appropriation to carry forward this great work. The Government has already set aside in Western reserves an area of more than 70,000 square miles, while there is not a single Government forest reserve in the East.

[Forest and Stream.]

The Appalachian Forest Reserve measure must go over to another Congress. We believe: however, that this is simply a postponement, not a defeat, of the scheme. The reserve, there is abundant confidence for believing, will ultimately be established.

[Forester, Washington, D. C.]

It is safe to say that only the great pressure of other business prevented the House from voting in its favor this year. Some ground will have to be gone over again, but it needs no prophet to see that, though its friends failed of success this year, this reserve will in time be established.

[Farmer Advocate, Topeka, Kans.]

Everyone interested in having this beautiful region preserved from wanton destruction by fire and timber thieves should write at once to their Congressmen to vote for the passage of the bill establishing the park.

[The Medical Dial, Minneapolis, Minn.]

The therapeutical uses of such a national park are exceedingly great. The salubrity of the climate in this section of the country, amid the everlasting hills and the giant trees, has no parallel in the world.

[St. Louis (MO.) Star.]

It is to be hoped Congress will act favorably upon the petition. Such a park would be a proper twin for the Yellowstone.

[Davenport (Iowa) Democrat.]

There are very many reasons for it-none worth counting on the other side.

[American Field, New York City.]

The American Field urges every public-spirited citizen of this country to "put his shoulder to the wheel" and to work upon his representatives in both halls of Congress to obtain during the next session of Congress decisive action toward the creation of the Appalachian and Minnesota national parks.

[Harrisburg (Pa.) Telegraph.]

This country is gradually waking up to the destruction of its timber, and the Secretary of Agriculture does wisely when he advocates forest preservation and forest reservation.

[Pittsburg (Pa.) Commercial-Gazette.]

Such a forest reservation ought to prove a good investment of national money.

[Brooklyn (N. Y.) Citizen.]

Measures to stop the destruction of mountain forests which protect the water sources in the Appalachians and elsewhere will need to be taken some day, and they ought to begin now when the Government is in pecuniary condition to make the cost of condemnation and care a trifling matter.

[New York Herald, January 12, 1900.]

The efforts of the Appalachian Park Association are to be commended. Its promoters are moved only for the public good, and should this movement finally succeed, the thanks of the entire community will be due to them for their earnest efforts.

[Albany (X. Y.) Argus, January 7, 1900.]

It is sincerely hoped Congress will immediately take up the matter and establish the park.

[The Tradesmen, Chattanooga, Tenn.]

The movement to establish a national park in the Southern Appalachian Mountains deserves a general and hearty support.

[Knoxville (Tenn.) Times.]

If the Government wants to make an appropriation to encourage both the aesthetic and the useful, it could not easily do a better thing than to establish this Appalachian National Park.

[New Orleans (La.) Picayune.]

The Appalachian region is accessible to a greater number of the citizens of the United States than any other section where there is any likelihood of a national park reserve being established.

[Parkersburg (W. Va.) Sentinel.]

That such a forest reserve should be established in the hardwood regions of the East is the opinion of men of science, experts in forestry, intelligent lumbermen and men connected with the business interests of the country.

[Lynchburg (Va.) Advance.]

The merits of this scheme should commend it to the judgment of Congress and insure the speedy passage of the bill.

[Montgomery (Ala.) Advertiser.]

The Appalachian Park will offer many substantial advantages which the Yellowstone lacks, and we hope the matter will not be allowed to rest until all steps are taken and all the laws passed necessary to carry the project to a successful termination.

[Hartford (Corm.) Courant.]

No part of the United States offers more attractions to the sight-seer. It is ideally fitted for a park and the Government will miss a great opportunity if it fails to avail itself of the present conditions and to secure the lands which can still be had for reasonable prices.

[Toledo (Ohio) Journal.]

This part of the Blue Ridge is recognized as the most salubrious, combining a dry and equal climate, attracting thousands of people from the North during the winter months, and drawing large numbers from the South during the warm season. It enjoys the best properties of a winter park and a summer resort. The climate is healthy, equable, balmy, yet exhilarating.

[Indianapolis (Ind.) News.]

The preservation of forests is a subject to which too little attention has been paid in the past and to which should be given much thought. Already the country is experiencing the bad effects of indifference.

[Tallahassee (Fln.) Tallahassian.]

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.

[Chicago Times-Herald, December 24, 1899.]

The Blue Ridge has a climate that is delightful at any season of the year, and as it is only twenty-four hours travel from Chicago, New York, or New Orleans, the mass of the population in the east, even those in moderate circumstances, could readily avail themselves of the advantages it offers as a health and pleasure resort.

[Cincinnati Volks Freund, February 1, 1900.]

We wish the undertaking complete success.

[Newport (R. I.) News.]

The central location of the proposed park is undoubtedly a strong point in its favor. It is within easy reach of most of the great cities of the middle Western States and the Eastern and Southern States. Apart from these natural reasons, the Eastern States are entitled to a national park.

[St. Louis (Mo.) Globe-Democrat.]

There is every reason why the movement for the establishment of the Appalachian Park in North Carolina should succeed.

[The Hartford Courant.]

The wildest and most naturally beautiful part of this country east of the Rocky Mountains is that region where Worth Carolina, Tennessee, Virginia, South Carolina, and Georgia approach each other. It is a mountain country with an average elevation of 4,000 feet and peaks running up to 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 on and the railroads of the vicinity are loaded with lumber for the 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 now is a great natural park.

The General Government ought to step in, before it is too late, an3 take possession of the whole region. The Yellowstone Park, far away and to all but a few inaccessible, should be supplemented by this natural reservation, which is easily reached by the great majority of the people of the United States. Take your map and you will find that from Boston on the east around by Rnffalo, Cleveland, Cincinnati, Chicago, and St. Louis to New Orleans, Jacksonville, and so on up to Washington every city on the imaginary circuit has railroad facilities bringing it within not more at most than one night's ride of Asheville, the central point in the Blue Ridge and Great Smoky country. Establish a park there and people from every large city this side of the Mississippi would be visiting it in large numbers at all seasons of the year.

As an opportunity for conferring on the citizens of the country a means of great enjoyment, this chance for Congressional action is unique. But that really would be only an incident of the work. In this elevated land are multitudes of clear, sweet streams delivering water to the Atlantic coast and to the Mississippi River. The divide is in the possible park. If the timber is all stripped from these hills, the streams will dry up and the ultimate loss will be serious and widespread. 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 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 in 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 purchaseable now at hardly more than nominal tigurcs. The cost of a single battle ship 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.

[The Scientific American.]

Within about a day's travel of New York, Philadelphia, Baltimore, Washington, and most of the Atlantic seaboard, and quite as accessible to Pittsburg, Cincinnati, Louisville, Indianapolis, and St. Louis there are vast stretches of virgin forests-along the line of the Great Smoky

Mountains, on the border between Tennessee and North Carolina—that are thoroughly suited to the purposes of a great game and forest preserve. Going up from the lowlands of Walhalla, S. C., to the high plateau surrounding Highlands, N. C., a stage trip of about 30 miles, the late Professor Gray, the eminent botanist of Harvard, tells us that he encountered a greater number of species of indigenous trees than could be observed in a trip from Turkey to England through Europe, or from the Atlantic coast to the Rocky Mountain plateau. The region surrounding that described by Professor ***Gray,*** especially to the west, with the headwaters of the Tennessee, the French Broad, and the Savannah rivers, all within a few miles of each other, with fertile valleys and mountain elevations of 5,000 feet or more, and a density of verdure unapproached elsewhere, is an ideal spot for a preserve, where every sort of North American animal or fish would thrive, and where almost every tree or plant found within our borders, from the Atlantic to the Pacific, would grow uncared for.

[The New York Sun.]

A national forest reserve in the Appalachian belt can be established only by the purchase of land, for there is no public domain in that region. The bill now before Congress directs the Secretary of Agriculture to purchase not more than 2,000,000 acres of forest in the Southern Appalachians and appropriates $5,000,000 for that purpose. The lands must be situated within the States of Virginia, North and South Carolina, Georgia, Alabama, and Tennessee. The purpose of establishing the proposed reserve is to introduce scientific forestry methods, conserve the forests, and at the same time permit lumbering in this large area of hard woods.

No one now doubts that it was wise policy to set apart the forest reserves which have been established since 1896 in eleven of our Western States and Territories. The idea was at first strongly opposed on the ground that the withdrawal of so much public land from purchase would retard the development of the States concerned and delay the discovery of new sources of mineral wealth. These misgivings, however, were not justified by our policy with regard to the reserves. The Geological Survey has been engaged since the summer of 189'7 in studying the timber, mineral, and agricultural resources of these regions. All of them may be developed as fast as capital and labor seek employment there. In some of the reserves, as in the Black Hills, for example, large industries have long been established. But these large areas can no longer be stripped of all their timber without a thought of tree replanting. The propagation of timber must hereafter go hand in hand with its utilization; aud destruction by forest fires that have swept large areas will at least be diminished by proper regulations.

But in our forest reserves the hard woods that have so prominent a place in our Iumher industry and agricultural implement, furniture, and cabinet manufactures are scarcely represented. The cedar, tamarack, canon live oak, and tan-bark oak are the only hard woods of commercial importance found on the reserves. Our walnut, maple, ash, locust, hickory, cherry, and beech timber are as yet derived almost wholly from the Central States, mainly east of the Mississippi. Timber planting has not kept pace with timber cutting, and the supply is diminishing. Furniture makers already complain of the scarcity of black walnut.

The only other source of these hard woods is the Appalachian belt from the southern part of New York to Alabama. They grow in largest numbers on the slopes of the southern half of these mountain ranges. On the neighboring lowlands spread away the forests of long-leaf, short-leaf, and loblolly pines, which make the great lumber industry of our South Atlantic States. The hard woods above them have as yet scarcely been touched, but with the diminishing supply of hard woods on the central plain from the Mississippi eastward, lumbermen are beginning to look to the mountains.

The question is whether this large source of supply shall also be depleted or whether, by the methods of scientific forestry, the timber shall be renewed, so that later generations, as well as ourseives, may have the benefit of it. These forests can be protected only by Government regulation, and if the States do not take steps to conserve these large sources of wealth the question whether the National Government should not acquire the right to do so at a time when it is asserted it may be cheaply acquired is certainly worthy of serious consideration.

[The New York Times.]

One of the most interesting matters now before Congress, and one which should attract general attention, is the proposition for the establishment of the Appalachian forest reserve, for which a bill was introduced in Congress a few days ago. This proposed measure directs the Secretary of Agriculture to purchase not to exceed 2,000,000 acres.

[The Wilmington (Del.) Star.]

The efforts of the Appalachian National Park Association are succeeding far beyond the anticipation of the most urgent supporters of this great movement. * * * Prominent and influential men in every part of the country have given their aid, numerous newspapers have advocated the project, and as yet no adverse or unfavorable criticism has been heard or written, and it seems practically certain that with a united movement the park can be secured. * * *

[Washington Post, January 3, 1900.]

The location in western North Carolina of a great national park would be a cause of more pleasure and benefit to more people than any other public institution we can think of at this moment.

[Brooklyn Eagle, January 14, 1900.]

It ought to go without much pushing. All that is needed is to set the people thinking about it.

[Prof. N. S. Shaler, in The North American Review, December, 1901.]

It may be charged that the legislation which established these reservations is, in its tendencies, socialistic, but the most inveterate enemy of that political theory, if he be open to reason, will not be disposed to contend against such action. He will have to acknowledge that these gifts to the community are very helpful to its best interests, and that they could not have been secured by private or corporate endeavor or even by the action of individual States. They can be obtained by national action alone. * * *

Although a national reservation in the southern upland will, perhaps, most commend itself to the people from their interests in the noble forests which it will permanently preserve, there are economic considerations that would of themselves warrant the undertaking. The effect of such a forested area on the streams which have their headwaters in this mountain district would be considerable and most advantageous. Properly located, this park would include the tributaries of rivers which flow to the Ohio, as well as streams that course to the Atlantic. It is evident that, in the future, these water courses, like all others in settled countries, are to be extensively utilized as sources of electric power. Owing to the form of the country, it will not be possible, as it is in New England, to hold back the stream water in reservoirs for use in the dry season of the year; the only economical method will be to have the water stored in the spongy mat which naturally forms in an unbroken forest, and which to a great extent prevents the water courses from becoming beds of torrents in rainy seasons and in other times dry channels. In proportion to its area and rainfall, in relation to the whole of the drainage of the rivers flowing from it, such a forest reservation would serve to diminish the floods which, year by year, become more destructive to the tilled grounds and towns along the lower reaches of our great waterways, and more injurious to their value for navigation. This evil, already great, is constantly becoming a more serious menace. as the steep sides of the mountains are further stripped of their woods. * * *

It is, or should be. an accepted principle that the Government is to provide for public needs when private enterprise, for any reason, can not be induced to make adequate provisions. * * *

Such truly imperialgifts have greatly enriched a part of this country; it will be well, before the remnants of primeval nature have vanished, that the other parts of our realm should have like share in them.

[Prof. W J McGee in the Worlds Work, November, 1901.]

The geographer in studying the Appalachian region perceives that in the wooded wilderness nature provides a vast reservoir system for the storage of storm waters-a system at once so perfect and so economical that all the year's rainfall (and light snow fall as well) is first appropriated to the uses of plant life, then conserved for a time in the subsoil against drought,, and finally carried by subterranean seepage to the lower levels, where only the excess above local plant needs and animal demands is allowed to flow through spring and stream and river down the long way to the distant ocean. * * *

Now he may turn another leaf to the closing lines of his lesson and read of that delicate interrelation of natural conditions which has resulted throughout the Appalachian region in the development of a floral mantle to stay the storms, and thus at once to sustain the flora itself and to estop destructive erosion. These final lines run deep into earth science and into plant science and need not be followed save by the specialist. Yet the ultimate axiom is simple, so simple that he who runs might read, so simple as to make it a marvel that observant men did not grasp it at the beginning of knowledge rather than wait until the end-it is the simple axiom that life prevails over death, that plant power is stronger than rock power. Nor can the geographer in the Appalachian region fail to apply the axiom. He may call the application theory, argument, policy, cause; he may whisper it in private council, may announce it in scientific conclave, may proclaim it in legislative halls, may **send** it ringing through the world and up the corridors of future time to benefit all mankind; he may smother it cravenly in coward breast, or he may sacrifice it to paltry greed, yet if he is honest with his facts and with himself he can not fail to realize that the forests must be preserved, else the mountains will be destroyed.

Only a generation ago science plodded wearily along one side of the pathway of human progress, while statecraft flitted airily along the other side of the straight and narrow path, both led in part by hereditary theories. But within the work time of men now living **science** and statecraft have drawn well into the main pathway of practical humanity, and in this country at least, they have joined hands firmly; to-day science stands in the Federal Cabinet in all the dignity of an

executive department, while the leading statesmen are grasping that modern geography which seeks to assimilate science. So it is but natural that the mountaineers of the Appalachian region, a virile and farseeing race, and various representatives of public interests have come to read alike the public lesson of conservation, the conservation of forests, in order that the very mountains may be conserved. Naturally, too, the applications of the lesson first came home to the hearts of the mountaineers amid their beloved ranges and rivers. They first noted the gullying of hillsides, with the accompanying loss of soil and clogging of valleys and polluting of streams, when clearings were pushed too far up the valley sides. They first observed that the carelessly set forest fire produced, although more slowly, effects as disastrous as those of injudicious clearing. They first noticed that reckless lumbering robbed the land not merely of trees but of soil, of welling springs, and of the trout-filled brook, which were converted into muddy, freshet-ridden streams, running dry in mid-summer. They first realized that the stripping of the chestnut oaks for tan bark was but the first step in a cumulative desolation. They were the first to realize the gradual change of brook and river from crystal streams flowing steadily all the season round to dirty danger lines mapped out by disastrous wrecks with every storm, only to lose themselves in mud between storms. Naturally, then, the agitation of a policy began among the mountaineers, and their voices were heard first in local conventions, then in the legislative halls of several States, and finally before Federal Congress and Cabinet. Such, in brief, is the history of the movement toward an Appalachian forest reserve, a movement which may lag or lunge according to the firmness of the alliance between science and statecraft, but which is manifestly destined for ultimate success, to the immeasurable benefit of mankind.

'RESOLUTION OF THE LEGISLATURE OF VIRGINIA.

Resolved by the senate of** Virginia, **the house of** delegates **concurring, That the general assembly of Virginia, hereby expresses its approval of the movement looking to the establishment by the Federal Governmentof an extensive national forest in the Southern Appalachian Mountain region as a wise and beneficent measure, such as many other nations have already adopted, and which this country has already adopted in the West and should adopt in the East before it is too late, looking to the conservation of its forests and the protection of the sources of important streams; and

Whereas- the proposal to establish this forest reserve has been approved and urged by the leading scientific societies and forestry associations of this country and by both the general and technical press; and

Whereas the general assembly of Virginia has already passed an act granting the State's consent to the acquisition of lands in Virginia by the Federal Government for incorporation in such a forest reserve, believing the reserve to be one of great importance to the people of this State; and

Whereas a bill is now before the Federal Congress providing for the purchase of lands for this purpose:

Resolved, That the Senators and Representatives in Congress from this State are hereby requested to urge upon Congress the importance of prompt and favorable action in behalf of this measure; and that copies of this resolution be sent to the Senators and Representatives from Virginia.

Passed unanimously by the legislature of Virginia, March 21, 1902.