GPO 8—7671

FIRST BIENNIAL REPORT

OF THE

State Forestry Department

TO THE

Governor *and* General Assembly

OF THE

STATE OF GEORGIA

1926

VOGEL FOREST PARK
Looking north from Neel's Gap
Georgia's First State Forest.

FIRST BIENNIAL REPORT

OF THE

State Forester

TO THE

State Forestry Board

OF THE

STATE OF GEORGIA

1925-1926

B. M. LUFBURROW,
State Forester

Georgia State

Board of Forestry

1927

(Ex-Officio)

Hon. Clifford Walker, Governor.
President

Hon. S. G. McLendon, Sec. of State,
Vice President

Hon. S. W. McCallie, State Geologist,

Hon. J. Phil Campbell, Director of Extension,
State College of Agriculture

(Appointed)

Bonnell H. Stone, Blairsville

J. Leonard Rountree, Summit

Alex. K. Sessoms, Cogdell

C. B. Harman, Atlanta

Mrs. M. E. Judd, Dalton

B. M. Lufburrow, Secretary and State Forester.

FORESTRY DEPARTMENT
B. M. LUFBURROW STATE FORESTER
ATLANTA, GEORGIA

Letter of Transmittal

To His Excellency,

Hon. Clifford Walker, Governor,

State of Georgia,

Atlanta.

Sir:

In accordance with Section 2158 (jjj-5) Vol. 12 of the Supplement of the Code of 1926, and by direction of the Board appointed under such Law, we have the honor to submit for transmittal to the General Assembly, the First Biennial Report of the State Forestry Department covering the period October 15th, 1925, to December 31st, 1926.

Respectfully,

C. B. HARMAN,
S. W. McCALLIE,
B. H. STONE,
Chairman of Executive Committee.

FORESTRY DEPARTMENT
B. M. LUFBURROW State Forester
Atlanta, Georgia

Letter of Transmittal from the State Forester

MEMBERS OF STATE BOARD OF FORESTRY,

Sirs:

I herewith submit to you my report which covers the first 14 1-2 months of our work, and the findings of the Georgia Forest Service within the period.

The practise of forestry is becoming recognized throughout the State as a basic and economic necessity. In bringing about this recognition, the Board acknowledges the splendid cooperation, especially in an educational way, by many agencies, such as the Georgia Forestry Association, civic and business organizations, Federated Women's Clubs, Parent-Teacher Associations, Scout and Campfire organizations, County Officials, and the various DEPARTMENTS OF STATE.

The newspapers of the State and the various press agencies have given valuable cooperation. The lumber and naval stores industries as a whole have given important information. Regional organizations having a large membership in the State, such as the Southern Forestry Congress, American Tree Association, American Forestry Association, have cooperated closely with the Department. The Federal Forest Service has co-operated both financially and otherwise.

With the continued coordinated efforts of all these agencies, it is felt that every acre in Georgia will be producing that crop most suitable and profitable, and that the timber crop, WHICH RANKS THIRD as a natural resource, will be conserved, restored and perpetuated.

I wish to express my appreciation to each member of the Board for their assistance, interest and active support in the work of the Department.

Respectfully,

L. M. LUFBURROW,
State Forester.

First Biennial Report

Board of Forestry, State of Georgia

TO THE

General Assembly

1927

Introduction

Forestry had its beginning in Georgia in the Forestry Act of 1921 providing for a State Board of Forestry composed of five ex-officio members and four citizens appointed by the Governor from the State at Large. The duties of this Board were purely investigative, and to "report to the General Assembly of Georgia with whatever recommendations the said Board sees fit to make." However, there were no funds available for the work. The first official report to the General Assembly of Georgia was made in 1922 in compliance with the Act of 1921.

The splendid report of this Board received most favorable comment from all parts of the country. The limited number of copies printed was soon exhausted by the enormous demand for this information. The report gave a perfect picture of the forestry situation in Georgia and contained most valuable information pertaining to the forest industrial development of the State and its subsequent decline since 1909.

Since the report of 1922 covers so completely the industrial phase of the forest problems, the present timber supply and the direct influence which this natural resource has had upon the development of the State, it will not be necessary to cover these vital points in this report except by reference.

Administrative Act of 1925.

The Forestry Administrative Act of 1925 was signed by the Governor on August 14th, 1925. This Act named the Governor as "ex-officio Chairman and President of said Board," the Secretary of State, the State Geologist, and the Director of Extension at the State College of Agriculture as ex-officio members to serve with five citizens of the State who shall be appointed by the Governor, "as follows: One representing the Women's Civic Organizations of the State and four representatives of the farming, lumbering, lumber manufacturing, and naval stores or timberland owning interests within the State of Georgia, who will be named with reference to geographical location."

Duties of the State Board of Forestry

The broad policies which have been initiated by the Board pursuant to the mandates of the Forestry Administrative Act of 1925 are:

I. **To inquire into the forest conditions in Georgia, with reference to**

	Forest Law 1925
(a) Preservation of the forests	Sec. 3
(b) Effect of the destruction of forests upon the general welfare of the State	Sec. 3
(c) All other matters pertaining to :	
1. Subject of forestry	Sec. 3
2. Tree growth	Sec. 3

II. **To make recommendations to the General Public, as to:**

(a) Reforestation	Sec. 3
(b) Approved methods of lumbering	Sec. 3
(c) Approved methods of turpentining	Sec. 3

III. **To report to the regular session of the Legislature:**

(a) Results of investigation	Sec. 3
(b) Recommendations as to necessary legislation with reference to forestry	Sec. 3

IV. **To give, as may be practicable, to Georgia land owners and forest users, when requested, such:**

(a) Advice	Sec 3
(b) Aid	Sec. 3
(c) Assistance	Sec. 3
(d) Cooperation	Sec. 3

V. To promote in Georgia among all classes of the population a proper appreciation of the benefit to be derived from:
   (a) Forest culture ..... Sec. 2
   (b) Forest preservation ..... Sec. 3.

VI. To take such action as may be reasonable and practicable and apply such part of the funds as may be necessary to:
   (a) Prevent forest fires ..... Sec. 3
   (b) Suppress forest fires ..... Sec. 3
   (c) Establish fire control:
      1. Independently ..... Sec. 3.
      2. Or in cooperation with Federal Government ..... Sec. 3

VII. To employ a State Forester, who shall:
   (a) Enforce provisions of the Forestry Act Sec. 4
   (b) Serve as Secretary of the Board ..... Sec. 2
   (c) Be custodian of the books, records and papers of said Board ..... Sec. 2
   (d) Perform all other duties that may be designated by the Board ..... Sec. 4

VIII. To recommend to the Governor, forest land to be acquired, or the acceptance of gifts of land, to be:
   (a) Held and administered as:
      1. State forests ..... Sec. 5
      2. Demonstrating the practical utility of timber culture ..... Sec. 5
   (b) To recommend to the Governor for appointment as Deputy Forest Wardens:
      1. Sheriffs and Deputy Sheriffs ..... Sec. 8
      2. Constables and marshals ..... Sec. 8
      3. Farm demonstrators ..... Sec. 8
      4. Other persons who may be willing to serve WITHOUT COMPENSATION. ..... Sec. 8

IX. To meet:
   (a) Semi-annually in Atlanta ..... Sec. 2
   (b) At such other times and places as may be designated by the Governor ..... Sec. 2

X. To perform such other duties as may be imposed upon it by Law ..... Sec. 3

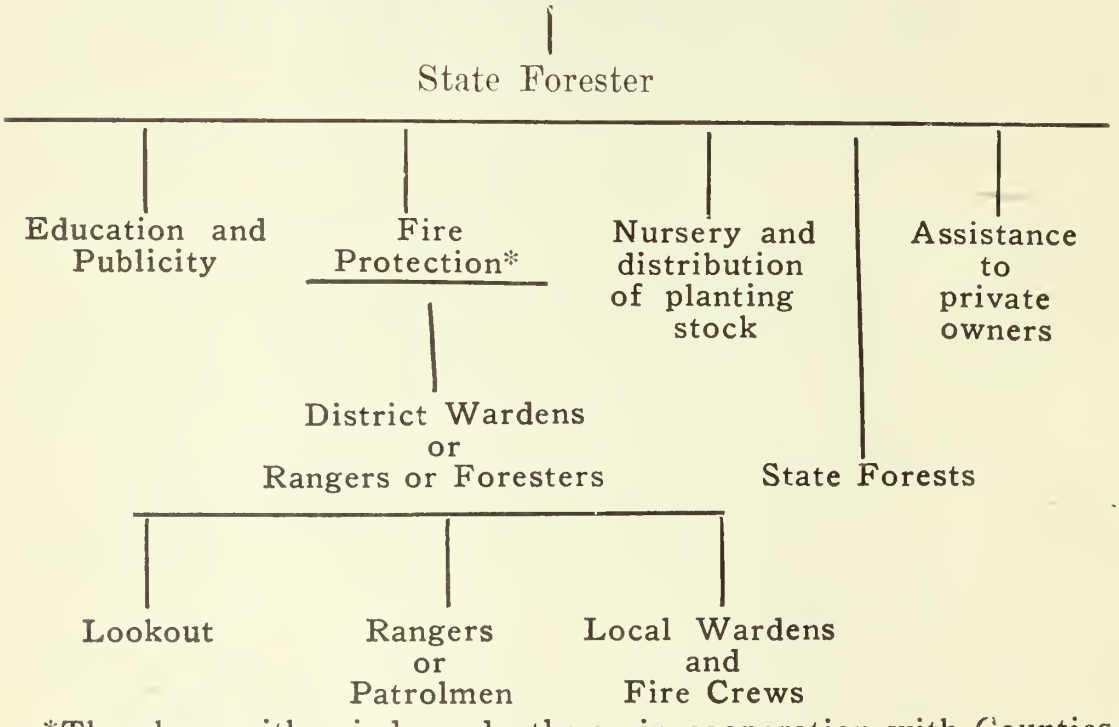
Thus the Forestry Act of 1925 sets forth in brief terms the comprehensive program for the restoration of Georgia's forest resources. The State has approximately 23,000,000 acres of forest land. *Any land that will show greater profits to the owner from the growing of timber than from the raising of any other crop is forest land.*

Board Meetings

The first meeting of the Board under the Administrative Act of 1925 was held in Atlanta September 25th, 1925. At this meeting the preliminary work of organizing, the election of an Executive Committee, authorizing them to complete the details of the organization and to recommend a State Forester, was taken up.

The second meeting was held on October 15th, 1925, when the State Forester was elected and directed to organize the office of the State Board of Forestry and to proceed with the performance of other duties prescribed by law. The recommendation of the Executive Committee as to an organization chart, the appointment of Deputy Forest Wardens, the design for the badge of the Department, and many other details were approved.

Organization Chart



*The above either independently or in cooperation with Counties or private owners who would share part of cost.

The third and fourth meetings were held in the office of the Secretary of State in Atlanta on May 25th, 1926, and November 23rd, 1926, respectively.

Investigative work, under the Law, is rightly placed as a primary duty of the Board. In specifying that this shall cover the preservation of the forests, the effect of the destruction of the forests upon the general welfare of the State, and all other matters pertaining to forestry and tree growth, the Legislature included the entire field of technical forest research, statistical compilations and economic investigations bearing upon wood-using and forest industries and the interest of both the producer and the consumer of forest products.

Fact Finding Survey

Before any definite forest policy could be inaugurated, it was necessary to secure definite information as to the real forest conditions in the State through a fact finding survey.

This survey included THE 161 COUNTIES IN GEORGIA, EACH OF WHICH WAS VISITED BY THE STATE FORESTER OR A MEMBER OF HIS STAFF, and the following data was gathered:

I. Facts about:

- **(a) Area of forest land in each county;**
- **(b) 1. Condition of forest land,**
  2. Kind of forest land (virgin, culled, cut-over, idle);
- **(c) The forest industries;**
- **(d) Cause of forest fires and the attitude of the local people;**
- **(e) Information on the number of fires and estimates of damage;**
- **(f) Forest activities under way;**
- **(g) Names of timberland owners interested;**
- **(h) Native trees and some information on rate of growth;**
- **(i) Values.**

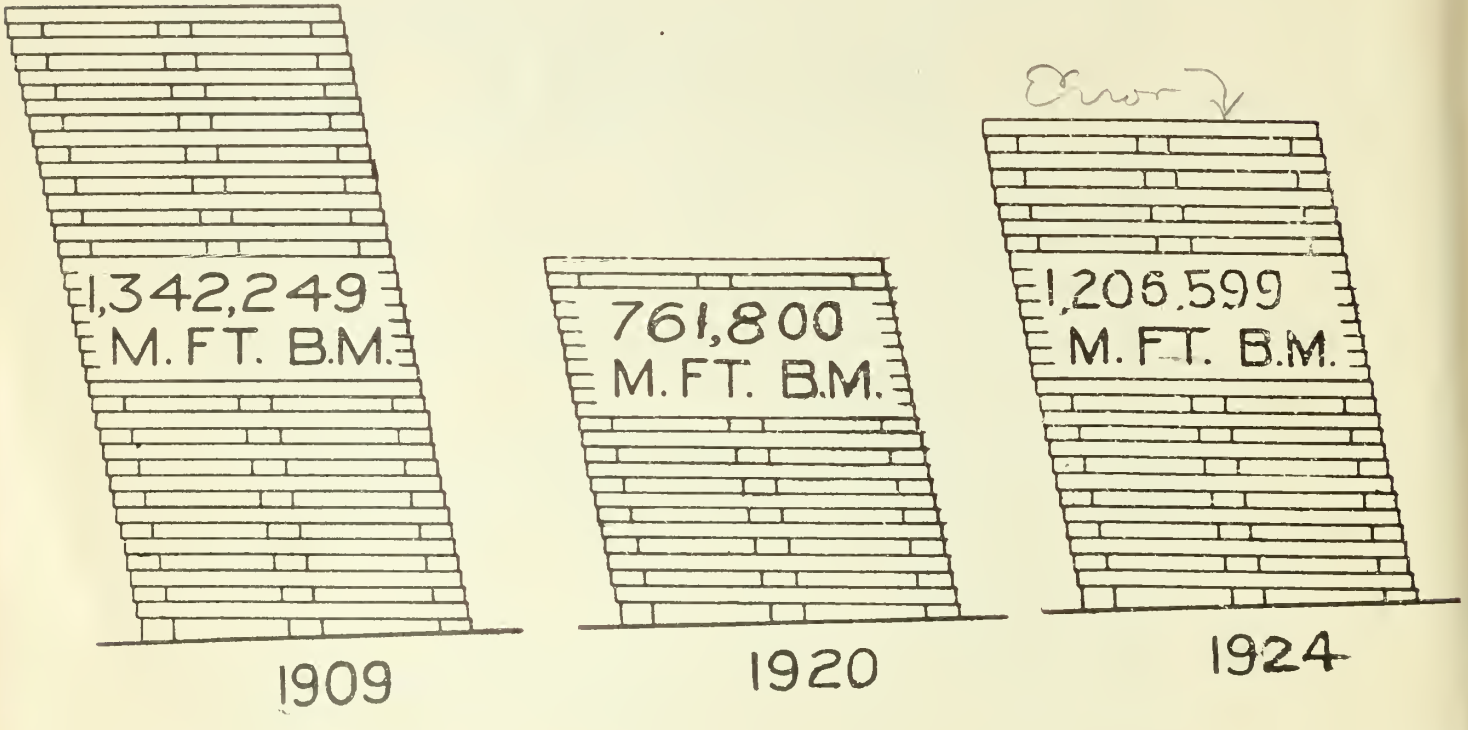
II. The work of the Forestry Department was explained to as many of the county officials, newspaper editors, timberland owners, lumbermen, naval stores operators, or dealers in forest products, and citizens as could be interviewed during the time allotted to each county, on these first visits.

III. Literature containing information on forest fire damage, methods of control, State cooperation with private owner, and general forest information was left in each county.

IV. A number of addresses were made before civic organizations, schools, clubs, and public gatherings.

Georgia's Timber Production Reached Its Peak In 1909, But The Consumption Continues To Increase

The large increased production of 1924-25, due to heavy demand, resulted in the cutting of smaller trees, and consequently poor quality of lumber of less value to both producer and consumer, making heavy inroads into the future supply.



Forests under adequate fire protection will produce 50% more timber of the better quality for this ever-increasing demand.

Results of the Survey

The above survey shows that:

1. Georgia has 23,000,000 acres of forest land which represents 60.7-plus per cent of the entire area of the State, (land not needed for agricultural or other purposes, and better suited for growing a crop of timber).

2. 47 Counties in Georgia have 60% or more of their area in forest land; 20 counties have 80% or more in forest land; 9 counties have 90% or more in forest land The smallest per cent of any county in forest land is 12%.

3. Less than 1,000,000 acres of virgin timber land are left in Georgia.

4. Approximately 9,000,000 acres are supporting a second timber crop.

5. More than 6,000,000 acres are idle and unproductive. EVERY COUNTY IN THE STATE HAS A PROPORTIONATE PART OF IDLE AND UNPRODUCTIVE LAND.

6. In 1925 the production of 1,130 sawmills in Georgia was approximately 1,356,000,000 board feet of raw material, valued at $6,780,000, on the stump, with the finished product valued at $27,120,000.

7. The present rate of consumption is more than 1,600,000,000 board feet, the value of the finished product being around $32,000,000.

8. Georgia is an import State, more than $5,000,000, going out of the State annually for forest products.

9. The 23,000,000 acres of forest land in the State, properly managed and under adequate fire control, are capable of producing more than 7,000,000,000 board feet annually, worth approximately $40,000,000, on the stump (raw material). The finished product would be worth more than $140,000,000.

10. Records show that there were 65 counties in Georgia producing naval stores in 1925, which included 581 operators with an average of 354 barrels of turpentine per operator, a total of 6,185 crops worked (a crop is 2,000 boxes or cups). The turpentine industry furnished employment to 12,458 people.

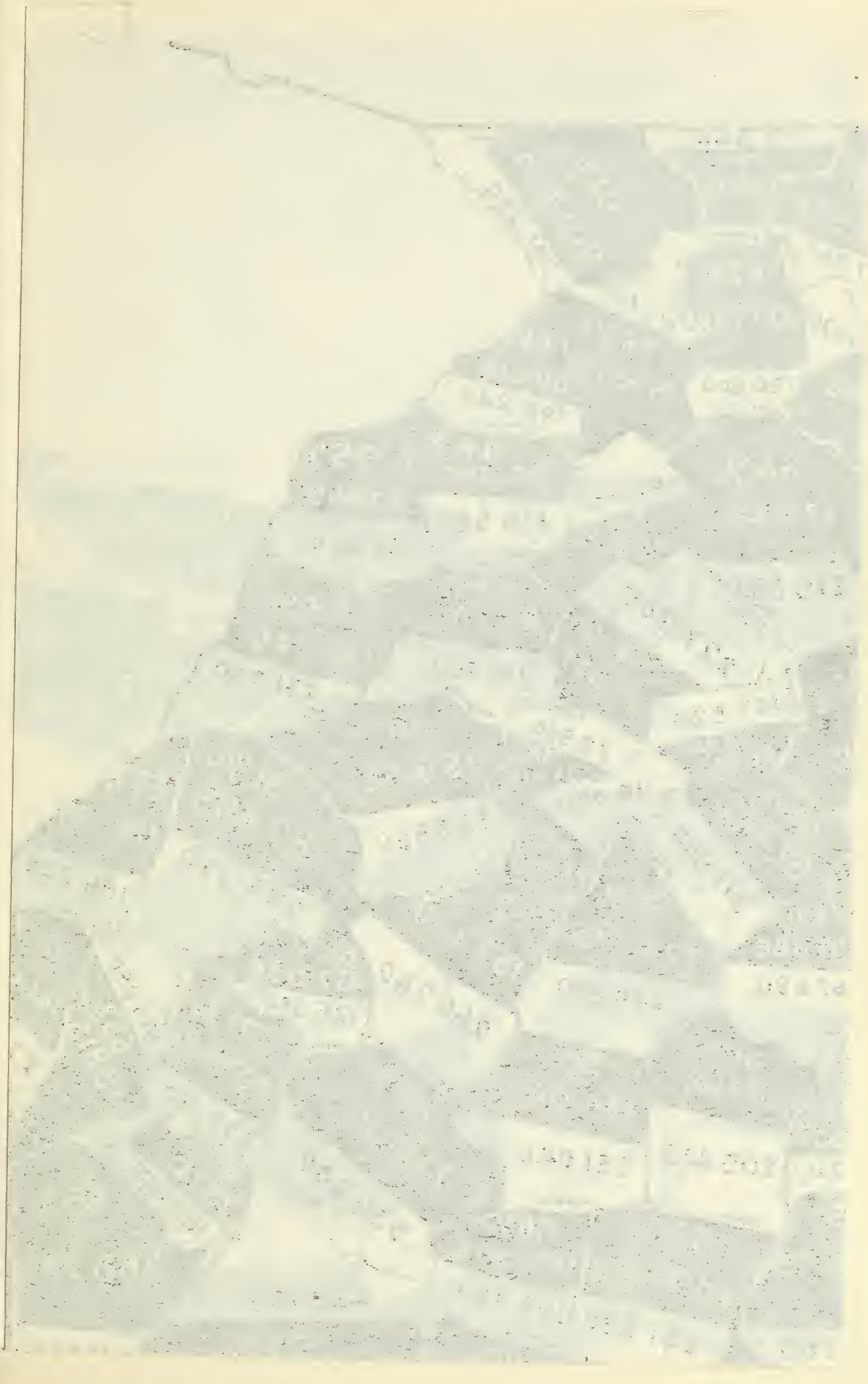
11. Approximately 15,000,000 acres of the forest area of the State is in the Pine Belt.

12. The income from Georgia's Naval Stores industry in 1926 was more than $23,000,000.

13. Under adequate fire protection and proper forest management the income from Naval stores should be *at least three times* the present amount.

14. There is an enormous demand by the citizens of the State for specific information that is applicable to:
    (a) Individual forest problems;
    (b) Local forest conditions;
    (c) A specific forest region;
    (d) The State as a whole;
    (e) Particular forest industries;
    (f) Reforestation;
    (g) Marketing of forest products.

15. There is a vital need for research work in:
    (a) The lumber industry;
    (b) Naval Stores industry;
    (c) Forest fire damage;
    (d) Fungi and insect damage.



GEORGIA FORESTRY DEPARTMENT

B. M. LUFBURROW, State Forester

Forest Area Map of Georgia. Showing forest land by counties, compiled from U. S. Census of 1920, State Tax Digests, and other sources.

Black—Forest land.
White—All other land.

Figures in black areas:
1. Percent of forest land.
2. Acres in forest land.

Figures in white areas:
Total acres in county.

Land Classification Data—By Counties

County	Total Area of County	Potential Forest Land	Percent Forest Land
Appling	290,560	231,800	80
Atkinson	211,200	172,550	82
Bacon	173,440	137,437	79
Baker	228,480	140,985	62
Baldwin	196,480	109,508	56
Banks	142,080	79,211	56
Barrow	107,520	46,085	42
Bartow	301,440	174,148	58
Ben Hill	163,840	103,213	63
Berrien	320,000	246,343	77
Bibb	177,280	97,215	55
Bleckley	131,200	60,961	46
Brantley	280,537	190,184	67
Brooks	328,960	182,924	56
Bryan	275,840	244,058	88
Bulloch	427,520	263,411	63
Burke	611,840	330,471	54
Butts	129,920	72,301	56
Calhoun	181,760	95,312	53
Camden	455,040	441,893	97
Campbell	135,040	69,379	51
Candler	145,920	78,665	54
Carroll	314,880	147,289	47
Catoosa	108,160	58,781	54
Charlton	563,840	542,744	91
Chatham	236,800	198,109	84
Chattahoochee	139,520	113,983	81
Chatooga	209,920	115,335	55
Cherokee	274,560	189,628	69
Clark	72,960	24,917	34
Clay	129,920	53,956	42
Clayton	90,880	36,865	40
Clinch	576,000	546,708	95
Cobb	225,920	111,738	49
Coffee	404,480	290,694	72
Colquitt	338,560	188,056	56
Columbia	224,000	141,505	63
Cook	154,240	102,250	66
Coweta	283,520	143,701	51
Crawford	204,160	132,991	65
Crisp	177,280	76,718	43
Dade	119,040	96,005	81
Dawson	138,240	107,529	74
Decatur	526,720	343,173	65
DeKalb	174,080	94,147	54
Dodge	275,840	109,665	71
Dooly	254,080	112,805	44
Dougherty	218,880	122,456	56
Douglas	133,120	81,366	61
Early	335,360	180,090	54
Echols	231,680	212,417	92
Effingham	286,720	239,534	84
Elbert	231,040	123,546	53

County	Total Area of County	Potential Forest Land	Percent Forest Land
Emanuel	488,960	318,139	65
Evans	183,680	143,540	78
Fannin	256,640	217,526	85
Fayette	149,760	83,415	56
Floyd	321,280	182,092	57
Forsyth	158,080	83,613	53
Franklin	178,560	86,197	48
Fulton	118,400	41,882	35
Gilmer	281,600	241,544	86
Glascock	108,800	73,141	67
Glynn	280,960	267,611	95
Gordon	240,000	134,401	56
Grady	284,160	168,482	59
Greene	266,240	152,120	57
Gwinnett	281,600	144,491	51
Habersham	185,600	144,479	78
Hall	279,680	179,466	64
Hancock	339,200	214,165	63
Haralson	181,760	113,255	62
Harris	320,640	217,188	68
Hart	167,040	75,465	45
Heard	182,400	102,863	56
Henry	207,360	91,625	44
Houston	374,400	210,098	56
Irwin	241,920	149,576	62
Jackson	227,200	99,477	44
Jasper	205,440	96,408	46
Jeff Davis	192,000	150,443	78
Jefferson	413,440	268,281	65
Jenkins	218,880	132,615	61
Johnson	186,880	94,590	51
Jones	241,280	139,858	58
Lanier	123,428	56,259	45
Laurens	515,840	258,477	50
Lee	208,640	95,539	46
Liberty	599,040	541,111	90
Lincoln	186,240	128,209	69
Long	244,598	147,249	60
Lowndes	304,640	192,391	63
Lumpkin	179,200	150,396	84
McDuffie	183,680	118,815	65
McIntosh	300,800	289,687	96
Macon	236,160	102,162	43
Madison	181,760	85,291	47
Marion	230,400	147,342	64
Merriwether	317,440	166,359	52
Miller	161,920	89,001	55
Milton	92,800	49,731	54
Mitchell	350,720	174,048	50
Monroe	373,760	242,309	65
Montgomery	121,600	60,435	50
Morgan	249,600	128,170	51
Murray	218,880	160,145	73
Muscogee	150,400	101,360	67
Newton	167,680	65,886	39
Oconee	110,080	42,259	38

County	Total Area of County	Potential Forest Land	Percent Forest Land
Oglethorpe	322,560	196,637	61
Paulding	207,360	128,447	62
Peach	95,651	12,340	12
Pickens	147,840	110,114	74
Pierce	330,880	276,566	83
Pike	196,480	80,906	41
Polk	202,880	118,160	58
Pulaski	165,120	83,356	50
Putnam	231,040	135,086	58
Quitman	92,160	51,234	56
Rabun	241,280	219,354	91
Randolph	263,680	142,443	54
Richmond	204,160	118,161	58
Rockdale	76,160	30,122	40
Schley	98,560	48,673	49
Screven	508,160	353,551	70
Seminole	160,214	54,833	34
Spalding	133,760	51,105	38
Stephenson	106,240	69,918	66
Stewart	263,040	153,878	58
Sumter	291,840	111,553	38
Talbot	199,680	125,022	63
Taliaferro	135,680	87,536	65
Tattnall	298,240	221,013	74
Taylor	217,600	130,633	60
Telfair	238,720	149,278	63
Terrell	206,080	82,652	41
Thomas	339,200	209,570	62
Tift	155,520	82,474	53
Toombs	251,520	178,620	71
Towns	115,840	91,932	79
Treutlen	167,680	113,073	67
Troup	278,400	149,425	54
Turner	147,840	71,052	48
Twiggs	200,960	118,170	54
Union	207,360	169,565	82
Upson	202,880	124,263	61
Walker	276,480	164,876	60
Walton	211,840	87,475	41
Ware	493,440	452,066	92
Warren	258,560	183,483	71
Washington	428,160	226,532	53
Wayne	504,320	446,524	88
Webster	193,280	132,329	69
Wheeler	168,960	100,674	60
White	156,800	127,798	82
Whitfield	181,120	99,982	55
Wilcox	257,920	139,525	54
Wilkes	293,120	150,493	51
Wilkinson	302,080	206,776	68
Worth	416,640	245,145	59
	37,583,900	23,970,960	63, 75

Summary of the Responsibilities of the Board

The State Board is Responsible for:

I. Police powers sufficient to cooperate with the owners of 23,000,000 acres of forest land in Georgia that are in need of fire protection, or an adequate fire control system, to insure a second crop of timber without the expense of planting.

II. Determining the effect that the destruction of the forest has on the general welfare of the State.

III. Aiding, advising, assisting, cooperating with Georgia land owners in the cultivation and use of the third greatest natural resource of the State in such ways as will conserve the present supply and insure a permanent supply of timber.

IV. Assisting the forest industries in the closer utilization of the timber supply, determining improved methods of cutting, operating and marketing their output.

V. Establishing practical demonstration areas as examples of the proper methods of timber culture.

VI. Collecting and putting in graphic form such forest facts as will bring about the proper appreciation in Georgia of the value of her forests and how they can be handled as a timber crop, so that the next generation will not be found with a timber shortage.

VII. Encouraging the use of Georgia products by Georgians.

Administration

The inauguration of a State Forestry Department is distinctly a problem of administration. This problem involves:

I. **The establishment of the office, with the necessary administrative, technical and clerical personnel, and securing a permanent office with technical and field equipment;**

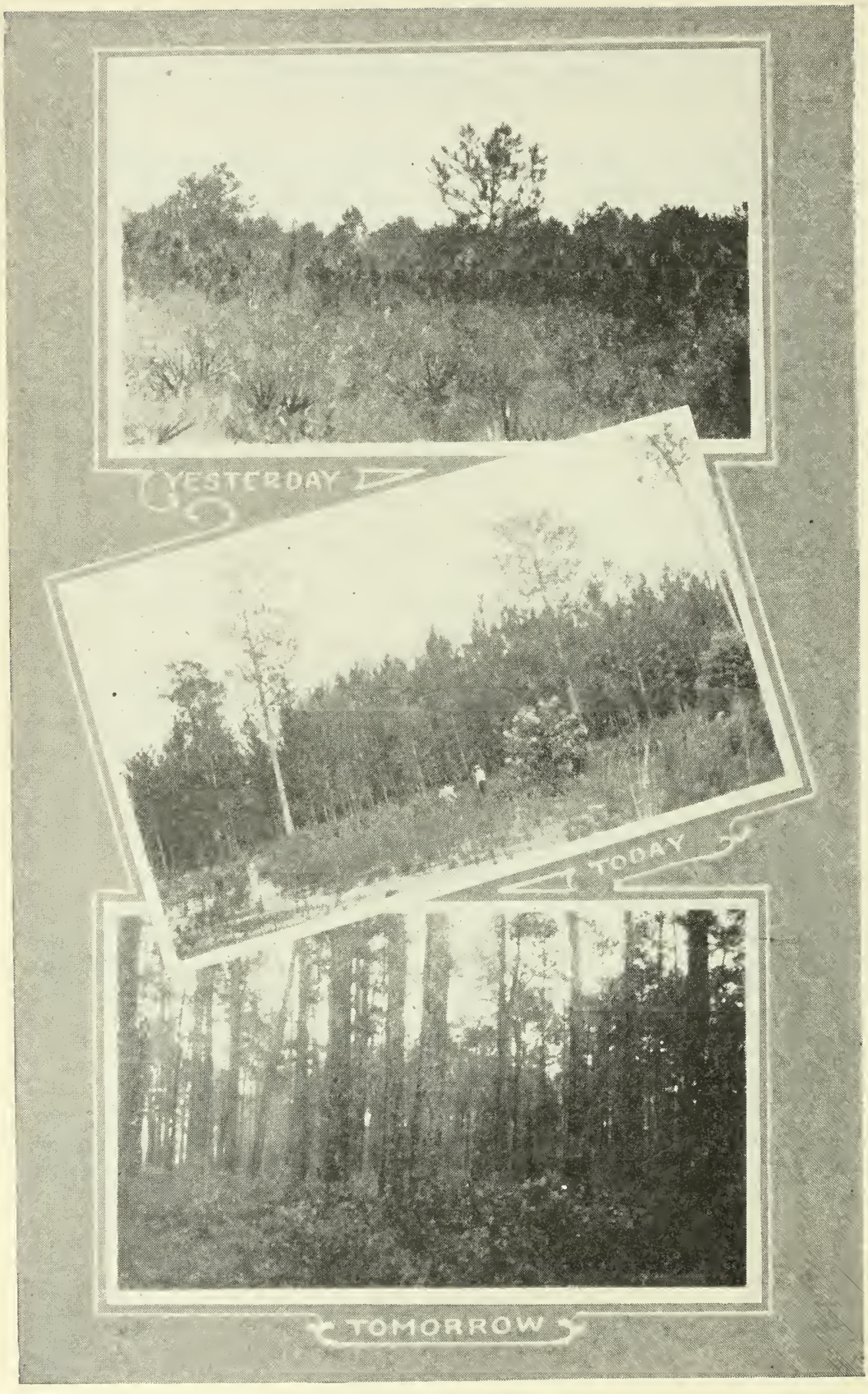
II. **Formulating a definite work plan which would be a safeguard against over-organization and an assurance that the projects undertaken were necessary to the proper development of Georgia's timber crop;**

III. **Undertaking the work in such a way as to insure efficiency, accuracy and economy in the expenditure of both effort and funds. The work of the Board, however, must lead the way in Forestry.**

The administrative duties have received most careful study and consideration. The activities undertaken by the Board are of invaluable assistance to the State. The policy of laying a broad and sure foundation has been followed from the beginning. Projects have been initiated in those localities where the people were ready for them, and yet the entire State is being given the facts and information necessary to develop the proper knowledge and interest in the growing of a crop of timber.

The office of the State Board of Forestry was opened in the Chamber of Commerce Building, as the guest of the Georgia Forestry Association, because of the congested condition at the Capitol, but in May 1926, the Board moved to Room 334 in the Capitol.

The personnel of the Department consists of the State Forester, the Director of Management, the Director of Education, and a Secretary. The Director of Education is serving without compensation from the State.


YESTERDAY
TODAY
TOMORROW

Education

At the last meeting of the Board in 1926 it was decided to begin definite work in Forestry Education. The need of more accurate knowledge of the many phases of this subject and the simple requirements for beginners is essential to a forest policy in Georgia. The original Organization Chart of the Board provided for this, so now that results were being secured in the work of Protection and Management, the Board made an allotment for educational work. Many other States have not only made their beginnings in forestry with purely educational methods, but some of the States continue to concentrate their efforts in this one field. The State of Mississippi recently enacted a forestry law under which the work is almost wholly devoted to education in forestry; and Federal Funds, as well as State Appropriations, are thus wisely applied in that State for a Forest Policy.

Results are the aim of all business policies, although methods may vary. In Georgia, the present generation of timberland owners are receiving first aid in forestry, and the work of protection and management will continue to be developed as rapidly as funds and expediency will permit. In the meantime, the Director of Education has begun work for the future generation of Georgia timberland owners now in the public schools of the State. Realizing that this foundation work for permanent results in timber production and perpetuation should not be longer delayed, the Board approved an educational program for the boys and girls in High Schools and Grammar Grades which will give these future citizens a working knowledge of forestry by the time they must meet the problems of community builders and home makers.

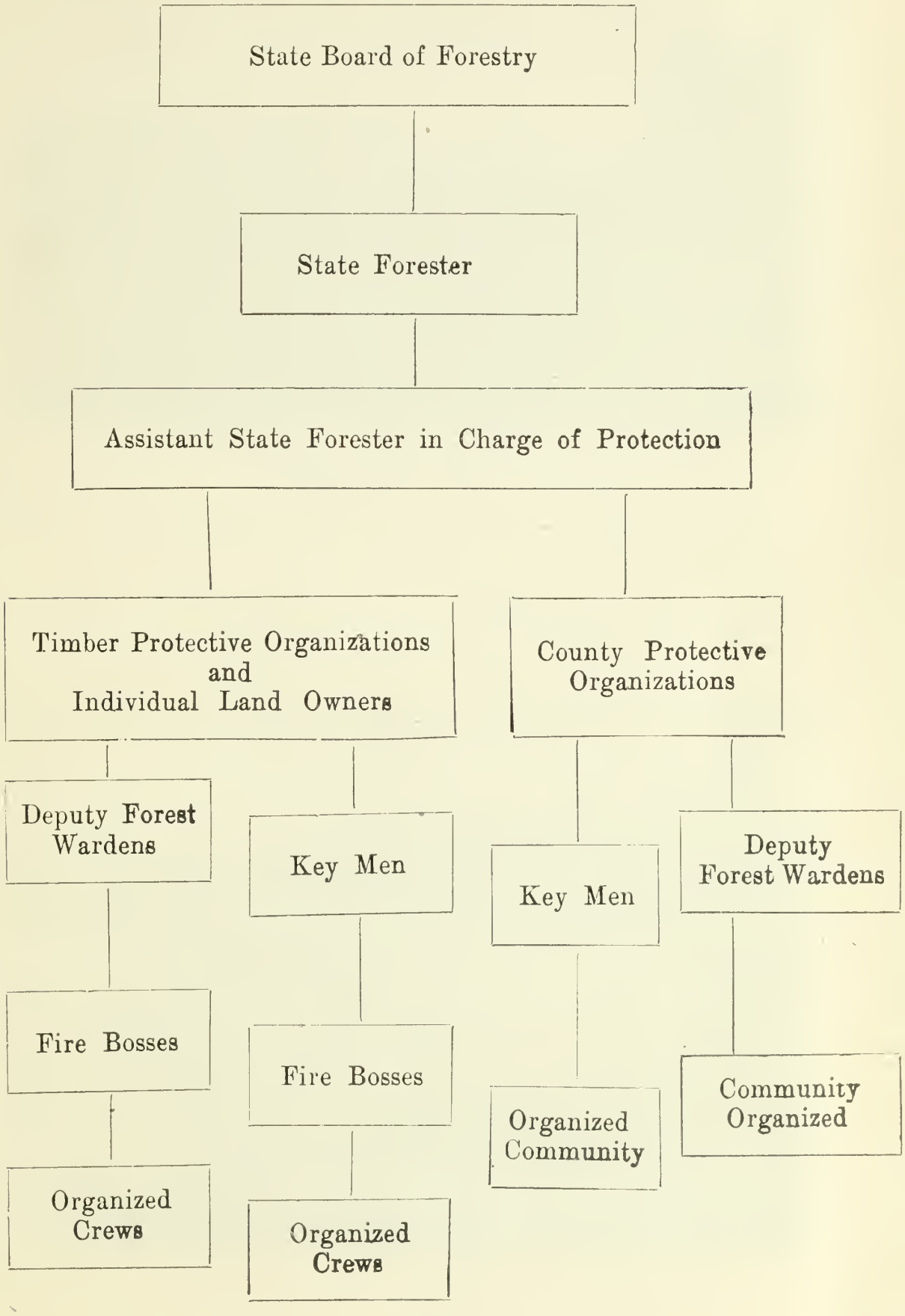
In order that this work could make progress simultaneously with the first aid and relief of our present timber situation and not hinder the gratifying results in cooperative protection and management, the Director of Education is serving without compensation from the State and the Board has welcomed the aid of civic organizations thru this channel. A plan of introducing forestry studies in the public schools without overloading the present curricula with new text books is being worked out cooperatively with the State Superintendent of Schools. The complete project will correlate forestry with lessons in history, english, arithmetic, etc., and finally the field work will require specially trained instructors in forestry to attend teachers' institutes and visit schools for demonstrational help. Illustrated lectures, motion pictures, colored charts, maps and other equipment will be supplied as the work develops. The Georgia Forestry Association

is continuing its cooperation to the limit of its capacity. The Parent-Teacher Association and other organizations are interested and some of their representatives are now actively sharing some of the responsibilities of this educational work in forestry. The Board has approved a prize essay contest now being conducted by the Georgia Forestry Association, and by the middle of April 1927, 5,000 Forestry Primers will have been distributed to Georgia school teachers for use in this contest. The Primers were furnished free by the American Tree Association and 10,000 additional copies will be distributed for this purpose.

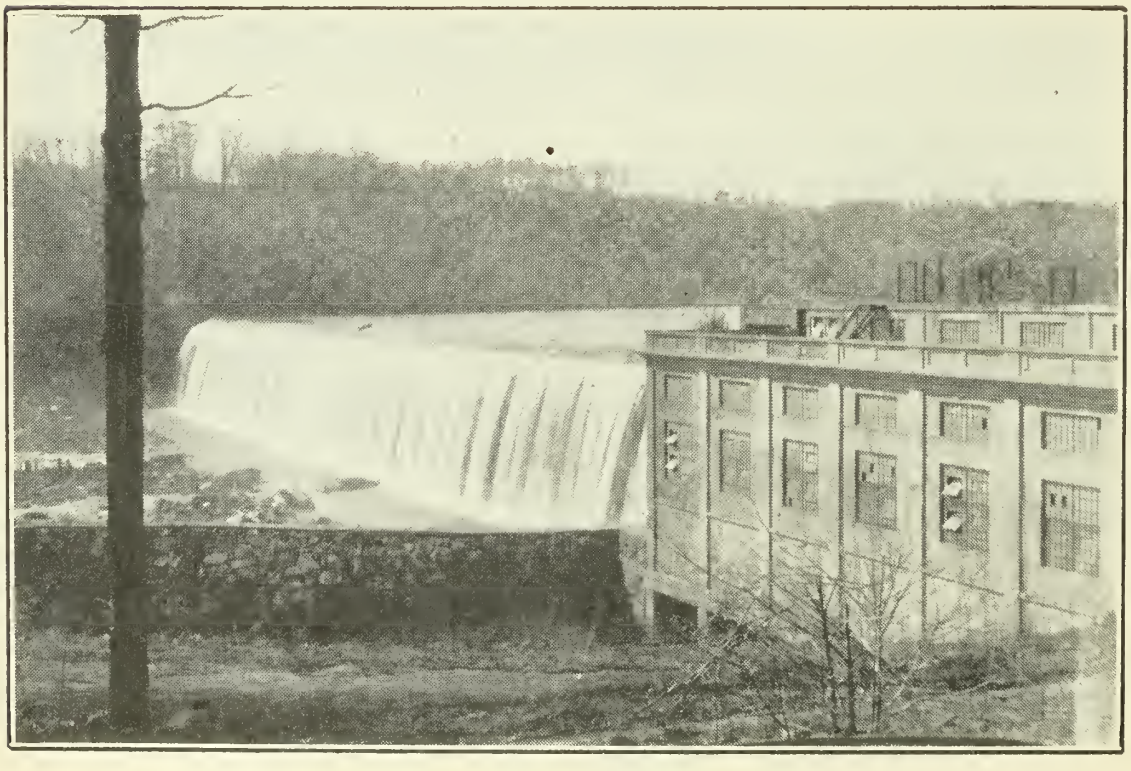
The Board feels that the opening of this channel for private cooperation in educational work will undoubtedly help bring many consumers of wood to realize that forestry is everybody's problem. At the same time, the concentration of State and Federal funds available for forestry in Georgia may be more largely continued for immediate needs in proper protection and management of timbered areas and for the earliest possible rehabilitation of cut-over lands and waste areas.

Georgia's Fire Control Plan 1926-1927

ORGANIZATION CHART.



Prevent forest fires here, and



Prolong this industry (miles away)

Forest Fire Prevention

The Board recognizes the fact that forest fire is the greatest of all enemies to tree growth. The Legislature made this plain in the Law of 1925, and as an activity of the Board, Fire Prevention ranks first.

The facts about Georgia's forest fire condition were indefinite and incomplete. Many citizens of the State were interested and had made close observations. The estimates (based on such observations) of forest area burned over varied from 25% to 95%, depending upon the locality, and whether the weather conditions were favorable or unfavorable to forest fires during the season of high danger. Many forest fires were never reported, nor was any effort made to suppress them.

The need for organization, or group effort on the part of all land owners and citizens, with systematic fire prevention as well as fire suppression methods, was most obvious. The Law makes it the duty of the Board to provide *"such fire control, either independently, or in cooperation with the Federal Government."* Pursuant to this mandate of the Law, the survey as outlined on Pages 11 to 14 of this report was made. From the information gathered, although very incomplete in detail, a definite idea that the paramount need of the State at this time was a definite fire control policy, either independently or in cooperation with counties and private owners, or jointly with the Federal Government in cooperation with the counties and private owners.

Conditions necessitated a very broad policy as the foundation on which to build for the future, and as the facts became known, they, together with the experiences of other States under very similar conditions to those in Georgia, were used as a guide or basis for formulating the present fire control policy.

With the small amount of State funds available for the work, independent cooperation with the private owners was out of the question, but through the Federal Law, known as the Clarke-McNary Law, and Section 3, Paragraph 4, of the Forestry Act of 1925 of the Georgia Law, a cooperative agreement between the Georgia Forestry Department and the United States Department of Agriculture, Forest Service, was entered into on October 25th, 1925, and a limited amount of Federal Funds made available for cooperation with private owners.

The National policy in forest fire cooperation recognized the Federal Financial responsibility as 25% of the cost of protection. The Board recognized 25% as the State's proportionate share in

the cost of protection, with the remaining 50% to be borne by the owner. This places the major portion of the burden of protection on the owner, who receives the greatest direct benefit or returns from the investment. But, forest fire control is of vital concern to both the State and the Nation, and is recognized by the people as a direct public responsibility.

Georgia's 23,000,000 acres of potential forest land, if protected from fire and handled under forest management, are capable of maintaining an industry that should contribute at least $75,000,000. annually to the wealth of the State. Probably 90% of this forest area will reforest itself, if fires are kept out, and the rate of growth will more than double that of the annually burned areas.

With these principles clearly in mind, the Board's cooperative fire control policy includes both large and small owners and offers:

I. **The service of the Chief of Protection in:**
   - (a) **Fire prevention work;**
   - (b) **A fire protection system, including both patrol and lookout systems;**
   - (c) **A reporting system, including methods and men;**
   - (d) **Method of transportation to fires;**
   - (e) **Necessary tools and equipment;**
   - (f) **System of fire lines—how, what and where to construct them;**
   - (g) **Training men in fire suppression work, such as organizing crews, handling crews on fire, the best method or way to attack, completing a job or being sure the fire is out before leaving.**

II. **The refund of from 25% to 40% of all money spent in fire prevention work, up to and including 10c per acre per annum, where there is a cooperative agreement between the organized owners and the State Board of Forestry.**

III. **The expert advice, aid and assistance of forest officers trained in this line of work.**

Cooperative Protection

It would be impossible for the man in the city to protect his home but for cooperative effort. Every individual in the city detects and reports fires to the Fire Department, and this coordination of individual and collective effort gives him protection.

The timberland owner has greater obstacles to overcome. He has not the authority to enforce the law, or to secure aid in preventing and suppressing forest fires, and the cost of protection on a small area is relatively high. However, the organized effort of a group of timberland owners in close cooperation with the State offers the most economical and practical method of forest fire protection. The technical work and necessary supervision can be given by the State. The estimated average cost of cooperative fire protection is 2 1-4c per acre per annum, or less than 7-10 of 1% of the income from Georgia's forest land. The individual effort would cost at least four times as much as the cooperative work.

Timber Protective Organization

There are fourteen Timber Protective Organizations in Georgia.

Any organized group of timberland owners representing 10,000 acres or more is called a Timber Protective Organization, and is eligible for State financial aid. The officers of the organization are a President, Vice President, Secretary and Treasurer, who serve without compensation and are elected by the members. The cooperative agreement is between the organization and the State Board of Forestry.

The members of the Timber Protective Organizations pay forest fire insurance at the rate of 2 1-2c to 3c per acre per annum. This fund pays the salaries of the patrolmen, whose specific duty it is to:

1. **Prevent forest fires from starting on the organized area;**
2. **Suppress those fires which do start;**
3. **Build up the fire department through personal contact, teaching and awakening the interest of the people living in or around the organized area.**

Every land owner is eligible for membership in the organization. Each member receives the same degree of protection in proportion to his participation, e. g., those who pay the per acre assess-

ment receive patrol only, whereas, those who go still further and construct fire lines, telephone lines, purchase fire fighting equipment, etc., are allowed to match these expenditures through the Timber Protective Organization against State and Federal funds.

The records and books of the Timber Protective Organizations are kept by the Secretary and Treasurer and are open for audit by both State and Federal officers.

The field work, etc. receives the supervision, advice and assistance of the State Forester and his staff.

So many owners want to cooperate with the State in protecting their forest lands, and some are spending as much as 35c per acre, that it necessitated the State Board fixing 10c per acre per annum as the maximum amount on which the Department would allow a refund. This amount is higher than was recommended in the beginning and can be materially reduced by efficient organization.

Bulletin No. 1, which is for free distribution, explains in detail how the organization is perfected and operated.

There are 14 Timber Protective Organizations under cooperative agreement with the State Board of Forestry, covering 1,355,270 acres. These organizations employ a total of 33 patrolmen for periods varying from four to twelve months in each year, and have constructed approximately 2,300 miles of fire line. Some organizations have purchased fire fighting tools and equipment and some have budgeted funds for the purchase of five steel lookout towers varying from 85 to 110 feet in height.

County Plan

Under the County Plan, cooperation is offered to the 42 counties in Georgia having county police organizations. Eleven of these counties, with a total forest area of 1,593,000 acres, have had their county police appointed as deputy forest wardens, and in this way have an active law-enforcing organization. The wardens thus appointed are instructed to carry on both fire prevention and suppression work.

This gives us a total of 2,958,207 acres of forest land under organized fire protection in Georgia, which represents 12 3-4% of the entire forest area and this has been accomplished in less than eleven months time since cooperation was made available under the Forestry Act of 1925.

Deputy Forest Wardens

Section 8 of the Administrative Act further authorizes the appointment by the Governor of *Deputy Forest Wardens,* TO SERVE WITHOUT COMPENSATION FROM THE STATE.

There are 196 men in Georgia who have received a commission from the Governor and a badge from the Department which gives them authority to make arrests for infraction of the Forest Fire Law. Many of these are patrolmen employed by the Timber Protective Organizations, while a large number are prominent men vitally interested in forestry and are serving *as a patriotic duty to Georgia.*

Summary of Protection Work

I. *Every County visited* by the State Forester, or a member of his staff.

II. 2,958,207 Acres, or 12 3-4% of the forest area of the State under fire control system in 11 months time.

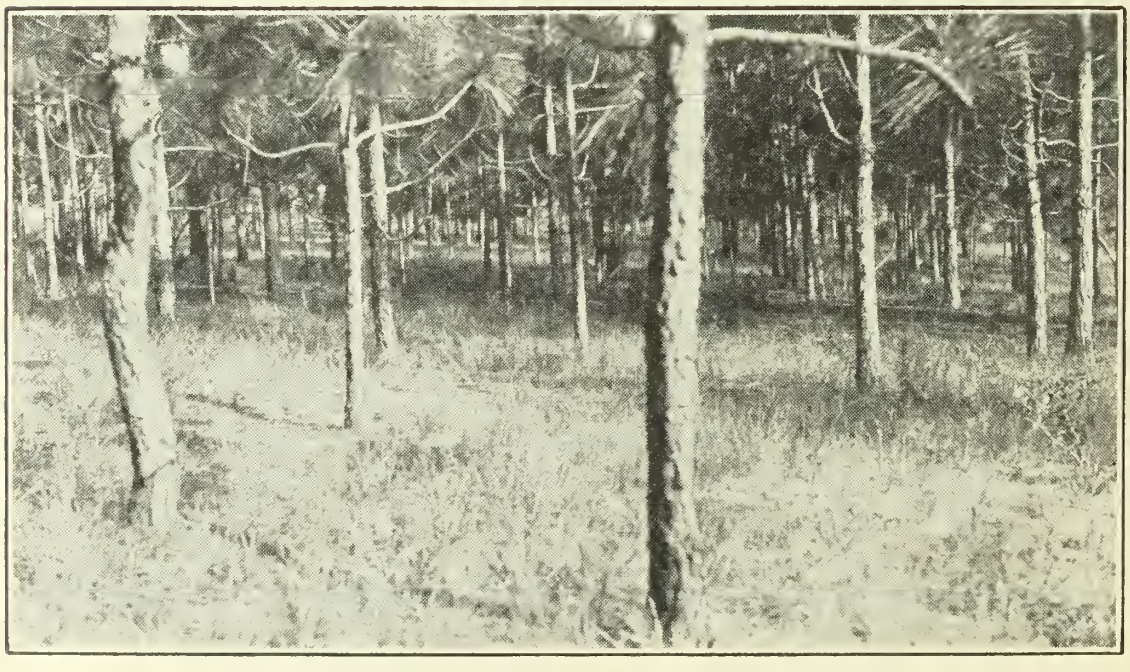
III. 196 Deputy Forest Wardens, SERVING GEORGIA WITHOUT COMPENSATION FROM THE STATE.

IV. A definite fire control policy inaugurated.

V. Eleven counties with law enforcement organizations, *without any additional expense* to the County or to the State.

VI. FOREST FIRE FACT FINDING SURVEY.

Unprotected and unproductive



Protected and productive

Fire Statistics

Fire statistics in the past have been conservative, though incomplete. It is difficult to gather accurate information of this character without a protective organization. Estimates either of area burned or amount of damage by the untrained or inexperienced are subject to correction. In the same way, many fires are not reported.

The drought of 1925 was the most serious in years. The forest fires which followed took an enormous toll. Only the actual damage could be estimated. Fire reports for 1925 were incomplete and exceedingly conservative. Many localities failed to report at all.

The reports of 1926 from the protected areas are accurate and complete, but from the unorganized area, the data is still incomplete. The figures used are most conservative.

In the summer and fall of 1926 the drought, which extended over middle and south Georgia, resulted in a larger acreage burned *in this region* than in 1925.

The best information available for the unprotected areas and the investigations of the Board show the following data for the past two years:

Year	Number of Fires	Area Burned	Total Actual Damage
1925	9,580	2,200,000 acres	$5,101,058
1926	6,415	1,896,637 acres	3,406,476

The figures given in the damage column above cover direct losses only. The indirect damage, which cannot be measured by the dollar mark, are not included. These include young growth, fish and game, fertilizing values, erosion, influence on stream flow, recreational values, etc.

Area Burned By Classes

1926

	Area Dec. 31, '26	Total Number Fires	Total Area Burned	Percent Forest Land Burned
Total area protected by Timber Protective Organization in co-operation with State	980,000 acres	34	6,267 . acres	.006
Unprotected or Unorganized	10,000,000 acres	6,381	1,896,637 acres	.189

NOTE: Entire forest area not included in reports.

Management

The Board is directed in the third paragraph, Section 3, of the Forestry Act to advise and cooperate with land owners and forest users. To facilitate carrying out this provision an application form has been prepared and distributed. Many applications have been received and responded to. These applications indicate that land owners are coming to understand the value of systematic management and also the value of technical assistance in formulating a system of management. The advantages of this form of assistance over general advice by publications are apparent; the advice is based on a study of the land and the local conditions, and the system of management recommended can be adapted to the local requirements. In this connection, attention is called to the nature of land ownership in Georgia. With the exception of the National Forests, a few acres that have been given to the State, and a few tracts owned by institutions, the forest lands of Georgia are in private ownership. They are owned by lumber and turpentine interests, mining interests, and farmers.

The future timber and naval stores supply of the State depends on the extent to which these private owners put the principles of forestry into practise on their lands, as well as on the attitude of the State as expressed in its forest fire control policy. Realizing the importance of encouraging private owners to put their lands under systematic management, the offer of assistance has been extended to all classes of owners.

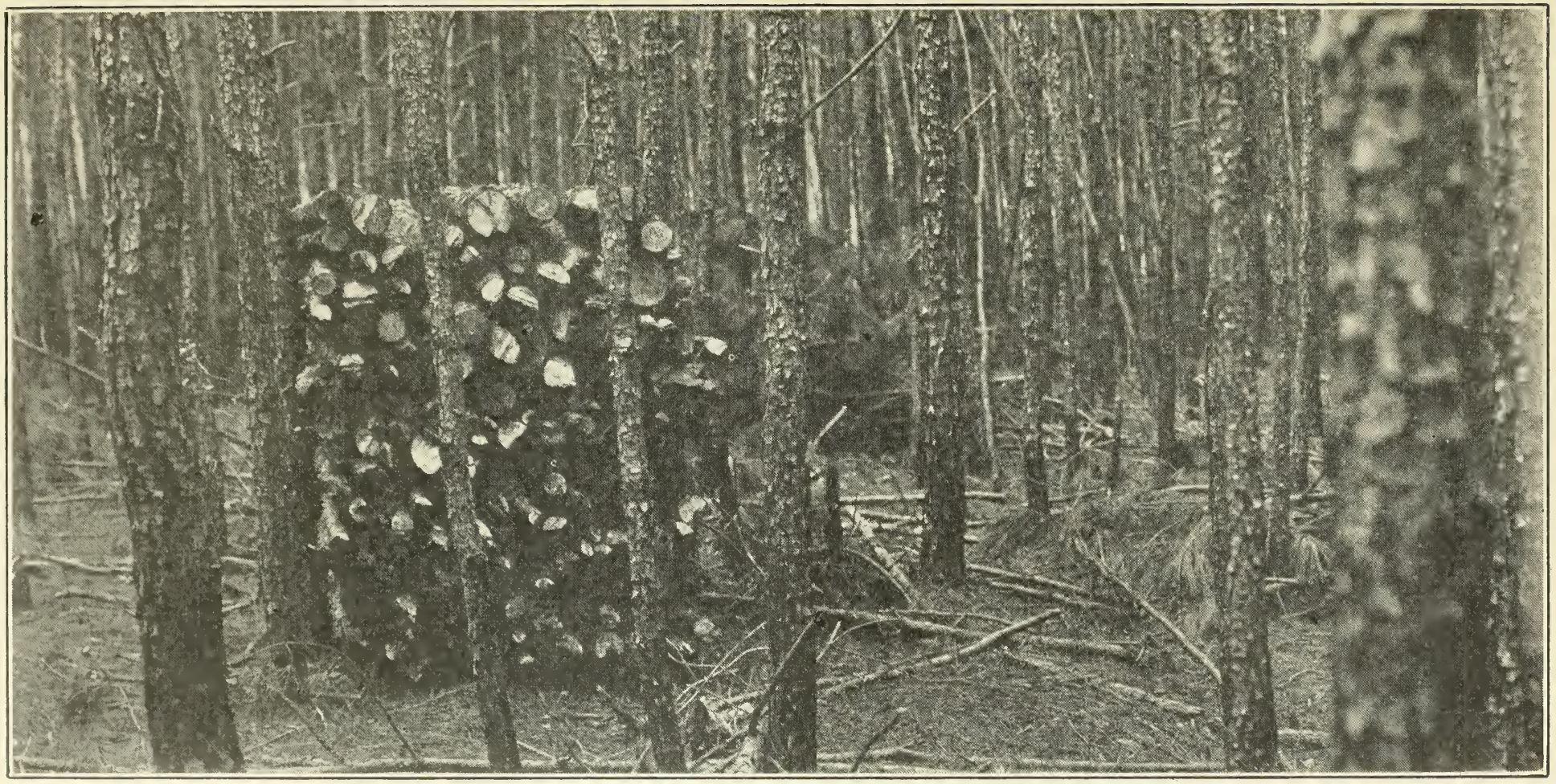
The Board has adopted the policy of requiring applicants to provide the travelling expenses incident to making the study and report that their applications call for, but makes no charge for the time of the forester while making the examination and preparing the report. It is felt that the small amount paid by the owner is an earnest of his purpose to put into operation the advice sought.

In addition to the individual advice referred to above, several projects have been undertaken for the assistance of forest owners.

A leaflet on the loblolly pine, based on original investigation in this State, has been printed and placed in the hands of many owners in the range of the loblolly pine. The manuscripts for similar leaflets on the shortleaf, slash, longleaf and white pines are under preparation and will be issued as soon as the necessary field work can be completed.

Before the creation of this Board, the present Director of Forest Management began an experiment to determine the response of young stands of second growth loblolly pine to thinning. The

Stand of old field pine on a Georgia farm, at 17 years of age. There are more than 1900 trees to the acre.



Inside same stand. A moderate thinning furnished fire wood, reduced the number of defective trees, and increased growth in diameter, height and volume.

Board has taken over this experiment, the Director of Management has re-measured the plots, repeated the thinning, and is preparing a progress bulletin for publication. This publication will place at the disposal of Georgia land owners information based on actual trial extending over a period of fifteen years. This trial shows that the removal of 23% to 27% of the medium and smaller trees from a young stand, or 15% to 18% of the volume of the stand, has resulted in thriftier height growth, larger diameters, a volume increase of 22% over the unthinned check plots, and a reduction of the fire risk. There was also an improvement in the quality of the timber, due to the elimination of limby and crooked trees.

Some preliminary work has been done in thinning slash pine thickets to develop the trees for turpentining. It is known that crowding during the younger stages reduces the value of slash pine as a turpentine producer; but the cost of thinning and the response of the trees will have to be determined by experiment. The preliminary work indicates that thickets of slash pine can be thinned when from 5 to 15 years old at an outlay of $1.50 or less per acre.

Attention is called to the importance of such work as the experiments in thinning loblolly and slash pine. Many owners hesitate about embarking on a program of forestry because exact, dependable information is not available, and they haven't the time and technical training to get such information by private experimentation.

The Board, acting under authority given in the third paragraph of the Forestry Act referred to above, is rendering a service to land owners by undertaking such experimentation. The value of such work will increase as time goes on and its findings are applied on a large scale. For example, the experiment in thinning loblolly pine shows that poles, firewood and pulpwood may in like condition be cut from young stands, and after producing these supplies the stands are in better shape to produce sawlogs later on, provided the cutting is done in accordance with the principles of forestry; and the application of this knowledge on a large scale will save the needless drain made by the production of poles, firewood and pulpwood, and even convert the drain into an increase.

State Forests

Section 5 of the Forestry Act of 1925 authorizes the Governor, upon recommendation of the Board, to acquire land by purchase, and to accept gifts of land to the State, the same to be administered by the Board as State Forests.

Offers to donate land to the State as State Forests for practical demonstrational areas necessitated early action on this phase of the work of the Board, and a State Forest Policy. It was evident that:

(a) **A few acres scattered over the 161 counties of the State would necessitate prohibitive administration costs;**

(b) **Any tract of land must be of value as a practical demonstrational area and of sufficient size to form a workable unit and be accessible to the public;**

(c) **The possibilities of the future purchase of additional acreage at a reasonable cost must be unusually good;**

(d) **There is need of a demonstrational area in each forest region of the State;**

(e) **These areas should provide a practical demonstration of each phase of the many and varied forest activities.**

Vogel State Forest Park

In carrying out or applying the above fundamental principles, only one of three offers has been accepted to date. This offer by Pfister & Vogel Land Company, a Georgia Corporation with headquarters at Blairsville, Ga., owning some 65,000 acres in North Georgia and who have been practising forestry on this area for fifteen years, is located on the Appalachian Scenic Highway at and near Neel's Gap in Union County. The deed, which has been accepted by the Governor, and title approved by the Attorney General's office, has been prepared and recorded. It conveys a total of 16 acres to be administered as a State Forest.

This gift includes Neel's Gap, the highest point reached by a hard surfaced road in Georgia, and offers scenic views unequalled east of the Rocky Mountains.

Research

Forest research is another distinctive service which the Department can render. The great need of forest research work is felt, not only in Georgia, but throughout the entire United States. A few of the important projects are:

(a) **Studies of fire damage in each of the eight forested regions of the State;**

(b) **Rate of growth—by species and region;**

(c) **Thinnings—how, when, cost and profit;**

(d) **Volume and yield tables;**

(e) **Fungi and insect control measures;**

(f) **The effect of annual burning on the spread of fungi and insects;**

(g) **Timber supply and improved methods of operation and utilization;**

(h) **Naval Stores industry;**

1. **Methods of chipping;**
2. **Depth and width of face;**
3. **Maximum production per acre from a given stand;**
4. **Utilization of products, especially rosin and its unknown values;**

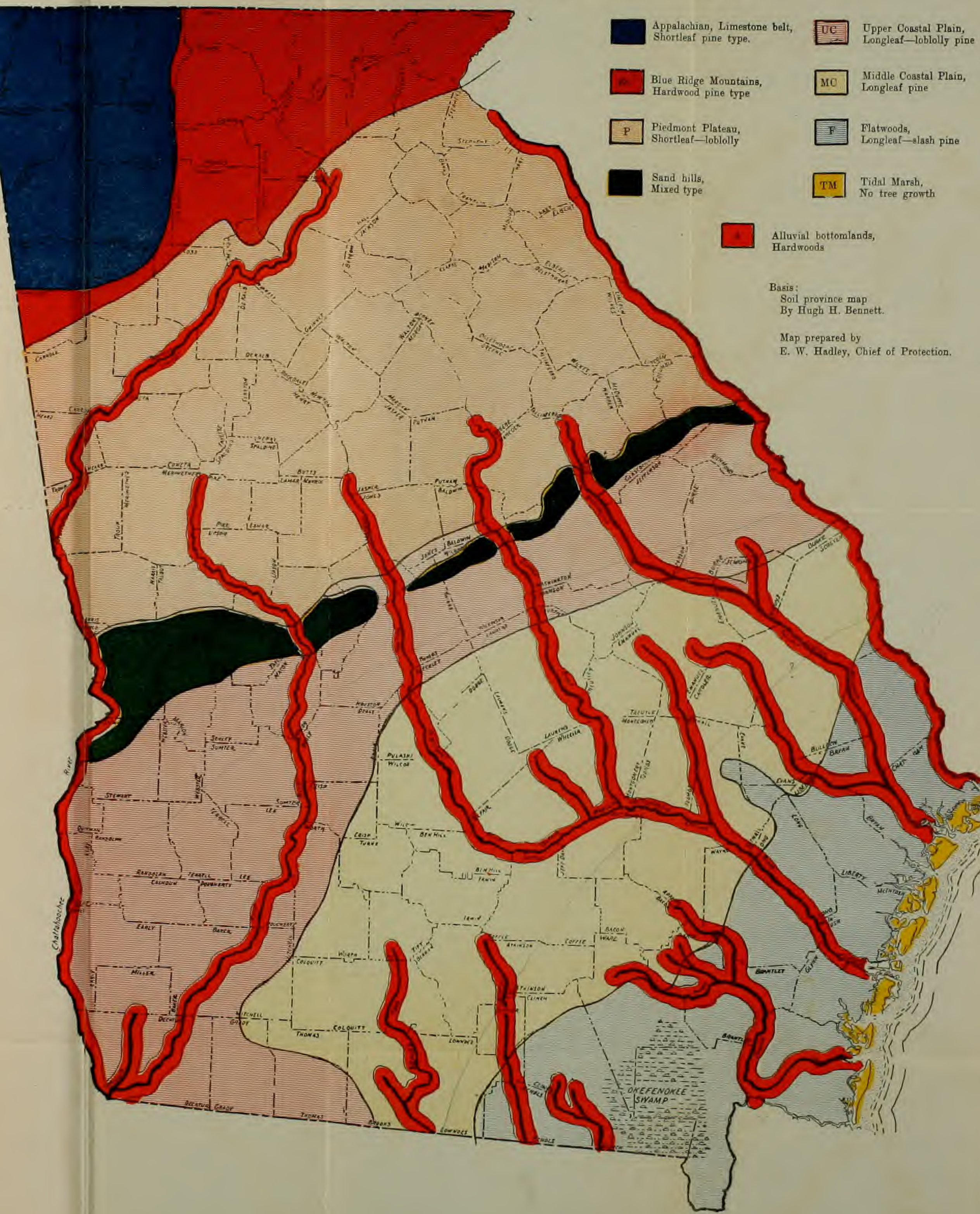
(i) **Land classification survey, so that every acre will produce the crop most profitable to the owner.**

Before any of these projects can be undertaken by the Board, a most carefully considered and feasible plan must be worked out and necessary provision made so that the results will fill the most pressing need at that time.

GEORGIA STATE FORESTRY DEPARTMENT

B. M. Lufburrow, *State Forester*

Forest Type Map of Georgia, Showing Boundaries of Forest Regions



Regional Map

The regional map is based on the soil survey map of Hugh H. Bennett; although the various forest regions, as shown by the map, may not conform to the exact boundary lines, still, the typical region or forest type does lie within these lines.

A glance at this map shows that Georgia offers a wonderful opportunity as a timber producer because of the many forest types which afford a wide range in the number of species, the fast growing varieties, together with the long growing season, and the soil and climatic conditions most favorable to tree growth.

Native Trees

The forest flora of Georgia is rich. The wide difference between the climate of the lowlands in the southern part of the State and of the highlands in the northern part, brings into the short compass of 320 miles most of the trees found from northern Florida to southern Pennsylvania. This great variety in tree growth, while enriching the timber resources of the State, complicates our problems of silviculture, management and marketing. Believing that the forestal practise of the State should rest on a full knowledge of the trees and their distribution, a compilation of the available information will be made, and this will be extended as rapidly as new information is obtained. Our work along this line has been facilitated by the work done by the Geological Survey in former years. The Geological Survey realized the importance of the State's forest resources years ago, and made an excellent collection of wood specimens which is on display in the Capitol where it is seen by hundreds of visitors during the course of a year. The informational value of this collection was enhanced by the distribution of maps made by Dr. Roland M. Harper. The collection would be still more interesting if specimens of the leaves, flowers and fruits accompanied the specimens of wood.

The Director of Management has offered to donate his private collection of mounted specimens, and we are considering a way to place these on exhibition along with the specimens of wood.

To convey an idea of the richness of the forest flora of Georgia, a list of trees found in the State is given below. The trees that are considered to be of importance are printed in heavy type, and those represented in the collection are marked with an asterisk. In deciding what trees are important, two things were taken into consideration, the technical value of the wood and the abundance. For example, white pine, although it is not abundant, has high technical value, and the scrub pine, although it is a poor timber tree, was included on account of its wider range and growing use as pulpwood. It will be observed that there are 163 species on the whole list and that 53 of them are regarded as important.

There is no State except Florida that has so large a number of species, and no State in the Union has so many that may be regarded as important timber trees.

In preparing the list, the nomenclature of Sudworth's Check List of 1898 was followed except in the case of the basswoods, which are given as in the 1926 edition of Sargent's Manual, and the alder which is given as in Gray's Manual.

Trees Found In Georgia

WHITE PINE, *PINUS STROBUS**
LONGLEAF PINE, *PINUS PALUSTRIS**
SLASH PINE, *PINUS CARIBAEA**
LOBLOLLY PINE, *PINUS TAEDA**
Pitch pine, *Pinus rigida*
SHORTLEAF PINE, *PINUS ECHINATA**
Pond pine, *Pinus serotina**
SCRUB PINE, *PINUS VIRGINIANA**
Spruce pine, *Pinus glabra**
Table Mountain pine, *Pinus pungens**
HEMLOCK, *TSUGA CANADENSIS**
Carolina hemlock, *Tsuga caroliniana**
BALD CYPRESS, *TAXODIUM DISTICHUM**
White cedar, *Chamaecyparis thyoides*
RED CEDAR, *JUNIPERUS VIRGINIANA**
Torreya, *Tumion taxifolium*
Cabbage palmetto, *Sabal palmetto**
Aloe-leaf yucca, *Yucca aloifolia*
Butternut, *Juglans cinerea*
BLACK WALNUT, *JUGLANS NIGRA**
BITTERNUT HICKORY, *HICORIA MINIMA**
Water hickery, *Hicoria aquatica**
SHAGBARK HICKORY, *HICORIA OVATA**
MOCKERNUT HICKORY, *HICORIA ALBA**
PIGNUT HICKORY, *HICORIA GLABRA**
Pale-leaf hickory, *Hicoria villosa*
Max myrtle, *Myrica cerifera*
Corkwood, *Leitneria floridana*
BLACK WILLOW, *SALIX NIGRA**
Largetooth aspen, *Pupulus grandidentata*
SWAMP COTTONWOOD, *POPULUS HETEROPHYLIA*
COTTONWOOD, *POPULUS DELTOIDEA**
RIVER BIRCH, *BETULA NIGRA**
Yellow birch, *Betula lutea**
Sweet birch, *Betula lenta**
Alder, *Alnus rugosa**
Hornbeam, *Ostrya virginiana**
Blue beech, *Carpinus caroliniana**
BEECH, *FAGUS ATROPINICEA**
Chinquapin, *Castanea pumila**
CHESTNUT, *CASTANEA DENTATA**
WHITE OAK, *QUERCUS ALBA**
POST OAK, *QUERCUS MINOR**
OVERCUP OAK, *QUERCUS LYRATA**

CHESTNUT OAK, *QUERCUS PRINUS*
Swamp white oak, *Quercus plantanoides**
COW OAK, *QUERCUS MICHAUXII*
LIVE OAK, *QUERCUS VIRGINIANA**
Myrtle oak, *Quercus myrtifolia*
RED OAK, *QUERCUS RUBRA**
SCARLET OAK, *QUERCUS COCCINEA**
YELLOW OAK, *QUERCUS VELUTINA**
Turkey Oak, *Quercus catesbaei**
SPANISH OAK, *QUERCUS DIGITATA**
Georgia oak, *Quercus georgiana**
Blackjack oak, *Quercus marilandia**
WATER OAK, *QUERCUS NIGRA**
Laurel oak, *Quercus laurifolia**
Blue-jack oak, *Quercus brevifolia**
Shingle oak, *Quercus imbricaria**
WILLOW OAK, *QUERCUS PHELLOS**
Red elm, *Ulmus serotina*
Slippery elm, *Ulmus pubescens**
White elm, *Ulmus americana**
WING ELM, *ULMUS ALATA**
Planertree, *Planera aquatica**
Hackberry, *Celtis occidentalis**
Sugarberry, *Celtis mississippiensis**
RED MULBERRY, *MORUS RUBRA**
Osage orange, *Toxylon pomiferum*
MAGNOLIA, *MAGNOLIA GRANDIFLORA**
Sweet magnolia, *Magnolia glauca**
Cucumber-tree, *Magnolia acuminata**
Largeleaf umbrella, *Magnolia macrophylla**
Fraser umbrella, *Magnolia, Magnolia fraseri**
TULIP TREE, *LIRIODENDRON TULIPIFERA**
Papaw, *Asimina triloba**
Red bay, *Persea borbonia*
Swamp bay, *Persea pubescens**
SASSAFRAS, *SASSAFRAS SASSAFRAS**
Witch hazel, *Hamamelis virginiana*
SWEET GUM, *LIQUIDAMBAR STYRACIFLUA**
SYCAMORE, *PLATANUS OCCIDENTALIS*
Sweet crab, *Pyrus coronaria*
Narrowleaf crab, *Pyrus augustifolia**
Serviceberry, *Amelanchier canadensis**
Cockspur, *Crataegus crus-galli**
Scarlet Haw, *Crataegus coccinea*
Pear haw, *Crataegus tomentosa*
Dotted haw, *Crataegus punctata*

Green haw, *Crataegus viridis**
Summer haw, *Crataegus aestivalis**
Parsley haw, *Crataegus apiifolia**
Wild plum, *Prunus americana**
Chickasaw plum, *Prunus agustifolia*
Black sloe, *Prunus umbellata**
Choke cherry, *Prunus virginiana*
BLACK CHERRY, *PRUNUS SEROTINA**
Laurel Cherry, *Prunus caroliniana*
Chalky leucaena (*Mimosa*) *Leucaena pulverulenta*
Redbud, *Cercis canadensis**
HONEY LOCUST, *GLEDITSIA TRIACANTHOS**
Water locust, *Gleditsia aquatica**
Yellowwood, *Cladrastis lutea**
LOCUST, *ROBINIA PSEUDACACIA**
Clammy locust, *Robinia viscosa**
Prickly ash, *Xanthoxylum Clava-herculis**
Hoptree, *Ptelea trifoliata**
Loblolly bay, *Gordonia lasianthus**
Smooth sumach, *Rhus glabra**
Staghorn sumach, *Rhus hirta*
Dwarf sumach, *Rhus copallina**
Poison sumach, *Rhus vernix*
Ironwood, *Cyrilla racemiflora*
Titi, *Cliftonia Monophylla**
AMERICAN HOLLY, *ILEX OPACA**
Dahoon, *Ilex cassine*
Yaupon, *Ilex vomitoria*
Deciduous holly, *Ilex decidua**
Waahoo, *Evonymus atropurpureus*
Sugar maple, *Acer saccharum**
SILVER MAPLE, *ACER SACCHARINUM**
RED MAPLE, *ACER RUBRUM**
Boxelder, *Acer negundo**
Buckeye, *Aesculus glabra*
Yellow buckeye, *Aesculus octandra**
Wild china, *Sapindus marginatus*
Yellow buckthorn, *Rhamnus caroliniana*
BASSWOOD:
Tilia littoralis
TILIA CAROLINIANA
*TILIA HETEROPHYLLA**
*Tilia georgiana**
Angelica-tree, *Aralia spinosa**
DOGWOOD, *CORNUS FLORIDA**
Blue dogwood, *Cornus alternifolia**

Blackgum, *Nyssa sylvatica**
WATERGUM, NYSSA BIFLORA*
Sour tupelo, *Nyssa ogeche**
Cotton gum, *Nyssa aquatica*
Tree huckleberry, *vaccinium arboreum**
Andromeda, *Andromeda ferruginea*
Sourwood, *Oxydendrum arboreum**
Mountain laurel, *Kalmia latifolia**
Rhododendron, *Rhododendron maximum*
Catawba rhododendron, *Rhododendron catawbiense*
Tough bumelia, *Bumelia tenax*
Shittimwood, *Bumelia lanuginosa**
Buckthorn bumelia, *Bumelia lycioides**
PERSIMMON, *DIOSPYROS VIRGINIANA**
Sweetleaf, Symplocos tinctoria
Silverbell-tree, *Mohrodendron carolinum**
Snowdrop-tree, *Mohrodendron dipterum*
WHITE ASH, *FRAXINUS AMERICANA*
RED ASH, *FRAXINUS PENNSYLVANICA*
GREEN ASH, *FRAXINUS LANCEOIATA**
Water ash, *Fraxinus caroliniana**
Fringetree, *Chionanthus virginica*
Devilwood, *Osmanthus americanus*
Catalpa, *Catalpa catalpa**
Fever tree, *Pinckneya pubens**
Sheepberry, *Viburnum lentago**
Nannyberry, *Viburnum prunifolium*
Rusty Nannyberry, *Viburnum rufotomentosum**

Financial Report

Georgia State Board of Forestry

In account with Atlanta & Lowry National Bank.

FOR 1925, from Oct. 15th to Dec. 31st, inclusive:

RECEIPTS		
From State	$1,825.00	
From Fed. Gov.	None	$1,825.00
DISBURSEMENTS		
Salaries	$1,058.96	
Supplies	28.00	
Printing	54.44	
Office expense	159.75	1,301.15
Bal. on hand Dec. 31st, 1925, (State funds)		$ 523.85

FOR 1926

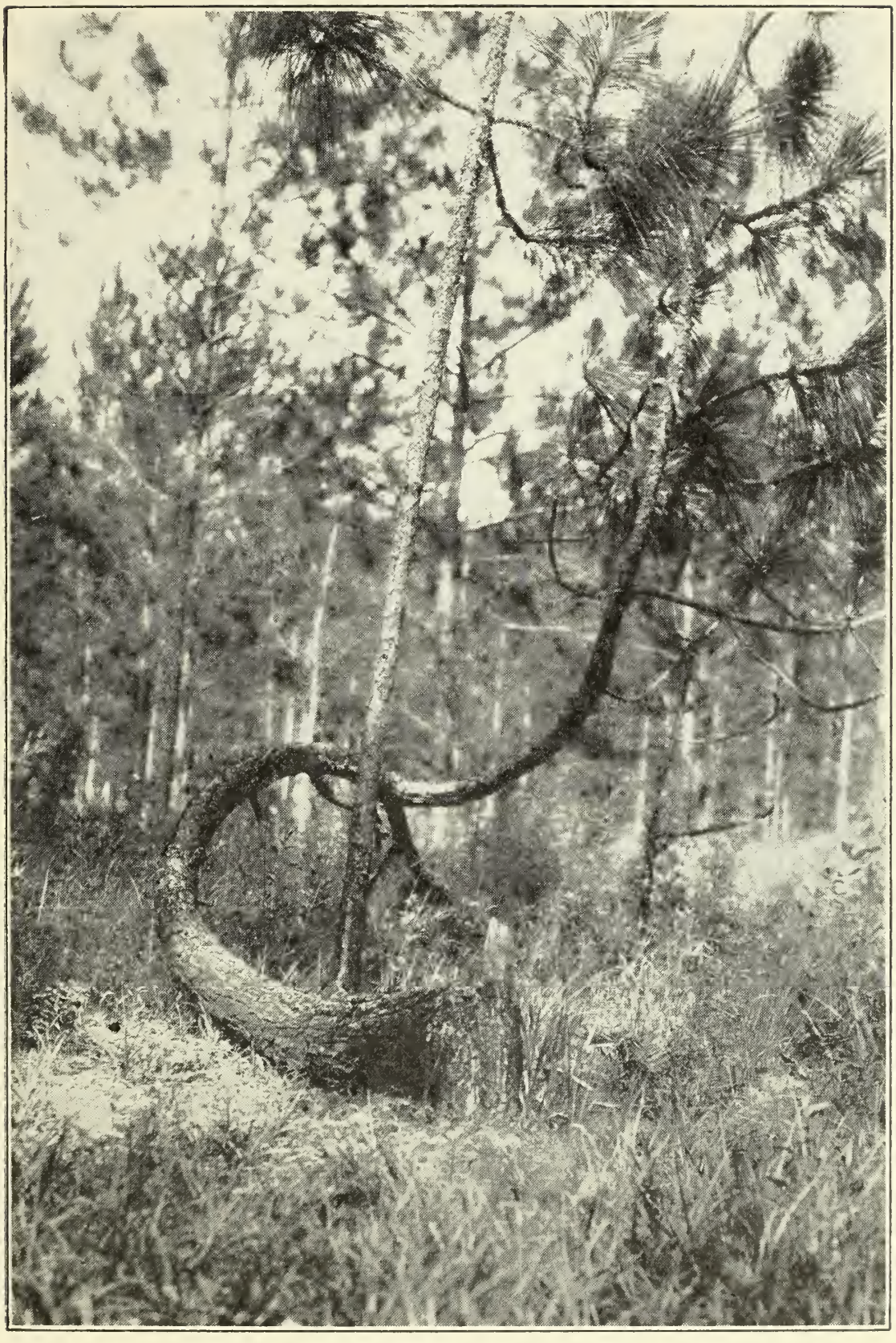
RECEIPTS		
From State	$13,402.42	
From Fed. Gov.	4,185.15	
Bal. from 1925	523.85	$18,111.42
DISBURSEMENTS		
Salaries	$ 8,630.77	
Supplies	1,733.59	
Printing	1,522.77	
Office expense	3,239.15	
Refunds to Timber Protective Organizations	429.74	$15,556.02
Bal. on hand Dec. 31st, 1926, (Fed. funds)		$ 2,555.40

The Board has strictly adhered to its policy of economy and efficiency in the use of funds. The citizens and the commonwealth have materially benefited from the appropriation allotted to forestry work in Georgia.

Conclusions

The magnitude of the work of this Department may be indicated by the fact that our conservative estimate for adequate fire protection ultimately will be approximately $450,000, or 2 1-4c per acre on 23,000,000 acres of forest land in Georgia.

The Forestry Board is not seeking an increase of present appropriations at this time, however, for the Board realizes that the better plan of constructive policies based on a firm foundation can and should be developed gradually for highest efficiency and best results. The Board needs more funds immediately, but Georgia's program of forest protection and management is now designed to accomplish the desired results through coordinated efforts of private owners, the State and Federal aid which will bring permanent forest development. By taking a little longer time, Georgia can build slowly but surely. The Board does submit for the consideration of the General Assembly at this time a "Forestry Contract Act", which would begin producing revenue within five years from such private cut over forest lands as may be placed under cooperative agreements with the State, when tax values are standardized, over a period sufficient for maturing new crops of timber. If the General Assembly in its wisdom sees fit to enact this legislation into law, as a companion measure with our present Administrative Act, the Forestry Board feels sure that the forestry work of Georgia will ultimately be self-supporting and this economic problem will be finally solved through perpetuation and proper use of forest resources.



The deformity of this tree is due to thoughtlessness—cut with an axe when a sapling, by a careless hand.

SECOND BIENNIAL REPORT

OF THE

State Board of Forestry

TO THE

Governor and General Assembly....

OF THE

STATE OF GEORGIA

1927-1928

B. M. LUFBURROW,
State Forester

SECOND BIENNIAL REPORT

OF THE

State Forester

TO THE

State Forestry Board

OF THE

STATE OF GEORGIA

1927-1928

B. M. LUFBURROW,
State Forester

Georgia State Board of Forestry

(Ex-Officio)

HON. L. G. HARDMAN, Governor,
President

HON. GEORGE H. CARSWELL, Sec. of State

HON. S. W. MCCALLIE, State Geologist

HON. J. PHIL CAMPBELL, Director of Extension,
State College of Agriculture

(Appointed)

MRS. M. E. JUDD, Dalton

J. LEONARD ROUNTREE, Summit

C. B. HARMAN, Atlanta

BONNELL H. STONE, Blairsville

ALEX K. SESSOMS, Cogdell

B. M. LUFBURROW, Secretary and State Forester

LETTER OF TRANSMITTAL FROM THE STATE FORESTER

MEMBERS OF THE STATE BOARD OF FORESTRY:

SIRS:

I herewith submit report covering activities of the Georgia Forest Service for the period of 1927 and 1928.

The two years of activity since the last biennial report have progressed favorably. The staff has been enlarged and the various lines of work outlined by your board at the beginning are now being carried on.

Fire protection, one of the major projects, has progressed to the point where 996,790 acres are now under the intensive fire protection of the Timber Protective Organizations. Individual landowners in a number of places are also practicing improved methods of fire control under the advice and direction of the staff. Besides, there is a widespread awakening among farmers to the importance of fire control as the result of various forms of educational work. In a word, there is a general improvement in the attitude of the public toward forest protection which it is believed will soon produce very noticeable results.

The Georgia Forest Service has been able to prosecute its educational work on a more intensive and extensive basis which has met splendid cooperation on the part of the press, the schools and various civic organizations. Among the activities of the Educational Department may be mentioned the cooperation of 150 agricultural high schools which are introducing forestry in their courses of study and are to have school demonstration forests. This is the first project of the sort started by any state in the Union.

Another achievement, the first of its kind, is the State Forest Fair which has met with signal success.

State forest-parks are meeting favor and it is expected that the two now existing will be increased in number through private donations in the near future.

The leaflets and bulletins issued during the past two years have sought to deal in a practical way with important problems. The demand for these publications indicate that they have supplied a need.

The Georgia system of administration, designed to give direct service at the lowest possible cost, is meeting expectations. Placing responsibility and local supervision on Timber Protective Organizations supervised by the trained force of assistant state foresters and district foresters located over the state at advantageous points, is securing results at comparatively small cost.

In carrying out its program great help is being obtained from the Georgia Forestry Association and it is with pleasure that this recognition of assistance is here recorded.

A cooperative enterprise known as the Southern Education Project which is employing forestry moving pictures with success, is participated in by the American Forestry Association, the Georgia Forestry Association, the Georgia State College of Agriculture and the Georgia Forest Service. Cordial relations are also being maintained with the American Tree Association, Southern Forestry Congress and various state organizations.

I wish to express my appreciation to the members of the State Board of Forestry for their very active and intelligent interest in the work of this department.

Respectfully,

B. M. LUFBURROW,

State Forester.

SECOND BIENNIAL REPORT

BOARD OF FORESTRY, STATE OF GEORGIA

1927-1928

INTRODUCTION

The First Biennial Report to the General Assembly of 1927 gave a survey of the work of the State Board of Forestry up to and including December 31, 1926. This the Second Biennial Report, deals with work done for the past two years and outlines the scope of the future work necessary to develop the forest resources of Georgia.

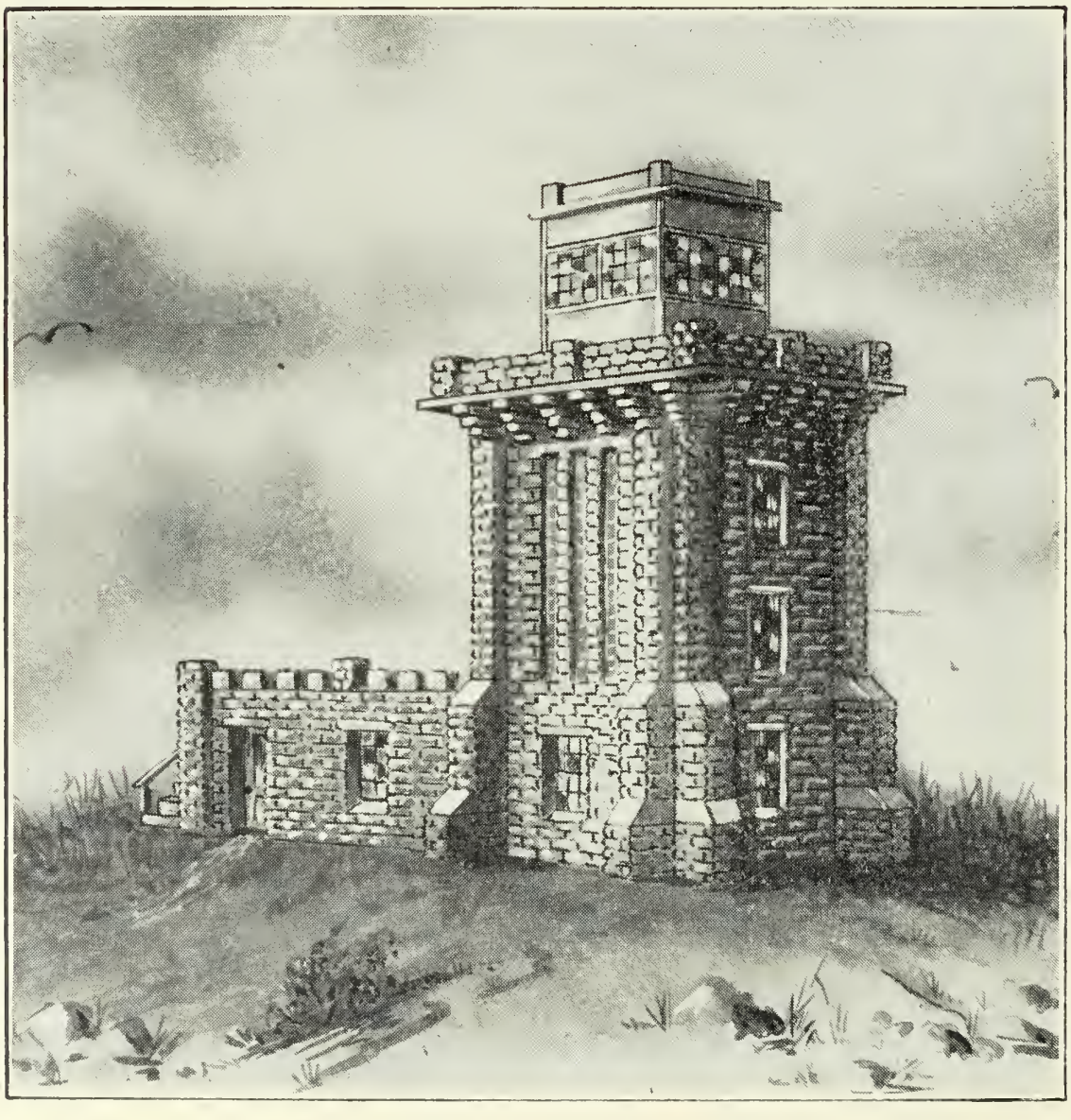
Responsibility has been definitely placed upon the Georgia State Board of Forestry to direct the activities of the Georgia Forest Service so as to secure results beneficial to the owners of Georgia's 23,725,000 acres of forest land. A fact finding survey has been made in a more detailed way than was previously undertaken, which has enabled the Board to direct the work with a better knowledge of the real needs of the State.

ADMINISTRATION

The Georgia State Board of Forestry is composed of nine members, four of whom are ex-officio and five appointed. The Governor is ex-officio Chairman and President. The appointed members are chosen because of their knowledge of the needs of Forestry and their intense interest in the proper development of Georgia's great forest resources. The ex-officio members not only have the knowledge and interest, but are familiar with the procedure in carrying on the State's business. Therefore, this Board is quite capable of directing the work.

The members of the Board serve without compensation from the State, deeming it a patriotic duty and an honor to render

this service to Georgia. They are reimbursed for their expenses while engaged in the performance of their duties as members of this Board. The records show that it cost the State an average of only $205.32 per year for traveling expenses of all Board members since 1925, during which period they have set up and directed the work under the Forestry Administrative Act of 1925. The same amount of business transacted by the directors of a bank or private corporation would cost many times that sum.



Proposed Legion Memorial Tower to honor Georgia soldiers who lost their lives in the World War—to be erected on Blood Mountain near Vogel Forest-Park, and serve as a lookout for forest fire control.

Activities since the 1926 report have been extended as funds have permitted. Additional projects have been launched, and the scope of the work now includes all projects set up in the organization plan adopted at the first board meeting.

The personnel of the department consists of the State Forester, the Director of Education and Utilization, two Assistant State Foresters, two District Foresters, a Secretary, and Assistant Superintendent of Forest-Parks. Headquarters for Assistant State Foresters are located at Albany and Gainesville, the District Foresters at Waycross and Rome.

The purpose of this form of organization is to render the most direct, efficient and economical service to the land owners. By reason of being located at strategic points over the State, the Assistant State Foresters and District Foresters are enabled to keep in close touch with land owners and cooperators. Transportation costs and travel time are thereby reduced to a mini-

On the left, a fire observation tower on the top of Ware Hotel at Waycross. On the right, a typical fire tower in the pine region of South Georgia, 100 feet high.

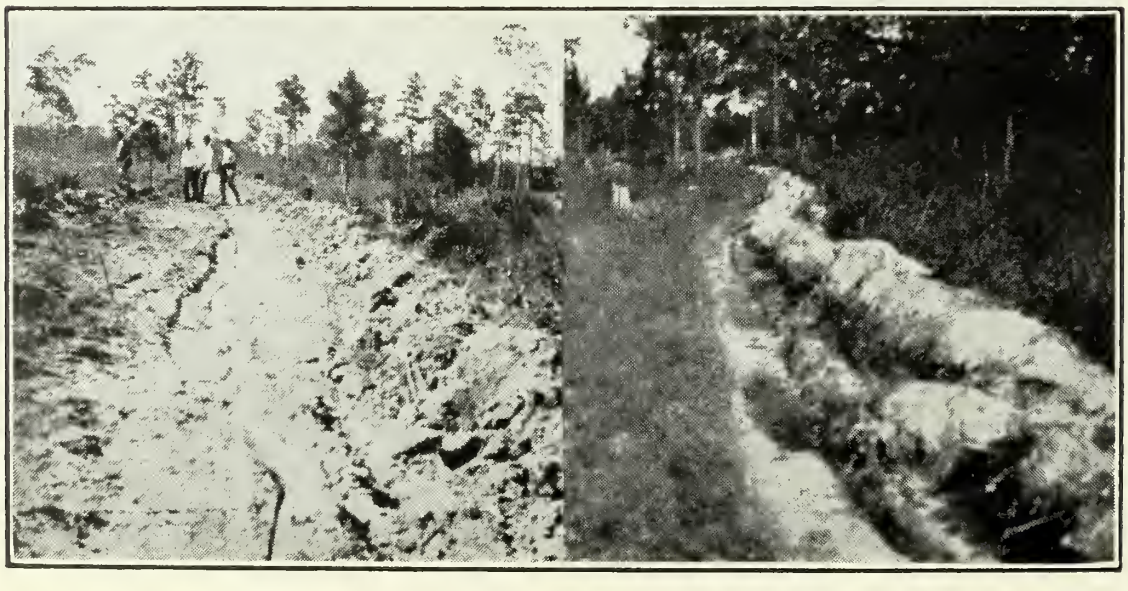
mum. Overhead costs of the field men are kept low, since all field offices are rent free through the liberality of the cooperating Chambers of Commerce at all headquarters towns.

FOREST FIRE PROTECTION

Following the mandate of the Forestry Administrative Act of 1925, the Board recognized the forest fire problem as its major activity.

It was realized in the beginning that facts regarding forest fires were incomplete, hence a broad survey was inaugurated. As information was secured, remedies were applied as far as possible to each situation which would produce the desired result in the shortest possible time.

A careful study of conditions proved the need for organized effort between the land owner, county, State and Federal Government with the responsibility for fire protection definitely fixed upon the owner first and upon the State and Federal Government second. With this fundamental principle as a working basis, the Timber Protective Organizations, composed of land owners, were formed. These organizations have their



Two demonstrations in construction of firebreaks. On the left, a road grader was used. On the right a tractor plow was employed.

own officers and each operates as a unit to carry out plans prescribed by the Georgia Forest Service. The State is giving supervision, aid, advice, and renders some direct financial assistance through Federal aid under Section 2 of the Clarke-McNary Law.

Administration expense is reduced to a minimum in that the officers, who are vitally interested, direct the local work of their units, supervise detail expenditures, collect data, keep records and make necessary reports without compensation.

If done by the State Forester's office, the supervisory work would require additional employees and greater official overhead cost, to say nothing of the added impetus, interest and support secured through local participation and local responsibilities.

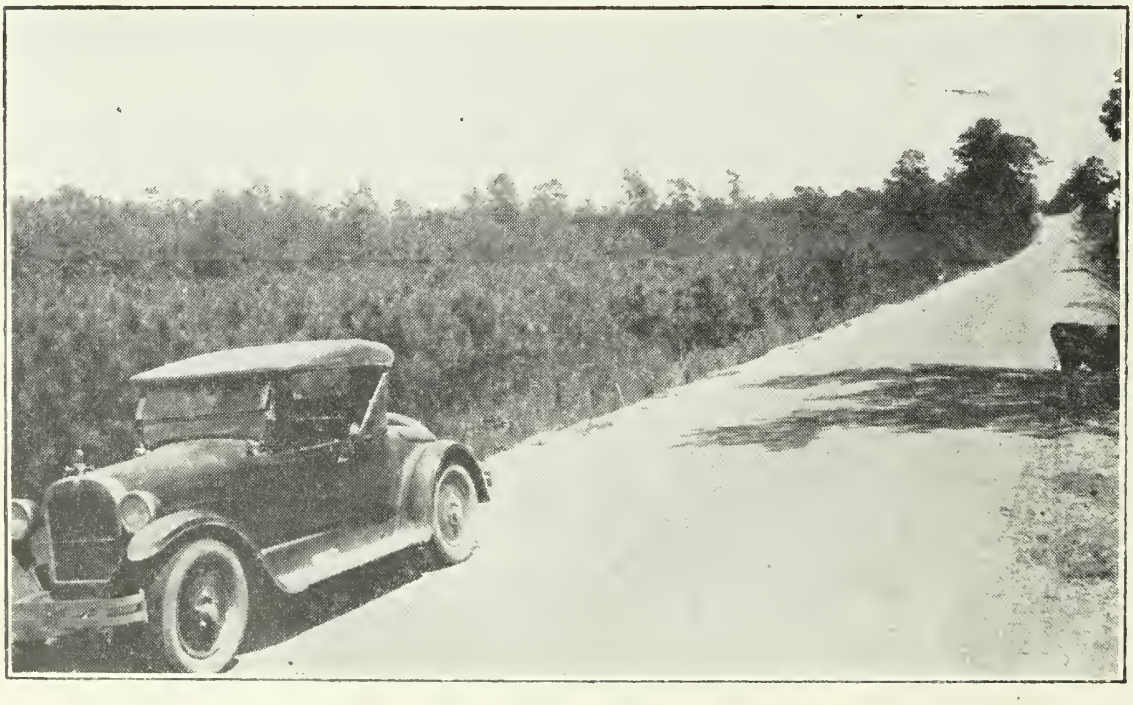
During 1927 and 1928 new Timber Protective Organizations have been formed, existing organizations have been enlarged, and the policy of grouping a number of small units to reduce cost of protection and promote the purchase of lookout

Tree nursery at the State College of Agriculture conducted cooperatively by the Georgia Forest Service and the Forest School of the College.

towers for detection purposes, have extended and made the protective system more efficient. Seven organizations have been enlarged, eight new organizations formed, and two consolidations affecting some six organizations, are being completed.

Steel lookout towers erected on the Suwanee and Satilla lands, in operation since 1927, have given results beyond expectations. To bring the tower system into wider use, the consolidation of five small organizations in four counties is under way. This consolidation will enable the units to purchase and erect six steel towers ranging in height from 100 to 110 feet. Already one of these towers has been erected on a city water supply tank of one town and another on the top of a new hotel at Waycross. When connected by telephone lines and properly manned, the towers will give an efficient fire detective system to half a million acres, about half of which is now organized and cooperating.

Four Timber Protective Organizations have erected 12 lookout towers and others have been provided for in the 1929 budgets. In all, 16 Timber Protective Organizations have built and



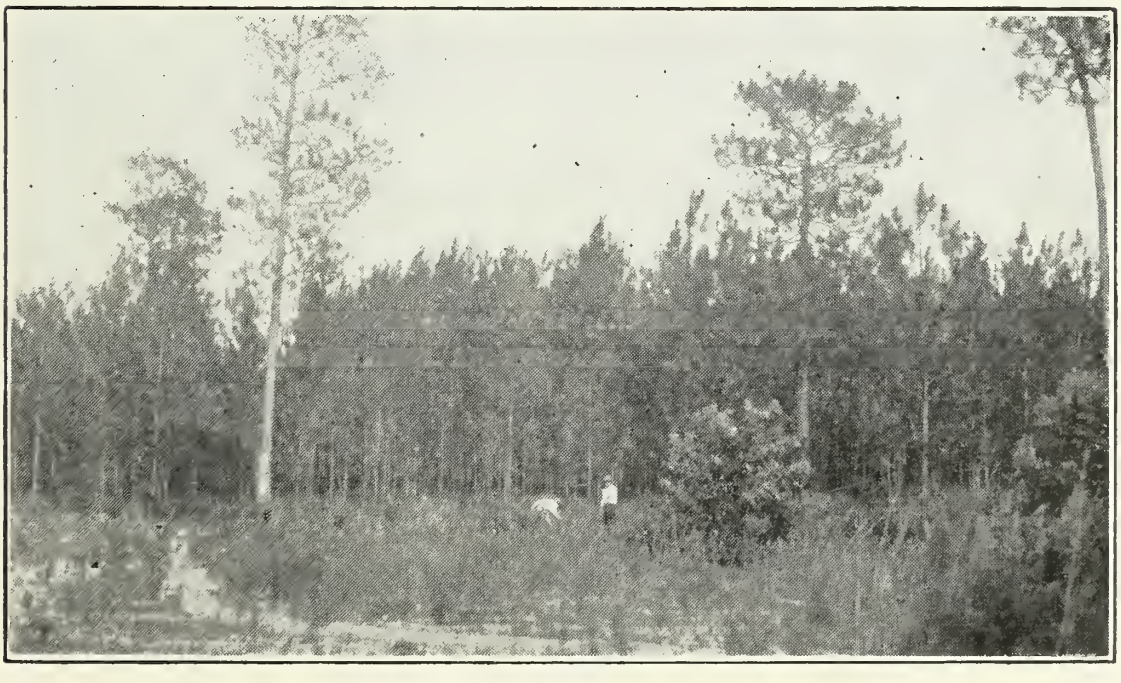
Demonstration in natural reproduction of pine forests where fire is kept out.

maintained 360 miles of telephone lines at an average cost of $37 per mile, 50 miles of fire trails at $20 per mile and 2,219 miles of fire breaks at $10 per mile. They have purchased fire fighting equipment such as fire trucks, trailers, fire pumps, hose, axes, rakes and tools to the amount of $8,089. They employ a total of 53 patrolmen four to eight months in the year and 12 towermen five to ten months in the year.

These Timber Protective Organizations give adequate protection, under State supervision, to 996,790 acres.

Private protection is also increasing at a rapid rate due to the effect of observable results obtained by Timber Protective Organizations. These demonstration areas have probably induced owners of unorganized areas to protect an additional half million acres. The other forms of forest fire protection in Georgia are the county plan, the cooperative management plan on small units and the national forest plan.

The interest manifested throughout the State and efforts being made by large owners, and owners of the farm woodlot indicate that rapid progress is being made in forest fire protec-

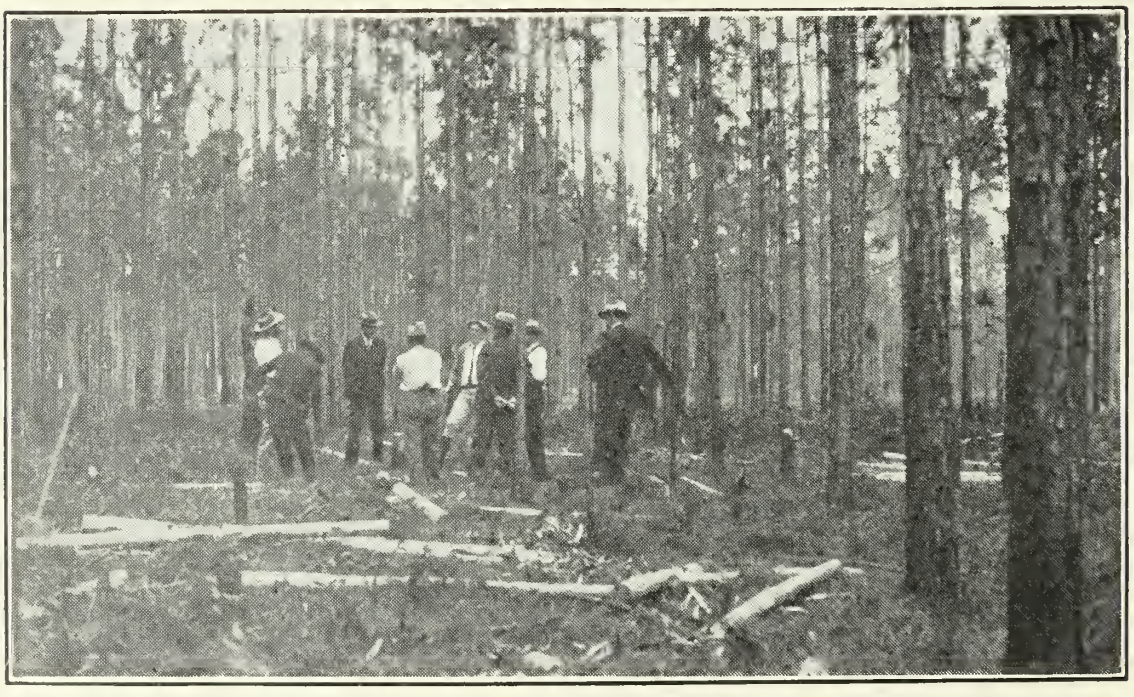


Demonstration of new pine growth in area protected from fire.

tion. Favorable public sentiment continues to grow, and the requests that additional acreage be placed under the State's fire control system are increasing. The total acreage that can be placed under cooperative agreement is limited by the personnel needed for supervision of the work and the necessary funds to finance it.

During 1927 and 1928 the State expended $19,584.86, the Federal Government $53,258.00, and private matching funds amounted to $48,587.78, a total of $121,430.64. The State Board of Forestry has secured $101,845.78 as matching funds against $19,584.86 State funds, or a ratio in matching funds of $5.20 for every dollar the State has expended.

Georgia has 23,725,000 acres of forest land in need of protection from fire, according to the best available figures. This forest area is a great responsibility on the State, as well as a great asset, in that this natural resource is capable of producing an annual income of $163,000,000 in raw material and finished product if given adequate protection from fire and if proper forest practices are used.



Demonstration in forest thinning conducted by he Georgia Forest Service

The owners of 5,000,000 acres of forest land are ready for organized forest fire control with State cooperation as soon as funds are available.

EDUCATION AND UTILIZATION

A director of Education and Utilization for full time was appointed and began his duties November 1, 1928. Under his leadership, work was inaugurated for developing various lines of activity embracing publications, news service, school relations, contacts with civic organizations, fairs and manufacturers of wood.

PUBLICATIONS

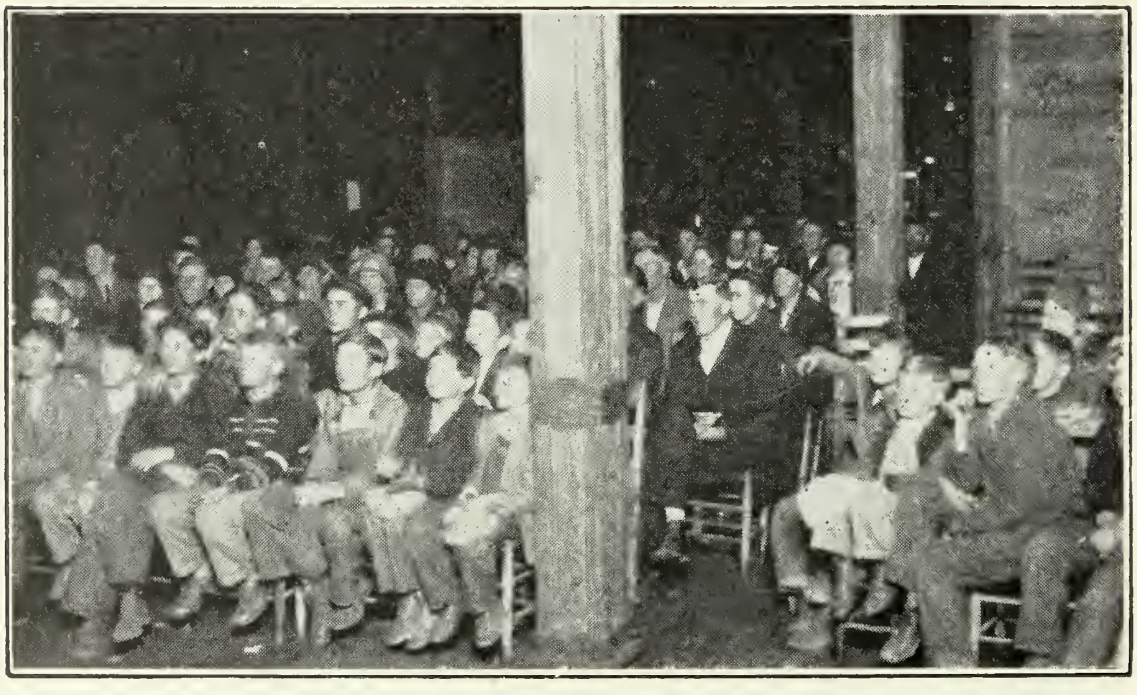
Since the last biennial report, 12 publications have been issued, 7 of which were bulletins and 5 leaflets and folders. The subject, author and number printed of each bulletin issued are as follows:

One of the Georgia forestry moving picture trucks at a rural school.

Subject	*Author*	*Number Printed*
Forest Thinning	Alfred Akerman	3,000
Highway Shade Tree Planting	Eitel Bauer	3,000
Forest Planting	Eitel Bauer	3,000
Uses of Georgia Woods	C. A. Whittle	10,000
Georgia Forest-Parks	C. A. Whittle and B. H. Stone	5,000
Vocational Forestry	C. A. Whittle	2,500
The Cellulose Industry	B. M. Lufburrow and W. W. Ashe	1,500

The name of each leaflet, author and number printed are as follows:

Subject	*Author*	*Number Printed*
Report on Fire Line Demonstration at Waycross	B. M. Lufburrow	2,000
Georgia's Forests	C. A. Whittle	15,000
Forests—A Waste Land Crop	B. M. Lufburrow	10,000



Rural school children absorbed in the message of forest fire protection as presented by moving pictures.

Estimating Standing Timber	C. A. Whittle	5,000
Reprint from Manufacturers' Record	C. A. Whittle	1,500

A number of posters designed to impress the public with the importance of fire prevention was distributed from stocks previously printed, mainly to schools. The two moving picture units have placed many of them at schools, stores, filling stations and on county roads. A number have gone to county protective units, Timber Protective Organizations, boy scouts, etc.

Cartoons have a universal appeal, being especially interesting to children. Cartoons with appropriate legends have been issued and widely distributed.

Distribution of Publications—A mailing list has been built up, consisting of 25 or 30 leading land owners in each county, county agricultural agents, vocational agricultural teachers, saw mill operators, wood working establishments, lumber dealers,

On the left, a demonstration of the French method of turpentining. On the right, turpentining started by American method on a virgin pine.

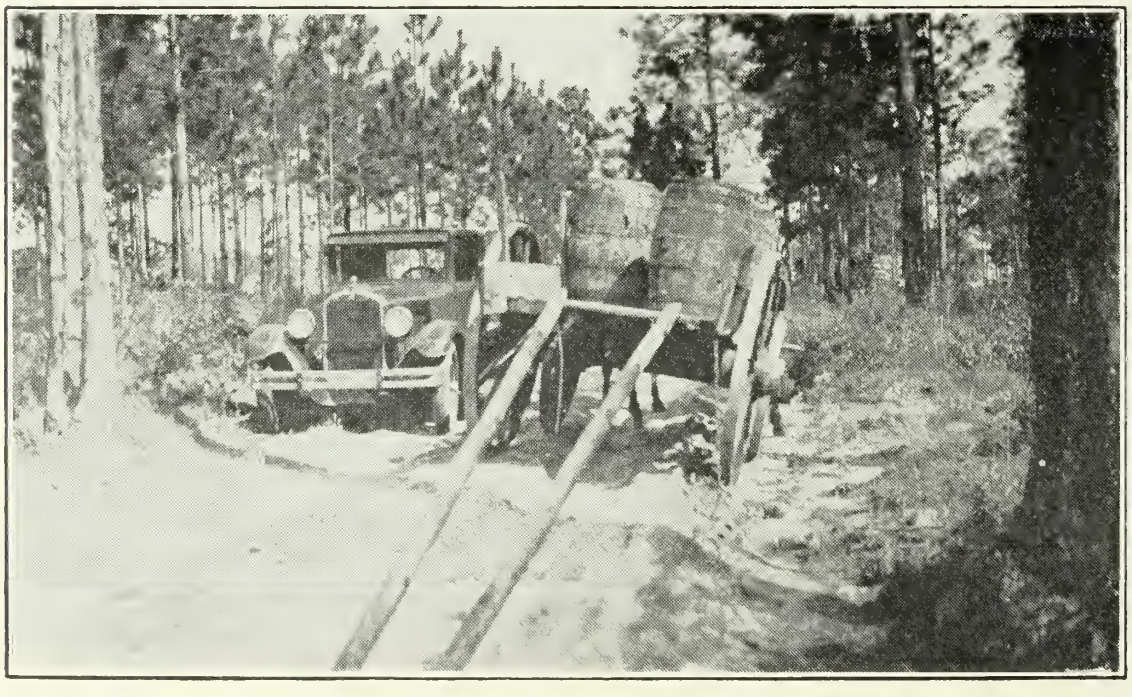
city and county school superintendents, consolidated public schools, members of the Georgia Forestry Association, state foresters and assistants, United States Forest Service, state chambers of commerce, members of the state legislature, naval stores operators, turpentine operators, women's clubs and civic organizations, newspapers, deputy wardens, fish and game wardens, county commissioners, and individuals of various classes who have asked to be placed on the mailing list. The total mailing list numbers 10,000 names. Not all publications are sent to the entire mailing list.

The two moving picture units are distributing some of the publications and are putting up posters.

On request of school principals, county agents and others, packages of various publications are sent out for local use.

NEWS SERVICE AND CONTRIBUTED ARTICLES

With the installation of the Director of Education and utilization, a systematic weekly news service was inaugurated for all



Typical scene in the turpentine forest of South Georgia.

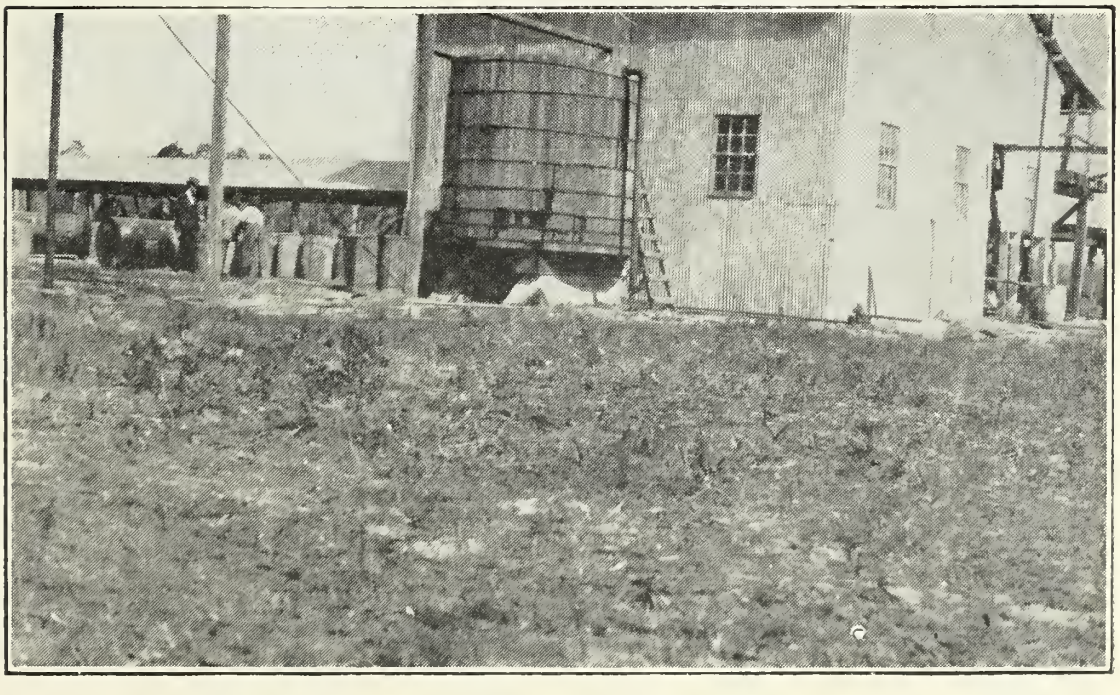
the newspapers in the state. The training and experience of the director in the publicity field equipped him for developing the news service. The results have been gratifying. The news matter is very generally used by the press of the state.

Special articles have been contributed to the daily papers of the state, to the press association, to lumber trade journals, commercial publications, forestry magazines and farm papers. They have found ready acceptance.

Through these avenues of publicity a large reading public has been reached frequently with messages that are timely and of public interest.

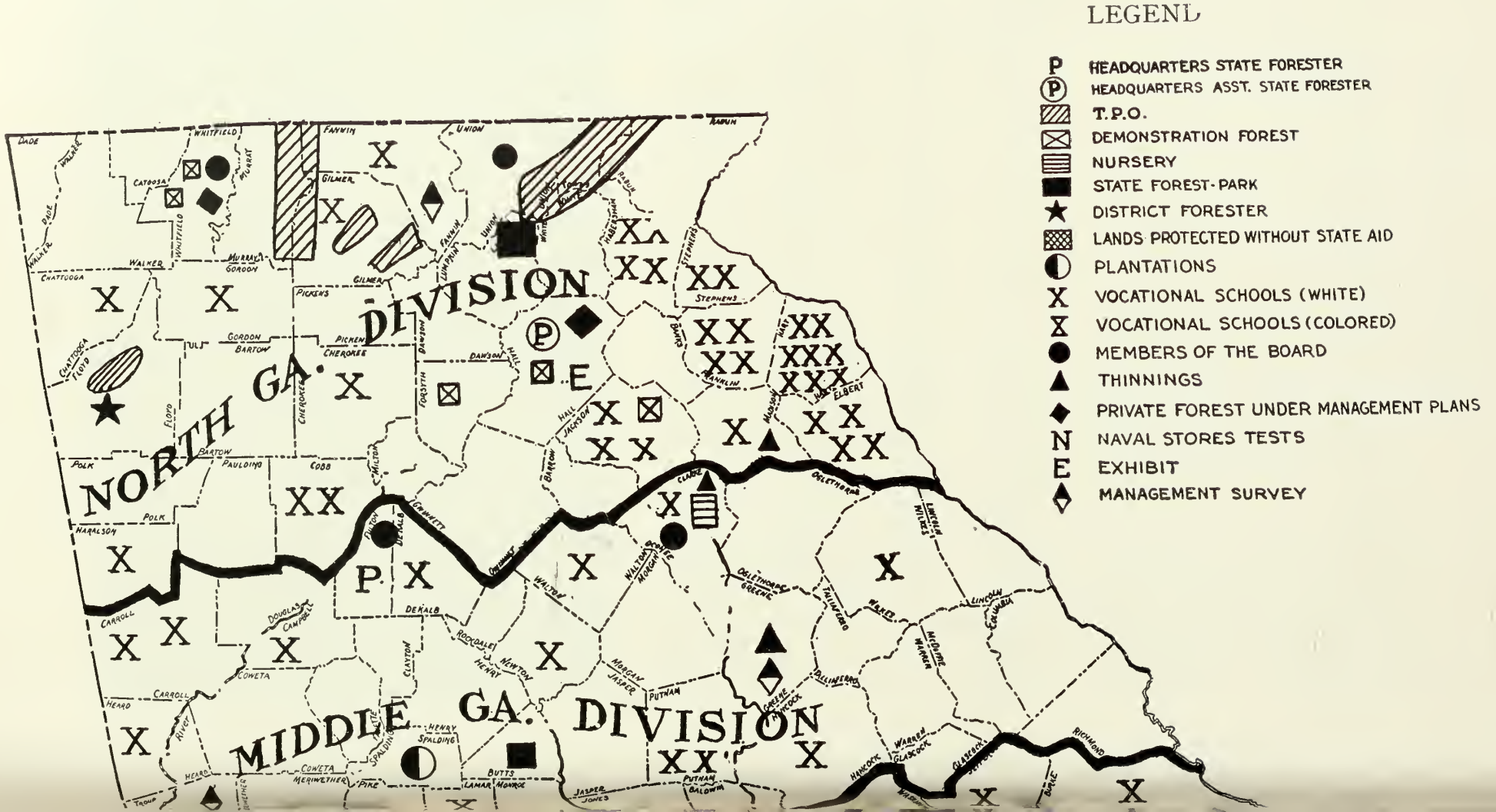
SCHOOL RELATIONS AND SCHOOL FORESTS

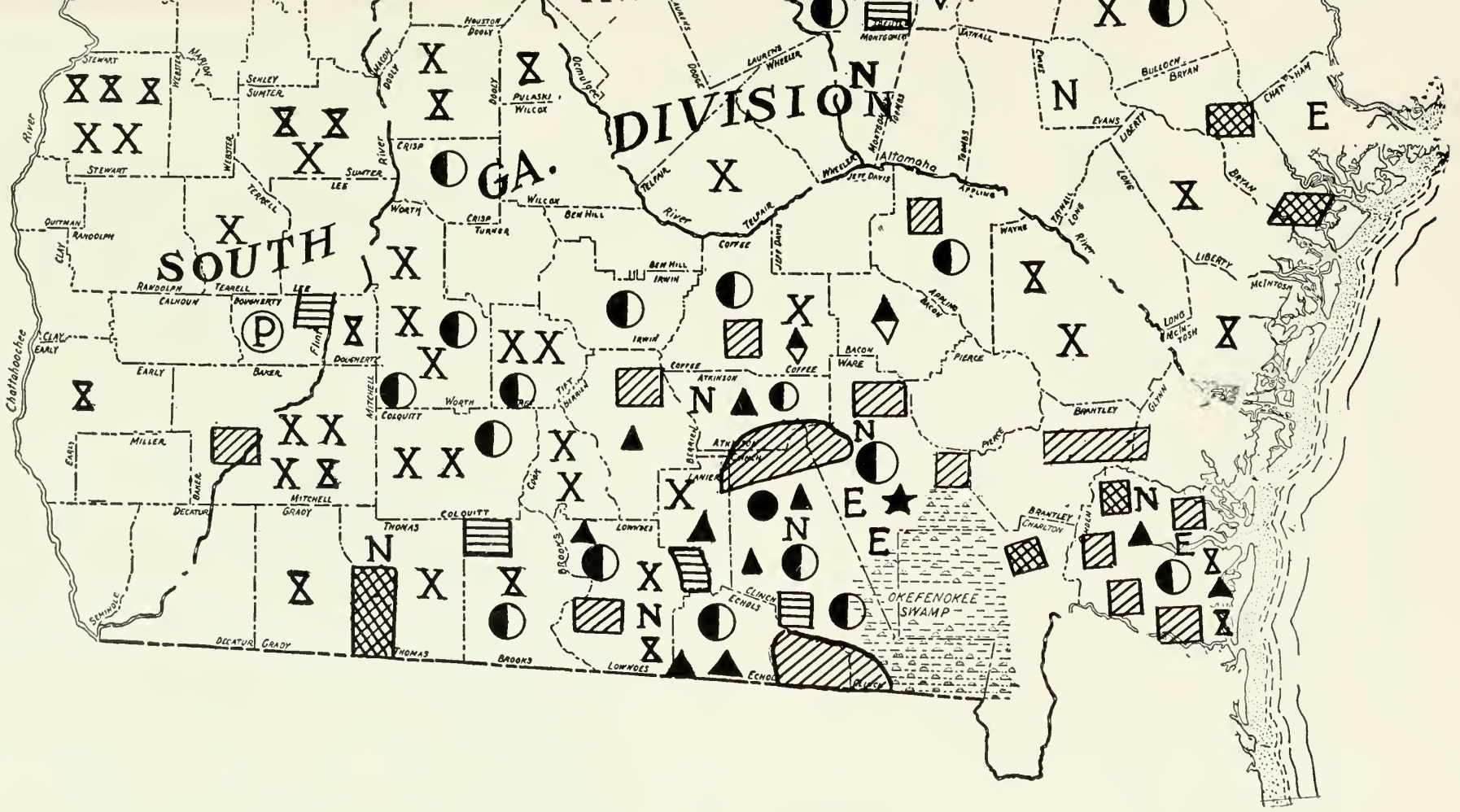
Vocational School Project—An outstanding development of schools relation work is that in connection with the rural high schools having vocational agricultural teachers whereby a course of study in forestry is to be introduced and a forest of ten acres or more is to be used by each school for forest demonstration. This project is carried on in cooperation with the



One of the steam turpentine stills in South Georgia.

Points of Activity of Georgia Forest Service





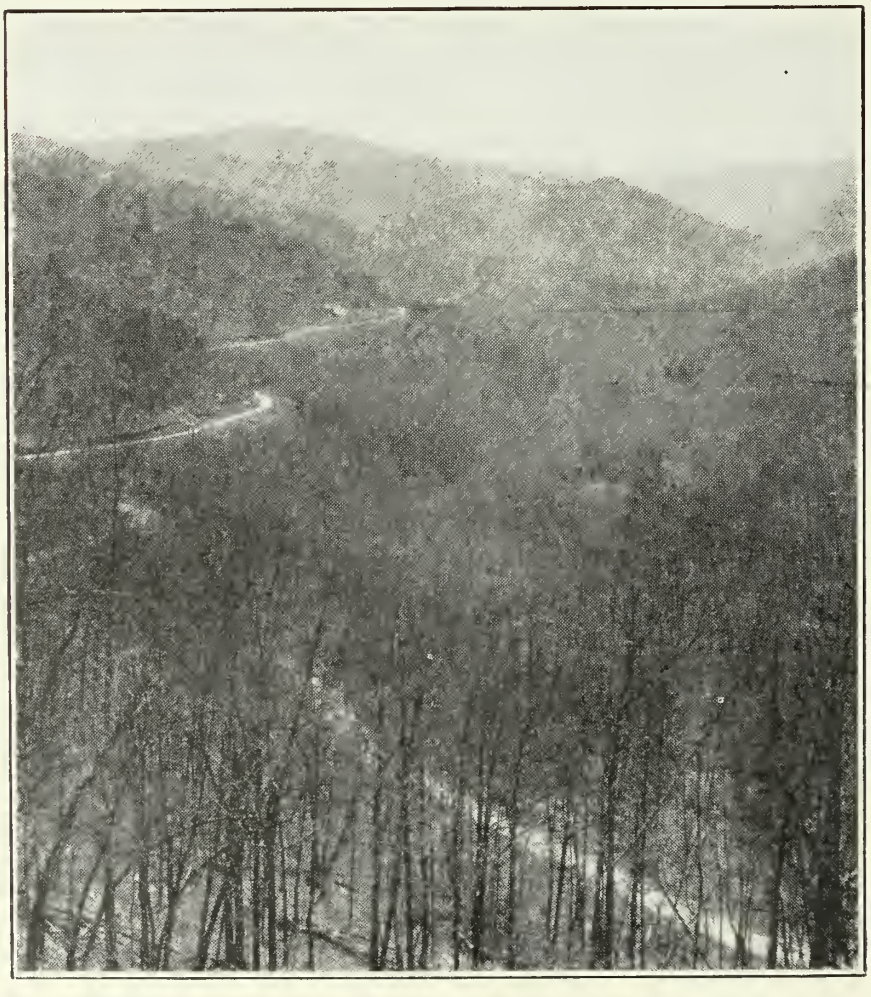
NOTE: Marks are placed in each county in which activity of the Georgia Forest Service is conducted, but no effort is made to place the marks at the exact point in the county where work is carried on.

Georgia State Board of Vocational Education. There are 100 white schools and 50 colored schools of this nature in the state. The forest areas are to be obtained on lease for ten years or through outright donation.

The Georgia Forest Service is to make a complete survey of these school forests and working plans for their management. Areas will be chosen for reforestation and schools will be assisted in operating tree nurseries for tree planting.

Two or more times each year a representative of the Georgia Forest Service will visit the schools and conduct some form of forestry demonstration.

A bulletin issued by the Georgia Forest Service will serve as a foundation of the course of study and mimeographed instruc-



Winding mountain highway leading to Vogel Forest-Park.

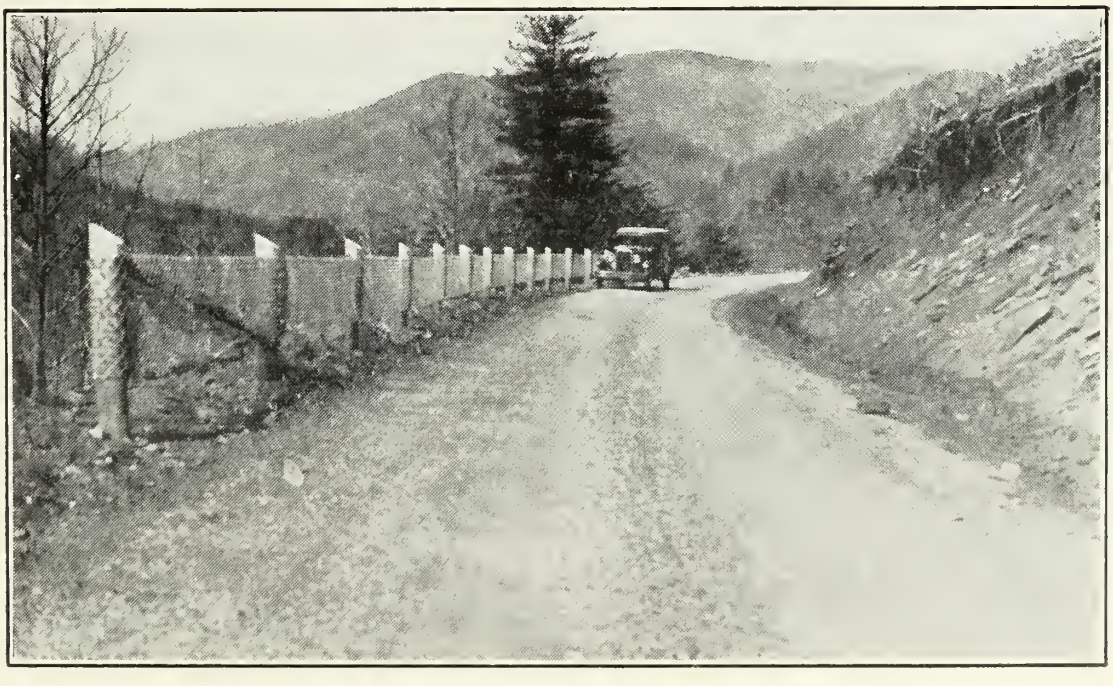
tions for practical work will be sent to the schools from time to time. Cooperation is also being established with junior colleges and degree colleges in forest demonstration work along more advanced lines than is being offered the high schools.

The plan calls for a summer camp for students showing the greatest proficiency in forestry. Practical training will be given in these camps to increase their efficiency. With satisfactory completion of the summer camp work the student will receive a certificate of Vocational Forester, recommending him for non-technical forestry work.

These summer camps are to be supported through scholarships of $75 each which it is expected will be provided by interested citizens, corporations, banks, etc.

This is the first project of this kind to be launched in this country and it has received the commendation of some of the leading forestry authorities in the nation.

The teachers are enthusiastic about the forestry project, and every indication is that the Georgia Forest Service will be



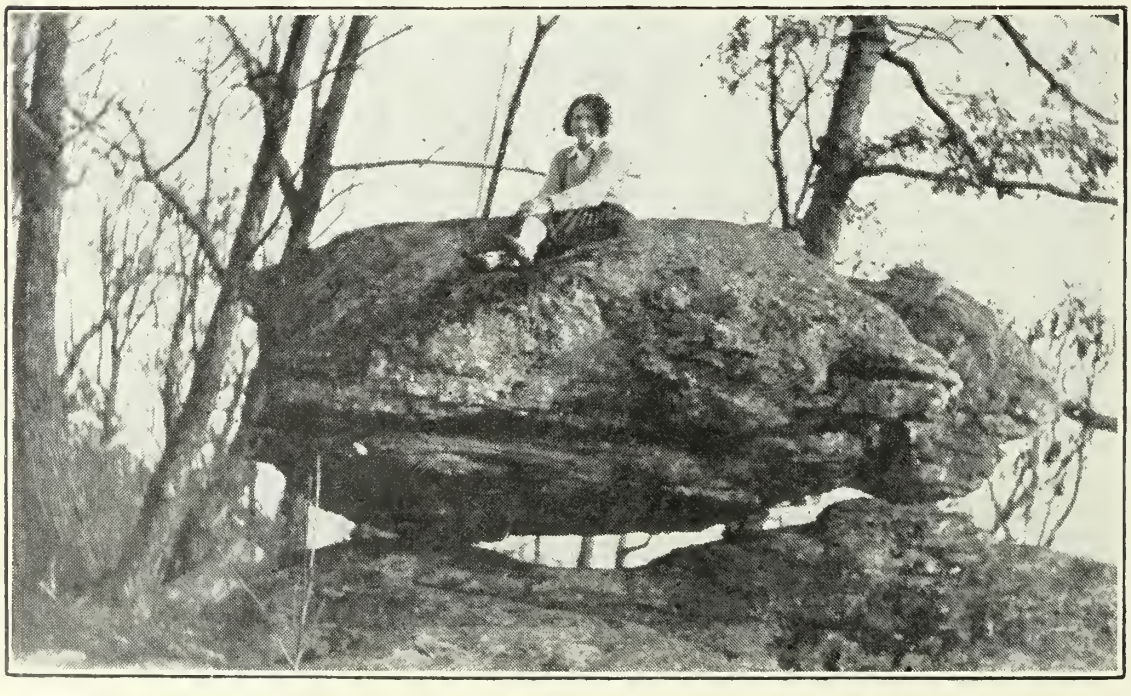
Scenic approach to Vogel Forest-Park.

in great demand to properly supervise this work to be carried on. At least two men are needed to carry on this important work but funds are not now available for this purpose.

Moving Picture Project—The Georgia Forest Service is cooperating with the Georgia Forestry Association, the American Forestry Association, and the Georgia State College of Agriculture in carrying on the activity of the Southern Forestry Educational Project in Georgia.

Two well-equipped trucks, each manned by two foresters, showing pictures emphasizing the importance of forest fire control are operating throughout the state and making public contact through the schools. The shows are largely attended. From September 1st to June 1st the records show that 139,183 people were reached. The interest has been keen and it is believed that the lessons the films teach have been impressive and will result in much good.

This project is for three years. The first year has been concluded. Other pictures are to be made which are expected



Balancing rock on the trail to Blood Mountain from Vogel Forest-Park.

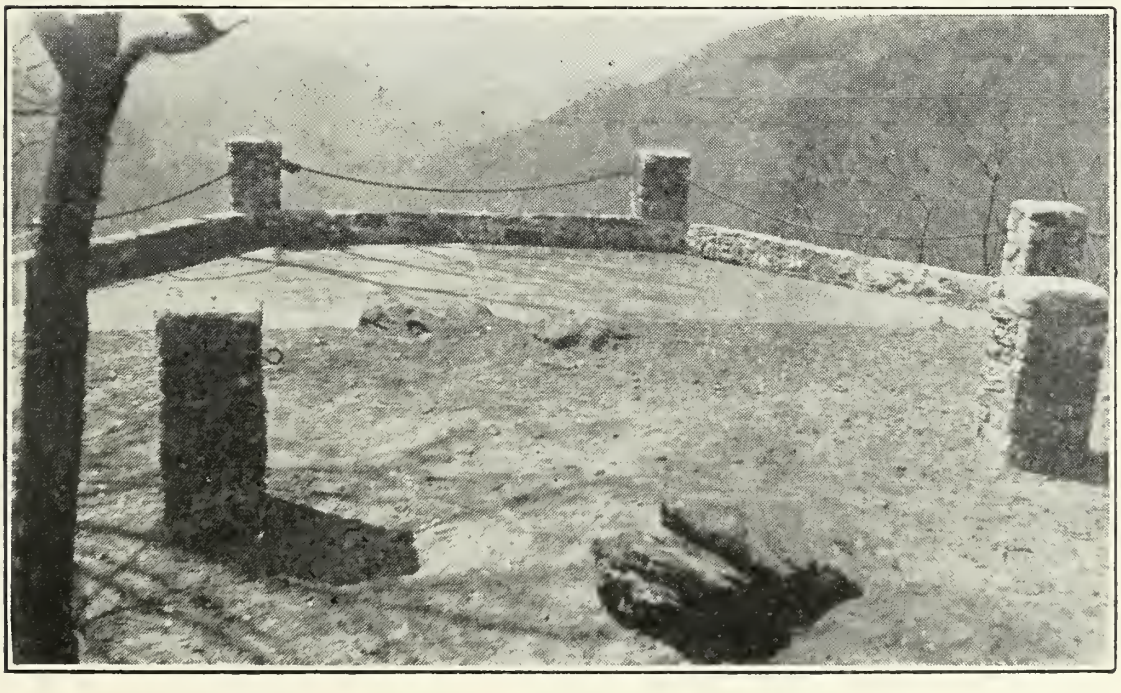
to be more directly applicable to Georgia conditions and result in greater good to the protection of Georgia forests.

During the period that the schools are not in session these moving picture outfits are scheduled to visit boy and girl scout camps, teachers' summer schools and other public gatherings.

CONTACT WITH CIVIC ORGANIZATIONS

It has not always been possible to meet the demands of various civic organizations for speakers, but a number of these organizations have been addressed. Women's clubs interested particularly in roadside planting of trees, school grounds and other public places have been helped with addresses, conferences, demonstrations and with literature as to what trees to plant and how to plant them. In some instances essay contests on forestry have been conducted among school children under the auspices of women's clubs.

Boy scouts afford a field for useful cooperation and a number of contacts are being made with scout masters, and, as



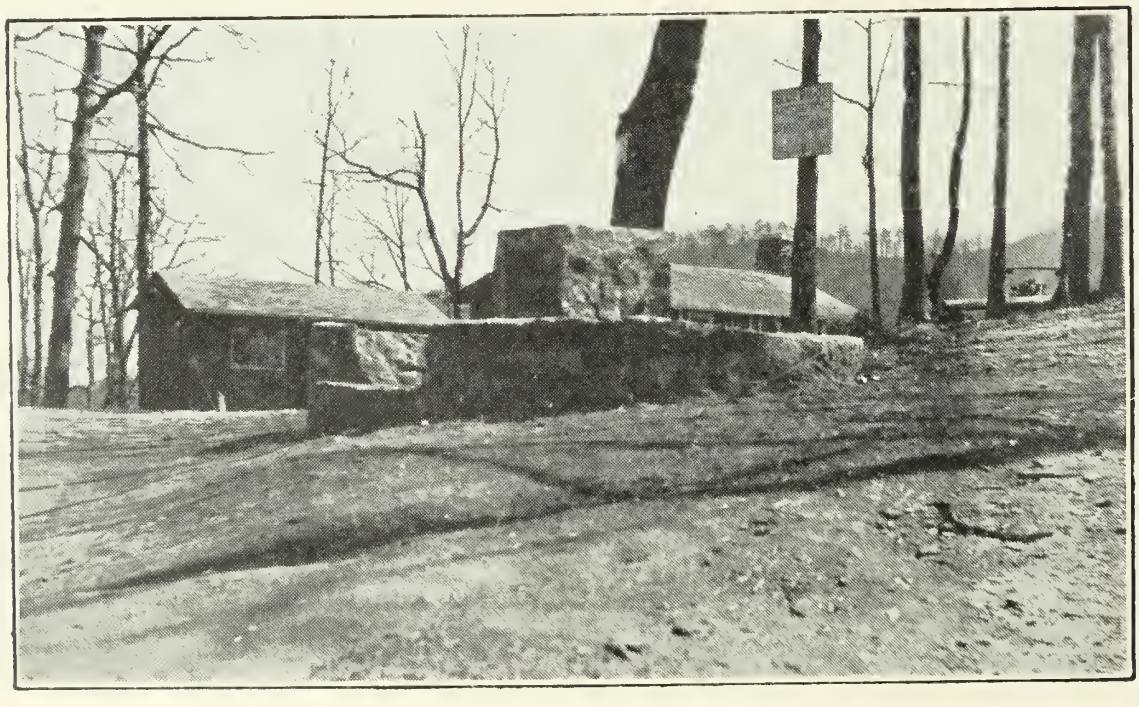
Lookout platform at Vogel Forest-Park.

has been mentioned, scout camps are to have moving picture shows. Scout organizations in Augusta and vicinity have an annual awarding to Eagle scouts of a certificate from the Governor appointing them Junior Fire Wardens and badges presented by the Georgia Forest Service. Each year this is made an important public occasion.

Chambers of Commerce, Civitans, Kiwanians, Rotarians and other organizations offer opportunity for contacts which it has not been possible to develop fully because of inadequate force, but more of this class of work will be scheduled for the future.

FOREST FAIRS

Georgia has the distinction of being the first state to inaugurate the State Forest Fair. In 1928 the first fair of this nature was held at Waycross, Georgia. The attendance was large and the interest gratifying. Many industries related to forest development and utilization had exhibits on display. Demonstrations of practical value were carried out. Moving pictures and addresses afforded interest and instruction.



Neel Gap marker at Vogel Forest-Park.

The fair was such a pronounced success that other cities have sought it, and in 1929 the Second Georgia State Forest Fair will be held at Valdosta, Ga. The program includes forestry demonstrations which will be one of the features of the fair, to give very practical information to timber growers.

Demands are being made by fair associations throughout the state for exhibits of the Georgia Forest Service. Insofar as possible these demands will be met.

WOOD MANUFACTURERS

In connection with the work of utilization, the bulletin "Uses of Georgia Woods" was issued and given wide circulation. This bulletin has sought to awaken a greater appreciation of the kinds of woods grown in Georgia, their various uses, and to show that there are woods as good or better for various purposes than those shipped into the state from the far north or west.

To make the publication as practical as possible, and establish connections between the owners of forests and the wood

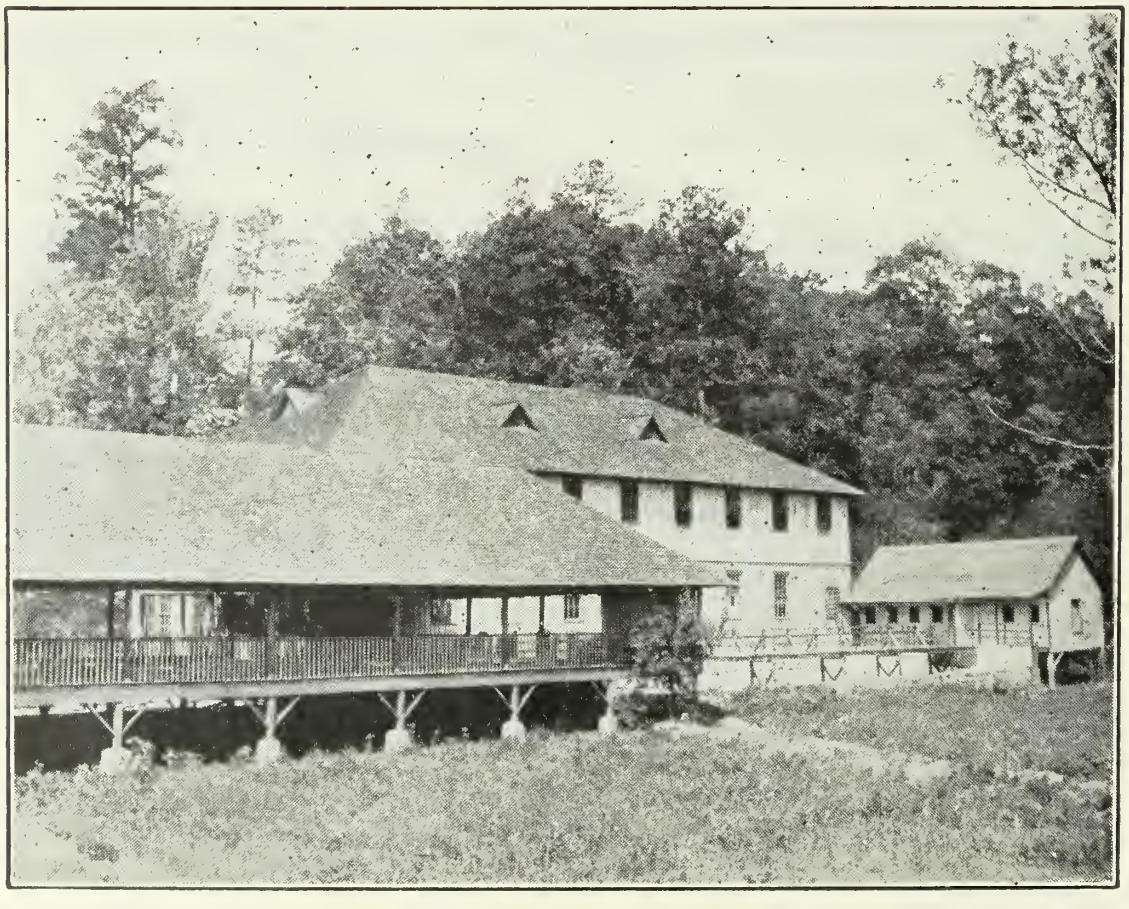
All Trails of Vogel Forest-Park have signs.

manufacturers, a directory of saw mills, wood manufacturers and lumber dealers of the state is given.

Visits are being made from time to time to architects in Georgia in an effort to increase the use of southern woods for both exterior use and interior finishings.

Additional work for promoting the uses of Georgia woods could be undertaken in making contracts with saw mills, manufacturers and lumber dealers, and also with landowners, to instruct them in the better utilization of their timber resources through proper forest management. This, of course, would call for increased personnel and expense.

A questionnaire was sent out to leading landowners of southeastern Georgia to develop data on the amount of cordwood that would be available for wood pulp manufacture. With



View of Pavilion and Annex at Indian Springs Park.

the information thus obtained and other data, a basis was established for an estimate on the resources of cordwood in southeast Georgia. The estimate was made for parties interested in paper manufacture. The Georgia Forest Service is stressing for paper manufacture and for other cellulose industries the use of species of trees not desirable for lumber, the use of timber cut out for thinning purposes and the tops of trees cut for saw logs and mill waste.

Various members of the forester's staff are frequently called upon to give advice to landowners about the best methods for cropping and marketing their timber.

STATE FOREST-PARKS

The Georgia Forest Service now has two state forests-parks under its management—the Vogel Forest-Park at Neel Gap on

New entrance to the spring basin at Indian Springs Park.

Blood Mountain in Union county, and Indian Springs in Butts county. The Indian Springs property, owned by the state since the Indian treaty of 1802, was turned over to the Georgia Forest Service by an act of the General Assembly, effective January 1, 1928, which act carried with it an annual appropriation of $3,000 for a period of two years, to be expended on improvements and maintenance. This property consists of a mineral spring, casino, bath house and park area, all occupying approximately ten acres.

Both forest-parks are devoted largely to recreational purposes for which they are particularly well adapted.

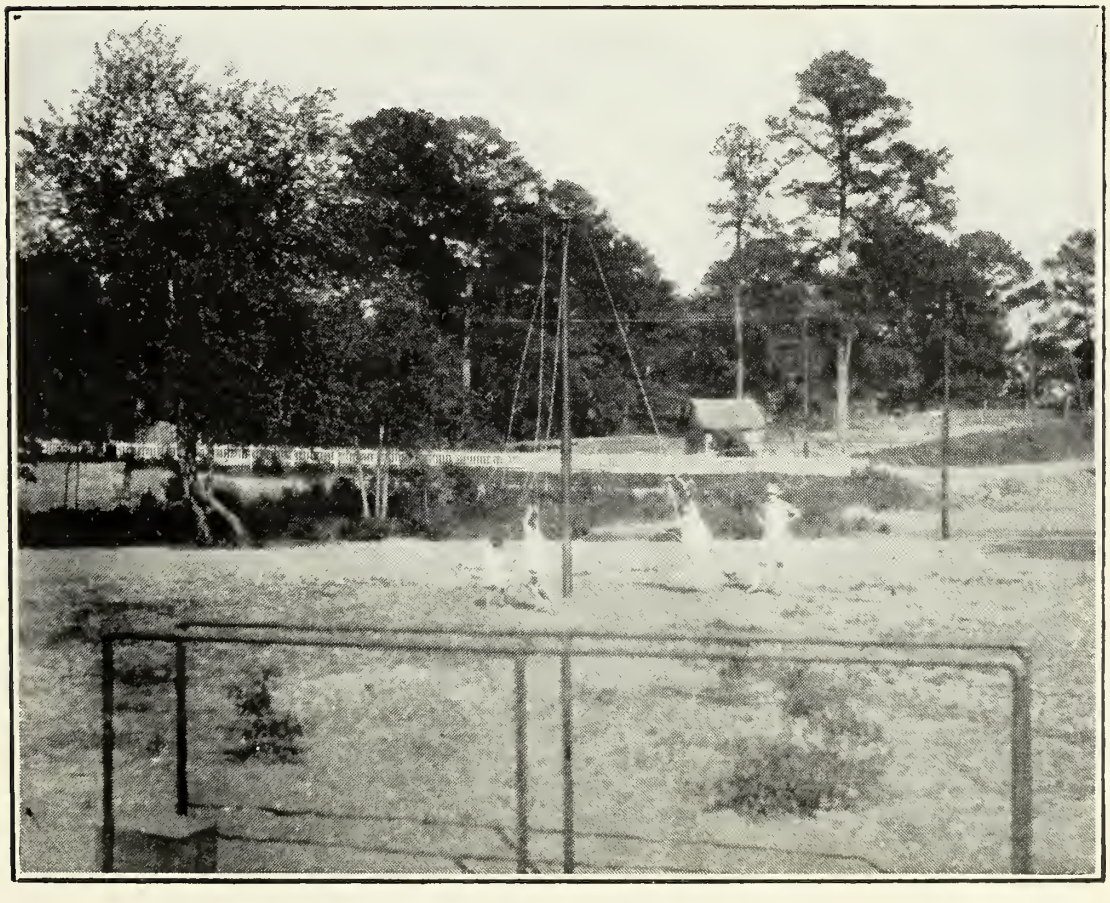
Vogel Park—Since the last biennial report the area of Vogel Forest-Park has been increased by an additional gift of land by Mr. Fred Vogel, Jr., of Milwaukee, Wisconsin, bringing the area up to 160 acres.

Spring, basin and new superstructure at Indian Springs Park.

Improvements have been made on the property that have added to its attractiveness and its conveniences. Two houses have been constructed near the highway for the accommodation of visitors. At one, refreshments are sold and a book for registering visitors is kept. The other, a larger building, provides an attractive tea room equipped with electric lights and other conveniences.

Trails have been constructed through the area and to the summit of Blood mountain, with signs giving directions, information and cautions about protecting the forest. A stone observation platform has been constructed, overlooking the famous Blood Mountain gorge and camp sites and parking areas have been established.

Approximately 10,000 visitors registered at this park in



Children's playground at Indian Springs Park

1928, representing 42 states of the Union and ten different countries. Quite a large number of visitors did not register.

A proposition to erect a stone tower on Blood mountain to be known as the Legion Memorial Tower has received favorable consideration. Plans for the proposed tower have been drawn by Dr. Charles Strahan of the University of Georgia. It is to be about 30 feet high, made of mountain stones, and will be an imposing, picturesque structure, appropriate to the surroundings and a fitting memorial to the Georgia men who lost their lives during the World War. The cost of the tower is estimated at $10,000 to $15,000, which the American Legion proposes to raise.

The tower is to serve as a lookout for fire control on the state forest-park and the adjoining national forest as well as a lookout for the sightseers who visit the park in great numbers.

In addition to assistance in erecting the tower, funds are needed to construct trails to other mountain peaks, to construct roads into other automobile parking spaces, to provide additional facilities for drinking water, camping facilities, to make a small lake, to construct an additional building and quarters for forest service men, to do some landscaping work, put up additional signs, etc. A budget of such improvement calls for an expenditure of $7,420.00.

Indian Springs—The condition of the Indian Springs property when taken over by the Georgia Forest Service was poor. The State appropriation has been used to repair the buildings, improve the grounds and to protect the spring from the overflows of nearby streams. Considerable additional improvement and beautifying of the grounds have been made possible through private subscription obtained by local parties. As a consequence, the Indian Springs property has been greatly improved in appearance and facilities since coming under the direction of the Georgia Forest Service, and is apparently becoming a more popular recreation center for the people of Georgia than ever.

The growing popularity of the Indian Springs property renders it necessary to make other improvements to meet public demands. A retaining wall capable of protecting the lower part of the park from overflow and which at the same time could serve as a roadway to reach an area that would serve for additional parking space for automobiles would greatly add to the facilities of the park, make it possible to beautify an unsightly portion of the grounds and also provide a place for seats, and a sunken garden for flowers and ornamental shrubs.

This property is very greatly in need of improved comfort houses of the most sanitary kind. A number of other improvements to make better play grounds for children and to make other parts of the property accessible and enjoyable to the increasingly large crowds are very much needed.

An outlay of $10,000.00 during the next two years would help to meet these public demands.

Forest-Park Plans—The Georgia Board of Forestry has approved a plan to establish a system of forest-parks over the state, with one in easy reach of all population centers. Donations of areas to the Georgia Forest Service that are suitable for forest-parks are expected in carrying out this idea. Two tentative offers of forest-park areas are pending and others are expected. The objects sought in establishing forest-parks are to provide recreational centers and forest areas for demonstrating successful forestry practices.

ASSISTANCE TO TIMBERLAND OWNERS

The Forestry Act of 1925 says the Board "shall give such advice, aid, assistance and co-operation as may be practicable to Georgia landowners or forest users . . . . . "

More than 98 per cent of the State's 23,725,000 acres of forest land is privately owned. This ownership represents a wide variety of interests including lumber, naval stores, farm-

ing, mining, manufacturing, water power, etc., and involves a natural resource, the product of which could be worth more than $150,000,000 annually. Hence, the importance of this resource to the State and the necessity for its proper care and management.

The full development of the State's forest resources will depend upon the extent to which these owners of timber land practice the principles of good forest management. Realizing this, the Georgia Forest Service has pursued the policy of assisting private owners to make plans for the systematic management of these timber lands. More applications for this type of service have been received than our limited personnel could handle, showing a widespread awakening to the importance of proper care of forests.

A technically trained forester has been employed by an owner as the result of service of this sort rendered by the Georgia Forest Service. A number of owners have co-operative agreements whereby the Georgia Forest Service gives advice in handling of their forest areas. Interest in this phase of the work has been state-wide, many applications coming from the more thickly settled areas. Those reached report that the forest management plans given them have been of real value. Bulletins, leaflets, letters, inquiries, interviews, public talks on forest management have also borne fruit in actual practice on many woods areas of the state.

A large number of private owners are now protecting their forests from fire. They are thinning, planting and carrying on demonstrations and, in some instances, are doing research work on a small scale.

Demands for this phase of forestry work will continue to increase as the fire control sentiment spreads and forestry educational work progresses.

RESEARCH

The Board of Forestry feels very keenly the need of comprehensive research work. Many problems in handling woodlands in Georgia have little reliable data on which to base future work. Until the projects now under way and those awaiting funds to start are carried on over a sufficient length of time, we will be dependent upon the too meager information now available.

In the projects undertaken, only as many were taken up as there seemed assurance could be carried to completion, the controlling factor being available funds and personnel.

Thinnings of loblolly, slash, longleaf and shortleaf pine have been made with records of each. Studies of a few of the hardwoods are under way. Experiments in naval stores production are being conducted with relation to thinnings, plantings, weighing gum, chipping, per acre production and fire damage. Many other studies are needed, for the State is lacking in much desirable valuable information.

FOREST FIRE STATISTICS

Georgia is developing a "forest fire consciousness" to a greater degree than the accompanying forest fire statistics would seem to indicate. Not until the last year was it possible to obtain comprehensive data for the state as a whole. The larger fire loss reported for 1928 than for previous years is probably to be accounted for by the fact that the 1928 figure is more complete and more nearly pictures actual losses than the reports of previous years.

Inquiries made of private owners for information on forest fire losses have been gladly answered and where checked the figures given have proven to be correct to a remarkable degree.

Though the 1928 figures are estimates rather than actual measurements, the available information may be considered re-

liable, particularly that from areas where organized fire control is in operation. The figures on unprotected areas are considered conservative and have been checked as far as possible.

The fire statistics for the years 1927 and 1928 for the state as a whole and for areas under control of Timber Protective Organizations are as follows:

FOR STATE

Year	*No. Fires*	*Acres Covered*	*Area Burned*	*Total Damage*
1927	8,118	10,000,000	2,472,740	$4,961,520
1928	17,247	23,725,000	5,159,385	5,159,350

FOR TIMBER PROTECTIVE ORGANIZATIONS

1927	55	722,180	9,542	$ 19,650
1928	196	996,790	21,780	24,350

The increase in burned over area under the Timber Protective Organizations in 1928 does not mean that these organizations were not functioning as effectively in 1928 as in 1927 as the difference in the burned over area indicates, but the increase is attributable in part to the larger area under protection in 1928 than in the previous year. There were 996,790 acres under control of Timber Protective Organizations in 1928, whereas there were 722,180 in 1927.

Financial Report
Georgia State Board of Forestry
1927

RECEIPTS

Balance on hand Jan. 1, 1927 (Federal funds)	$ 2,555.40	
From State—Tax collected on Forest Industries	11,354.58	
From U. S. Gov.—Clark-McNary Law	19,991.60	
From individuals for examination of timber	152.09	$34,053.67

DISBURSEMENTS

ADMINISTRATION

Salaries	$10,388.90	
Travel	2,974.43	
Office expense	346.43	
Teleph., Teleg. and Postg.	366.04	
Printing	1,568.31	
Supplies and equipment	312.52	
Miscellaneous	15.00	$ 4,834.47

FIELD

Salaries	$ 1,405.67	
Travel	1,687.84	
Office expense	335.24	
Tel. and Tel. and Postage	412.74	
Printing	652.90	
Supplies and Equipment	325.08	
Miscellaneous	15.00	$ 4,834.47
T. P. O.—refunds under agreement		$ 9,682.16
		$30,579.53
Balance, December 31, 1927		$ 3,474.14 $34,053.67

State Auditor's Comments:

"All records are full and complete."

1928

RECEIPTS

Bal. on hand Jan. 31, 1928 (Federal funds)	$ 3,474.14	
From State	18,360.90	
Appropriation Indian Springs Forest Park	3,000.00	
From U. S. Government — Under Sections 2 and 4, Clarke-McNary Law	43,949.64	
Individuals for examination of timberlands	399.17	
From Gainesville, Ga. Chamber of Commerce for Vogel Forest-Park	275.00	
Interest on Bank balances	73.95	$69,532.80

DISBURSEMENTS

ADMINISTRATION

Salaries	$ 8,908.75	
Travel	1,683.26	
Office expense	554.30	
Printing	1,422.69	
Supplies and Equipment	670.27	
Telph., Telg. and Postage	230.14	
Miscellaneous	64.30	$13,533.71

FIELD

Salaries	$ 8,852.93	
Travel	5,182.47	
Office equipment	1,347.03	
Supplies	175.59	
Telph., Telg. and Postage	152.16	
Printing	28.00	
Miscellaneous	28.01	$15,766.19

Sou. Forestry Educational Project	$ 1,463.70
Bureau of Education	1,327.46
Nursery Project	1,462.50
Vogel Forest-Park	1,040.87

Indian Springs Forest-Park	2,399.65	
T. P. O.—refund under cooperative agreement	16,851.03	
	$53,845.11	
Balance, December 31, 1928 (Federal funds Under Clarke-McNary Law)	$15,687.69	$69,532.80

State Auditor's Comments:

"The records are neatly and accurately kept, and all disbursements covered by proper vouchers."

THIRD BIENNIAL REPORT

OF THE

State Board of Forestry

TO THE

Governor and General Assembly

OF THE

STATE OF GEORGIA

1929-1930

B. M. LUFBURROW,
State Forester

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THIRD BIENNIAL REPORT

OF THE

State Forester

TO THE

State Forestry Board

OF THE

STATE OF GEORGIA

1929-1930

B. M. LUFBURROW,
State Forester

Georgia State
Board of Forestry

(Ex-Officio)

HON. L. G. HARDMAN, Governor,
President

HON. GEORGE H. CARSWELL, Sec. of State

HON. S. W. MCCALLIE, State Geologist

HON. J. PHIL CAMPBELL, Director of Extension,
State College of Agriculture

(Appointed)

MRS. M. E. JUDD, Dalton

J. LEONARD ROUNTREE, Summit

C. B. HARMAN, Atlanta

BONNELL H. STONE, Blairsville

ALEX K. SESSOMS, Cogdell

B. M. LUFBURROW, Secretary and State Forester

LETTER OF TRANSMITTAL FROM THE STATE FORESTER

MEMBERS OF THE STATE BOARD OF FORESTRY:
SIRS:

The Biennial Report covering activities of the Georgia Forest Service for the calendar years 1929 and 1930 is herewith submitted.

The factors paramount in the rise or fall of public welfare are our natural resources and mankind's attitude toward them.

During the two years that have elapsed since the last Biennial Report we have experienced a material change in the attitude of the public toward the forest resources of the State from general indifference to one of widespread active interest and concern.

During this period the technical staff, as planned in the organization chart of 1926, has been completed with the exception of a district forester for District 3.

Forest fire control continues as the major activity. This problem is being attacked both by organized effort through the Timber Protective Organizations and through stimulating individual effort. Available federal funds under Section 2 of the Clarke-McNary Law have almost doubled since 1929, but State funds have not increased sufficiently to acquire full federal aid, therefore, $25,000 of federal funds will probably be lost to the State this year for lack of State matching funds.

Georgia has received nation wide attention for its co-operative educational work in forestry with the 150 vocational schools of the State, and much faborable comment has been received on our bulletins and leaflets.

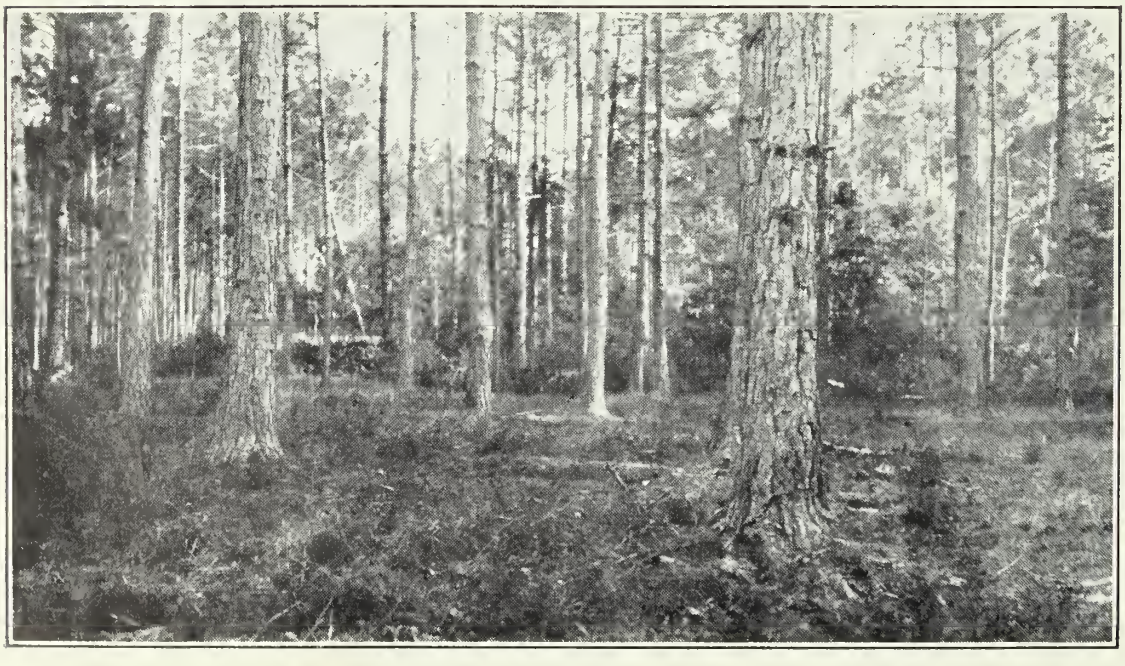
The demand for services made on each branch of our activities has increased and has been met as fully as possible. Our system of administration has made it possible to render this service at the lowest cost.

The active interest and support of our program by the Georgia Forestry Association has enabled us to carry on more effectively and economically. The State press has been gen-

erous in carrying forestry messages to the masses that would not otherwise be reached.

The enthusiasm and intelligent interest of each member of the State Board of Forestry are not only very helpful, but an inspiration to the State Forester. But for the enthusiastic and intelligent direction of the Board the work could not have made such rapid progress, and for this I wish to express my sincere appreciation.

Respectfully,
B. M. LUFBURROW,
State Forester.



THIRD BIENNIAL REPORT

BOARD OF FORESTRY, STATE OF GEORGIA

1929-1930

INTRODUCTION

Previous Biennial Reports covered the work of the State Board of Forestry up to and including December 31, 1928. This, the Third Biennial Report, gives a survey of the work during the two years 1929-1930, with plans for the future work necessary to develop the forest resources of the State.

Definite and direct responsibility is placed upon the Georgia State Board of Forestry to conduct the State's forestry activities and secure maximum results to the owners of Georgia's 23,725,000 acres of potential forest land. Because of its active interest and intimate detailed knowledge, the Board is able to direct the work effectively and efficiently, and since the Board serves without compensation, its service is rendered with little cost to the tax payer. In fact, Georgia's forest resources, second in size in the State, with possibilities of an annual income of $163,000,000 or more in finished products, are directed by a Board that merits the wholehearted support of all Georgians.

ADMINISTRATION

The Governor is ex-officio chairman and president of the State Board of Forestry. Three other ex-officio members who have the knowledge and interest, as well as experience in conducting affairs of the State, are on the Board. The five appointed members are chosen because of their personal experience and knowledge of various activities necessary to develop the forest resources of the State. Under this set up the Governor is in direct contact with the work and has the able council of eight other directors.

The members of the Board serve WITHOUT COMPENSATION, being satisfied with the realization that they are rendering a service to Georgia. Each member is reimbursed the expenses incurred in the performance of his official duties. The total of such cost to the State for the five year period January 1926 to December 1930, is $1,792.38, or an average of $348.48 per annum, or less than $1.00 per day for the service of this group of able and efficient directors of the forestry department, a cost so small compared to the service rendered as to find no parallel in the cost of operating any private business. The excellent record of attendance at board meetings is a criterion as to the interest and personal responsibility felt.

All available funds are budgeted. Quarterly statements of receipts and disbursements are submitted to each member of the board in advance of the meeting and all expenditures are kept within the budget. This system, together with the fixed policy of the board—to adhere strictly to the budget—has enabled the department to operate without creating a deficit since its existence.

Summing up, we find the work administered by—

1. *Fixed Responsibility:* The Governor as president and chairman, with eight advisors, assume the responsibility.
2. *Low Cost:* Members of the board serving without compensation, but receiving actual expenses while attending meetings, have incurred an expense that totals less than $1.00 per day for the past five years.
3. *Budget System:* All expenditures are made under a budget approved by the board in advance of the calendar and fiscal years.
4. *Interest of Board Members:* Attendance averages seven over the five-year period. Each member appointed by the governor has not only particular fitness to serve, but has been glad to render service to the State.

PERSONNEL

The personnel of the department consists of the State Forester, the Director of Education and Utilization, two Assistant

State Foresters, five District Foresters,* an Assistant Director of Education and Utilization, a secretary to the State Forester and a secretary to the Director of Education and Utilization. These employees were appointed because of the technical training and experience that fitted them to give Georgia timberland owners scientific information and assistance in handling their timber crop.

The headquarters for the Assistant State Foresters are at Gainesville and Macon, and the District Foresters are located at Rome, Columbus, Albany, Waycross and Savannah. The offices of the entire force, together with heat, light, water and in some instances office equipment, are furnished without cost to the State. The work of the staff is primarily with the timberland owner and therefore in the woods, approximately 80 per cent of the time being in the woods assisting the owners in solving their forest problems.

FOREST FIRE CONTROL

The forest fire problem constitutes the major activity of our work. Since the 1927-28 biennial report was issued, federal

*As of March 1, 1931.

Fire break in south Georgia. Note reproduction on right and lack of it on left where subjected to fire.

funds available under Section 2 of the Clarke-McNary Law, have increased from $39,000 to $69,750. This increase of $30,750 is due to a slight increase in the federal appropriation for forest fire control work, and to a federal estimate that Georgia has 23,000,000 acres of forest land, an area greater than the U. S. Forest Service had previously recognized. It is on the average basis and at a cost of 4 cents per acre for State wide organized fire control that the increased allotment was made.

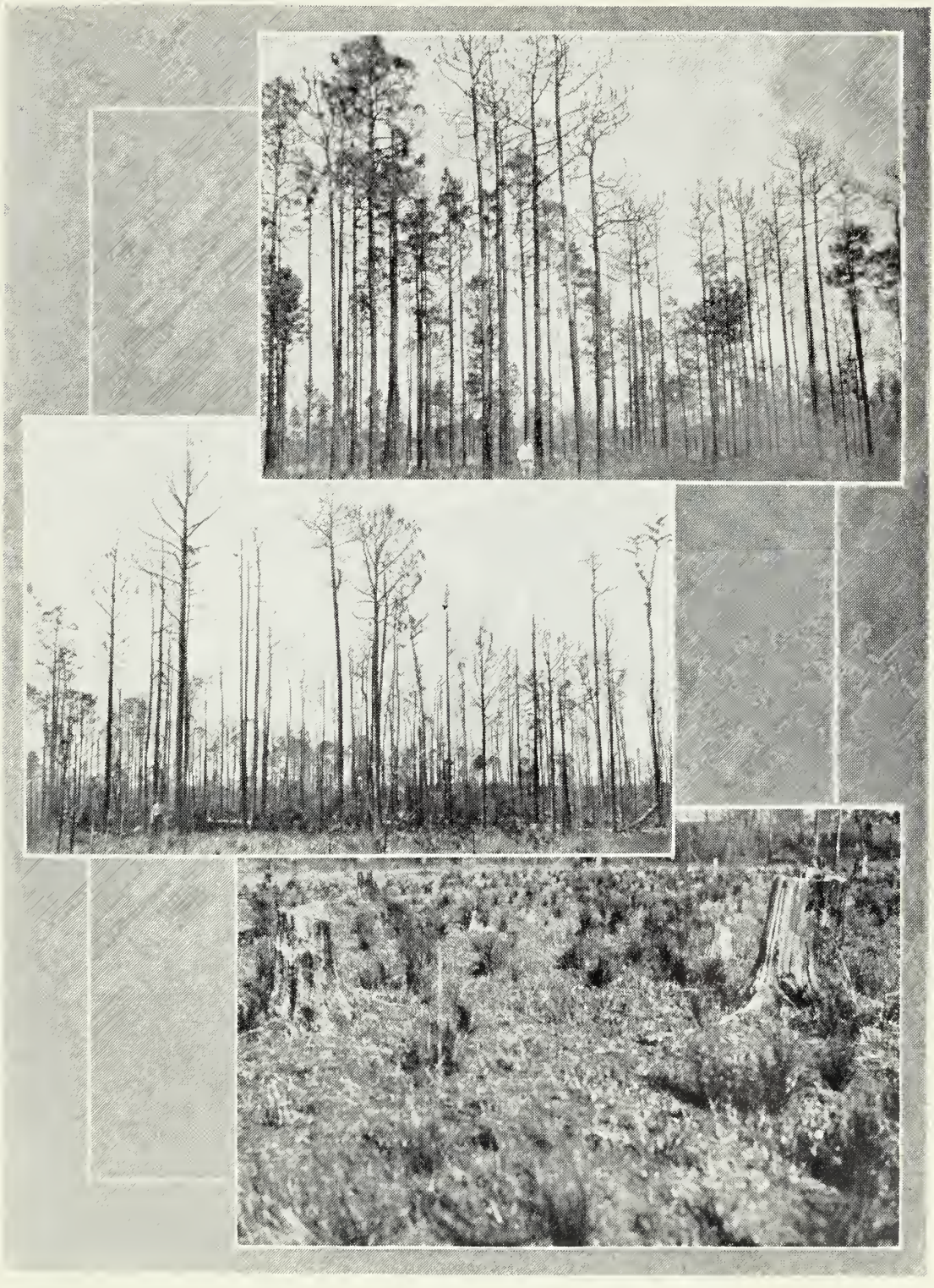
These funds are to be matched on a 50/50 basis, but State funds available did not permit us to secure all the federal forest fire control funds allotted to Georgia in 1930.

The Georgia Forest Service is the designated agency for co-operative work under Section 2 of the Clarke-McNary Law and is responsible for its administration. It received federal funds for forest fire control work, and the intent of the law is that all such funds should be passed on to the timber owner and that each State must carry all necessary administrative or supervisory cost. Georgia and one other State are the only ones that have failed to meet this requirement. State funds are not sufficient to carry the personnel required by approved nation-wide standards for acceptable fire control practise, and part of this is now carried by federal funds.

The basic principle of Georgia's forest fire control plan is organized group effort. The federal government, the State, the county and the private owner pool their funds for expenditure through co-operative organizations known as Timber Protective Organizations. This offers the most efficient, economical and practical basis for forest fire control work.

The Timber Protective Organization plan—

1. Reduces the administrative overhead to a minimum.
2. Is elastic enough to allow the private owner the use of his labor and machinery for fire protective measures during periods when they would not otherwise be employed.
3. Places responsibility on the private owner, thereby insuring active local interest at all times.
4. Affords a channel through which assistance and advice



TOP—Longleaf pine killed by fire near Cogdell, Georgia.
MIDDLE—Slash pine killed by fire near Cogdell.
BOTTOM—Longleaf reproduction killed by fire near Ocilla, Ga.

of the specialists of the Georgia Forest Service can be effectively rendered to private timber owners.

5. Enables public agencies to participate to the extent of their obligations and to handle affectively questions that extend beyond the province of the local organization.

Individual effort in fire control has proved both expensive and unsatisfactory. Organized effort through the timber protective organization system during its five years has proven practicable and inexpensive and has secured good results (see table page 30) due to this form of co-ordinating the activities of

TOP—Forest protected from fire showing excellent growth and reproduction near Baxley, Georgia. BOTTOM—Across the road where fire has devastated the forest.

federal, State and private agencies. A visit to the timber protective organization areas will prove convincing. Results are seen at a glance and the wisdom of expending public funds in this manner will be unquestioned, for returns amply justify the expenditures.

The demand for co-operative forest fire control work continues to increase, although the lumber and naval stores industries have faced a serious depression during the period covered by this report. Private agencies have so fully realized the importance of growing trees and of forest fire control that they have made considerable sacrifices to keep organized fire control work up to standard during this period, and others have taken up protective measures. This is shown by the increased acreage under protection. During 1929-30 the total area listed in the timber protective organizations reached 1,351,070 acres. It was necessary to protect 410,668 acres of land that was not contributing to protection cost, this area either being intermingled with organized areas, or constituted a hazardous boundary. Protected lands in or adjacent to national forests of North Georgia that are under protection amounted to 414,734 acres, which, added to the State's protected area makes a total of 2,176,472 acres in the State under adequate organized fire control. In addition, there are 850,000 acres in farm woodlots, game preserves, or tracts of less than 10,000 acres under fire protection which are not included in the organized area mentioned.

The grand total under the various forms of protection is 3,026,472 acres or 12.7 per cent of the 23,750,000 acres in Georgia needing protection from fire.

ASSISTANCE TO TIMBERLAND OWNERS

Ninety-nine per cent of the 23¾ million acres of potential forest land in Georgia is privately owned and most of this ownership is in small holdings. Less than a million acres of the original timber remains. Five and one-half million acres represent abandoned farm lands. What to do with this vast area

of forest land is a problem confronting Georgians, and affects every citizen of the State.

Forest fire is both an individual and a State problem, but the management of a tract of timber is the owner's problem. The Georgia Forest Service can only hope to reach many of the individual owners through its bulletins and leaflets which treat of almost every vital forest problem, and through demonstrational areas which all may visit and learn lessons to apply to their own timberland.

The demand for individual advice during the two years 1929 and 1930 has been enormous. Many owners now see a greater present and future value for their woods and want help to make their forests produce at maximum capacity. In-

Forest fire lookout tower, built of cypress, on Pine Island Timber Protective Organization, near Albany, Ga.

sofar as possible, we are glad to give advice to individual timber owners.

FIRE CONTROL IMPROVEMENTS

Permanent and semi-permanent fire control improvements erected on the organized areas include 17 steel towers 80 to 110 feet in height, 3 wooden towers, 187 miles of telephone line, 3,844 miles of fire break, and 50 miles of fire trail. The purchase of fire fighting equipment such as trucks, trailers, fire pumps, hoes, axes, Texas swatters, rakes, lanterns, and tools amounted to $11,771 during 1929-30.

Expenditures for forest fire control work during this period by the State amounted to $29,751.53, by Federal Government $87,110, and by private owners under co-operative agreement $65,210.08, a total of $182,071.63. It will therefore be readily seen that for every dollar the State has invested $5.12 is received in return.

EDUCATION AND UTILIZATION

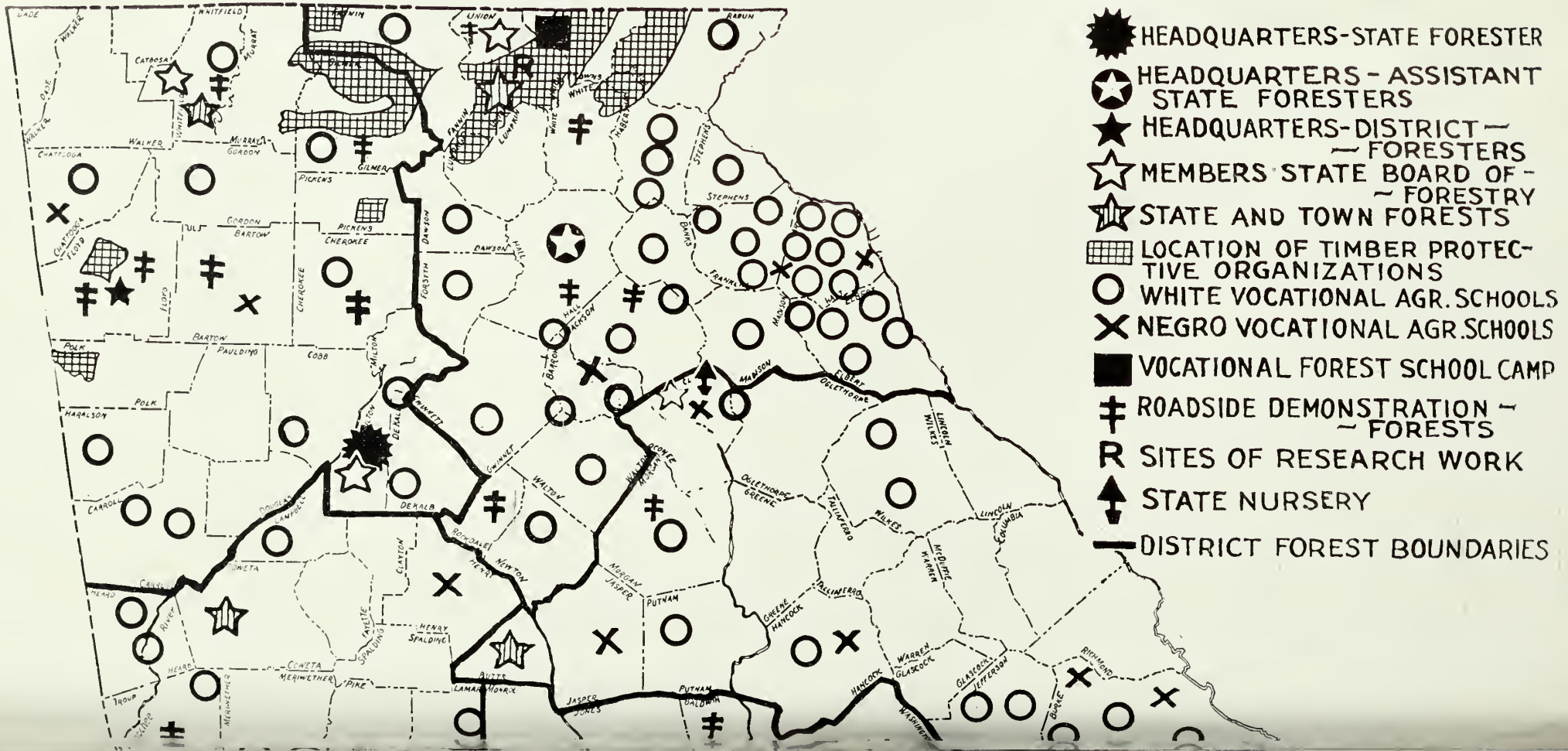
PUBLICATIONS

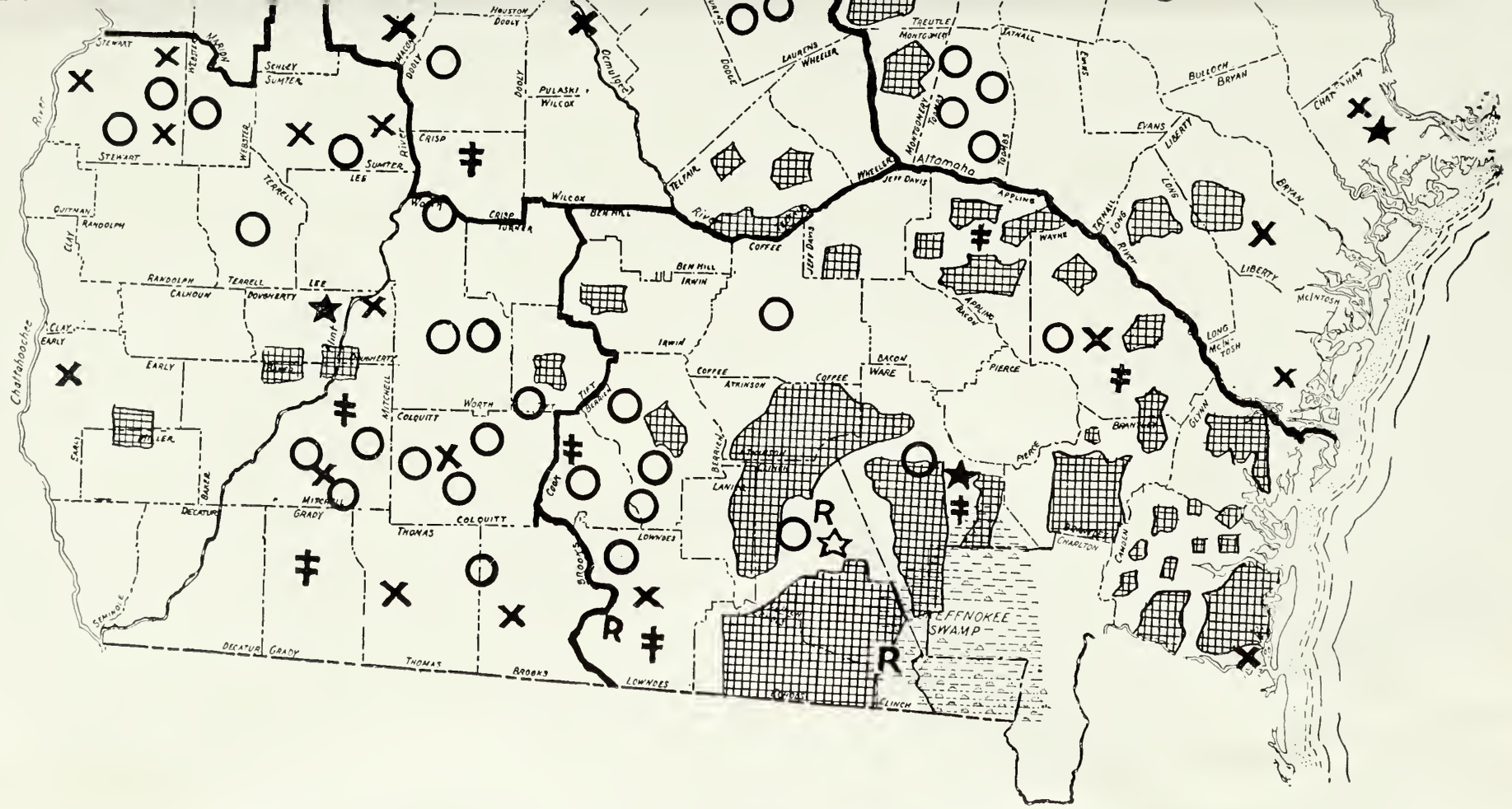
During the two-year period covered by this report, the Georgia Forest Service has issued six bulletins and six leaflets. The more popular bulletins and leaflets are issued in quantities of 5,000 each. The demand for these publications is such that it has been necessary to reprint a number of them. The more technical bulletins have been issued in quantities of 3,000 each. These too have been much in demand.

The bulletins issued since the last report are as follows:

Subject	*Author*	*Number Printed*
Planting Pines in South Georgia	Fred B. Merrill	2,000
Profitable Forestry in Georgia	C. A. Whittle	7,500
Proceedings of the Georgia Commercial Forestry Conference	C. A. Whittle	1,000
Forests and Waters	C. A. Whittle	3,000

Points of Activity of Georgia Forest Service





NOTE: Consult the legend column in the upper right hand corner as to character of work represented by each mark. No effort has been made to mark the exact spot in every instance where work is carried on, only the county in which work is done being designated.

The leaflets issued since the last report are as follows:

Regulations of the Timber Protectime Organizations	B. M. Lufburrow	1,000
Why Prevent Woods Fires	C. A. Whittle	20,000
The South a Source of Wood Pulp	C. A. Whittle	3,000
Fire Break Construction	C. B. Beale	3,000
Forestry in Vocational Agricultural Schools	C. A. Whittle	3,000
Be Careful About Starting Woods Fires	C. A. Whittle	5,000

Posters carrying messages of fire warnings are employed. Most of those distributed during the biennial period have been taken from stock previously printed. A large calendar carrying information to naval stores operators was issued and distributed in 1930.

Some assistance has also been rendered to timber protective organizations in preparing and printing posters designed for their own use.

NEWSPAPER SERVICE

The educational department releases an article a week to the newspapers of the State. For the most part these articles have news value and are welcomed by the press as shown by clippings collected by a newspaper clipping service. Information has been supplied from time to time to news agencies which have sent out articles to daily papers of the State.

Photographs and cuts have been provided for newspapers, some of them being used in rotogravure sections of Sunday papers.

It has been very gratifying to note many editorials on forestry in the State press. These are contributing much to quickening public interest and in laying the foundation for organized effort particularly in forest fire control. In fact, much of the progress in developing forestry sentiment in the State is to be credited to the Georgia press.

PUBLIC ADDRESSES

A number of groups of land owners interested in forming timber protective organizations have been addressed by staff representatives. Talks have been made before civic organizations such as the Rotarians, Kiwanians, Civitans, Lions, women's clubs, teachers' clubs, boy scout camps, colleges, schools and in county-wide school campaigns for forest fire prevention.

Invitations to address a sawmill association, the Southeastern Waterworks Association and sections of the Society of American Foresters have been accepted by members of the staff.

Five large groups of Georgia farmers allied with the Federal Land Bank were addressed in 1930 by representatives of the staff on farm forestry, the invitations to participate in the program coming from the Federal Land Bank at Columbia, South Carolina.

The demand for public addresses have, in fact, been greater than it has been possible for the staff to meet.

WORK WITH SCHOOLS

The Georgia Forest Service has concluded its second year's co-operation with the Department of Vocational Agriculture in the State, assisting it to carry out a forestry educational project. There are 146 of these schools in Georgia, 106 being white and 40 colored.

Of the white schools, 98 have school forests of ten or more acres, and of the colored schools, 12 have school forests. In a few instances one school forest is serving two schools. The use of these forests has been obtained under ten year leases from owners, except where the forests are owned by the schools.

These school forests are used for teaching practical forest management. The work is conducted along lines recommended by the Georgia Forest Service. Field demonstrations are held at the school forests by representatives of the staff on periodical visits to the schools. The major forestry subjects taught and practiced are:

(a) Tree identification, (b) gathering tree seed, making and

operating a seed bed and planting, (c) thinning of forests, (d) estimating the volume of standing timber, (e) fire prevention measures, and (f) uses of timber.

An interesting demonstration to show the effect of fire on tree growth is carried out on each school forest. A quarter-acre plot is burned over annually and a similar area adjoining is left unburned. Annual growth measurements are recorded. Demonstrations are also being made to show how thinning affects the rate of tree growth.

Beginning with the school year in 1930, plans were inaugurated for having the high school students to make report on forest fires in the region of the schools. Vocational agricultural schools are rural consolidated high schools, with students brought by school busses from a wide region. There-

Forestry Cabin and Students Who Built It.
Georgia Industrial College, Barnesville.

fore, these fire reports cover, in some cases, as much as 100 square miles, but the average area is nearer 50 square miles.

Cards are placed in the hands of students for making the fire reports. On the cards is a questionnaire calling for the name of the land owner who has suffered fire damage, the number of acres burned over, cause of the fire, and severity of damage.

These fire reports are compiled in the office of the State Forester as a part of the forest fire records on unprotected areas of the State. The land owners having fires are mailed literature on the importance of keeping fire out of the woods and are visited by district foresters.

At the conclusion of the period covered by this biennial report, data on school fire reports was not complete.

In 1929, 2,359 students took the forestry work; in 1930, there were approximately 2,500 students. Nearly all of these students live on farms. A number have taken up projects in forestry on their father's farms for which they obtain units of credit in school work. A number of them are also reforesting old fields.

Georgia has the distinction of being the first State to inaugurate forestry in its agricultural or Smith-Hughes Schools, and as a result, nation-wide attention has been attracted to the undertaking.

SUMMER CAMP

Plans have been made for holding a summer camp for boys doing outstanding work in forestry. The first camp will be held at Young Harris College in the Georgia mountains this year, July 27 to August 15. A free scholarship covering expenses at the camp is awarded by competitive examinations to one boy in each county having vocational agriculture schools. Other vocational students who have done good work in forestry and can arrange to finance their own way will be permitted to attend the camp.

The work at the camp will consist of more intensive training in the subjects given in the schools. Six weeks' training

in camp will entitle the student to a certificate of Vocational Forester, and recommend him as capable of doing non-technical work in forestry.

Through the liberality of the Georgia Forestry Association, one hundred dollars was offered in 1930 as a prize to the vocational teacher doing the best work in forestry. This prize went to Professor C. L. Veatch of Commerce. For 1931 the association offered one hundred dollars to the white teacher and fifty dollars to the colored teacher doing the best work. These awards have not yet been made.

The Georgia Forestry Association has also offered 15 scholarships to the summer forestry camp.

The Georgia Forest Service co-operated with the American Forestry Association and the Georgia Forestry Association in the Southern Forestry Educational Project for two years, ending July 1, 1930. Moving picture trucks carried the message of fire protection to the public schools.

A worthy example has been set by the Chamber of Commerce of Rome, Georgia, and schools of Floyd county. A week's campaign in fire prevention was conducted in all the schools of the county, the judges of the courts, Secretary W. H. Foster and representatives of the staff of the Georgia Forest Service participating.

ROADSIDE FOREST DEMONSTRATIONS

Twenty-five roadside forest demonstrations have been established at as many points on leading highways of the State. The attention of the public is drawn to these demonstrations by attractive signs, telling how natural reforestation has taken place where fires have been kept out. Each sign bears the name of some local organization that is sponsoring the demonstration, usually a civic organization. Other demonstration forests are to be established. These areas consist mainly of young pines, properly thinned and with firebreaks constructed. Studies are being made by the Georgia Forest Service in a number of these forests to determine growth rates for various tree species on different soils and sites.

Co-operation is also given by the Georgia Forest Service to private timber owners in establishing roadside demonstrations of pine plantings.

SURVEY OF MILL REQUIREMENTS

The staff of the Georgia Forest Service is making contacts with mills and wood manufacturers of the State to learn their needs in order to be of service in directing timber owners to where they can find a market for their various forest products. This survey has not been completed. The information is kept on record in answering inquiries of timber owners.

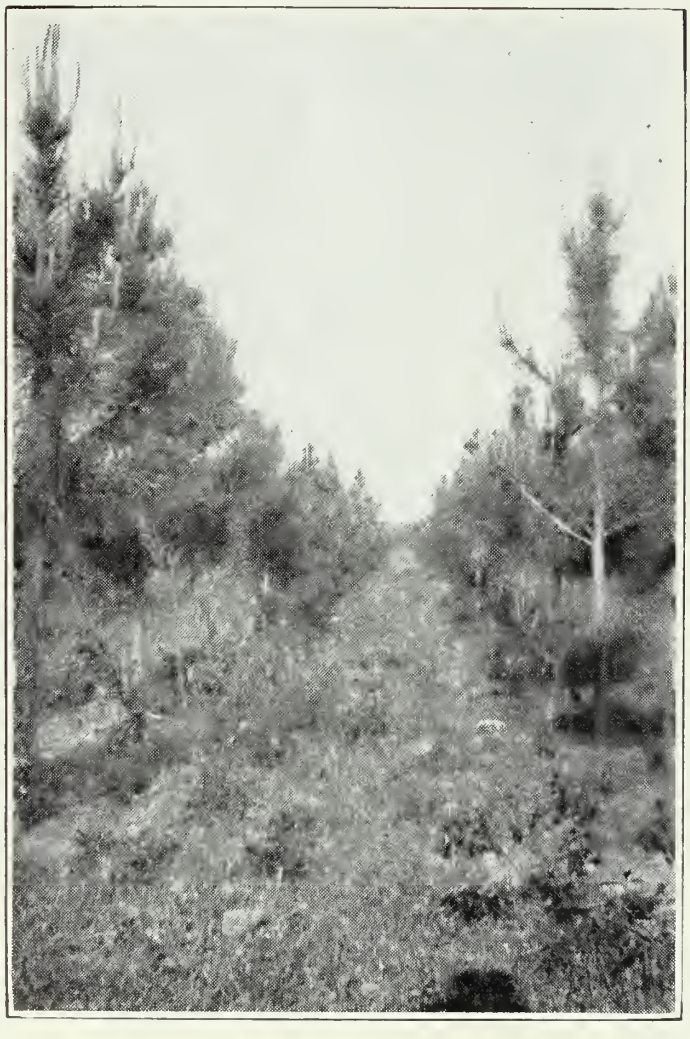
CO-OPERATION WITH ASSOCIATIONS

An organization doing much to further the interest of forestry in the State is the Georgia Forestry Association, made up of public spirited citizens, both business and professional, including leaders of the press. It has been the pleasure of the Georgia Forest Service to co-operate with this association. The valuable addresses at the forestry conference held under the auspices of the association at Savannah in 1930 were printed

Twenty-two year old longleaf pine Ichaway Plantation, Baker county. Thinned to 300 trees per acre.

and widely distributed. Assistance was rendered in the preparation of literature which the association has distributed to the public schools of the State. Exhibits and demonstrations have been presented by the Georgia Forest Service at the annual meetings of the association.

It has also been a pleasure to co-operate with naval stores organizations. Attractive calendars have been supplied for distribution to naval stores operators. On these calendars are messages concerning improved methods of woods operations, approved alike by leaders of this industry and by forestyr authorities.



Fenn slash pine plantation near Cordele, Georgia, making rapid growth, planted 1926.

FOREST FAIRS

The Second Georgia State Forest Fair was held at Valdosta in November, 1929. What is stated by forestry authorities to be the greatest strictly forest exhibit ever made in this country was that displayed at Valdosta. The numerous exhibitors took particular pains to make their displays interesting and instructive. The co-operation of the United States Forest Service, the American Forestry Association, the State School of Forestry, Pine Institute of America, United States Bureau of Chemistry and Soils, and a number of industries related to forest protection, wood manufacture, naval stores production, etc., participated. Field demonstrations in firebreak construction, turpentining, fire fighting, planting and thinning were conducted in nearby forests.

STATE NURSERY AND REFORESTATION

Through provisions of the Clark-McNary Act of Congress, $2,000 is annually made available from federal funds for operating a State nursery for raising forest planting stock. The Georgia State College of Agriculture contributes an additional $2,000 annually, making in all $4,000 for operating this nursery. Through co-operative arrangement with the College of Agriculture, operation of the nursery is placed in charge of that institution. This agreement calls for the sale of forest planting stock to citizens of Georgia at cost.

Not until 1929 was the nursery established on a production basis of any importance. During that year 400,000 seedlings were grown and sold; in 1930 the number was 1,057,000. The nursery is now prepared to grow two million seedlings each year.

The increasing interest in reforestation in the State indicates that this number of seedlings, or more, may be required annually by Georgia land owners.

Some of the large land owners of Georgia are raising planting stock for their own requirements. Several vocational agricultural schools are doing likewise. A number of land owners

are also transplanting seedlings that have come up naturally on their wooded areas to fields and open places in the forest. It is probably conservative to say that 3,000,000 seedlings are now being planted annually in Georgia. This number should increase and doubtless will as interest in reforestation grows.

It is, however, recognized that the greater part of Georgia can be reforested without artificial planting. Wherever three to six good seed trees per acre are left by loggers and where fires are kept out, a good stand of pines will be established. Artificial planting, in fact, is needed only on abandoned fields or land bare of seed trees, or where undesirable species are stocking the land.

Specific instructions as to methods of planting are given

LEFT—Seed tree where fires have prevented reproduction. RIGHT—Good seed trees bearing 4 bushels of cones, capable of doing a good job of reproduction.

in bulletins issued by the Georgia Forest Service, and where these instructions are followed, land owners have been getting good results. These plantings are giving a more rapid rate of growth and will bring the trees to commercial size more quickly than trees grown under natural reforestation.

STATE FOREST-PARKS

Considerable impetus was shown in the public demand for forest-parks during 1929-30. This was demonstrated by the large number of visitors to the two State forest-parks—Vogel Forest-Park at Neel Gap in Union county, and Indian Springs Forest-Park in Butts county. These forest-parks are particularly well adapted to recreation, to which they are largely devoted.

Vogel Forest-Park. This area of 160 acres was donated to the State in 1926 by Mr. Fred Vogel, Jr., of Milwaukee, Wisconsin. Present improvements are an attractive tea room, ranger's cabin for visitors to register and for information, both equipped with electric lights and running water; a rest room with lights and water, a water supply, drinking fount, observation platform overlooking Blood Mountain Gorge, camp sites, picnic area, parking grounds and a number of trails with signs, pointing out places of interest and cautioning about protecting the forest from fire.

Thousands of visitors from Georgia, all parts of the United States and from several foreign countries are registered at Vogel Forest-Park. These visitors are enthusiastic about Georgia mountains and express wonder why these potential recreational grounds have not been more fully developed, and why Georgia itself is not awake to its recreational possibilities. We feel the necessity of letting the world know more of the wonderful recreational possibilities the mountains of North Georgia offer, and for improving the facilities there as the demand increases.

Indian Springs Forest-Park. The historic background of Indian Springs is unsurpassed by any in the State. This spot played an important part in the history of Georgia, and Indian Springs' reputation is national in scope. State ownership dates

back to 1801. Today it is a very popular forest-park, visited by thousands every year. Twelve acres were added in 1930 as a gift to the State from the Jackson Kiwanis Club. Recent improvements have added to its attractiveness and there has been a marked increase in the number of visitors in 1929-30.

Recreational Demands. Georgia owes it to her citizens to provide public playgrounds sufficient in size and number to accommodate her people. This demand is increasing yearly. A number of State forest-parks will be needed to meet this demand. With proper administration, forest-parks will be self-sustaining, so far as maintenance is concerned.

FOREST RESEARCH

Research workers continue to find new uses for wood. Recent research has opened up new channels of unlimited possibilities for southern timber. The South is recognized as the leading producer of wood because of its natural advantages, of tree species, rainfall, growing season and topography. Dr. Chas. H. Herty's work on southern pines has aroused thinking people of the State to an appreciation of industrial possibilities of Georgia in pulp and paper manufacture. He is pointing the way to more forest industries to utilize the forests that can be grown and harvested at such low cost to the owner here in the South.

Besides pulp and paper possibilities, there are other fields yet untouched where wood is to play a vital part in the progress and development of the South. Cellulose manufacture in the form of rayon, artificial leather, etc., is just as promising as the pulp and paper industry, but without chemical research to determine the adaptability of southern woods to these new products, these promising fields must remain undeveloped.

During the two-year period covered by this report we find some material progress in forest research. The Georgia Forest Service is co-operating directly with the Appalachian Forest Experiment Station and the Georgia Experiment Station through its branch at Blairsville in Union county in a research project started in 1930. The first bulletin on this work is now avail-

able. It contains much valuable information collected on types and rate of growth in the mountain hardwood section.

Research work at the Southern Forest Experiment Station of the U. S. Forest Service in New Orleans and at Starke, Florida, has been of considerable value to the naval stores industry and to forestry in general. Direct co-operation of the Georgia Forest Service with Dr. Austin Cary of the U. S. Forest Service in practical demonstrations in South Georgia has been carried on. The studies of Dr. Ziegler of the U. S. Forest Experiment Station in New Orleans, and of Dr. Shingler in the Bureau of Chemistry have been of great value to forestry and the naval stores industry of Georgia.

FIRE STATISTICS

During the two-year period covered by this report, there has been a small reduction in the total area burned over, both in 1929 and 1930, although there is an increase in the actual number of fires occurring. This is a healthy sign in that it indicates that private owners are becoming concerned and some definite effort is being made by them to suppress fires. Otherwise, with the increased number of fires the total area burned over would be larger.

The fire statistics on unprotected areas for the entire State are estimates. These figures are conservative. They were checked as far as possible and the results are believed to be fairly close.

The figures for the protected areas—the timber protective organizations—are accurate. Here also we notice an increase in the number of fires in 1930 over 1929. This is due to the fact that there is a small increase in the total acreage under protection and to a very unfavorable fire season; also to large fires on two new units which had just gotten under way and were not fully organized.

The fire statistics for the State as a whole for the years 1929 and 1930, and for areas under control of timber protective organizations, are as follows:

FOR STATE

Year	No. Fires	Area Covered	Acres Burned	Total Damage
1929	19,103	23,725,000 Acres	4,948,205	$4,048,205
1930	21,734	23,725,000 Acres	4,605,193	$4,631,415

FOR TIMBER PROTECTIVE ORGANIZATIONS

Year	No. Fires	Area Covered	Acres Burned	Total Damage
1929	104	1,212,071 Acres	10,558	$13,205
1930	239	1,351,070 Acres	13,613	$25,674

FINANCIAL STATEMENT

RECEIPTS

	1929	1930
Balance (book) from previous year	$14,425.42	$21,107.23
From State, allocated funds	23,508.52	26,937.90
From State for Indian Springs	2,754.94	5,121.72
From Fed. Government, Sec. 2 (fire control)	38,850.49	37,523.23
From Fed. Government, Sec. 4 (nursery)	1,616.44	1,670.52
From Individuals	40.22	223.76
Interest on bank balances	367.04	537.71
	$81,563.07	$93,122.07

DISBURSEMENTS

Administration:		
Salaries	$ 6,300.00	$ 6,300.00
Travel, State Forester	1,733.37	1,922.10
Travel, Board Members	372.64	610.80
Office expense, including porter	329.76	260.00
Postage, telephone, telegraph	327.28	453.83
Printing	2,037.89	632.15
Supplies and Equipment	234.84	704.71
Miscellaneous, including express	329.55	160.54
	$11,665.33	$11,044.13
Field:		
Salaries, 5 men and stenographers	9,268.92	12,228.00
Travel, 5 offices	5,166.61	7,083.27
Postage, telephone, telegraph	45.09	110.72
Supplies and Equipment	657.56	1,058.31
Miscellaneous	296.24	233.74
Special (exhibits)		94.68
	$15,434.42	$20,808.72

Bureau of Education:	1929	1930
Salaries, Dir. Ed., Asst. & Stenographer	4,402.	4,749.99
Travel, Dir. of Ed. & Asst.	1,990.90	2,406.87
Postage	372.00	500.00
Printing	2,161.91	1,550.81
Supplies and Equipment	494.52	792.48
Miscellaneous, including express	80.51	146.77
Highway signs		403.70
	$ 9,501.84	$10,550.62
Forest-Parks:		
Improvements	2,594.50	3,154.34
Indian Springs	2,920.51	4,973.17
Southern Forestry Educational Project	3,057.94	2,473.51
Refunds to Timber Protective Organizations	13,814.86	15,030.18
Nursery Project	1,466.44	1,811.34
Research, North Georgia		500.00
South Georgia		414.25
Total Disbursements	$60,455.84	$70,760.26
Balance December 31	21,107.23	22,361.81
	$81,563.07	$93,122.07

STATE AUDITOR'S COMMENTS

In 1927—"All records are full and complete."

In 1928—"The records are neatly and accurately kept, and all disbursements covered by proper vouchers."

In 1929—"Payments are supported by proper vouchers. The records are being satisfactorily handled. The State Forester is bonded."

In 1930—"The records of the State Forestry Board are neat, accurate and full, enabling us to commend those in charge for their industry and efficiency."

GEORGIA FOREST SERVICE FINANCIAL STATEMENT

RECEIPTS: Calendar Years	1925	1926	1927	1928	1929	1930
Borrowed from Bank on personal endorsement of members of Board, to begin work	$1,000					
From State, tax collected on forest industries	825	$13,402.42	$11,354.58	$ 18,360.90	$ 23,508.52	$ 26,937.90
From Federal Government under Sec. 2, Clarke-McNary Law	None	4,185.15	19,991.60	42,465.64	38,850.49	37,523.23
From Federal Government under Sec. 4, Clarke-McNary Law				1,484.00	1,616.44	1,811.34
From State for Indian Springs				3,000.00	2,754.94	5,121.72
From Individuals for transportation expense, examining timberlands, etc.			152.09	399.17		220.00
From Gainesville Chamber of Commerce for Vogel forest-park				275.00		
Interest on bank balances				73.95	367.04	537.71
Balance from previous year		523.85	2,555.40	3,474.14	14,425.42	21,107.23
	$1,825	$18,111.42	$34,053.67	$ 69,532.80	$ 81,522.85	$ 93,259.13
Funds spent by T. P. Os. under co-operative agreement	None	7,342.10	51,046.58	53,815.11	48,499.90	46.016.66
TOTAL	$1,825	$25,453.52	$85,100.25	$123,347.91	$130,022.75	$139,275.79

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REPORT

OF THE

Commission

Department of Forestry and Geological Development

TO THE

Governor and General Assembly

OF THE

State of Georgia

1931-1932

INDEX

LETTER OF TRANSMITTAL

January 10th, 1933.

To His Excellency,
Hon. Eugene Talmadge, Governor,
State of Georgia,
Atlanta.

In accordance with Article 4, Section 23 of the Reorganization Bill enacted by the General Assembly of Georgia at its session in 1931, the Commission administering the Department of Forestry and Geological Development herewith transmits the following report to the Governor and General Assembly.

Respectfully,

S. W. McCALLIE,

Secretary of the Commission.

LETTER OF TRANSMITTAL

January 10th, 1933.

To the Members of the Commission of
Forestry and Geological Development:

Pursuant to your instructions, we have the honor to submit this report covering the activities of the Department under your control.

Separate statements of the activities of the State Geologist, State Forester, Research Chemist and Development Agent reporting for the Main Office, are embodied herein.

Throughout the year the Development Agent has observed at first hand the energy, enthusiasm and economy with which the employees of the department have carried on their numerous activities under your control. Service has been the watchword. Results may be indicated but not fully recorded in this report.

I am sure I speak for the personnel of the entire department when saying we are grateful to the Commission for the great amount of time and thought it has given to the development of the department's program of work.

Respectfully submitted,

BONNELL STONE,

Development Agent.

MAIN OFFICE

DIVISION OF FORESTRY

Organized as

GEORGIA FOREST SERVICE

in 1925

DIVISION OF GEOLOGY

Organized as

STATE GEOLOGICAL SURVEY

in 1889

DIVISION OF PAPER RESEARCH

Organized in 1932

Reporting to the

COMMISSION OF FORESTRY AND GEOLOGICAL DEVELOPMENT

FINANCIAL STATEMENT OF COMMISSION

COMMISSION OF
FORESTRY AND GEOLOGICAL DEVELOPMENT
1932

President—Governor Richard B. Russell, Jr.
Mrs. M. E. Judd, Dalton
J. Leonard Rountree, Summit
C. B. Harman, Atlanta
Alex K. Sessoms, Cogdell
J. M. Mallory, Savannah
Secretary—S. W. McCallie, State Geologist, Atlanta

President-elect Franklin D. Roosevelt Appearing on the Platform at Warm Springs to Speak on Forestry—Greeted by a Large and Enthusiastic Audience

MAIN OFFICE

BONNELL STONE, Development Agent, Oxford
C. A. WHITTLE, Educational Manager, Atlanta
MRS. NELLIE E. EDWARDS, Treasurer, Atlanta

FOREWORD

Since January 1st, 1932, the Department of Forestry and Geological Development has been vested with all powers, functions and duties of the former State Board of Forestry, and all powers, functions and duties of the former Advisory Board to the State Geologists. The two former departments were abolished, but all laws affecting the two former departments were, therefore, made applicable to the new department by this merger and transfer of authority.

This department, by virtue of the Reorganization Act, is under the direction of a Commission, consisting of the Governor of Georgia as Chairman, and six members who are appointed by the Governor.

The General Assembly of 1931 made provision for the support of this department by appropriations from the General Treasury, thus changing from the former allocation to forestry of certain privilege taxes. A special appropriation was also made "for the purpose of developing the paper pulp industry in this State."

At the first meeting of the Commission in January, 1932, three divisions of the department were set up for the proper handling of the work. as follows: The Division of Geology, the Division of Forestry, the Division of Pulp and Paper Research. The experts placed in charge of these divisions were given the titles of State Geologist, State Forester and Research Chemist, while their duties were concentrated in these broad fields of activities.

The work of the Division of Pulp and Paper Reasearch is entirely new, as no other State has provided facilities and established a progressive program for the development of pulp and paper from the pine trees of the south. The outstanding progress made in proper forestry practice in Georgia since 1925 gives a logical background for such leadership in research by this State. The presence of practically all minerals and other economic advantages required in the manufacture of high grade paper also gives Georgia an added incentive to secure a pulp and paper industry within her borders. Very encouraging results have already been obtained in the Research Paper Plant at Savannah in 1932.

NEW DUTIES

In addition to the further development of forestry and geology, therefore, this department has been given new duties of great importance to the State of Georgia.

Section 24 of the Reorganization Act begins as follows: "It shall be the duty of the department to encourage the development of NEW MARKETS for Georgia forest and geological products, and use its efforts to bring NEW INDUSTRIES into the State." Also in Section 23 of the same Act, the Commission is instructed to " . . . make public reports upon the geological and forest conditions in Georgia, including ECONOMIC AND INDUSTRIAL SURVEYS . . . "

These new duties have been undertaken by the Commission through its Main Office, which was set up for this purpose and for coordinating the work of the three divisions.

MAIN OFFICE PERSONNEL

The personnel of the Main Office cooperates with the heads of the three divisions for the proper development of the department as a whole. It also serves the Commission as a central agency for contacts with other State departments and institutions and with the public.

The four employees in the Main Office are the Development Agent, Educational Manager and Editor, the Treasurer and the Office Assistant. As these titles imply, their various duties include the development of markets, industrial surveys and commercial relations, all educational programs and projects, editing publications and news service, and all accounting and bookkeeping for the department.

SPECIAL ACTIVITIES IN 1932

It was necessary in the beginning of the year to make adjustments for the new department and establish an organization plan. This the Commission handled through special committees consisting of its members and the Development Agent. The Educational Manager and Editor was transferred from the forestry office to the Main Office for uniform service to the entire department. The former Assistant Educational Manager was made District Forester with headquarters at Augusta, thus completing an original program to organize the State into eight forestry districts. Through the District Foresters the State Forester can supervise to best advantage the decentralized plan of administration.

State nurseries were needed for larger production of forest tree seedlings at lower prices than had ever before been offered in Geor-

gia, so with Federal and State funds available for this purpose, the Commission secured splendid local cooperation and selected sites at Albany and in Union county, after very careful investigations of several other sites offered in other sections of the State. When these two State nurseries were established on lands leased for 99 years at a nominal figure, they were turned over to the Division of Forestry for operation. This year the seedlings were sold at half the former prices and at actual cost of production. With a greatly increasing demand for these seedlings, larger quantities will be planted next year, so that many acres of abandoned farm lands, marginal and waste areas may be planted cheaply for future revenue from tree crops. These State nursery sites are so located that thy will grow all species of forest seedlings indigenous to the State.

COOPERATION WITH VOCATIONAL SCHOOLS

Cooperation with the Vocational Agricultural schools throughout the State in the study of the rudiments of practical forestry has brought most gratifying results. Students taking the course learn to identify trees, the commercial uses of wood and the propogation and care of forests.

The Pulp and Paper Research Division through its head has joined in educational work with prizes to students and talks to students who visit the plant in Savannah.

We also propose to acquaint the students in these schools with the varied and enormous mineral resources of Georgia; enable them to identify at least the common minerals, and have general knowledge of their uses and value.

As this cooperative project now heads up in the Main Office, a complete program for the department calls for each division to render its particular service to the schools.

NEW MARKETS AND USES

It is well known that Georgia soils in every county will produce abundant crops of trees when protection from fire and proper management plans are made effective. According to best authority we are fast approaching the time when the annual reproduction of southern pine will equal the lumber cut.

The per capita consumption of lumber decreased from 500 feet in 1906 to 300 feet in 1925, and to 120 feet for 1932. The Naval stores industry is suffering, not only from the world-wide depression, but from strong competition of synthetic substitutes. These conditions make it urgent that we find new markets and uses for naval stores and other timber products. The coming of pulp and paper mills

would be a step in that direction. We believe that systematic research would widen the use of naval stores.

Too many of our mineral products are shipped from Georgia in their raw state and processed elsewhere. The Georgia School of Technology, at its ceramic department, through research and semi-commercial tests, is making progress to correct this situation and it has been the pleasure of your Development Agent to keep in constant contact and cooperate in these efforts.

Chambers of Commerce, city governments and individuals are frequently called upon to prepare industrial surveys for prospective manufacturers, mine operators, or for publicity purposes. The Forestry Division and the Geological Division have on file much data bearing on the forest and mineral resources of the State and this information is available to anyone who may be interested.

Accentuating the depression, producers of lumber, pulp, paper, minerals and many other products have suffered severe competition during the year from Great Britain, Norway, Sweden, Finland, Japan, Russia and other countries by the change in the money standard from the gold to the silver basis. These products and the ocean freights are paid by the American importers in the money of the producing or exporting country. In round figures it has amounted to 35 per cent reduction in the former prices.

Among others, Congressman Vinson introduced a bill in the last Congress which would equalize the difference and prevent the dumping of these foreign products, and there were hearings before the Ways and Means Committee of the House on the bills. The Development Agent accompanied a delegation of citizens of Georgia to Washington and assisted in the preparation of evidence for the committee.

Some relief was granted in the cases of lumber and coal and it is hoped the present Congress will pass the Vinson Bill which will help the producers of kaolin, fullers earth and other products of Georgia.

SURVEY OF WATER RESOURCES

A special committee consisting of two members of the Commission and the Development Agent has recently completed a study and report on the cost of a survey of Georgia's water resources.

We do not consider stream gauging necessary in Georgia for either navigation purposes or for power development, because such uses are confined to the larger streams and are gauged by the Federal Government, or have been developed or surveyed. What is

needed is the flow or capacity of smaller streams of sufficient volume for municipal or industrial purposes, upon which there is now no data. Besides the flow of these streams we should have the chemical analyses and temperatures of all streams in the State, so that the proper development of Georgia may be speeded up through general industrial use of its waters.

Streams with a daily minimum flow of 25 million gallons can be used for municipal and industrial purposes. Even streams of a smaller flow are available where it is feasible to impound them. A glimpse of a map of Georgia will show scarcely any, if a single county, but has streams of these classes.

The manufacture of pulp and paper requires a large quantity of water, 25 million gallons being the minimum. Roughly speaking, a stream 15 feet wide with an average depth of 2 feet and flowing 60 feet per minute will furnish that amount, but obviously the supply must be constant,

If the water is turbid, or carries an excess of lime, sulphur and other minerals, it must be treated. Bleacheries and plants manufacturing rayon, chemicals and other products are also large consumers of water of certain purities.

Pulpwood and pulp can be transported a considerable distance, but usually at the expense of the seller. Paper and pulp plants must be near the water supply, as pumping is expensive. Generally speaking, Georgia is blessed with both surface and underground supplies of water, but little is known of the capacity of our smaller streams and the chemical analyses or temperatures of the waters of any streams. Other southern states with second growth pine and advantages similar to our own, have been collecting this information for years. Manufacturers from distant states seeking mill sites in the south have little choice as between states. Water, raw materials, labor, power, fuel and transportation are the controlling requirements. The cost of surveying available streams, including chemical analyses and the recording of temperatures is comparatively a small outlay as the Geological Survey of the United States will share half the cost. We urge the consideration of this work.

CONCERNING STATE PARKS

The Department of Forestry and Geological Development, through its Main Office, has spent judiciously the limited funds available for park development and maintenance. We anticipate the receipts from concessions and other sources at these parks will in time make them self sustaining.

Few states embrace as many points of historical, scenic and recreational value as does Georgia. Ancient mounds and artifacts here and there carry evidence of the prehistoric Mound Builders. On the coast are remains of ancient Spanish mission buildings established a hundred years before those in California. Indian Springs, where the State owns a beautiful park, and other sites represent the occupancy of the Indians. Many locations attest Georgia's struggle and cooperation for American independence.

"Liberty Hall", the home of Alexander H. Stephens, recently donated to the State, and other shrines, represent the period of the War Between the States.

Vogel Park at Neel Gap illustrates the wonderful scenic beauty of our Georgia mountains.

Parks representing the Spanish pioneering and the American Revolution period would be very desirable acquisitions. We hope the owners of some of these sites will, through their generosity and public spirit, donate them to the State and that we may be able to accept and preserve them.

As the beginning of a system of State Parks, Georgia has acquired to date the three areas without cost to the State—**Vogel State Park,** located in Union county where the Appalachian Scenic Highway traverses the Blue Ridge Mountain divide; **Indian Springs State Park,** located in Butts county on highway No. 42 midway between Atlanta and Macon; **Alexander H. Stephens State Park,** located at Crawfordville in Taliaferro county on State highway No. 12.

Vogel State Park was very generously presented to the State by Mr. Fred Vogel, Jr., one of the owners of large timber holdings in northeast Georgia. The State came into possession of Indian Springs State Park through the treaty of 1825 with the Creek Indians. Ten acres of this unit are the remnant of a much larger area ceded to the State by this treaty. The citizens of the town of Jackson recently made the State a gift of 12 additional acres, which have been added to this unit at Indian Springs. The Stephens home, "Liberty Hall", and some adjoining property were given to the State by the Alexander H. Stephens Monumental Association and the United Daughters of the Confederacy.

VOGEL STATE PARK—This park embraces an area of 166 acres and has within its boundaries some of the most interesting picturesque scenery of the mountain section of the State. It includes the summit of Blood Mountain with an elevation of 4463 feet, one of the finest of our mountains. The area also contains a picturesque waterfall, and occupies Neel Gap, one of the principal gaps in the Blue Ridge. This area with its wonderful topographic features, great variety of trees and shrubs is admirably suited for recreational pur-

poses, and compares favorably with such areas anywhere in the United States. The Department has made this area accessible by the construction of trails and other improvements which add greatly to its usefulness.

An adequate sanitary water supply has been developed through the construction of a cement reservoir. Comfortable rest rooms with modern conveniences have been constructed, and picnic and camp grounds, as well as adequate parking areas, have been developed.

A restaurant service is provided under a concession lease, and a limited number of overnight quarters have been provided in the same manner. The area is kept under observation during the fire season and adequate provisions have been made for its protection from forest fires.

The park has been visited by approximately 20,000 persons each year, and an analysis of the guest register maintained there shows that in 1929 visitors came from 42 states, and from 313 towns and communities in Georgia.

INDIAN SPRINGS STATE PARK—This park embraces an area of 22 acres, surrounding the mineral spring, the water from which was used by the Indians and by white men ever since their discovery of it in the 18th century. The park area is situated at the confluence of two streams and a large part of the area is well wooded. In addition to the curative properties of the waters of the mineral spring, the area is a very attractive one and lends itself to development for recreations.

Owing to the famous treaty of 1825, at which time the Indians gave up their title to a large part of what now comprises the area of Georgia, the park has considerable historic interest. Perhaps no other spot in Georgia is known to so many people. This with its historic background adds greatly to its desirability as a state park.

The Department has done considerable improvement work on the area, which includes the construction of a stone shelter over the spring itself and covering the spring so as to insure its waters against pollution to which it was subjected before this improvement was undertaken. A concrete restroom and complete water system has been installed, as well as facilities for taking mineral water baths. The dilapidated elevated walkway from one entrance to the property and spanning one of the streams mentioned has been replaced with a suitable cement structure.

Adequate parking areas have been provided for automobiles, and picnic and camp grounds have been developed and are maintained in keeping with the demand for their use. The area has been made accessible through the construction of trails, and considerable planting of trees and shrubs has been done in an effort

to restore some of the original forest setting around the spring itself. A wading pool and other playground equipment have been provided for the many youngsters who visit the place every year. Electric lights have been provided for the playground and area immediately around the spring, which makes it possible to use the area by a large number of people who visit the spring after dark. The bath house and restaurant are maintained as a concession, and the State employs a caretaker to look after the property and give it proper protection.

During the past year more than 50,000 people visited the area, this being considerably more than the number during the previous year, and it is believed that with the improvement of roads in that section that still larger numbers of people will take advantage of the recreational facilities provided there.

ALEXANDER H. STEPHENS STATE PARK—This unit containing 18 acres on which is situated the former home of Alexander H. Stephens and upon which he is buried, has only recently become the property of the State and no improvement work has been undertaken. The Stephens home is in a fairly good state of preservation but some repair work is needed on the building and also on some of the furniture which was formerly the property of Mr. Stephens. Although this place has been given very little publicity, it has been visited by a comparatively large number of people during the past ten years. The register contains the names of many thousands of people from many parts of the United States.

This historic shrine came into the State ownership at the instance of the Alexander H. Stephens Monumental Association and the United Daughters of the Confederacy through the good offices of Judge and Mrs. Horace M. Holden of Atlanta. With the continued cooperation of these organizations and their members, "Liberty Hall" will soon be visited by the American people under more favorable conditions.

WORK OF EDUCATIONAL MANAGER

Under the reorganization plan, the educational and publicity work hitherto functioning under the Division of Forestry, was transferred to the Main Office to serve all divisions.

The Educational Manager is in charge of forestry work in vocational agricultural schools; the vocational forestry camp; is editor of the monthly publication of the department; edits bulletins, leaflets and posters; prepares news items released to the press, and assembles and organizes reference literature for use of the department.

Work with Vocational Agricultural Schools—Georgia is the first state to introduce a forestry project in its agricultural Smith-Hughes schools. This step was initiated by the Division of Forestry, which found the Division of Vocational Education of the State willing and enthusiastic in its co-operation.

School forests of ten or more acres were leased for 10 years. Each white and several colored vocational schools obtained school forests which were surveyed and mapped by representatives of the Division of Forestry. The Division also outlined a program of job work in the management of the forests, embracing the growing of forest seedlings, planting, thinning, fire protection, timber cruising and wood utilization.

The educational manager, in company with district foresters, visits from time to time the schools having the forestry projects to assist in promoting the work.

Two or three times each year the district foresters visit the schools and conduct practical demonstrations supplementing the work of the vocational teachers who instruct their students in the rudiments of forestry by using State and Federal bulletins as texts. The teachers have also encouraged boys to conduct forestry demonstrations on their home farms with considerable success.

Three years of work of this nature have amply justified the undertaking. It has resulted in training thousands of rural boys in the principles of practical forestry. Those in position to judge have stated

Group of Agricultural Vocational Students Receiving Certificates of Vocational Forester in 1932.

that no school project has proven so popular nor received more enthusiastic support than the forestry project.

Some vocational schools drop out, but others take their places so that the average number of schools carrying on the full forestry projects is about 115 annually. The average number of students taking the forestry work in the schools is between 3,000 and 5,000 annually.

Vocational Forestry Camp—For two years a vocational forestry camp has been conducted at Young Harris College in the mountains of North Georgia. One boy from each county having vocational schools is entitled to attend camp. The award of a camp scholarship is made on the basis of a competitive forestry examination, home forestry demonstration, general scholarship and character. A scholarship entitles the holder to attend two camps of three weeks each. If the six weeks camp work is satisfactorily carried out, the student receives a certificate of Vocational Forester.

The school work at camp consists of more intensive training along lines taught in the schools, the teaching being carried on by the educational manager and district foresters. The control of students, athletics, etc., is under the direction of an assistant state supervisor of vocational agricultural teaching, assisted by vocational teachers he selects.

In addition to the class and field work, students are taken on trips of interest into the Great Smoky Mountain National Park and to points of interest in the national forests. Lectures by prominent speakers, and moving pictures relating to forestry are nightly features of the camp.

The Vocational Forestry Camp has undoubtedly stimulated a great deal of interest in the school forestry work throughout the state, and each boy who has been fortunate enough to attend the camp will be a missionary in promoting forestry in his section of the State.

Thirty-nine students received certificates of Vocational Forester in 1932 and around 50 will receive certificates each year the camp is held. This means that about 100 students will attend camp each year, half of them completing the two summers work each year. Eight to ten vocational teachers also attend on scholarship provided by the Division of Forestry.

Forestry-Geological Review—With the reorganization, the "Forest Lookout", previously issued by the Division of Forestry, was enlarged and its name changed to the "Forestry-Geological Review" to serve the entire department. The publication is issued monthly and is distributed to leading land owners, civic and business leaders, county

agents, vocational schools, mine and quarry interests, naval stores operators, lumbermen, etc. The little publication is serving a useful purpose in stimulating interest in forest fire protection and other good forestry practices; in bringing to the public information about the progress of work at the paper research plant; in acquainting Georgia with its mineral resources; in promoting the interest in forestry in schools and in creating interest in state parks.

News Service—The Educational Manager sends out weekly news releases touching various activities of the department. They are especially acceptable to weekly papers, while press agencies and daily papers accept articles especially prepared for Sunday editions. These items contain news or timely information and are quite generally acceptable as shown by clippings obtained through a clipping bureau.

Contributions are made by district foresters and geologists of the state to newspapers, trade journals and magazines. The number of contributions accepted show a gratifying interest on the part of the state press in the resources represented by this department.

The number of editorials in state papers and technical journals, especially regarding forestry and the use of southern pines for making paper, is numerous and reflects strong sentiment in promoting these interests in Georgia.

Bulletins, Leaflets, etc.—In line with its policy of rigid economy, the Commission considered it advisable to restrict the publication of bulletins and leaflets as much as possible. The department, therefore, issued no new publications in 1932 and only reprinted new editions of old bulletins and leaflets that were exhausted and were in demand.

Fire posters were much in demand in the spring of 1932, also in the fall. New posters were printed and distributed to supply this need.

Exhibits—It has not been found feasible with present funds and limited personnel to do extensive exhibiting at state, divisional and county fairs, but exhibits have been made at the annual meeting of the Georgia Forestry Association and at a few county fairs. District foresters have placed exhibits at fairs and assisted in arranging forestry features of school exhibits in a number of places. Occasionally the Educational Manager is called upon to explain the forestry feature of the state museum to visiting school groups and individuals, also to address schools and civic clubs on the subject of forestry.

DEPARTMENT TREASURER

All accounting and fiscal duties of the department are performed by the treasurer located in the Main Office. This includes the book-

keeping of all divisions, the receipt and disbursement of funds and the preparation of monthly and quarterly financial statements for the State Auditor and each member of the Commission. In addition, the treasurer also acts as secretary of the Main Office.

DIVISION OF FORESTRY

B. M. LUFBURROW, State Forester, Atlanta,
W. D. YOUNG, District Forester, Rome,
EVERETT B. STONE, District Forester, Gainesville,
C. N. ELLIOTT, District Forester, Augusta,
W. G. WALLACE, District Forester, Columbus,
H. M. SEBRING, District Forester, Macon,
JACK THURMOND, District Forester, Savannah,
C. BERNARD BEALE, District Forester, Waycross,
H. D. STORY, JR., District Forester, Albany,
EITEL BAUER, Nurseryman, Albany,
MRS. R. S. THOMPSON, Secretary, Atlanta.

INTRODUCTION

(From data of State Forester Lufburrow)

The three previous biennial reports to the State Board of Forestry covered activities of the Georgia Forest Service since 1925 when the Administrative Law creating the department was passed. This report covers the calendar years 1931 and 1932, except for details, explained herein.

The bill reorganizing state departments became effective on January 1, 1932. This report, therefore, will combine the work for 1931 and 1932 in so far as is practicable.

The progress of forestry in Georgia along all lines has been rather remarkable during the past two years. All activities have increased in scope and effectiveness. Cooperative work with new agencies has been established and that already undertaken has been continued and, in many cases, increased.

Forest fire control work continues as a major activity. Forest fire fighters organizations of small landowners have been added to the cooperative work, and the timber protective organizations continue to increase in number and the acreage protected to be enlarged. Federal cooperations continues on a very satisfactory and pleasant basis.

The cooperative work with the Department of Vocational Agriculture in 115 vocational agricultural schools completed its second summer camp in August, 1932. Thirty-nine certificates were awarded. This cooperative work is a most valuable asset to the forestry cause in Georgia.

Our cooperative relationship with all other agencies has been most gratifying.

The intelligent direction of the work by the Board and Commission has made the two years' results possible, and my sincere appreciation is hereby expressed.

Previous biennial reports have covered forestry work of the State to January 1, 1931 and this report covers work of the past two years.

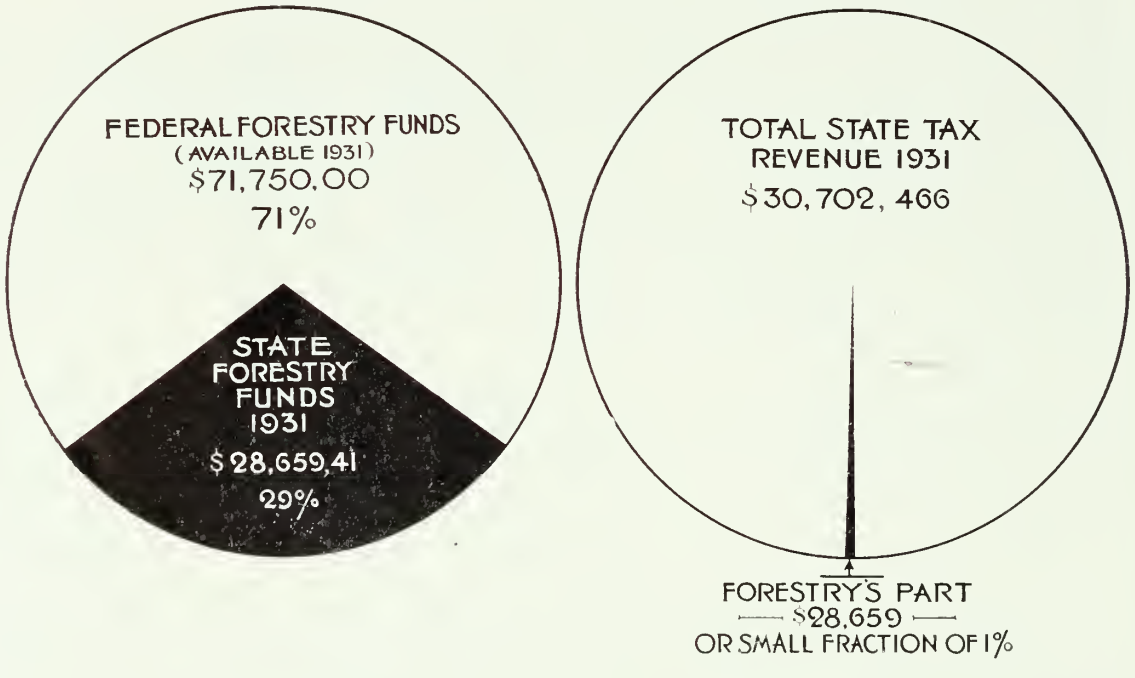
The forest resources of Georgia represent a possible annual income of approximately 163 millions of dollars (reproduction). This enormous natural resource is being directed by a State organization that merits the wholehearted support of the citizens of the State in order to attain its objectives.

ADMINISTRATION

All available funds of the Division of Forestry are budgeted. This division has maintained its record of living within available funds, having completed the year 1931 with a surplus.

Federal aid, under Sections 2 and 4 of the Clark-McNary Law for fire control and nursery work, respectively, is the source of the greater portion of funds supporting the Division of Forestry.

SOURCES OF FORESTRY FUNDS



PERSONNEL

The personnel of the Georgia Forest Service during 1931 consisted of the state forester and a staff consisting of a director of education and utilization, two assistant state foresters, five disrict foresters, an assistant director of education and utilization, a secretary to the state forester and a secretary to the director of education and utilization.

Technical training and practical experience prior to entering the forest service fitted this personnel to give scientific and practical information and assistance to Georgia's timberland owners.

In 1932, the personnel of the Division of Forestry consisted of the state forester, a secretary, and a staff of eight district foresters.

The headquarters for the district foresters are Albany, Augusta, Columbus, Gainesville, Macon, Rome, Savannah and Waycross. These offices are provided, together with heat, light and water, without cost to the State.

FOREST FIRE CONTROL

A major activity of the division from the beginning of our work has been forest fire control. A greater portion of this work is supported by Federal funds under Section 2 of the Clark-McNary Law. The Georgia Forest Service has never had sufficient State funds to match the Federal allotment to Georgia for fire control work although during the fiscal year 1932 the State received more Federal funds than in any previous year. In this same year, Georgia was one of very few states to increase the area under organized protection and cooperative expenditures. The intent of the Federal Law is that these funds must be spent for fire control work only, and not for administrative purposes.

The timber protective organizations represent organized grouped effort in fire control. This plan offers the most economical and practical basis of pooling funds of the Federal government, the State, county and private owners for expenditure on fire protection. The administrative cost is reduced to a minimum and the method provided is sufficiently elastic to meet local requirements. It places responsibility on the local landowner and permits him the use of available local labor and equipment. It insures active local interest at all times and affords a channel through which the personnel of the Division of Forestry can render effective service.

The Forest Fire Fighters' organizations, which were inaugurated at the July meeting of the Commission, represent group effort of small landowners throughout the State. They receive service from the personnel of the Division of Forestry similar to that received by the timber protective organizations, and receive Federal aid in the purchase of fire fighting equipment where funds are pooled for its purchase.

The Forest Fire Fighters' organizations not only emphasize the importance of group effort and provide community leadership but form the basis for building up community sentiment.

The special patrolmen who were used during the 1932 fire seasons promoted an extensive protective undertaking covering 10,306,600 acres with remarkable results. This undertaking disclosed the possibilities of forming the Forest Fire Fighters' organizations mentioned and thus enabled this division to respond to a demand for cooperation in fire control work and to render a real service to the small landowner.

The land listed in the timber protective organizations during 1931 and 1932 reached a total of 1,405,347 acres. This area is under intensive protection and contributes to the cost of same. Within or adjoining organized areas, are lands which it is necessary to protect because of the fire hazard they create to the organized lands. These areas amount to more than 500,000 acres. Land in or adjacent to the national forests in north Georgia under intensive protection that must be kept free of fire to protect national forests from invading fires amount to more than 482,318 acres. It is estimated that an additional 700,000 acres in farm woodlots, game preserves and small ownership are under protection and not included in the above, making a total of approximately 3,087,665 acres within the State that are under intensive protection. A total for areas which are under both intensive and extensive protection is about 13,394,265 acres.

ASSISTANCE TO TIMBERLAND OWNERS

An important forestry problem of this State, which has 23,750,000 acres of potential forest land, 99 per cent privately owned and the greater portion of which is in small holdings, is forest management. This is now largely a problem of the owner, provisions having been made for the State to help only in solving the fire problem.

Georgia's future development will depend upon how her forest areas are managed. It is a land-use problem affecting more than 63-2/3 per cent of the land area of the State, and assistance from the State to the private owner is an essential part of a program of full development and proper use of forest areas.

Each of the eight district foresters are covering from 17 to 23 counties. They are helping the landowners on their forestry management problems in so far as their time will permit and are glad to do so, but it is apparent that they can do very little of the great amount of work needed in directing individual landowners in their forestry management problems.

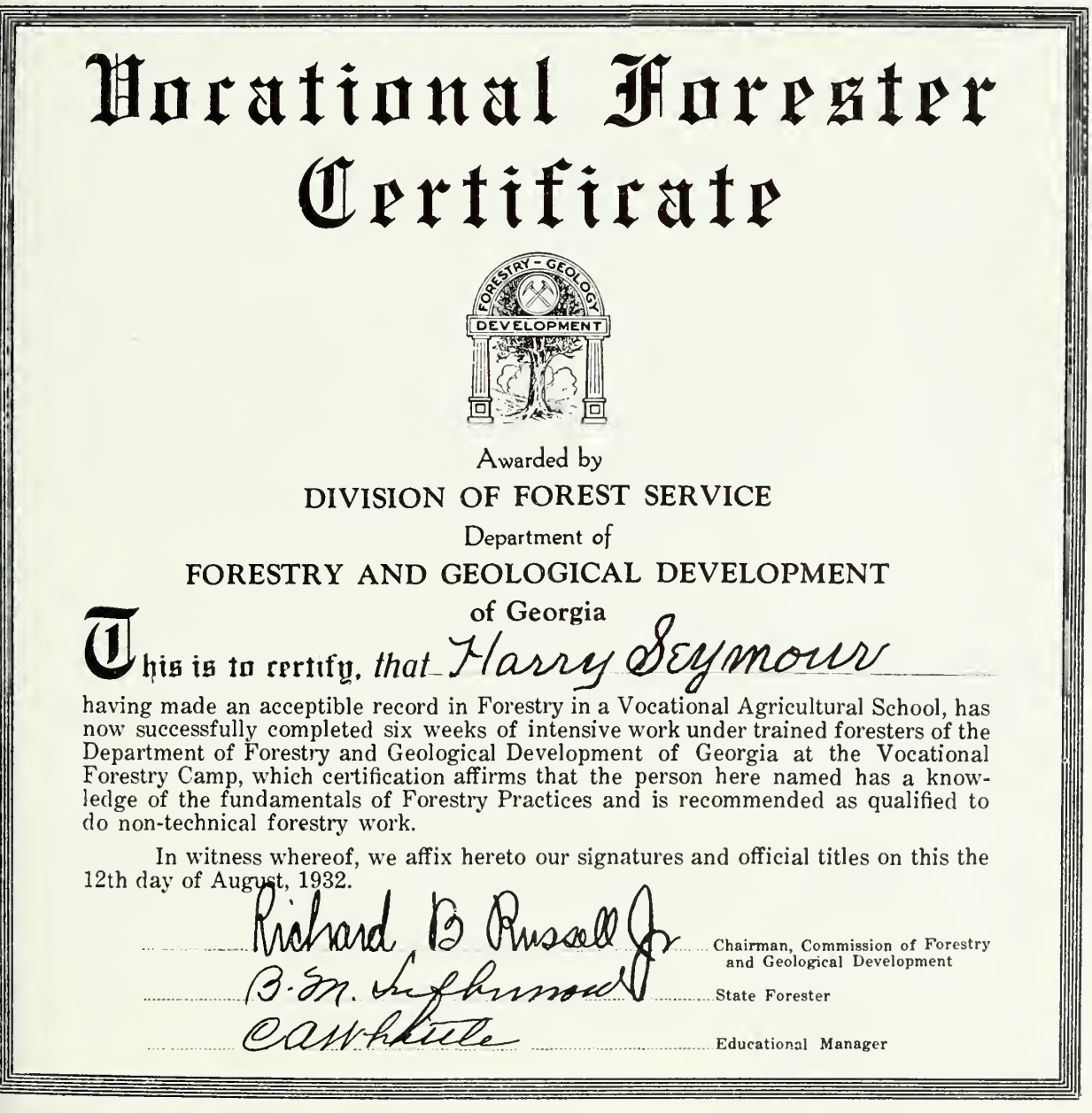
SCHOOL PROJECTS IN FORESTRY

The forestry project of 115 vocational agricultural schools of the State made satisfactory progress in 1931 and 1932. These schools

are for the most part rural consolidated high schools, to which students are assembled by school buses from a wide territory.

Every white school of the State, having a full time vocational agricultural teacher, has a school forest of approximately 10 acres leased for a period of 10 years. A few colored vocational schools also have forests.

These school forests are surveyed and mapped and have management plans made by members of the forestry staff. Each district forester visits the schools in his district two to three times a year and



Vocational Forester Certificate

FORESTRY - GEOLOGY DEVELOPMENT

Awarded by

DIVISION OF FOREST SERVICE

Department of

FORESTRY AND GEOLOGICAL DEVELOPMENT

of Georgia

This is to certify, that Harry Seymour

having made an acceptible record in Forestry in a Vocational Agricultural School, has now successfully completed six weeks of intensive work under trained foresters of the Department of Forestry and Geological Development of Georgia at the Vocational Forestry Camp, which certification affirms that the person here named has a knowledge of the fundamentals of Forestry Practices and is recommended as qualified to do non-technical forestry work.

In witness whereof, we affix hereto our signatures and official titles on this the 12th day of August, 1932.

Richard B Russell Jr ..... Chairman, Commission of Forestry and Geological Development

B. M. Duggan ..... State Forester

Carl Kelly ..... Educational Manager

Fig. 4—Reproduction of Certificate of Vocational Forester given to rural high school students completing course at Vocational Forestry Camp.

gives demonstrations in growing tree seedlings, planting, thinning, fire prevention, estimating the volume of standing timber and wood utilization. Upon each district forester rests responsibility for the school forestry project in his district.

The vocational agricultural teacher gives a definite period of time each year to teaching the rudiments of forestry, using for this purpose State and Federal forestry bulletins. Under the direction of the teacher, students conduct home forestry projects in which planting, thinning and fire protection are carried out.

A feature of the school forestry project that has stimulated a great deal of interest is the vocational forestry camp held for three weeks in July and August of 1931 and 1932 at Young Harris College in the mountains of northeast Georgia. One hundred boys and a few vocational teachers attend. The selection of one boy for each county for the camp is by examination, each contestant also being required to have a home project in forestry and a good general scholarship and character certificate from his teacher. In this way, a high class of boys is assured.

The expenses of the camp are paid from forestry funds. Each student is entitled to six weeks' camp work, three weeks each summer for two summers. If the camp work is successfully performed the student is awarded a certificate of Vocational Forester. The first class received certificates at the camp in 1932. These boys have been taught the fundamentals of forestry and will undoubtedly be enthusiastic advocates of good forestry practices in their home communities.

The camp is in charge of the educational manager with the district foresters acting with him as a faculty. The course of study at the camp has been worked out by the state forester, the educational manager and the district foresters, and is designed to give intensive practical training, mainly by the job method of teaching, in the fundamentals of forestry.

Discipline, recreation and activities aside from teaching, are in general charge of M. D. Mobley, assistant state supervisor of vocational education, assisted by a group of vocational teachers selected by him each year.

The state forester believes that this forestry school work, which the Georgia Forest Service originated, is very valuable and recommends its continuance.

In this connection, it is a pleasure to say that the heartiest cooperation has been received from the heads of vocational education in the State and the vocational teachers, and to them an important share of credit is due for the success attained.

PUBLICITY

Monthly Publication—During 1931 a 4-page monthly publication entitled the "Georgia Forest Lookout" was issued by the Georgia Forest Service. With the reorganization, this publication, enlarged to eight pages, is now issued under the name, "Forestry-Geological Review", and is in the charge of the main office.

The publication has met an important need in keeping people who are interested in forestry and forestry products and civic leaders informed about the progress of forestry in the State and its needs. Articles appearing in the publication have been widely copied in the State.

News Service—In 1931 a weekly forestry news service for the press of the State was conducted by the Georgia Forest Service. In 1932 this service was transferred to the main office and continued.

These items have been quite generally accepted by the press of the State as shown by clippings received. They have been the means of getting before the great body of the State's citizens timely and important information about forests and parks. For the cooperation of the press, the state forester is very grateful.

Special Articles—Special articles have been prepared by members of the staff for the Associated Press, various newspapers, trade journals and magazines. District foresters have contributed more to newspapers and magazines than heretofore.

In some instances, district foresters have been solicited to prepare a series of articles on forestry for local papers and have made such contributions.

Clipping Service—A state newspaper clipping service was obtained by the Georgia Forest Service for 1931 and is still used. This service makes available once or twice a week the information appearing on forestry in the papers of the State, and affords a check on the use of news items sent out.

It is gratifying to note the space given by the press of the State to matters pertaining to forestry. Favorable editorials on forestry are growing in numbers in many of the Georgia newspapers.

PUBLIC ADDRESSES

The Division of Forestry is receiving numerous requests for addresses before various civic and business organizations on forestry. It is often necessary to regretfully decline some invitations because of the pressure of other duties.

Dr. Charles H. Herty has rendered valuable service to this division by speaking before gatherings arranged by district foresters.

A notable address at a district forestry meeting, arranged by the district forester and the Meriwether Timber Protective Organization was that made November 29, 1932, at Warm Springs, by President-elect Franklin D. Roosevelt. Governor Roosevelt is a member of the Meriwether Timber Protective Organization and is an enthusiastic advocate of forestry.

The growing demand for addresses on forestry in the State may be taken as an indication of a growing interest in forestry.

COOPERATION

The Georgia Forestry Association, composed of public spirited citizens in all walks of life, has given real assistance and cooperation to the Georgia Forest Service and its successor, the Division of Forestry in all of its undertakings from the beginning of the work.

The cooperative work with the Federal government under Sections 2 and 4 of the Clark-McNary Law has been conducted on a very high plane and the best of relationships exist.

We have also enjoyed the cooperation of the following bureaus and stations of the United States Forest Service: The Bureau of Chemistry and Soils; the forest experiment stations at Asheville, North Carolina; New Orleans, Louisiana; and Starke, Florida.

We have also cooperated very closely with the director of the Georgia Experiment Station at Griffin, in forestry research work; with the director of extension of the State College of Agriculture at Athens; with the Forestry School at Athens and various State departments.

STATE NURSERY

The Commission of Forestry and Geological Development, at its first meeting in January, 1932, authorized the establishment of two state nurseries and the use of Federal aid funds for the growing of forest planting stock.

One nursery was established at Albany, consisting of 11.5 acres of land on the county farm under a 99-year lease, the Chamber of Commerce of Albany donating the equivalent of $300 for a water supply for the nursery.

Because of a late start, only loblolly, longleaf and slash pine seed were planted in this nursery. We expect to produce approximately three-quarters of a million seedlings from this nursery in 1932.

The nursery in Union county on the Georgia Experiment Station grounds contains 3.4 acres. The director of the station has granted this division the use of this land under a 10-year lease. Black walnut, black locust, yellow poplar, white pine, shortleaf pine and loblolly pine were planted at this nursery in 1932.

The demand for planting stock of both nurseries this year has

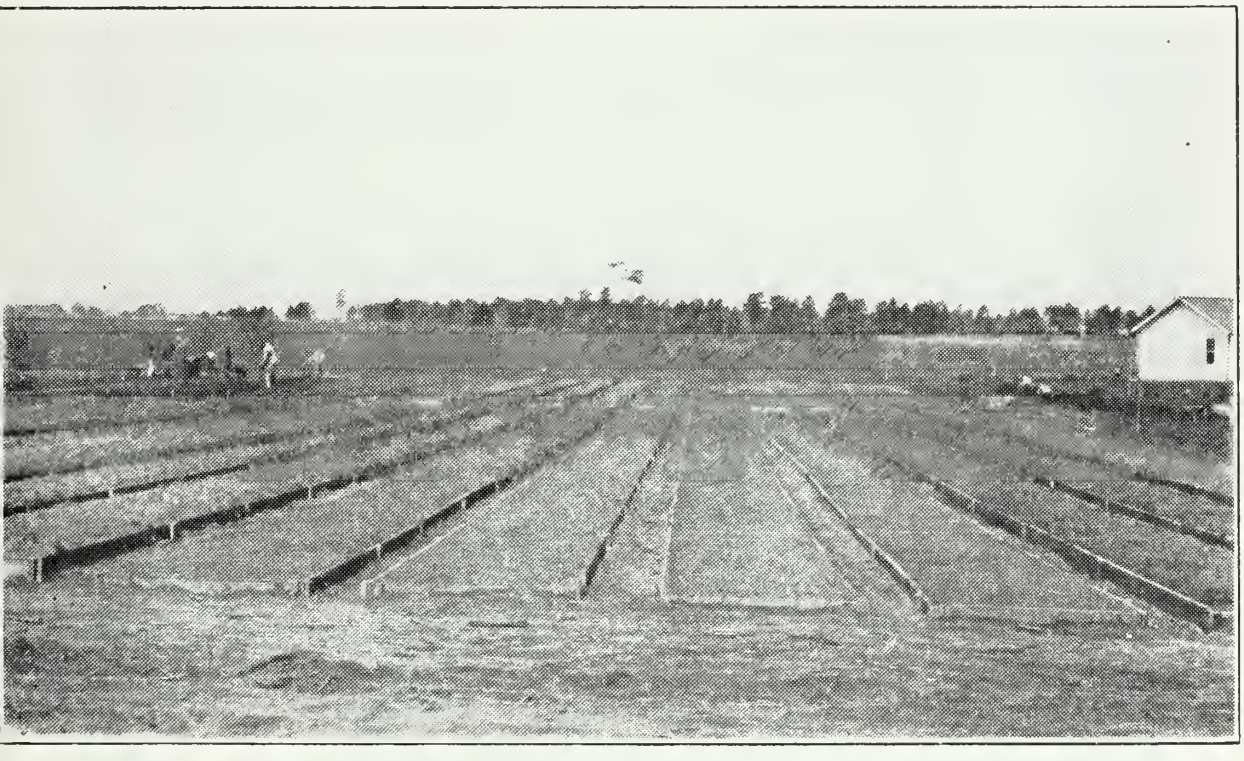


Fig. 5—View of State Tree Nursery at Albany, April, 1932.

been most gratifying. At the present time the orders for seedlings have exceeded the supply with the exception of slash pine, and before the planting season ends, we expect to receive orders for all of the slash pine.

On account of an obligation assumed in accepting Federal aid funds for operating the nurseries, the planting stock is sold at cost to farmers and timberland owners. Only forest tree planting stock will be grown at these nurseries. Commercial nurserymen are not interested in producing forest tree stock because of the small amount of profit to be made. Farmers and timberland owners can not afford to buy this stock from an investment standpoint unless the cost is very low. The Division of Forestry, is, therefore, conferring a real benefit on the landowner and the State by making it possible to

cheaply plant those areas that are now idle and are not within reach of seed trees where natural reforestation can take place.

STATE FORESTS

An offer of 100 acres of land in Richmond county near Augusta by Mrs. Eliza H. S. Nixon to be used as a state forest was accepted by the Commission at its meeting on July 8, 1932. The deed was pre-

Fig. 6—View of pine seedlings at Albany State Tree Nursery in November, 1932

pared, the title examined and approved by the State Attorney-General's office on October 5, 1932.

The Gwinn Nixon State Forest will be used for demonstration and experimental purposes. This forest is typical of a considerable forest area of middle Georgia. It will be administered on a business basis and will be put on a self-supporting basis as soon as practicable, so that it will be of very little cost to the State. On this area we hope to solve some of the forestry problems of middle Georgia.

The need of state forests in other sections of the State is obvious if the Division of Forestry is to give, through demonstrations and practice, similar service to the remaining area of Georgia's 23,750,000 acres of forest land.

FOREST RESEARCH

There are many problems confronting the users of southern timber. Georgia, with the largest forest area of any State in the Union, and with natural advantages, has barely touched the various possibilities in which wood can play a vital part in the State's development.

This division is cooperating with the Georgia Experiment Station at Griffin through its mountain branch in Union county in an effort to develop plans of management of farm woodlots of the principal types of north Georgia. Studies are being made of various phases of forest growth as influenced by its past usage. We are also cooperating with the station in a study of forest nursery seed bed problems and problems that deal with methods of harvesting and storing tree seed, treatment of seed to prevent attacks of diseases and promote higher germination, management of seed beds for individual species including spacing and cultural and fertilizer requirements of the seedlings.

This division is also cooperating in research with the United States Forest Service Experiment Stations in New Orleans, Louisiana; Starke, Florida; and Asheville, North Carolina; and with the Bureau of Chemistry and Soils in naval stores research.

TUNG OIL TREES

Considerable interest in growing tung oil trees exists in the lower counties of Georgia. Planting in that region seem to be making favorable progress. How far north tree will grow has not yet been determined.

This division is watching with interest experimental plantings of a hary species from north China, at the Georgia Experiment Station. Thus far these trees have survived winters of middle Georgia but they have not been grown sufficiently long to justify definite recommendations.

Those contemplating investing in tung oil trees should make a thorough investigation, especially of results in Florida where several years of experiments have been carried on.

ALPHARETTA COMMUNITY PROJECT

In cooperation with a committee from the University Board of Regents, several state departments have selected old Milton county as an area in which these agencies will concentrate and coordinate their respective work in an effort for the betterment of rural life.

The Division of Forestry has made a survey of the 83,394 acres included in the project. The survey map gives a complete picture of the entire area, showing the farm land, forest area by type and age classes, pasture land, abandoned areas, improvements, roads, streams, settlements, and so on.

The report covers the economic history of the old county's land uses, the present condition of its farm lands, amount and kind of standing timber, history of forest fires, and recommends methods of organized fire protection with estimated cost.

The report also recommends a detailed management plan for the forest area. A possible annual growth of some ten million board feet on a sustained yield basis is estimated which would provide sufficient timber to keep a community mill operating the year round.

Forestry work will be coordinated with other state agencies through a local committee composed of land and home owners in the area.

FIRE STATISTICS

The summer, fall and winter of 1931 and spring of 1932 were recorded as the longest drouth in 20 years or more. The forest fire situation became serious in midsummer of 1931 with increasing intensity until April, 1932. The entire personnel of the Georgia Forest Service was assigned to duty in south Georgia during November and part of December, 1931. Many state and county agencies were called upon to assist and the response was most gratifying. The State Highway Commission and many county commissions rendered valuable assistance through road crews, machinery, maintenance crews and instruction to their personnel. The press of the State was untiring in its effort to assist, for all of which the Georgia Forest Service is thankful.

The acreage burned in 1931 was held to a very low figure considering conditions. In the early part of 1932 losses were the heaviest on both protected and unprotected lands. In some counties 90 per cent of the forest areas burned over, while in others where timber protective organizations functioned for four or more years, the burned area was held as low as 3 per cent, including both protected and unprotected lands.

The special fire patrolmen assisted materially in both prevention and suppression, as shown by the record of areas burned in the localities they covered.

Conservative estimates tabulated from limited records or surveys cover the unprotected areas. The figures for the timber protective organizations (organized protection areas) are, however, accurate.

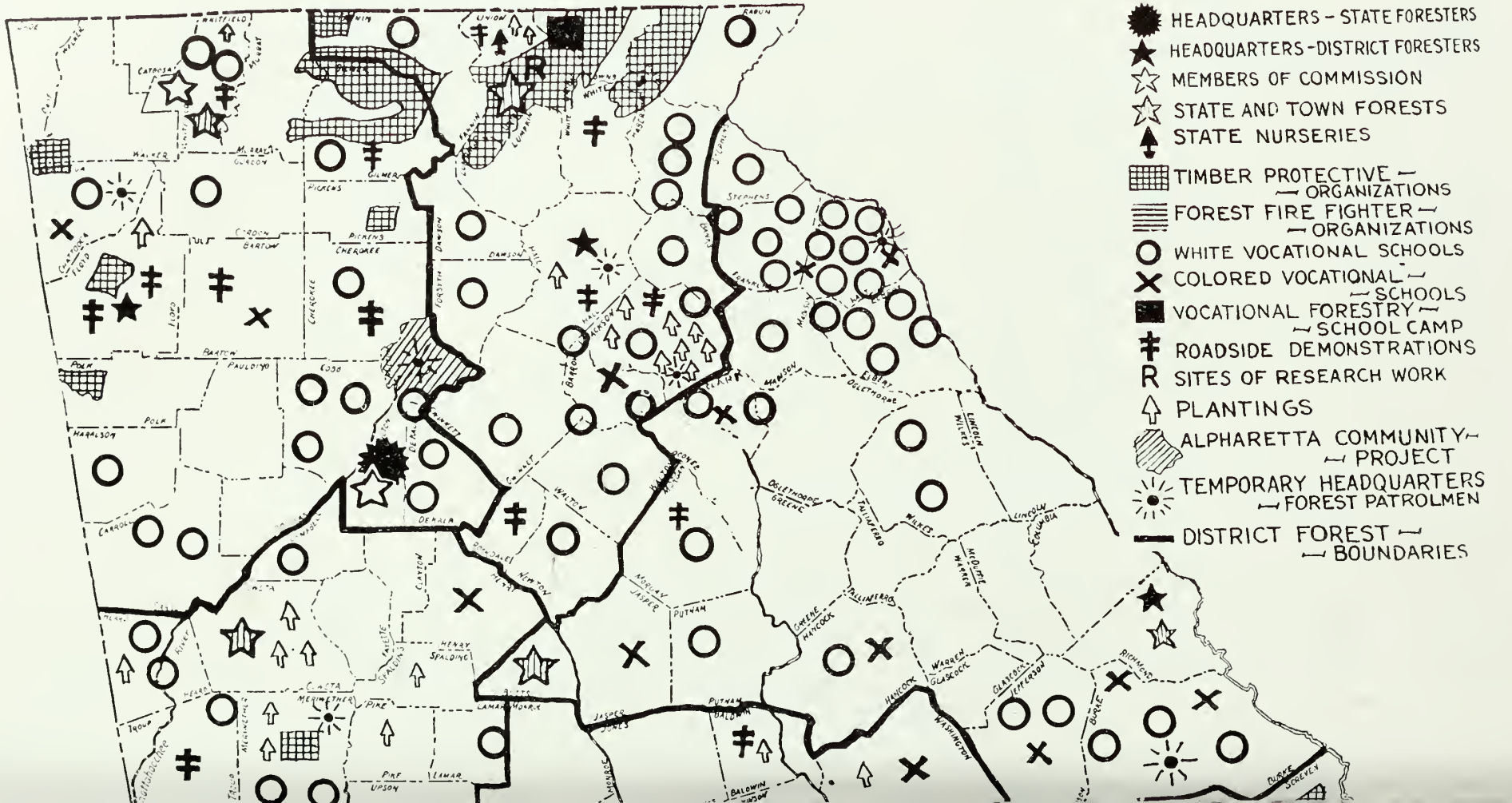
The records under prevailing fire conditions are considered encouraging.

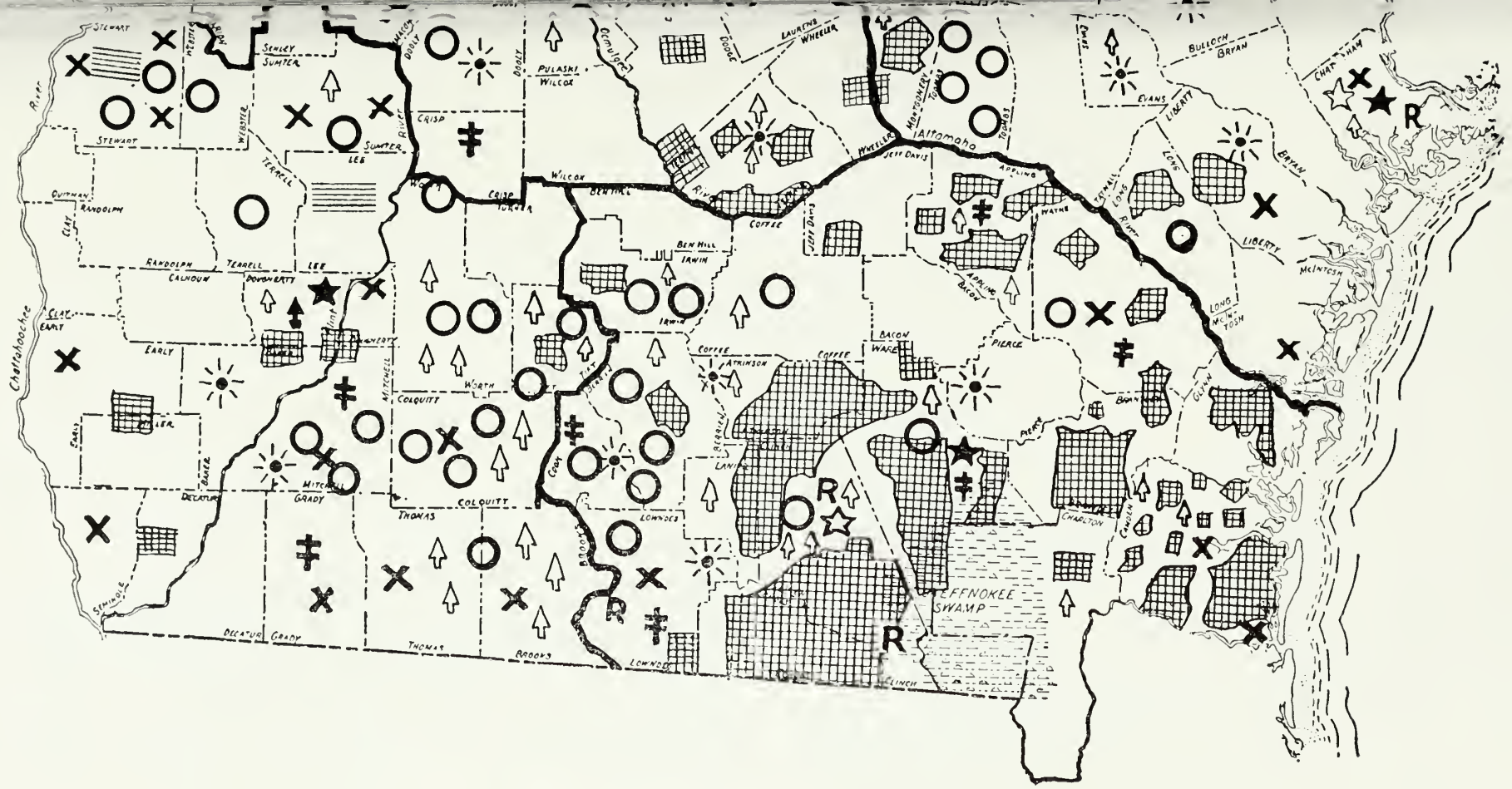
FIRE STATISTICS FOR 1931
Area covered (in acres)

Year	No. Fires	T. P. O. Contributing	Non-contributing	National Forests	Total	Per Cent	Damages
1931	728	1,507,661	500,000	482,318	2,489,979	.017+	$76,471

Figures for 1932 could not be compiled until after the first of the year and, for this reason, are not included in this report.

Points of Activity of Georgia Forest Service





NOTE: Consult the legend column in the upper right hand corner as to character of work represented by each mark. No effort has been made to mark the exact spot in every instance where work is carried on, only the county or section in which work is done being designated.

DIVISION OF GEOLOGY

S. W. McCALLIE, State Geologist
RICHARD W. SMITH, Assistant State Geologist
GEOFFREY W. CRICKMAY, Assistant Geologist
MISS MARGARET GANN, Clerk

PERSONNEL

(From data of State Geologist McCallie)

The personnel of the survey, in addition to the State Geologist, is at present as follows: Richard W. Smith, Assistant State Geologist; Geoffrey W. Crickmay, Assistant State Geologist; Miss Margaret Gann, clerk; porter. Both of the assistants are highly trained geologists. Mr. Smith holds degrees from Massachusetts Institute of Technology and Cornell University, while Dr. Crickmay holds degrees from the University of British Columbia and Yale University.

EQUIPMENT

The equipment of the survey consists of an up-to-date chemical laboratory (now in storage); two Ford coupes for field work; a geological library, consisting of several thousand volumes; a museum, one of the most complete and best-arranged of its kind in the southern states; field equipment consisting of cameras, aneroid barometers, Brunton pocket compasses, collecting bags, geological hammers, etc.

ACTIVITIES OF THE MEMBERS OF THE SURVEY DURING THE YEAR

S. W. McCallie: During the year my time has been taken up in general routine office work, such as answering correspondence, identifying specimens, making an occasional visit to the assistant geologists in the field, and visits to oil prospect wells being put down in south and northwest Georgia. I also spent considerable time in collecting and compiling statistics on the mineral resources of the State, which work was carried on in cooperation with the United States Bureau of Mines and the Federal Bureau of Census. The mineral and water power data are as follows:

VALUE OF THE MINERAL RESOURCES OF GEORGIA FOR 1931

Asbestos, Ocher*	$ 5,839
Barite, Bauxite	264,001

Cement, Lime (mostly cement)	1,336,457
Clay	1,656,433
Clay Products	1,194,371
Coal, Granite (mostly granite)	2,076,505
Fullers Earth	844,917
Iron Ore	51,513
Limestone	658,544
Manganese	78,824
Marble	3,350,351
Mica, Chlorite, Gold	20,761
Sand and Gravel	204,593
Slate, Talc	169.326
	11,912,435
WATER POWER	11,235,312
	23,147,747

The value of the mineral resources of the State for 1931 shows a decrease of $3,221,339 compared to the previous year.

*When there are less than three producers of any one product, its value is reported in combination with some other product, as Asbestos and Ocher.

NOTES ON INDIVIDUAL MINERALS

ASBESTOS

Asbestos is a fibrous mineral, somewhat resembling wood in physical appearance. It is non-combustible and is extensively used for insulation purposes. Only one company reported the production of asbestos in the State in 1931: namely, the Clayton Paving Company, located in White county near Cleveland. The total value of the output of asbestos for 1931 was approximately only 38 per cent of that of the previous year.

BARITE

Barite is a very heavy mineral, usually of a white color. It is known to occur in the following counties of the State: Bartow, Whitfield and Murray, but only in the first named county has it been extensively worked both during and subsequent to the World War. At present only two plants are operating: the Paga Mining Company and the Riverside Ochre Company. The latter company ships its product in raw state after washing, whereas the other company grinds and otherwise treats its ore before placing it on the market. Barite is largely used in the making of lithophone, a variety of white paint.

It is also used in the manufacture of paper, rubber, barium salts, as well as for refining sugar, glazing pottery, and in enameling iron. The total amount of barite put on the market in 1931 was practically the same as that in 1930; the value per ton, however, was slightly greater, the average price per ton being approximately $5.30.

BAUXITE

The ore from which the metal aluminum is made is called bauxite. It is a hydrated oxide of aluminum. Bauxite was first discovered in America near Rome, Floyd county, Georgia, in 1887. The first shipment of the ore was made in 1888. The following counties of Georgia have produced bauxite in commercial quantities: Floyd, Polk, Bartow, Gordon, Chattooga, and Walker, in northwest Georgia; and Wilkinson, Sumter, Macon, Stewart, and Meriwether, in middle and south Georgia.

Only two producers reported production of bauxite in 1931; both plants being located in Sumter county, near Andersonville. The average price, on boards cars, dried, was approximately $6.00 per ton. All of the bauxite produced in 1931 was consumed in the chemical industry.

CEMENT

The total value of Portland cement produced in 1931 was $383,906 less than in 1930. The plants reporting production are as follows: Pennsylvania-Dixie Cement Corporation, Clinchfield, Houston county; Southern States Portland Cement Company, Rockmart, Polk county; and Georgia Cement and Products Corporation, Portland, Polk county. The price per barrel of Portland cement in 1931 was 33 cents less than in 1930.

CLAY (KAOLIN)

Eight counties reported production of clay in 1931 which, named in the order of the value of their output, are as follows: Wilkinson, Twiggs, Glascock, Richmond, Houston, Hancock, Taylor, and Baldwin. Most of these clays were used in the paper industry, although a considerable amount was used in refractoring potter and other industries. The total value of the clay in 1931 was $1,656,433, which was a decrease of $304, 776 compared to the production in 1930. The value of the clay put on the market was approximately $6.00 per ton. Georgia still remains the leading state in the production of high grade clays.

CLAY PRODUCTS

The value of clay products in 1931 was $1,194,371, which is $279,740 less than that of the previous year.

COAL

Only one company, the Durham Land Company, whose mine is located on Lookout Mountain in Walker county, about 12 miles south of Chattanooga, reported production of coal. The value of the coal produced by this company in 1931 was $26,757 (55 per cent) greater than that of the previous year.

FULLERS EARTH

Fullers earth is a variety of clay used mainly in refining mineral and vegetable oils. Four counties reported production in 1931, which, named in the order of production, are as follows: Decatur, Twiggs, Wilkinson and Stewart. The value of production in 1931 was over a million dollars less than that of 1930. The average price of fullers earth in 1931 was approximately $11.00 per ton.

GOLD

The value of the gold output in 1931 was limited to a few thousand dollars. The main activities, which consisted chiefly of prospecting and development work, were confined to Lumpkin, McDuffie, Cherokee and Hall counties.

GRANITE

Eight counties reported granite production which, named in the order of the value of production, were as follows: DeKalb, Elbert, Warren, Madison, Henry, Greene, Hancock, Oglethorpe. The three leading uses to which the granites are now being put are for building stones, concrete, and monumental purposes. Granite is also being extensively used for paving blocks, curbing, road material, etc. The total value of granite produced in the State in 1931 was $2,031,845, which was an increase of $34,911 over that of the preceding year.

IRON ORE

Only two counties reported production in 1931 of iron ore: namely, Polk and Floyd. The total production of 20,745 tons was valued at $51,513, a decrease of approximately $100,000 from that of 1930.

LIME

The only plant reporting production of lime in 1931 was the Ladd Lime and Stone Company. The plant of this company is located in Bartow county, near Cartersville. The entire output was used mainly for building purposes.

LIMESTONE

Six counties reported limestone production in 1931, which, named in the order of the value of their production, are as follows: Houston, Gilmer, Bartow, Pickens, Polk, Crisp. The value of the total output was $658,544, an increase of $280,484 over that of 1930. This increase is mainly accounted for by an increase in the use of limestone in road surfacing. In addition to road construction, the stone is also used for tarraza (floor covering), poultry grit, rubber filler, paint, paper mills and agricultural purposes.

MANGANESE

Four producers, all of Bartow county: namely, J. T. Thomasson, H. C. Simpson, F. D. Smith, and Manganese Corporation of America, reported production of manganese in 1931. The total value of the production was $411,124 less than that of the previous year.

MARBLE

Three counties reported marble production in 1931: namely, Pickens, Randolph, and Cherokee. The main output was from Pickens county, and was produced by the Georgia Marble Company. The total value of the marble produced in the State in 1931 was $3,350,351, which was an increase of $528,391 over that of the previous year. Georgia marble is largely used for monumental purposes and for structural work. Many of the most magnificent buildings now being constructed in the United States are made of Georgia marble. It is indeed gratifying to know that Georgia's greatest mineral industry, the marble industry, increased in 1931 the value of its output approximately 18 per cent over that of the previous year.

MICA AND CHLORITE SCHIST

Both mica and chlorite schist were produced in 1931. The main output of the former was from the following counties: Rabun, Upson, Monroe, and Elbert, while the sale of chlorite schist was confined to Cherokee county. The value of these two mineral products was approximately 2 per cent less than that for 1930.

OCHER

Only two companies reported production of ocher in 1931; namely, the Riverside Ochre Company and the Cherokee Ochre Company. Both of these companies operate in Bartow County, near Cartersville. The value of the output of ocher was less than one-third of that of 1930. Ocher is made up largely of iron oxide and is used in the manufacture of linoleum, oil cloth, coloring for mortars, etc. Its value per ton ranges from $10 to $15 or more when prepared for market.

SAND AND GRAVEL

Nineteen counties reported production of sand and gravel last year. These counties, given in order of the value of production, are as follows: Crawford, Muscogee, Dougherty, Effingham, Talbot, Bartow, Thomas, Telfair, Chatham, Warren, Echols, Wheeler, Coffee, DeKalb, Taylor, McIntosh, Jasper, Richmond, Emanuel. The total value of the production was $204,593, a decrease of $23,803 below that of the previous year.

SLATE

Slate was produced in Bartow and Polk counties in 1931. The main output was from Bartow county. It was marketed in the form of granules, and used in the manufacture of composition roofing. The total value of the production in 1931 was approximately 43 per cent less than that of the preceding year.

TALC

Only two companies reported talc production in 1931; namely, the Cohutta Talc Company and the Georgia Talc Company. The mines and plants of both of these companies are in Murray county, near Chatsworth. The value of the output of these companies was less by approximately 26 per cent than that of the previous year.

WATER POWER

The total water power of Georgia for public use in 1931, as reported by the United States Geological Survey, was 680,928,000 kilowatt-hours, which was 179,809,000 less than in 1930. Rating the value of water power energy at an average of 1.65 cents per kilowatt-hour generated, the gross value of the output of Georgia water power development for 1931 was $11,235,312.

FIELD WORK

R. W. Smith: Mr. Richard W. Smith, Assistant State Geologist, makes the following statement concerning the mica, feldspar and

primary kaolins which he has been investigating during the present year's field work:

The first geologic work on the mica and feldspar deposits of Georgia was begun in 1912 by the Geological Survey of Georgia and resulted in the publication in 1915 of Bulletin 30, "A Preliminary Report on the Mica Deposits of Georgia", by Dr. S. L. Galpin, then assistant state geologist. This was a most timely and useful report, for the World War, already begun, greatly increased the demand for mica for electrical insulation and at the same time cut off the supplies of mica from India and Brazil. Prospectors demanded the report in such numbers that the entire edition has long been exhausted. The mining activity of 1917 and 1918 resulted in the discovery of many deposits of mica not previously known and not described by Galpin. A need has long been felt for a new report that would describe not only the new deposits but also the old ones in the light of modern mining and marketing methods.

The commercial deposits of mica, often called isinglass, are found in the Piedmont Plateau and mountain sections of Georgia in tabular and lens-shaped deposits called pegmatite dikes or veins. Pegmatite is largely made up of the same minerals that are found in granite—quartz, feldspar, and mica—but usually in very large rather than small crystals. It is probably one of the final phases of a nearby intrusion of granite. The pegmatites, in addition to quartz, feldspar, and mica, often contain comparatively rare minerals such as tourmaline, beryl, apatite, columbite, tantalite, rutile, and the radioactive minerals, some of which are of commercial value.

Mica was first mined in Georgia by the aborigines who used it for ornaments and looking-glasses. The early white settlers knew of the mica deposits and perhaps occasionally dug out sheets for glazing the few windows in the more primitive cabins, but it was many years before they were commercially mined. Several mines were opened in the mountains of north Georgia between 1880 and 1885 and furnished large sheets of mica for glazing the windows of stoves. The industry declined with the importation of mica from India, in spite of a growing demand for mica as an insulator in the electrical industry. A protective tariff limited the imports of the smaller sizes of mica about the beginning of the present century and increased the demand for domestic mica. Considerable mica was mined in Georgia from 1900 to 1907, but following the panic of 1907 practically none was mined until 1914.

The wartime demand for domestic mica resulted in prospecting all over middle and north Georgia. The greatest activity took place in some of the Piedmont counties which had received very little attention in the earlier mining. Upson and Monroe counties, which were

only briefly described by Galpin, furnished considerable mica of excellent quality. The height of the mining took place in 1918 when 208,200 pounds of sheet mica and 40 tons of scrap mica with a total value of $80,050 were reported. Since that time the demand for and price of domestic mica has greatly declined and with it the mining of mica in Georgia.

North Carolina and New Hampshire produce the greater part of the mica mined in the United States at the present time, with minor amounts reported from Maine, Connecticut, Virginia, Georgia, Alabama, South Dakota, New Mexico, and Colorado. An increase in the price of mica would result in more activity in the states, such as Georgia, that are now minor producers. This will probably gradually come about as the cheaply-mined deposits of North Carolina and New Hampshire are exhausted.

Feldspar, a silicate of aluminum containing varying amounts of potash, soda, or lime, is used as a flux in the manufacture of glass, white ware, glazes, and enamels, and as an abrasive in scouring soaps and window-cleaning compounds. It is mined from pegmatite dikes in the following states, named in order of their production in 1930: North Carolina, Maine, New Hampshire, South Dakota, Virginia, California, New York, Colorado, Connecticut, Pennsylvania, Maryland and Arizona. It has never been mined in Georgia.

The feldspar of pegmatite dikes is often weathered near the surface to a very white clay called kaolin, or primary kaolin, to distinguish it from sedimentary kaolin such as is found in the Coastal Plain of middle and south Georgia. These primary kaolin deposits, if present in large enough quantities, can be washed and used in the manufacture of white ware.

Quartz or flint, when absolutely pure and finely pulverized, is used in the manufacture of glass and white ware. Beryl is used as the ore of beryllium, a metal that is nearly twice as light in weight as aluminum and is finding uses in alloys where lightness and strength are desired. Occasionally beryls of gem quality are found. The various radio-active minerals are used as ores of radium and uranium.

The task of getting up a new report on the mica deposits and associated minerals of Georgia was assigned to me in 1931. One month of 1931 and seven months of 1932 have been spent on field work in 24 counties. It was decided to make this report as comprehensive as possible rather than a reconnaissance report, as was the previous one. The method of investigation followed in each county was to obtain advance publicity in the county newspapers, telling of the nature of the survey and asking the owners of property with outcrops of mica, feldspar and primary kaolin to notify me of their location. These outcrops were then visited and examined as well as

possible without actual prospecting. Hand samples of the mica or feldspar were often taken to supplement the notebook descriptions. In a very few cases it was possible to take fairly representative samples of feldspar or primary kaolin. Ceramic tests should be made of these samples at the end of the entire field work. In this way nearly all of the outcrops of mica, feldspar and kaolin, as well as the old mines, were visited, including a few mines that were operated previous to 1912 but not described in Bulletin 30.

I also visited a number of deposits of cyanite, an aluminum silicate mineral closely related to sillimanite. Recent experiments have shown that cyanite, although not suited for making the sillimanite-type of spark plug cores, can be used in the manufacture of high-grade fire brick and other refractory shapes where long service under high heat with little or no shrinkage or expansion is necessary. (See article **Cyanite in Georgia; A Museum Mineral Becomes Commercial,** in the December issue of the Forestry-Geological Review.)

The field work to date indicates that there are a large number of pegmatite dikes or veins in Georgia. Many of these contain mica, and some possibly feldspar and primary kaolin, in commercial quantities. Many others, however, are too small to be worked except during times of exceptionally high prices.

The value of mica greatly increases with the size of the sheets, The deposits of sheet mica are by nature very pockety and are seldom continuous for any great distance in either a horizontal or vertical direction. The vein may pinch out or may change in character, the mica disappearing or changing to small or twisted pieces. A promising outcrop may, therefore, lead to a large deposit or only a small pocket, and a large deposit may have a very meagre surface showing. Nearly every mica outcrop is, therefore, of interest and should be prospected to a depth of three or four feet by a trench at right angles to the vein. At this depth the width and character of the vein should show and it can be determined whether or not further prospecting would be justified. Deposits containing mostly the small or twisted and broken blocks of mica suitable only for grinding are of value only if large enough or numerous enough in the immediate vicinity to pay for the investment in a grinding mill.

The commercial mica has by no means been exhausted from all of the abandoned mica mines in Georgia. Many of them have been worked by miners with no capital or knowledge of the proper mining methods. These men "ground-hogged" their way down, skimming out the cream of the sheet mica and wasting the smaller sizes and scrap mica. As soon as the sides of the untimbered pit started to cave in or they struck water or hard rock, off they went to rob another outcrop, too often failing to pay the owner his expected royalty. Such

methods often result in an outcrop so cut up that future mining must be done from a shaft in the firm ground on either side of the vein.

Feldspar and kaolin, having a low value in the crude state, must be in large deposits close to railroad transportation to be of commercial importance. The majority of the Georgia deposits visited thus far are too small to be worked. A few of possible commercial importance have been sampled or described. The growth of the mica industry will undoubetly bring to light commercial deposits of feldspar and kaolin in Georgia. The feldspar industry of North Carolina, which now surpasses the mica in annual value, did not begin until long after the mining of mica there. The time spent in visiting the small deposits is by no means lost, for the information recorded may prevent unwise investment later.

It is estimated that at least 15 months more work will be required on this report. It will take a long and busy field season to visit the remaining 41 counties that may contain outcrops of mica, feldspar or primary kaolin. Some of these counties probably contain few deposits of interest and can be visited in two or three days, but others contain many old mines and prospects and will require a week or ten days apiece. The mountain section of the State, in which the work was necessarily slow, because of lack of roads, has largely been completed.

The large representative samples of feldspar and kaolin which are collected should be given chemical and ceramic tests. The chemical analyses will have to be made outside. The ceramic tests could be made by me at the Ceramic Laboratory of the Georgia School of Technology under a cooperative agreement similar to that by which the ceramic tests on the sedimentary kaolins, brick clays, and shales were made. This would probably add about two months to the time estimate previously made. The writing of the report and its preparation for the printer will probably take three or four months after the last field work is done.

G. W. Crickmay: Dr. G. W. Crickmay, Assistant State Geologist, makes the following statement concerning the mapping of the crystalline rocks of Georgia:

The area of crystalline rocks in Georgia at an early date attracted the attention of geologists, but it was not until 1913 that the first detailed geological map appeared in the form of a folio description of the Ellijay quadrangle. The most detailed mapping to date is that of W. S. Bayley on the Tate Quadrangle, an area containing the important marble deposits of the State. In addition to these maps, the reports of the Georgia Geological Survey which deal with mineral deposits of crystalline rocks, add valuable details in areas that have not been mapped.

More recently a need has been felt for a general geological map showing all the published knowledge, supplemented by new information in intervening areas, and correlating all the information available on the crystalline rocks. Such maps have been prepared for the states of Alabama, Tennessee and Virginia in the Southern Appalachian region. In August, 1930, the writer, in company with Dr. W. S. Bayley, started a reconnaissance survey of portions of northern Georgia. During the field seasons of 1930-32, most of the area under consideration has been surveyed in preparation of a State geological map. The following report outlines the present status of the geological mapping and the purposes of the work, together with comments on field and office work.

During 1932 my time has been distributed between field and office work as follows:

Jan. 1 to April 1—Office work ..... 3 months
April 1 to Nov. 1—Field work ..... 7 months

Since the start of the present project, I have spent in the office 7 months, in the field 26 months. In 1932 thirty counties were mapped.

A geological map embraces features which are economic, scientific and educational. The economic features are two-fold. In the first place, the map shows the location and areal distribution of valuable rocks, particularly granite, granite gneiss and marble, which together yielded in 1931 nearly one-half of the total mineral production of the state.

Marble is found in Georgia in two belts: the Murphy marble belt and the Brevard schist belt. In the former the marble form discontinuous masses from the North Carolina line to near Canton, Cherokee county. Marble production of the state is limited to this area. A small area in Haralson county, near Buchanan, probably represents an extension of this same belt. Marble deposits in the Brevard schist occur near Gainesville, Alto, and east of Clarksville, but their physical nature is such that these deposits cannot be used for structural material.

Granite and granitic gneiss are most common in the Piedmont and production is limited to that area. In the thirty years since the publication of the last report on the granites of the state by T. L. Watson, production of this stone has greatly increased. One of the latest developments is the quarrying of pink granite at three quarries in the Elberton area. This stone combines the textural qualities of the ordinary grey granite with a fine pink color.

All the varieties of granitic rocks were included by Watson under a common designation on his maps. Now the different varieties of

granite are used for different purposes. A strongly gneissic rock, like the Lithonia granite, is not suited for monumental work. The texture determines to a large extent the use to which any granitic rock is particularly adapted. It would be a decided improvement to have a map showing the areas where each type of granite occurs. On the state geological map which is now near completion, the granitic rocks are divided into four types based on texture, and each type is designated by a distinctive symbol.

The second economic feature of the geological map is that it shows the distribution of rocks with which particular mineral deposits are associated. For example, the gold deposits of the Dahlonega area occur in a belt of certain fine-grained schists and gneisses. On a map of small scale it is not possible to show the location of actual ore bodies, such as gold-quartz veins, but it is possible to show the rocks with which the veins are associated. When this is done, it is found that the gold-bearing rocks of Dahlonega form a belt more or less continuous from Lake Burton in a southwesterly direction to near Tallapoosa and this belt, as shown on the map, embraces the principal gold deposits. The gold deposits of McDuffie county also occur in a belt of distinctive rocks. The association of talc and asbestos with basic rocks is another case in point. There is some indication that the pegmatite deposits, now being studied by the Geological Division, show a preference for particular types of rock as host, so that, when these relations are fully worked out, prospecting for these deposits can be restricted to the areas where such rock types occur.

A geological map is prepared in accordance with scientific methods; all the known facts are collected and presented, even though many of these facts may offer no other benefit to mankind than satisfaction of a natural desire to understand the composition and geological history of the state. In the struggle of mankind upon the earth for useful products, science is the advance spy system, industry the captured territory. Scientific curiosities of yesterday are economic necessities of today. Mineral deposits, that yesterday belonged in the sphere of science, find themselves today in the realm of industry. The following is illustrative of countless examples that could be cited. With the development of the aeroplane engine, it became necessary to make spark plug porcelain that could withstand far higher temperatures than in the ordinary internal combustion engine. Research showed that such a porcelain could be made from the orthosilicate of aluminum, which occurs in nature as the minerals andalusite, kyanite and sillimanite. And these minerals, which were known to science two decades ago simply as minerals peculiar to certain metamorphic rocks, were at once sought after and became essential to the progress of aviation.

It is only by correct interpretation of obscure rock types that the

geological history of the crystalline rocks can be fully understood. The result obtained from the present work does not profess to be a final dictum; new mineral deposits will be discovered, new information will come to light. As Sederholm said of his geological map of Finnland, a geological map of any area of pre-Cambrian rocks must represent a summary of existing knowledge rather than a final analysis of the subject.

Of the 73 counties in which crystalline rocks occur, there remain 10 to be mapped. The plan for the following year is to complete the mapping of these counties. It will also be necessary to examine in detail certain crucial areas to obtain data for which a reconnaissance survey does not allow time.

Up to the present time I have spent but one month in the office following my field work of 1932, and in all my field work since 1930 I have spent but 7 months in the office for 26 months in the field. This length of time has been far too short to assemble all my field notes or to describe all the specimens that have been collected. This is particularly true in so far as my office work must include a survey of past reports of the Geological Department so that all published information can be correlated and incorporated in the State Geological map.

The collections of the Geological Division have been sorted out and arranged. A representative suite of samples of each mineral or rock studied by the Survey has been preserved in our collections. A card catalogue of thin sections has been started, the immediate purpose of which is to systematize the records, to facilitate reference to sections, and to avoid duplication of the work of others.

We now have a map of most of the counties covered in the present project. It is my aim to place the geology on these county maps and keep them in the office as a permanent record. Included will be a short description of each county, its geology and mineral deposits, compiled from my own field notes and supplemented by information already published in our bulletins.

In July, 1933, a section of the International Geological Congress, made up of about 75 geologists from all parts of the world, will visit Georgia. During 1931 a route was mapped out and a description prepared of mineral properties for this excursion. This description is now in press and will be published as part of the Geological Congress Guide book covering the mineral deposits of the southern states. In Georgia the congress will visit the Cartersville mining district, making a study of manganese, ochre and barite. It is possible that they will also visit the marble quarries at Tate.

RECOMMENDATIONS

An appropriation sufficient to permit the survey to employ a competent state geologist, two well-trained assistant state geologists, a reliable chemist, a clerk and janitor, and pay field and office expenses with a sufficient balance for printing the economic and scientific reports issued by the Survey, is essential for effective maintenance of this division.

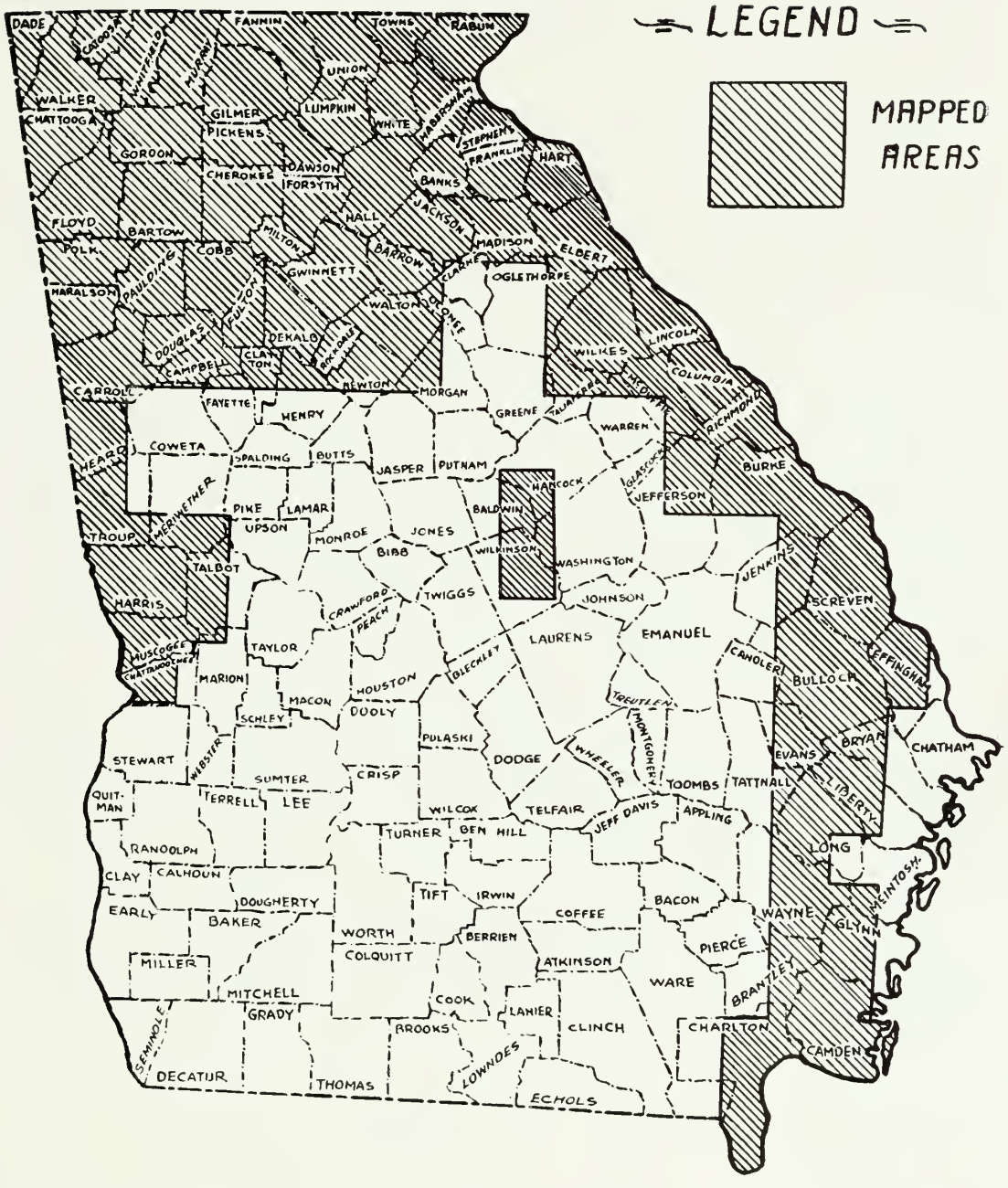
NEED OF TOPOGRAPHIC MAPS

The unit for topographic maps adopted by the United States Geological Survey is a quadrangle bound by parallels of latitude and meridians of longitude. These quadrangles, or sheets, are published in uniform size about 16½ by 20 inches. The scale varies from ½ inch to 2 inches per mile, the most common scale being one mile to the inch, with 20-foot contours.

Each quadrangle or sheet is designated by the name of some well-known city, town, or prominent natural feature situated in the quadrangle. The maps are printed in three colors. The cultural features, such as roads, railroads, cities and towns, as well as the lettering, are in black; the water features—streams, lakes, ponds, etc.—are in blue; while the features of relief—hills, mountains, etc.—are shown in brown contour.

Federal Survey Map: The outline map herein shows the area, indicated by parallel ruling, that has so far been mapped by the Federal Survey, which area constitutes approximately 41 per cent of the entire area of the State. It will be seen from the illustration that the topographic maps so far completed are confined to the northern and eastern part of the State, little having been done in the central and southwestern part. Many of these maps in the northern part of the State made 20 or more years ago are largely of a reconnaissance nature and are badly in need of revision.

Mineral Resource Development: Topographic maps probably reach their maximum value in the development of the mineral resources of the country. The topographic map forms the base map on which the geologist lays down the various geologic formations and traces out the distribution of the commercial minerals and rocks. Without such a map it is impossible for him to work out any satisfactory report on the mineral resources of a section or to suggest trustworthy plans for their commercial development. It is a notable fact that the states which are leading in the development of their mineral resources are those which are well advanced in topographic work. This is well illustrated in the case of New York, Pennsylvania and



Shaded Part Shows Areas of Georgia that have been Topographically Mapped.

West Virginia. These states are now wholly or largely supplied with topographic maps. No state can expect to attain the maximum development of its mineral resources until it is supplied with up-to-date topograhpic maps.

All topographic maps of Georgia up to the present time have been made by the United States Geological Survey without any expense whatever to the State. This policy, however, has recently been changed so that topographic maps at present are only made in the states which pay 50 per cent of the cost of the maps. This means that topographic mapping by the Federal Government in Georgia is

now at an end unless the legislature sees fit to provide means to have the work continued.

A large number of the northern and western states and not a few of the southern states have adopted this plan in topographic map work. Tennessee appropriates $16,000; and Kentucky, formerly, $75,000; while Georgia, the Empire State of the South, makes no appropriation whatever for this important line of work.

GEORGIA WATER RESOURCES

Georgia's rivers and streams are among the State's greatest assets and as yet there is little known in the way of definite facts concerning many of them. Rivers, in their natural state, are subject to wide variations of flow. There is a great surplus in wet seasons and a corresponding deficit in dry seasons. In times of flood they are a menace, while controlled and utilized they are a source of great wealth. The streams should be made to serve the people constructively instead of destructively.

Water for municipal, domestic and industrial uses, the development of power, the control of floods, the improvement for navigation and for all other purposes, require continuous records of river discharge over a period of years sufficient to establish the maximum and mean flow conditions.

Together with stream gauging, we should have chemical analyses and temperatures and study the decrease of the flow of artesian wells in such cases as at Savannah and other communities along the Sea Board.

REPORT

DIVISION OF PULP AND PAPER RESEARCH

Chas. H. Herty, Research Chemist
Geo. C. McNaughton, Assistant Research Chemist
Bruce Suttle, Plant Engineer
W. F. Allen, Chemist
Geo. Lindsay, Chief Mechanic
J. B. Osborne, Jr., Plant Assistant
F. W. Hendricks, Plant Assistant
Spencer Noble, Volunteer
Frank W. McCall, Volunteer
Jos. Fox, Volunteer

HISTORICAL

(From data of Research Chemist Herty)

Four factors led to the establishment of the pulp and paper research laboratory located at Savannah, Georgia:

First, a quantitative determination of the resin content of young slash pine, the most prolific producer of oleoresin for naval stores, established the surprising fact that the young pine as it stands in the woods contains approximately the same amount of resin as the spruce pine of northern climates, the tree most largely used throughout the world for paper production.

Second, small-scale laboratory experiments proved that this young slash pine could be just as readily pulped by the sulphite process as spruce, the resultant pulp being bleached with equal facility as that from spruce; and experiments pointed favorably to the preparation of groundwood, mechanical pulp, from the same young pines, thus indicating the possibility of the manufacture of newsprint, which consists of approximately 80 per cent of groundwood mixed with 20 per cent of sulphite pulp.

Third, the reforestation program already well under way in the State through intensive fire control over approximately two million acres necessitates the thinning of such new timber tracts, an expense to the timber grower who needs a market for such thinnings unsuited to the ordinary uses of wood.

Fourth, the existence of some twenty-three millions of acres of cut-over pine lands and five millions of acres of abandoned farm lands constitute a serious economic waste. Such lands are well suited to the development of pine growing and there appeared a possibility that through utilization of these waste lands for this purpose there could be developed large quantities of raw material for supplying many white paper mills, thus indicating the prospect of a new industry in the State that would offer pay to the farmers and timberland owners, would increase employment among our people, bring in capital, create new taxable values, and would tend toward a general increase of prosperity of the State.

With these points before it the last Legislature made an appropriation of $20,000 a year for the fiscal years 1932 and 1933 for the maintenance and operation of an experimental pulp and paper laboratory, provided a fund of $50,000 should be contributed to the State for the purpose of equipping such a laboratory. This conditional appropriation was made available through the gift of $50,000 by the Chemical Foundation, Inc., of New York City, an organization whose profits are devoted to education and research in chemistry and the allied sciences and their application to industry.

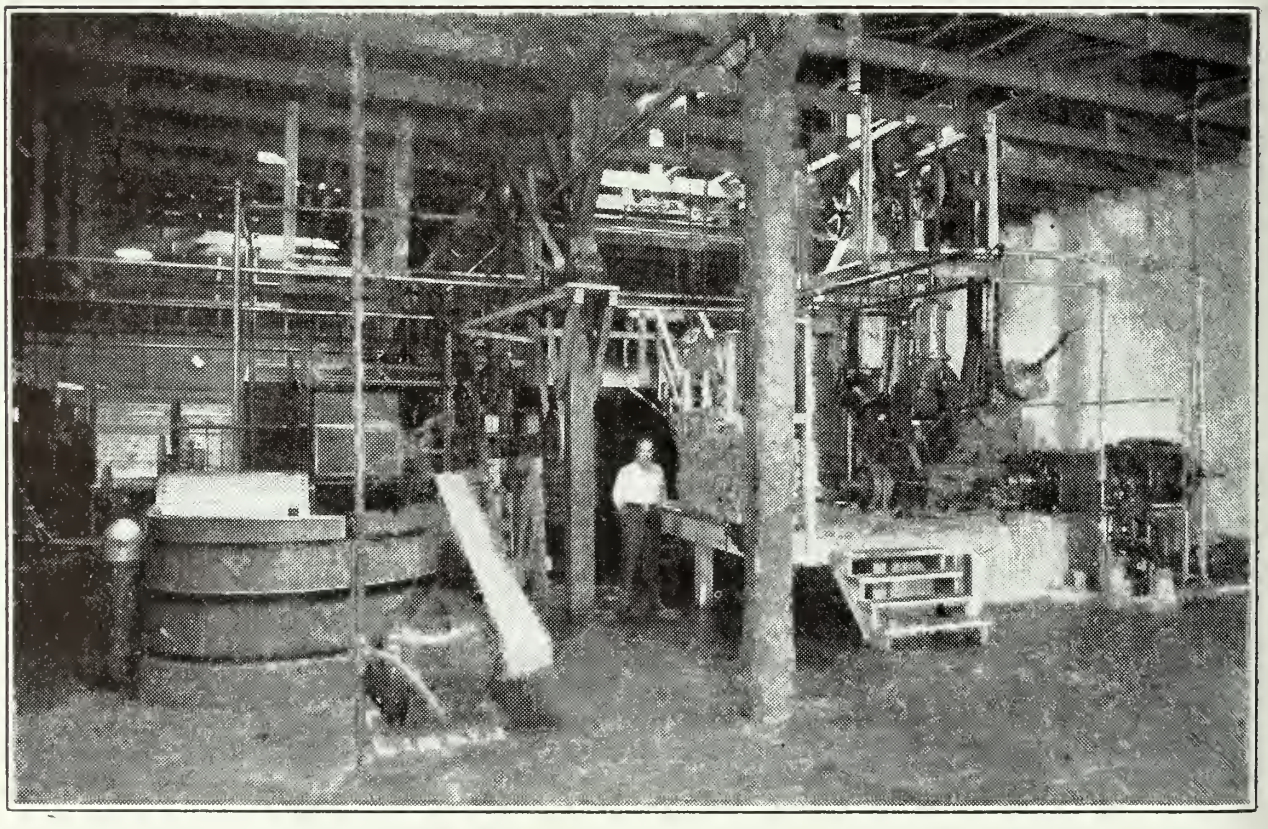


Fig. 7—Interior View of Pulp and Paper Research Laboratory at Savannah.

The problem of housing and of obtaining additional contributions for operation remained to be solved. A number of cities were

desirous of obtaining the location of the laboratory; accordingly offers were solicited from any interested city and after a careful review of the details of these offers the Commission accepted the offer of the Industrial Committee of Savannah, Georgia, which offer included without charge to the State for five years, the use of a building well adapted to the purpose, of unrestricted electric current for both power and lighting, of an abundant supply of suitable water, ample wood for all experimental needs, and fuel oil for the steam used in the digester and in drying paper.

Orders were then immediately placed for the equipment, and the organization of a technical staff begun. The material began to reach Savannah the last week in December, 1931, and the staff reported for duty on January 1, 1932. Installation was immediately commenced and was completed by the middle of May, 1932. (It is a pleasure to make acknowledgment here of the generous assistance, without cost, of the engineering staff of the Central of Georgia Railway in this work of installation and of the contributions by this railway and by the merchants of Savannah of all the material used in the foundations for the machinery.)

FINANCIAL

It soon became evident that to fit up this laboratory so as to carry logs through to finished paper a larger sum would be required than was first thought. This situation was frankly laid before the manfacturers of equipment who, foreseeing the possible new opening on a large scale for their equipment, generously made extra discounts, which made possible the installation of complete equipment for making newsprint on a semi-commercial scale.

Nothing was left, however, for equipping the testing laboratory so essential in guiding the course of research and for informing manufacturers of the exact quality of the product turned out from the laboratory. This situation was laid before the Chemical Foundation, Inc., which under authorization of its president, Mr. Francis P. Garvan, made a further contribution of $7,000, thus enabling the outfitting of a first-class testing laboratory. Here again completion of the outfit was made possible by further discounts by manufacturers of testing equipment.

Some manufacturers both of the operating machinery and of the testing equipment made their contributions in the form of indefinite loans of the material they manufacture. With the exception of these all the machinery and testing apparatus has by formal transfer become the property of the State of Georgia.

With the work of installation completed we were about to lose a valuable mechanic and an assistant mechanic because of the lack

of funds. This situation was saved by a contribution of $4,000 by Mrs. E. T. Comer, which allowed the services of these two men to be continued for a year.

As the work proceeded the need of further funds made itself evident and this was relieved by a contribution of $1,000 by the City of Savannah and of $767.50 which the Industrial Committee of Savannah raised from private citizens.

This staff has worked in complete harmony with the utmost zeal and is thoroughly imbued with the spirit of research. Attention is specially called to the spirit of the three volunteers, all young Georgians and graduates of technical schools, each of whom has agreed to work for the period of a year without any remuneration. They keep the same hours and give just as devoted service as the paid members of the staff. Their hope is that through this year's experience they may fit themselves for good positions in southern white paper mills, in the future existence of which they have full confidence.

On December 15, 1932, Mr. J. B. Osborne, Jr., resigned because of an offer of a far more lucrative position. It was with great regret that Mr. Osborne's resignation was accepted for he had given energetic and loyal service throughout his connection with the laboratory.

OPERATIONS

Thirty-two (32) shipments of wood have been received, totaling seventy-seven and a half (77½) standard cords.

The first run of the grinder for mechanical pulp was made on May 5, 1932. Seventy-three (73) runs have been made to date.

The first cook for mechanical pulp was made on May 12, 1932. Forty-two (42) cooks have been made to date.

The first paper machine run was made on June 10, 1932. Thirty-eight (38) runs have been made to date.

Earlier shipments consisted of 4-foot logs peeled in the woods. More recently the shipments have consisted of the entire length of the tree trunks with the bark on, peeling being done in the laboratory.

Through the courtesy of a number of manufacturers of newsprint the laboratory has been furnished with commercial samples of sulphite groundwood and of newsprint. These have been carefully tested and serve for comparisons with the products made in the laboratory.

RESULTS OBTAINED

As a result of the seven months of systematic research in the laboratory it has been established:

First, that the young pines free of heartwood (under twenty-five years of age), regardless of species, can be pulped by the sulphite process, and can be ground for mechanical pulp.

Second, that the sulphite pulps from seasoned woods of all species can be bleached readily.

Third, that in seeking to avoid "blue stain", an inherent danger in hot humid seasons, green sapwood pines can be pulped or ground readily with the production of even lighter colored pulp than that from seasoned wood.

Fourth, that pulps from green wood have shown no signs of pitch in the digester, on the pulp stone, in the beaters, or on the paper machine.

Fifth, that the pulps so prepared are remarkably light colored proving admirably adapted to newsprint manufacture and indicating a low requirement of bleach in experiments on book and bond papers, which will be taken up later.

Sixth, that by mixing sulphite and groundwood in the proportions characteristic of newsprint, sheets of good formation have been produced, such mixed pulps having a freeness and wet strength which indicate clearly the possibility of very successful use on modern large-scale fast machines.

Comparisons are constantly being made with sulphite and groundwood pulps and with samples of stock newsprint furnished us by manufacturers and publishers. A comparison of Run Number 23 with that of a paper used by one of the leading metropolitan dailies shows figures that are strictly comparable, the bursting test being somewhat higher on the experimental paper while the gloss is a bit lower due to no weights being used on the calender rolls:

COMPARATIVE TESTS OF NEWSPRINT FROM GEORGIA PINE

(Wood: Loblolly pine, fast growth, av. age 13 years, av. diam., peeled 5.75 inches)

	Georgia Newsprint	Newspaper Samples
Weight	31.58 lb.	32.00 lb.
Thickness	0.00343 in.	0.00353
Burst	8.40 points	7.30 points
Burst Ratio	0.266	0.228

Tear—Across	19.30 gr.	20.0 gr.
Length	20.80 gr.	22.0 gr.
Tensile—Across	1.29 kg.	1.17 kg.
Length	1.88 kg.	2.27 kg.
Gloss	32.66%	34.86%
Porosity (Gurley 100 cc.)	30.34 sec.	26.4 sec.
Oil Penetration (Av. both wire and felt sides)	60.80 sec.	66.0 sec.

Specimens of newsprint manufactured in the laboratory have been furnished the secretary of the Southeastern Newspaper Publishers' Association and the director of the Newsprint Service Bureau. These officers in turn have distributed the samples to each member of their respective organizations, the Newsprint Service Bureau including in its membership all the manufacturers of newsprint in the United States, Canada and Mexico. As a result of this, widespread interest has been developed in the possibilities of this section and every new development in the work attracts immediate attention.

The laboratory has been visited by numerous paper manufacturers, paper consumers and by organized groups who through their visual inspection of the work have been enabled to get an idea of the direct bearing of the work on reforestation and on the future prosperity of the state.

FUTURE WORK

The limited funds for equipment made necessary a set-up of the laboratory in such a manner that a number of pieces of equipment serve a double function in different types of work. This necessarily slows down the research output of the laboratory. It is hoped that each type of work can be made perfectly independent so that the work may go forward as rapidly as the staff can handle it.

Real progress has been made in the manufacture of sulphite pulp but much work remains to be done to enable a determination of those conditions of operation which will bring out the full strength of the fiber and make it thoroughly competitive with those now in use in the paper industry.

While there has been decided progress in increasing the length of fiber of the groundwood manufactured much work remains to be done on the numerous variables that are inherent in this work. There are real difficulties which must be overcome because of the wide difference in the structure of the cells of the spring and of the summer wood so characteristic of wood grown in warm humid climates. Furthermore, attention must be paid to the difference between rapid-growing wood characteristic of open stands as compared with the narrower ringed wood of the slower growing trees where rate of growth has been retarded by overcrowding and by fire.

Now that paper approaching commercial standards has been prepared, more attention will be given to the surface finishing of the same and studies will be undertaken of the behavior of the various runs of paper as to fitness for printing, especially the matter of opacity and printing ink consumption.

Approximate quantitative records have been kept during the progress of the work on the properties of the fibers, but from now on more attention will be given to quantitative yields, power consumption, etc., with a view to enabling an accurate determination of the cost of manufacture.

To date the work has been confined to newsprint because its development promises the use of large volume of logs, thus aiding the reforestation program and giving, it is hoped, employment to a maximum number of people in the woods. However, when this problem has been carried to an extent where it is felt that we are justified in urging the establishment of newsprint mills in Georgia work will be shifted to other lines, the first of which will be a thorough study of the bleaching of fibers. For this work the purchase of additional equipment will be necessary which will be somewhat expensive because of the destructive action of the bleaching agent on ordinary metal.

It will then be necessary to study the retention of fillers by these fibers for paper used, for instance, in the manufacture of books and magazines. Nothing is known on this subject and this work will offer an interesting joining-up of two Georgia industries, one an already existing industry, for Georgia produces the greater part of clay (kaolin or china clay) used as a filler in paper manufacture; the other the potential and hoped-for industry of white paper manufacture from young Georgia pines.

The application of coating clays on the paper manufactured in the laboratory must also be studied. Additional equipment must be bought for this but it will be well justified, for it will join work with the coating clay industry, another Georgia industry.

There is a third Georgia industry which must be associated with the work, viz. the use of rosin size as in the manufacture of writing paper.

Finally, it is highly desirable that as soon as possible thorough studies of alpha cellulose from the chemical pulp of these pines should begin. This product goes into a large number of modern industries such as rayon, smokeless powder, celluloid, artificial leather, etc. The time of the present staff is completely taken up with the manufacture of paper and its testing. An additional chemist experienced in alpha cellulose work will be necessary in order to initiate this work.

FORESTRY FINANCIAL STATEMENT, 1931

On December 31, 1931, the State Forester was relieved of the duties of treasurer by the Commission under the reorganization set-up, and this statement covers only the year 1931:

RECEIPTS

Balance from previous year (Fed. Funds)	$ 22,502.63
From State, allocated funds	28,659.41
From State for Indian Springs	4,912.58
From Fed. Gov't, Section 2 (fire control only)	45,484.44
From Fed. Gov't, Section 4 (nursery)	1,397.73
From F. G. Varner, concessionaire at Indian Springs	250.00
From petty cash fund, Ind. Springs Park	7.33
Interest on bank balances	386.30
	$103,600.42

PAYMENTS

Expense		
Administration		$ 11,907.95
Education and Utilization		14,224.94
Field Offices		26,760.54
State Forest Parks:		
Vogel	$ 993.95	
Indian Springs	5,057.61	6,051.56
Forest Fire Protection		23,830.70
Total Expense Payments		$ 82,775.69
Non-Expense		
Transfer to State College of Agriculture Nursery Project		1,397.73
Transfer to Georgia Experiment Station Forest Research Project		1,200.00
Transfer to C. A. Whittle, Treasurer, Dept. Forestry & Geological Development		18,224.39
Total Payments		103,597.81
Balance—December 31, 1931		
Petty Cash—Indian Springs Forest Park		2.61
		$103,600.42

STATE AUDITOR'S COMMENTS

The comments of the State Auditor during the entire time that the State Forester was treasurer for the Georgia Forest Service are as follows:

In 1927—"All records are full and complete."

In 1928—"The records are neatly and accurately kept and all disbursements covered by proper vouchers."

In 1929—"Payments are supported by proper vouchers. The records are being satisfactorily handled. The State Forester is bonded."

In 1930—"The records of the State Forestry Board are neat, accurate and full, enabling us to commend those in charge for their industry and efficiency."

In 1931—"The books of the State Forestry Board were well kept and accurate and reflect credit on the accounting personnel; every aid was given the examiner in making this examination."

FINANCIAL STATEMENT GEOLOGICAL SURVEY FOR 1931

Receipts

Balance in Treasury Jan. 1931	$ 646.96	
Balance in Bank Jan. 1931	275.83	
Appropriation for 1931	20,000.00	
		$20,922.79

Disbursements

Geologists' Salaries:		
State Geologist 1 year	$4,500.00	
1st Asst. State Geol. 1 year	3,000.00	
2nd Asst. State Geol. 1 year	2,583.33	
		$10,083.33
Office Salaries:		
Chemist, 3 months	$ 325.00	
Clerk of Dept., 1 year	1,327.00	
Custodian of Museum, 1 year	300.00	
Porter, 1 year	525.00	
Secretary of Board, 1 year	83.33	
		$2,560.33

General Expenses:		
Postage	$ 93.14	
Freight and Express	10.61	
Telephone and Telegraph	104.93	
Printing and Stationery	4,366.85	
General Expenses	1.00	
Library	67.29	
Travel Mileage	462.03	
Travel Expense	2,032.39	
Laboratory Expense	7.00	
Laboratory Equipment	500.00	
Field Equipment	119.46	
Museum Expenses	15.45	
Office Expenses	470.61	
		$8,250.76
		$20,894.42

STATEMENT—GEOLOGICAL DIVISION 1932

State Appropriation		$15,000.00
Less 11½% Deficit		1,725.00
Total available for 1932		$13,275.00
Expenditures:		
Personal Service	$11,515.83	
Travel Expense	1,407.58	
Supplies	368.25	
Tel. and Tel. and Postage	190.38	
Subscriptions	16.00	
		13,498.04
Expenditures in excess of appropriation		$ 223.04

FINANCIAL STATEMENT OF DIVISION OF PULP AND PAPER RESEARCH LABORATORY

Appropriation by the State of Georgia for maintenance and operation for 1932	$20,000.00	
Contribution by the City of Savannah	1,000.00	
Contribution by Industrial Com. of Savannah	767.50	
		$21,767.50

Contribution by Mrs. E. T. Comer for salaries	4,000.00
TOTAL FOR MAINTENANCE AND OPERATION 1932	$25,767.50
Contribution by Chemical Foundation, Inc. for equipment	57,000.00
TOTAL	$82,767.50

Expenditures:

Cost Plant equipment installed		$58,767.50	
Personal service	$19,433.31		
Travel expense	163.32		
Unskilled labor	784.75		
Telephone, telegraph, postage	115.41		
Freight and drayage	146.16		
Supplies	531.93		
Equipment and installation	2,851.40	$24,026.28	$82,793.78
Expenditure in excess of income			$26.28

STATEMENT, INDIAN SPRINGS 1932

State appropriation	$5,000.00	
Less 11½%	575.00	
	$4,425.00	
Received from concession	300.00	
Balance 1931 appropriation unexpended	863.55	$5,588.55

Expenditures:

Personal service	$ 425.25	
Travel	269.94	
Supplies	436.74	
Electric current	203.47	
Repairs and alterations	427.33	
Drayage	4.50	
Insurance	219.50	
Equipment	442.20	
Permanent improvements	2,493.26	4,922.19
Unexpended balance available for 1933		$666.36

1932 STATEMENT

FORESTRY AND MAIN OFFICE

Receipts:

State appropriation	$25,000.00	
Less 11½% deficiency	2,875.00	$22,125.00
State balance from 1932 appropriation		63.09
U. S. Section 4, Nursery matched funds		2,699.08
U. S. Section 2, Fire control matched funds		17,456.36
Interest on bank balances		220.42
Fire pumps sold		122.16
Cash balance Georgia Forest Service, 1931		18,224.39
Cash used out of Federal T. P. O. funds		5,028.38
Total receipts		$65,938.88

Expenditures:

Forestry Division:

Personal service		$25,855.84	
Unskilled labor		657.39	
Travel expense		10,825.71	
Supplies		2,719.10	
Equipment		2,661.06	
Telephone, telegraph, postage		638.03	
Electric current		129.05	
Printing and subscriptions		420.19	
Freight and express		142.86	
Rent North Georgia Nursery		13.60	
Refund to Nursery, Athens		402.88	
State Forest, Augusta		62.95	
Miscellaneous		30.00	
Summer School Camp		1,953.50	
Cooperative enterprises:			
Ga. Experiment Station	$300.00		
Naval Stores Tests	338.14		
Alpharetta Project	240.50	878.64	47,790.80

Main Office:

Personal service	$10,450.00	
Travel	2,178.29	
Postage, telephone, telegraph	1,228.17	
Printing and publicity	1,393.55	
Supplies	715.74	
Freight and express	45.04	
Photographic service and subscriptions	37.00	
Office furniture	77.50	
Insurance and bonds	92.74	
Repairs and alterations	108.00	
Miscellaneous	1.50	16,327.53

Vogel Park:

Personal service	$ 1.00	
Repairs and alterations	449.53	
Freight and hauling	20.50	
Insurance	78.00	
Equipment	50.25	
Permanent Improvements	1,121.25	1,820.55

Total Expenditures $65,938.88

STATEMENT FEDERAL FUNDS

Received from U. S. Treasurer, Sec. 2, Fire Control

Total receipts $58,636.61

Disbursements:

Reimbursement on State expenditures	17,456.36	
Reimbursement to T. P. O. members	18,202.42	
Paid rewards	400.00	
Spent for Special Fire Control	8,504.42	
Used for Forestry expenditures make up deficit	5,002.95	49,566.15

Cash in bank in Federal Fund account $9,070.46

ALEX K. SESSOMS,
Chairman Finance Committee,
Commission of Department of Forestry
and Geological Development.

REPORT

OF THE

Commission

Department of Forestry and

Geological Development

TO THE

Governor and General Assembly

OF THE

State of Georgia

1933-1934

INDEX

LETTER OF TRANSMITTAL

Atlanta, Ga., February 1, 1935.

To His Excellency,
Hon. Eugene Talmadge, Governor,
State of Georgia,
Atlanta.

In accordance with Article 4, Section 23 of the Reorganization Bill enacted by the General Assembly of Georgia at its session in 1931, the Commission of the Department of Forestry and Geological Development herewith transmits the following report to you as Governor and to the General Assembly.

Respectfully,

B. M. LUFBURROW,

Secretary to the Commission.

COMMISSION OF FORESTRY AND GEOLOGICAL DEVELOPMENT

1934

Chairman—Governor Eugene Talmadge

Mrs. M. E. Judd, Dalton

Alex K. Sessoms, Cogdell

J. M. Mallory, Savannah

L. L. Moore, Moultrie

Perry Middleton, Brunswick

T. G. Woolford, Atlanta

Secretary—B. M. Lufburrow, State Forester, Atlanta

REPORT OF THE DIVISION OF FORESTRY

By B. M. Lufburrow, State Forester

INTRODUCTION

Forestry activities in Georgia during the biennial period of 1933–34 were influenced by the unusual, chiefly by the emergency measures launched by President Roosevelt to give thousands of young men employment in the woods.

In an effort to obtain for Georgia its full share of the benefits, the Division of Forestry assumed a burden that taxed its force to the utmost. While some of the state's regular forestry work has suffered, its major enterprise, that of forest fire control, has found a welcomed opportunity for advancement to a point many years ahead of what could have been expected through state effort alone. In fact, more forestry work was done in Georgia in 1933–34 than ever before.

By energetic planning, Georgia was able to qualify for and obtain a greater number of Civilian Conservation Corps camps in forest conservation work than any other state in the South. For this accomplishment credit is due members of the state forestry force who gave enthusiastic, loyal and unstinted efforts that called for long hours and willingness to go the limits of endurance.

A basis for CCC work on which the federal authorities looked with favor in establishing camps in Georgia is the existence of the Timber Protective Organization. In fact, this land owners' timber protective organization, which originated in Georgia, made it possible for the state to get so many camps on privately owned lands. It is therefore suggested that any community desiring a CCC camp in the future would do well to form a timber protective organization as the first step, not that this step will guarantee a camp, but that it is one of the procedures that give promise of consideration by the federal authorities.

During the biennial period the Department of Forestry and Geological Development has witnessed rapid advancement in carrying out its state park program. From three state parks the number has grown to six, and arrangements were practically concluded in 1934 for establishing two others. Federal aid has enabled the state to carry on extensive plans for developing and improving these parks.

Forestry educational work with 192 rural consolidated high schools, carried on in cooperation with the Division of Vocational Teaching of the State Department of Education, continued with gratifying success. The vocational forestry camp, which is a part of this project, has also been continued with increasing efficiency.

The monthly publication, the Forestry-Geological Review, has been a means of stimulating interest and promoting plans of forestry development in the state.

The demand for literature dealing with Georgia forestry has been greater than the financial ability of the Division of Forestry to supply.

Service to timberland owners continues to the extent of the Division of Forestry to render it, but it has been restricted in considerable measure for several months to developing the timber protective organizations and in planning CCC work.

Forestry has an important part to play in the solution of the land use problem of Georgia. The state should not leave the planning to federal agencies, but should be in position to at least cooperate and give direction to such undertakings.

The State Forester expresses appreciation of the splendid cooperation of many civic organizations of the state in promoting forestry.

Tribute is paid and gratitude expressed by the State Forester to the Commission of Forestry and Geological Development for the ability it has displayed and the generous gift of time and talents of its members in dealing with the many forestry problems arising in a state that has the largest forest acreage of any in the union.

NEEDS OF THE DIVISION OF FORESTRY

While marked progress has been made in those lines in which emergency Conservation Work aid has been obtained, other established lines of forestry work on which federal funds cannot be used have suffered. It has been impossible to maintain a full force of district foresters. The demand for forestry bulletins and leaflets cannot be supplied for lack of funds with which to print them. Necessary funds for traveling expenses of district foresters in meeting demands for aid to timberland owners and for conducting forestry demonstrations at vocational schools have been lacking. In fact, many regular lines of forestry activity have been restricted and rendered less efficient for lack of adequate funds.

Other important lines of work which this Division hoped to develop, such as a forest survey to reveal the state's forest resources; research work to answer many questions of a practical nature for which there is a lack of data; assistance to farmers in forestry phases of land uses; a number of forestry demonstration areas, all await sufficiently large appropriations from the state.

ADMINISTRATION

The funds appropriated to the Department of Forestry and Geological Development were allotted and budgeted by the Commission in charge, to the forestry and geological services. The Division of Forestry has kept strictly within the income available to it from the state. Federal aid, under sections 2 and 4 of the Clarke-McNary Act, for fire control and nursery work, continues to provide the greater portion of funds supporting the Division of Forestry.

Administration duties have been greatly increased by federal emergency conservation work represented by CCC activities, and by the expenditures of funds in equipment and buildings on forest areas and parks. An office personnel for handling the details of this emergency conservation work was organized. While the services of the added help are paid for out of Emergency Conservation Work funds, the staff of the forest service is carrying on its part of the ECW administration without increase in its force and without additions to its salaries.

Personnel: The personnel of the Division of Forestry consists of a state forester, educational manager, assistant state forester, seven district foresters, treasurer who is secretary to the state forester, and bookkeeper who is secretary to the educational manager. All members of the staff are technically trained.

The staff members are as follows:

B. M. LUFBURROW, State Forester, Atlanta
C. A. WHITTLE, Educational Manager, Atlanta
H. M. SEBRING, Assistant State Forester, Atlanta
RUSSELL D. FRANKLIN, District Forester, Rome
W. D. YOUNG, District Forester, Gainesville
C. N. ELLIOTT, District Forester, Augusta
W. G. WALLACE, District Forester, Columbus
JACK THURMOND, District Forester, Savannah
C. BERNARD BEALE, District Forester, Waycross
H. D. STORY, JR., District Forester, Albany
MRS. R. S. THOMPSON, Treasurer and Secretary, Atlanta
MRS. N. N. EDWARDS, Bookkeeper and Secretary, Atlanta

The personnel of the Emergency Conservation Work in Atlanta consists of the following:

For Forestry camps, an office assistant, bookkeeper-accountant, senior clerk, two stenographers and a messenger.

For Park camps, an office assistant, superintendent of state park construction, landscape architect, senior clerk, secretary and stenographer.

Office space, heat, light and water are provided by cities or counties in which the district offices are located, without cost to the state.

FOREST FIRE CONTROL

As a major activity of the Division of Forestry, great progress has been made in bringing forest areas of the state into timber protective organizations. This has been attained by enlarging the holding of old protective organizations and by the formation of new. At present there are 3,274,902 acres of forest land of Georgia included in the holdings of these timber owners cooperative organizations.

The fact that only forest units belonging to the timber protective organizations were considered eligible for CCC work has resulted in materially stimulating interest in these organizations.

Such TPOs as have been fortunate in receiving CCC work have received material benefits in the development of fire protection plans, such as the construction of primary firebreaks, the elimination of fire hazards, the construction of truck trails to facilitate quick access of fire fighters and equipment to forest fires, and in the complete mapping of TPO areas.

The aid thus received has been met on the part of timberland owners with the construction of secondary firebreaks, the construction of TPO telephone lines, the erection of lookout towers, as well as the renewal of CCC firebreaks and maintenance of other improvements. For authorized expenditures made by timberland owners belonging to TPOs, the usual federal reimbursement is allowed under the Clarke-McNary law, not to exceed 50 per cent of the cost.

The timber protective organization method, which originated with the Division of Forestry of Georgia, has not only made it possible to obtain a large number of CCC camps on privately owned timberlands, but it has proven the best means of assuring that the CCC work will be maintained. The TPO is a self-governing, cooperative local organization on which responsibility for the success of the undertaking centers largely.

In addition to the 3,274,902 acres belonging to the TPOs, about 550,000 additional acres are also under effective fire control. Included in this estimate are the national forests, national parks, national military reserves, state parks, game preserves, town forests and school forests. Other forest lands, mainly unorganized farm woodlots, are given a measure of protection by their owners.

Taken as a whole, it is probable that 14,000,000 of the nearly 27,000,000 acres of timberland in Georgia are receiving some form of forest fire protection.

EMERGENCY CONSERVATION WORK

The aid received through the Emergency Conservation Work of the Federal Government has enabled the Division of Forestry to develop its program of forest protection and state parks far beyond expectations, for which, of course, the state is grateful.

The benefits of this work could not be distributed all over the state. Certain qualifications for obtaining CCC camps were required by the federal government. Many counties were not prepared to meet these qualifications, and were therefore automatically eliminated. Others having timberland units that could meet the conditions had to take their turn since there were not enough CCC camps to supply all at once.

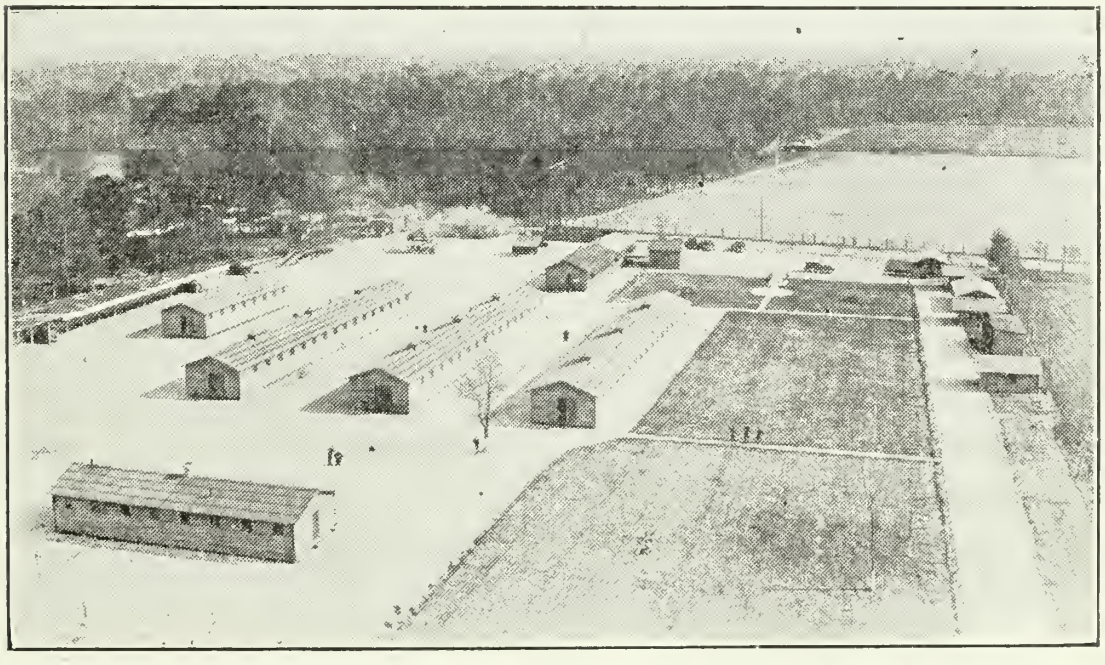
It is pertinent to say here that the Georgia Forest Service had nothing to do with establishing the qualifications to be met to secure a CCC camp, nor had it anything to do with the final determination as to where each camp would be located; neither was it within the power of the Georgia Forest Service to prevent the removal of a camp from one section to another of the state, or from Georgia to another state. These administrative acts were in the hands of the federal agencies.

A clear statement of conditions determining the location of CCC camps, as set forth by Federal Inspector Charles F. Evans, is given herewith:

"The Federal Forest Service states the policy on CCC work on privately-owned forest lands broadly as follows: The camps are supported by Federal funds and therefore are **Federal projects.** While the State forestry agency, representing the Government, submits recommendations as to location and purpose of all projects in the states, the entire set-up of each proposed camp is closely scrutinized by the United States inspectors whose decision is final in the matter and must be followed by State forestry authorities.

"It is not enough that there shall be large areas of private forest land badly in need of the kinds of work authorized under the President's direction. From the beginning the President has demanded that the State must guarantee continued **maintenance** of the CCC work done on private lands.

"In some forest regions, especially in the Northeast, the State itself assumes all responsibility for maintenance of protective improvements. In other forest regions, such as the Southern pine area, the State and the private landowner jointly assume the maintenance obligation.



View of CCC Camp, located at Homerville, Ga.

"Generally in the South, therefore, the Federal Government will not accept as a basis of a reliable guarantee the fact that the owners of the private lands have undertaken, verbally or in writing, to maintain the improvements constructed. However, if such owners have back of them a record of consistent care, protection, and development oftheir forest lands for several years, in cooperation with the State and Federal Government, it is assumed that the required maintenance will be done. Past performance of this character by landowners is recognized by the Government as strengthening such guarantee as the State may make.

"Federal foresters point out that the best guarantee lies in the amount of State forestry funds available for cooperative work with timberland owners. Such State forestry funds must be sufficient in amount to justify a State's guarantee that the protective improvements completed by the CCC camps will be continuously maintained. Exceptions exist where the past performance of the landowners, plus the amount of State funds that properly may be spent in cooperative protection work in their locality, together give assurance of future upkeep of the forest improvements."

A summary of ECW activities on private lands, state parks and other state owned lands, which the Division of Forestry administered from the beginning of the work on April 1, 1933 to January 1, 1935, is as follows :

Miles of telphone lines constructed	777.7
Miles of new firebreaks	4,657
Miles of firebreaks maintained	1,470
Acres reduction of fire hazards	86,223
Miles roadside and trailside clearing	563
Lookout houses constructed	4
Lookout towers constructed	39
Man-days fighting fires	30,622
Miles of truck trails constructed	671
Miles of maintained truck trails	701
Miles of new foot and horse trails	139
Miles of maintained foot and horse trails	41
Buildings and other permanent structures completed or partially completed	37
Miles of lineal survey	6,487
Acres type-mapped	3,937,397
Topographic mapping (parks) acres	1,079
Bridges constructed	926
Acres cleaned up for fire protection	699
Acres forest stand improvement	400
Water control, dams, lakes, etc. (parks)	3
Acres landscaped (parks)	210
Acres planted (parks)	166

Apparently, Emergency Conservation Work by the Civilian Conservation Corps camps is to be continued. Georgia should share in it as fully as possible. The extent of the State's participation will depend largely on the private land owners and the cooperation of other local citizens, for only a small portion of the forested area of the State is in national forests and parks.

The conditions to be met by private land owners will be defined in the future as in the past by authorities in Washington. Satisfactory assurance will be required that work done by CCC men will be maintained. The future of CCC work in Georgia is, therefore, largely up to the land owners themselves.

EDUCATIONAL WORK

The Division of Forestry is cooperating with the Department of Vocational Education of Georgia in carrying on a forestry project with 192 rural consolidated high schools in 94 counties. Georgia was the first State to inaugurate this type of work, having begun it in 1929.

The chief objective of the forestry project is to teach boys on the farm how to get the greatest returns from their forest lands, just as they are taught how to get the most from their agricultural crops.

To make the school work as practical as possible, a school forest of ten or more acres is required. On these areas students are taught by doing forestry jobs. The practical subjects taught in the classroom and applied in the forest are: The collection, care and marketing of tree seed; making and operating a tree seedbed; planting of trees; methods of fire protection and fire fighting; identification of tree species; uses of woods; harvesting and marketing of timber; thinning and improvement cutting and estimating the volume of standing timber.

As often as a representative of the Georgia Forest Service can do so, he visits the schools and conducts demonstrations along these various lines. Keen interest is shown by the students and abundant evidence is provided that the boys are obtaining a grasp of the practical phases of forestry that promise to yield results in school territories.

One of the requirements of each boy is that he have a home forestry project, just as he has a home project in crops or livestock. On these projects the student is required to plant trees, thin stands and construct firebreaks.

As a result of the vocational school project, there is already evidence of better fire control, better handling of forests and a movement toward tree planting of abandoned fields and open forests. Thousands of vocational students remaining on the farm are the foundation for progress in forestry in a large part of Georgia.

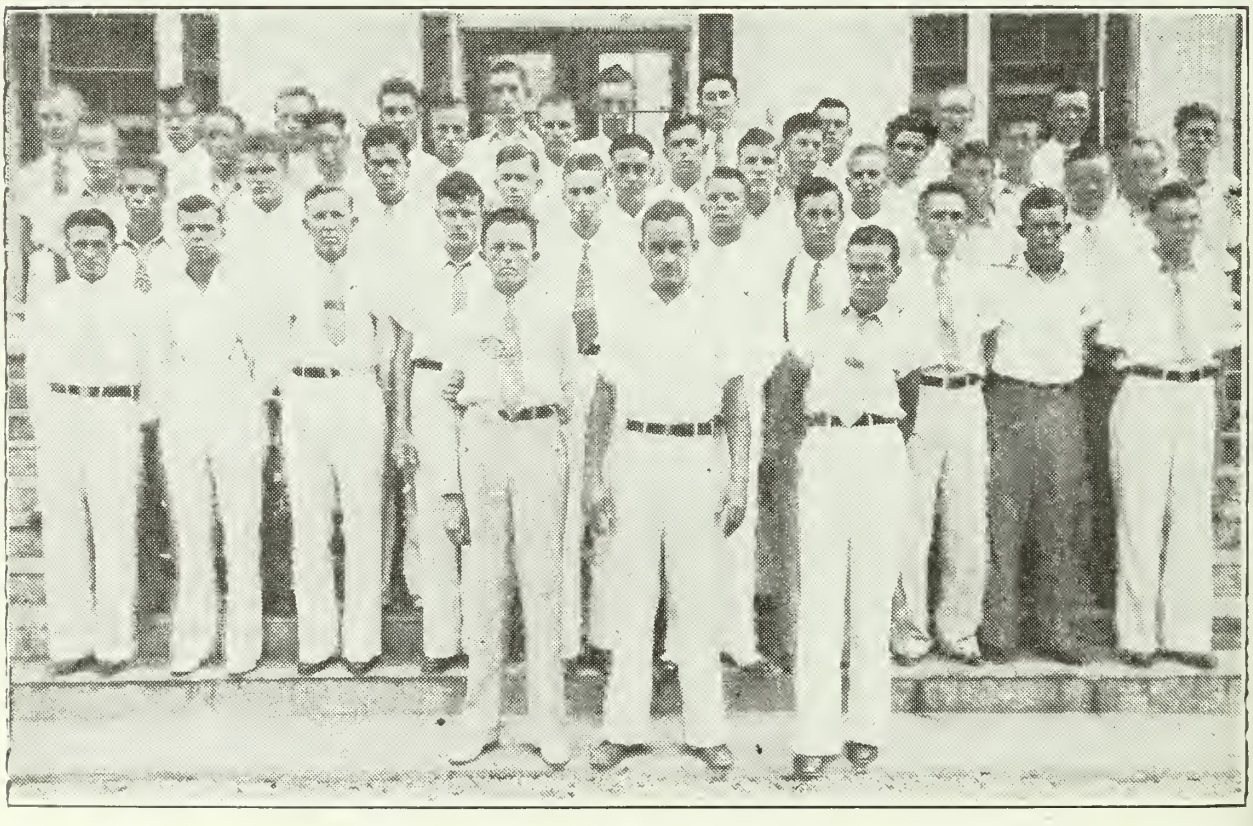
VOCATIONAL FORESTRY CAMP

When the school forestry project had been in progress one year, a vocational forestry camp was inaugurated, the object being to bring together annually outstanding boys showing particular interest in forestry, to take six weeks of intensive training in practical forestry under the guidance of the staff of trained foresters of the Georgia Forest Service. The camp course of six weeks is conducted in two summer camps of three weeks each.

Those who successfully complete the six weeks course obtain a certificate of vocational forester, which recommends them as equipped to perform several non-technical jobs in forestry.

As evidence that this training does equip the young men for forestry work, three vocational foresters qualified as assistant technicians in the forest survey now being conducted by the United States Forest Service in the south, and the director reports that they have met every requirement.

Other evidence is that the vacational foresters have obtained positions as foremen in the CCC work and in spite of their youth have made good. A number of vocational foresters have become relief teachers and are rendering excellent service in promoting interest in forestry, mainly in conducting adult classes.



Group of Students Receiving Certificates of Vocational Forester, Vocational Forestry Camp, 1934.

Quite a number of other vocational foresters have entered the University of Georgia to study forestry.

Prizes: An incentive that is proving very helpful in developing interest in the forestry project is that provided by the Georgia Forestry Association. Each year at the vocational forestry camp a cash prize of $75 is given by the association to the vocational agricultural teacher doing outstanding work in forestry, and $50 is given to the student making the best record in two sessions of camp. These are designated "Herty prizes" in honor of Dr. Charles H. Herty. The prizes of the 1934 camp, held at Abraham Baldwin College, Tifton, were presented by T. G. Woolford, president and Judge Ogden Persons, Forsyth, vice president of the Georgia Forestry Associaition.

The teacher winning the prize in 1933 was T. G. Walters, Moultrie, and in 1934, P. L. Elkins, Alpharetta. The student winning the prize in 1933 was Herman A. Braddy, Pavo; and in 1934, Elmon Vickers, Norman Park.

Permanent Camp Needed: The vocational forestry camp has been held at various colleges that have lent their hearty cooperation. Efforts are being made to obtain the use of the abandoned forestry camp in Towns county, a few miles from Hiawassee. It is hoped that as soon as possible a permanent vocational forestry camp may be established, not only to save in camp expenses, but to provide a forestry area on which work plans can be laid out for years to come.

School Work Increases: As additional funds from Federal sources are made available, the number of schools having vocational agriculture increases. The present school year has shown an increase of over 50 schools, with others in prospect. This increase has enlarged the opportunity for forestry, and entails a greater amount of work on the Division of Forestry to carry on the project.

In this connection, it is befitting that credit be given to the State Superintendent of Education, M. D. Collins, and to the officials in direct charge of vocational agricultural teaching, L. M. Sheffer, Athens; M. D. Mobley, Atlanta; and Geo. I. Martin, Tifton, for their excellent cooperation and encouragement in carrying on the school forestry project.

PUBLICATIONS

Forestry-Geological Review: This monthly departmental bulletin is serving an excellent purpose in promoting the activities of the timber protective organizations of Georgia; in fostering the school forestry project; in providing timely information for county agents, as well as forestry workers of the State; in providing timberland owners, lumbermen, naval stores operators with a digest of current forestry information, and in keeping leaders of the State informed as to the progress of forestry.

The publication also serves the Division of Geology. The timely articles on mineral resources of Georgia have attracted wide attention and created a greater demand for copies of the publication than it has been possible to supply, making it often necessary to reprint separates of such articles to meet the demand.

Constant requests are being made by interested persons to be placed on the mailing list to receive the Forestry-Geological Review.

Bulletins and Leaflets: The demand for bulletins and leaflets on forestry has been far in excess of the ability of the Division of Forestry to supply. Editions have been quickly exhausted, reprinted and again exhausted. Funds have not been available to reprint all the publications needed, nor for putting out new bulletins contemplated.

While a steady demand for literature has naturally come from schools cooperating in the forestry project, it is gratifying that many requests come from teachers in other schools for literature to use as teaching material.

It is also gratifying to receive requests for literature from women's clubs and various men's civic clubs to use in preparing for forestry meetings.

The Division of Forestry is in need of reprints of several bulletins and leaflets, and new publications dealing with harvesting and marketing timber, a text book for use of vocational agricultural teachers in presenting forestry; on parks and other scenic and historic places in the State, to answer requests of prospective tourists; a leaflet on tree planting to supply an increasing demand for information of this nature; a series of posters; a series of lecture charts on forestry.

Press Publicity: As a measure of economy, it was deemed necessary to discontinue periodic state-wide press releases on forestry, which a clipping bureau service revealed had been very acceptable to newspapers of the State. Newspaper contributions have since then been confined to news items released at the office to press representatives.

Contributions to a number of forestry, lumber, industrial and trade publications have been continued. A large amount of publicity has dealt with the use of southern pine for paper, a work inaugurated under the Department of Forestry and Geological Development. Considerable State publicity was also devoted as information incident to launching the CCC camps in Georgia.

Tourist Information: Requests for information from prospective tourists about location, camping facilities and regulations of State parks, and for suggested routings to visit historic and scenic spots of Georgia come to the Department of Forestry and Geological Development for attention.

In view of the fact that the department does not have a publication dealing with these matters, considerable correspondence—less effective than illustrated printed matter—is necessary. A tourist guide for Georgia is a much needed publication.

Wood Industry Information: Several inquiries have come to the Division of Forestry for information about supplies of timber for various manufacturing. The greatest number have come from those interested in the pulpwood supplies of Georgia, looking to establishing paper mills. A number have sought information about hardwood for staves; a few about pine stumps, charcoal material, billets for handles, and for veneer.

The inquiries have been given courteous attention and as full information as possible.

Cataloging Literature: All bulletins, scientific journals and reports dealing with forestry are cataloged and filed in bulletin cases for reference. In this manner, the Division of Forestry has established a small, but rather complete reference library. Lack of funds has admitted the accumulation of only a few standard books on forestry. The addition of a number of authoritative works on the subject is very much needed.

Exhibits: The demand for forestry exhibit material at state, sectional and county fairs continues. Assistance is given by district foresters in preparing local exhibits, but in many instances we have been unable to cooperate because of the lack of funds to provide the materials.

A number of vocational schools over the state have prepared their own forestry exhibits, and have been instrumental in spreading the cause of forestry by this as well as by other means.

STATE PARKS

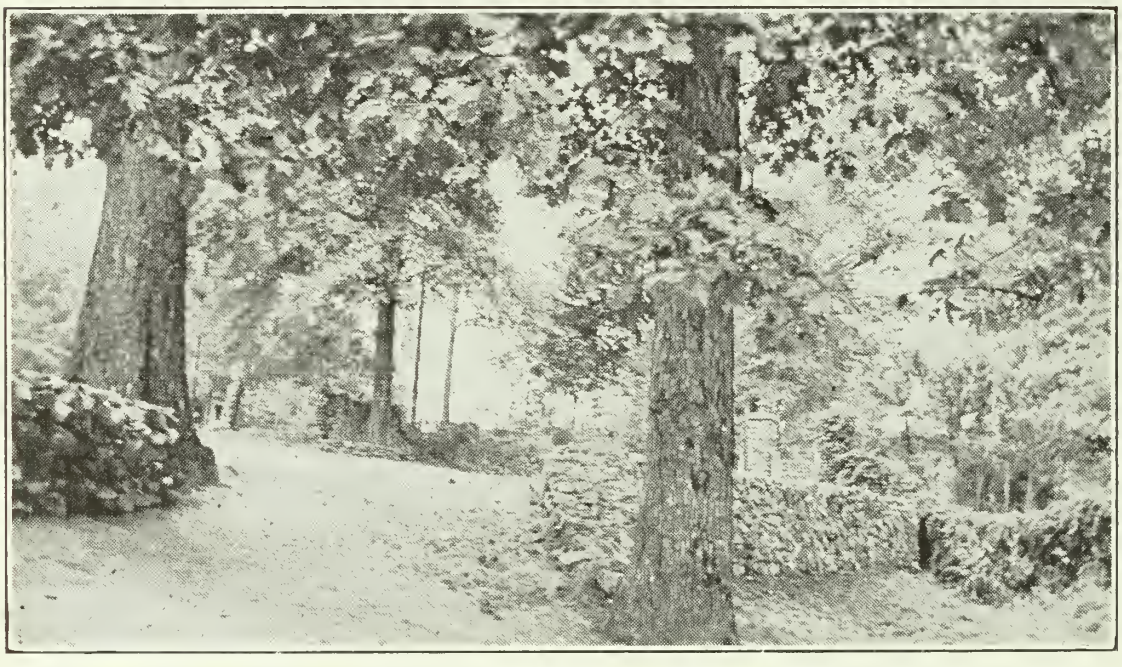
Within the period covered by this report, Georgia has made rapid progress in establishing state parks. Up to 1933 the state had only three state parks—Indian Springs, Vogel and Alexander H. Stephens Memorial Parks, the latter being donated to the state late in 1932. Since January, 1933, the state has acquired by donation additional lands at Indian Springs, Vogel and Stephens Memorial Parks, and new state park areas designated Santo Domingo State Park near Darien and Brunswick; Fort Mountain Park, between Chatsworth and Ellijay; Pine Mountain Park, near Warm Springs.

The present area of each park is as follows:

Indian Springs Park	157 acres
Vogel Park	259 acres
Alexander H. Stephens Memorial Park	216 acres
Fort Mountain Park	800 acres
Santo Domingo State Park	350 acres

Park Donors—The state is indebted for all its park lands to the generosity of private citizens, since no land for parks has been purchased by the state. The entire area of the Santa Domingo Park was donated by Mr. Cator Woolford, a public spirited citizen of Atlanta, to memorialize the earliest settlements of Georgia.

The crest of Fort Mountain, 106 acres, is an outright gift of Mr. Ivan Allen, Atlanta, another public spirited business man, who desired to preserve and make accessible a unique historic spot of great scenic value. Donations of public spirited citizens have increased the area at present to 800 acres.



View of Indian Springs Park after Improvements by CCC Workers.

A number of citizens in Harris county and vicinity combined in tendering to the state an area comprising Pine Mountain Park, a site well suited to serve the park needs of a western central section of the state.

The original gift of the home of Alexander H. Stephens and 18 acres has been generously supplemented by citizens of Taliaferro county and citizens of other counties to a total of 216 acres.

The Vogel estate, which made the first contributions for a state park in Georgia, of 160 acres at Neel Gap on the Blue Ridge Mountain, has generously increased its donation to make a total gift of 259 acres.

Through gifts of citizens of Butts county, materially aided by citizens of adjoining counties, Indian Springs Park property has grown from 12 to 157 acres.

Federal Aid: The Department of Forestry and Geological Development has been fortunate in obtaining the services of the CCC workers and ECW funds for developing these park areas. Federal aid has put Georgia forward many years in its state park program, and for this material assistance there is occasion for a deep sense of gratitude.

The Commission of Forestry and Geological Development has in mind other state parks, so that every region of the state may have one easily accesible. Steps have already been taken to locate one in Telfair and Dougherty counties.

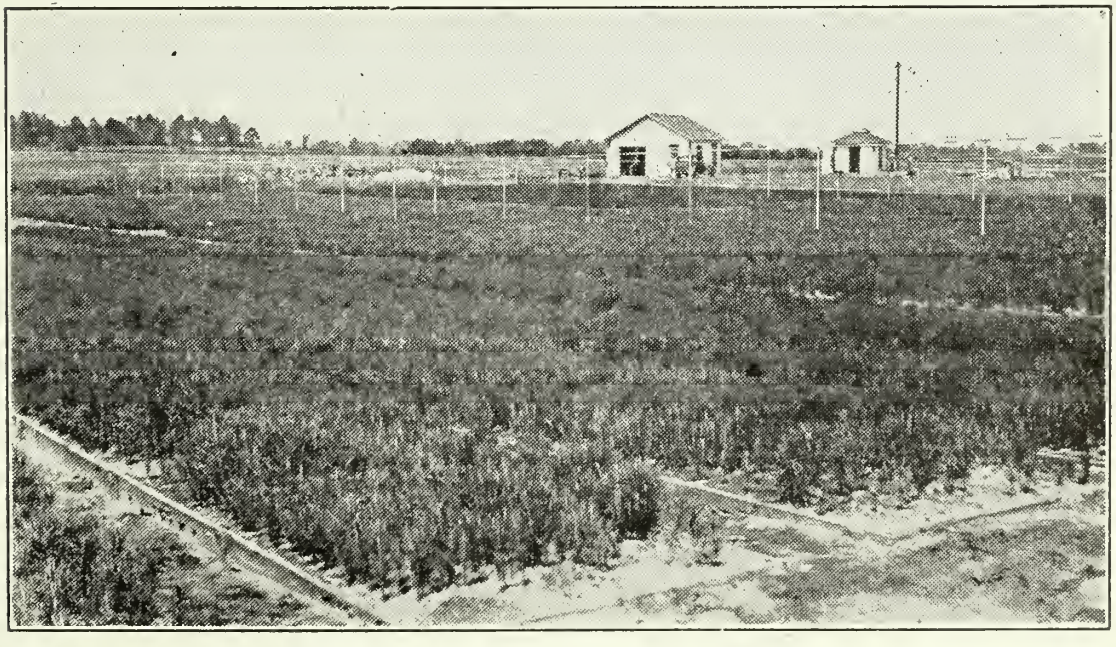
Plans are materializing to provide each state park with club houses, camp quarters, lakes, boating, fishing, play grounds, trails for hiking and landscaping to bring out the natural beauty of each park. Several of these parks are of rare and legendary interest. Museums and arboretums are included in the plans for some of these parks.

Since Emergency Conservation Work funds have been made available for state parks, the Division of Parks of the U. S. Department of Interior has a supervisory relationship, and is cooperating in carrying out the state's park plans.

The park develpment work already carried out has added greatly to their appearance and recreational facilities. When the plans for improvements have all been carried out, the state will have a system of state parks of which Georgians may well feel proud.

TREE NURSERIES

The two nurseries of the state forest service, one at Albany and the other at Blairsville, have been unable to meet the demand for planting stock, so great is the interest in reforestation in the state.



View of State Tree Nursery, Albany.

These nurseries are operated in cooperation with the federal government by a refund of 50 per cent of the cost. Both were established in 1932 and were ready to supply seedlings the same year. The plant beds have been extended and an increase in the production of seedlings has been hastened as rapidly as seemed practicable, but apparently it will be impossible to catch up with the demand for some time.

At the Albany nursery, special attention is given to growing slash, longleaf and loblolly pines. At Blairsville, attention is directed to growing black locust, black walnut and white pine, the species most in demand in the mountain part of the state. The Blairsville nursery is located on lands of the mountain branch of the Georgia Experiment Station, which cooperates in handling it.

With the assistance of CCC labor and ECW funds, a much needed house for the nurseryman has been constructed at Albany.

In accordance with terms of the Clarke-McNary Law, all seedlings are sold at cost, making it possible for the land owners to reforest their lands cheaply.

The number of seedlings grown and distributed in 1933 was 766,953 and in 1934, 593,313.

COOPERATION IN EXTENSION FORESTRY

From April, 1933, to July 1, 1934, the Division of Forestry maintained cooperation in extension forestry with the State College of Agriculture. This relationship was discontinued by mutual agreement.

Under the cooperative arrangement, three extension foresters were employed and direction of the work was given by a state leader in the office of the state forest service. One extension forester was located in upper Georgia, one in middle Georgia and another in south Georgia. By the cooperative arrangement, it was possible to so direct the activities of the extension foresters as to coordinate it with the activities of district foresters, and thus effect the greatest efficiency.

It is readily apparent that there should be a coordination of the activities of extension foresters of the State College of Agriculture with the activities of the state forest service, to obtain the best results. An agreement with this in mind is being considered.

COOPERATION WITH TVA

The Division of Forestry has been called upon by the Tennessee Valley Authority for information respecting forest resources of that part of Georgia on the Tennessee river watershed. Information has been given and the ground work laid for cooperative work in forestry development of the area.

COOPERATION WITH CIVIC CLUBS

A large number of civic organizations are giving attention to forestry. The most prominent and efficient of these is the Georgia Forestry Association, the membership of which is made up of a number of prominent citizens of Georgia who are giving their time and means to promoting the state's great forestry resources.

The Georgia Forestry Association was instrumental in creating the state forest service, and has fostered it in every possible way, sponsoring legislation, securing appropriations and aiding in developing plans and policies.

It is therefore appropriate to here express the gratitude of the state forest service for the great assistance rendered it by this boyd of far-seeing, public spirited, unselfish men and women of the Georgia Forestry Association.

Special recognition is due the Kiwanis Clubs of the state, which, under the leadership of the chairman of the committee on forestry, L. M. Sheffer, Athens, put on a forestry program in every club in the state.

Other similar organizations, such as the Rotarians, Lions and Civitans have put on special local programs devoted to forestry. In some instances these organizations have sponsored county-wide forestry campaigns.

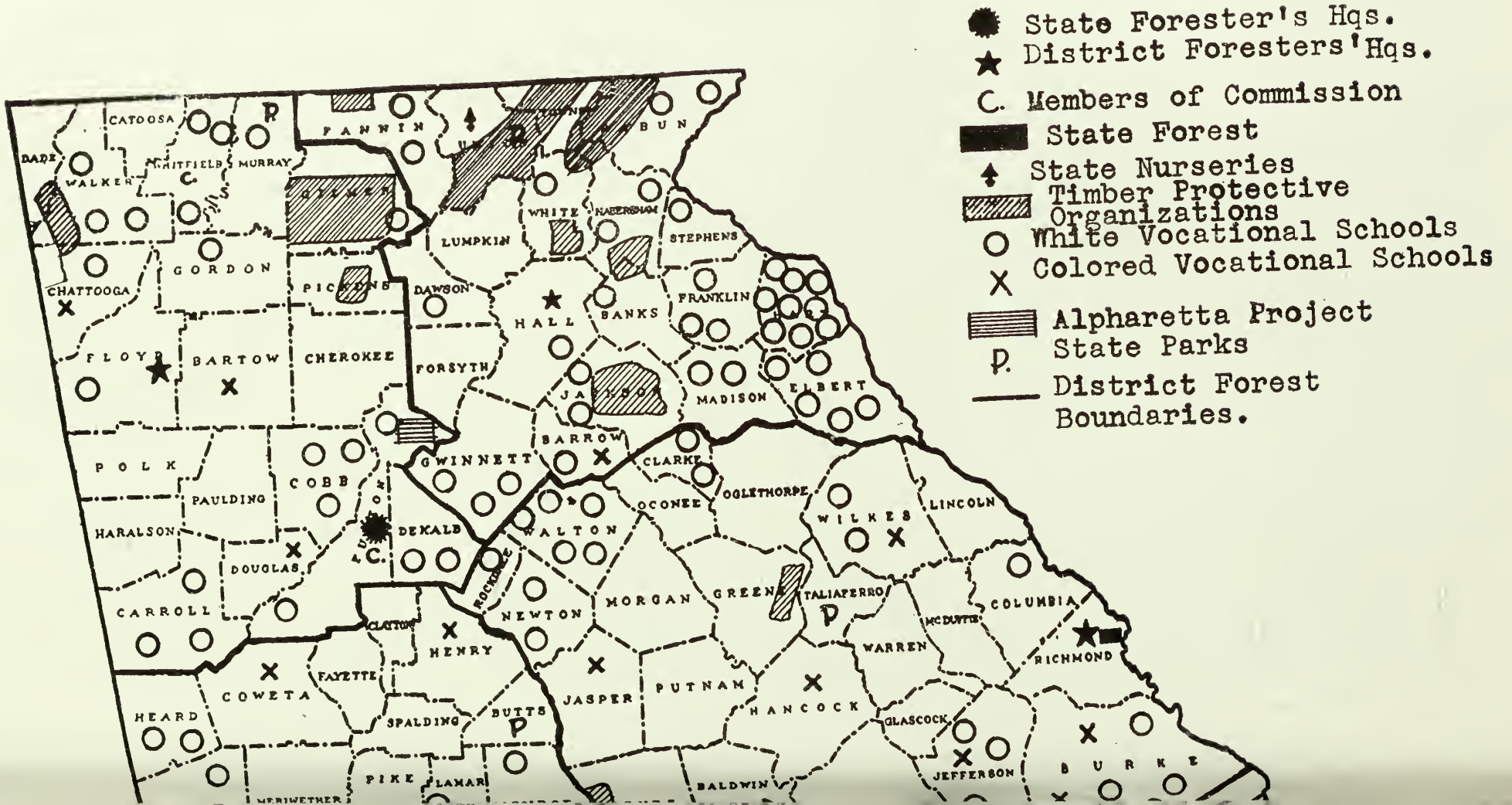
Women's civic clubs of various kinds have their committees on forestry and their conservation programs each year. Staff members of the Division of Forestry are frequently called upon to address the women's clubs.

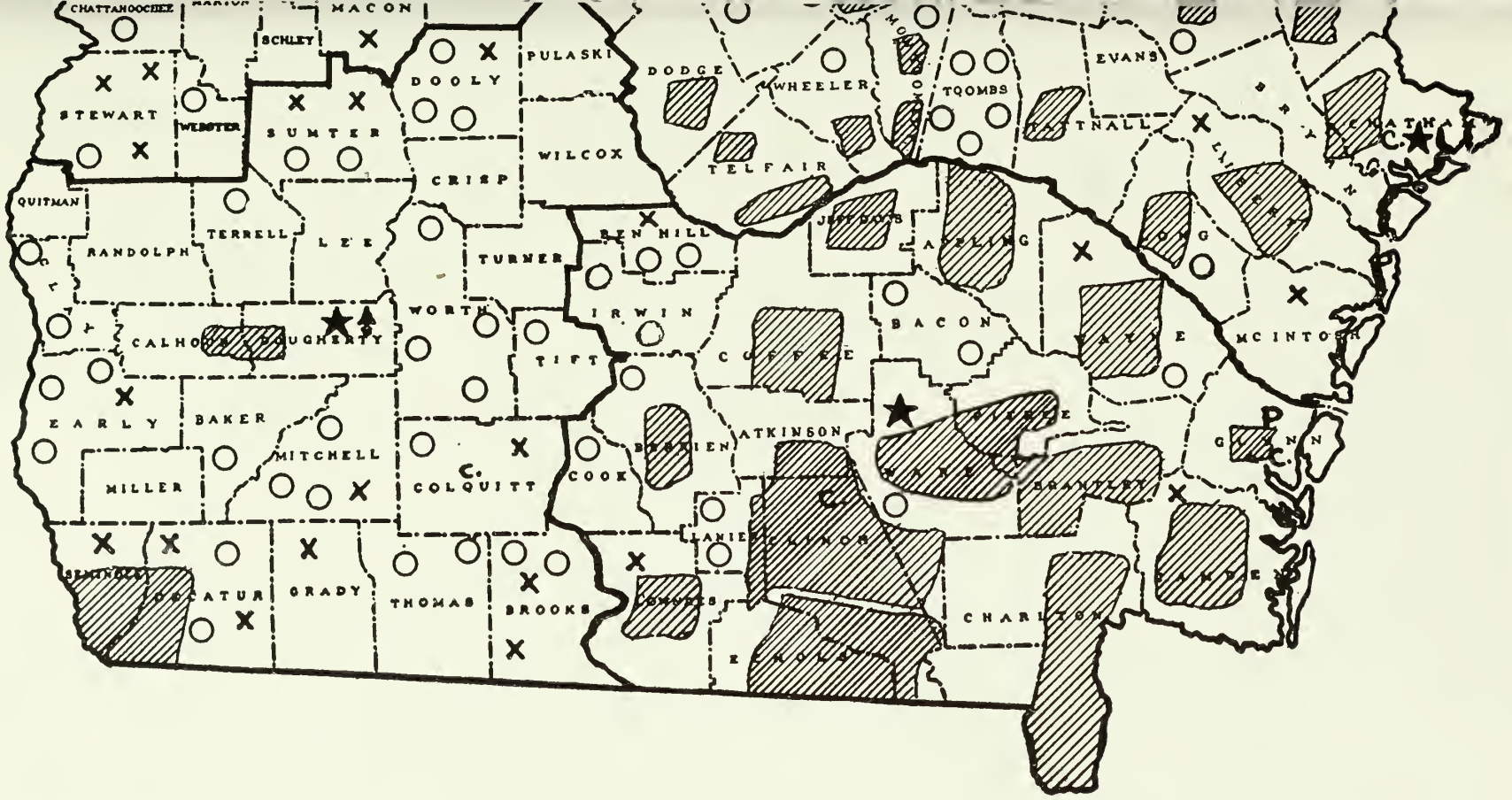
Chambers of Commerce are manifesting a keen interest in forestry and are sponsoring every forestry movement in their respective territories, donating office space, heat, light, water, etc., for district foresters' offices.

Boys' and girls' clubs of various kinds are making forestry one of their studies and in their camp work, forestry being featured.

These and other public activities are creating a strong sentiment favorable to more exacting requirements for forest protection.

Points of Activity, Georgia Forest Service





NOTE: Consult the legend column in the upper right hand corner as to character of work represented by each mark. No effort has been made to mark the exact spot in every instance where work is carried on, only the county in which work is done being designated.

FIRE STATISTICS

Forest fires in Georgia for the period of 1933 and 1934 were less prevalent than in the previous biennial period. The public is gradually developing a sentiment against burning the woods. Fewer are purposely burning their woods, but it takes only a few people to spread fire over a wide area. The most encouraging feature is that more people are willing to fight fires, and more people are careful about starting fires.

During the period of this report, CCC camps have been established in some of the best timber areas in the state and are constantly subject to call for fire fighting. During the period more than 30,000 man days were spent by CCC men in fire fighting. Their services have saved land owners of Georgia many thousands of dollars of property loss.

The possibilities of using young pines for making paper has become widely appreciated in Georgia, and has materially contributed to the greater willingness to protect the forests.

A report of forest fire losses for the year 1933 and 1934 are given herewith.

Fire Statistics for 1933: Number of fires 15,222; total acres burned over 6,600,548.

Number of fires on areas of the Timber Protective Organization, 1,261; acres covered, 188,560; damage, $306,175.00; percentage burned over 11.

Number of fires on unprotected land, 13,953; acres covered, 6,210,000; percentage burned over 29.

Number of fires on national forests, 8; acres covered, 126; damage, $51; percentage burned .06.

The total damage to protected land is $306,175 and to unprotected land, $7,141,730.

Fire Statistics 1934: Number of fires 25,761; total acres burned 5,469,409. Number of fires on acres of the Timber Protective Organization 1,711; acres covered 345,409; damage $413,571; percentage burned over .08 per cent. Number of fires on unprotected areas 24,050; acres covered 5,124,000; percentage burned over 27.

PAPER RESEARCH

The Pulp and Paper Laboratory, located at Savanah and directed by Dr. Charles H. Herty, concluded its connection with this department at the end of 1933, and since then has been wholly supported by funds from other sources. Satisfactory arrangements were made with those now in charge to perpetuate the state's equity in the plant.

The laboratory made splendid progress in its paper research in 1933, and it can be stated that the main object of the state's appropriation to the plant—the making of paper from southern pines—was achieved before the state's support was discontinued.

The gratitude of the state is due Charles H. Herty and his coworkers for their accomplishments, and to the Chemical Foundation, Inc., of New York; to the City of Savannah; to the General Assembly of Georgia; to Mrs. E. T. Comer, Savannah, and to numerous industries for contributions of money and service in establishing and maintaining the laboratory.

As is well known, the pulp and paper laboratory has continued to function, extending its research into the cellulose field with the result that announcement has been made of the discovery that rayon can be made from pine pulp.

DIVISION OF GEOLOGY

By Richard W. Smith, State Geologist

FUNCTIONS OF THE DIVISION OF GEOLOGY

The primary function of the Division of Geology, formerly the Department of Geology, is the survey and development of the State's mineral resources. This results in the creation of more taxable property, thus adding to the prosperity of the State. This is accomplished by investigating the mineral deposits of the State and disseminating the information obtained where it will do the most good, and by collecting the fundamental geological and physiographic information necessary for an intelligent search for new deposits or new minerals. Georgia is recognized as a state containing a wide variety of mineral resources, many of which are undeveloped. The people of the State must be taught to recognize this wealth that lies buried under their feet and to do their part in bringing it to the attention of those having capital to establish industries within the State that would use these raw materials. The prosperity of Georgia demands and its resources deserve a better balance between agriculture and industries based on local raw materials.

PERSONNEL

The personnel of the Division of Geology at the beginning of 1933 consisted of S. W. McCallie, State Geologist; Richard W. Smith, Assistant State Geologist; Geoffrey W. Crickmay, Assistant State Geologist; and Miss Margaret Gann, Secretary.

S. W. McCallie: Samual Washington McCallie, Assistant State Geologist of Georgia from 1893 until 1908 and State Geologist from then on, died, as he would have wished to, at the end of a day's work on October 26, 1933. His years of earnest, painstaking and thorough work, many of them spent in the field, resulted in a large number of authoritative reports on the mineral resources of Georgia. His personal service as State Geologist won for him the confidence and admiration of people in all walks of life. Governor Eugene Talmadge, ex-officio chairman of the Commission of Forestry and Geological Development under which Mr. McCallie held office, paid him the following tribute: "The State has lost the services of an efficient geologist and the devotion of one of the most earnest workers I ever knew. He was a high type man, able and conscientious."

State Geologist: Richard W. Smith, a graduate of the Massachusetts Institute of Technology and Cornell University, was Assistant State Geologist from 1926 until the death of Mr. McCallie. At that time he was appointed Acting State Geologist and in December, 1933, was elected to succeed Mr. McCallie as State Geologist.

Assistant State Geolgists: Geoffrey W. Crickmay, who has been Assistant State Geologist since 1930, is a graduate of the University of British Columbia and of Yale University.

Lane Mitchell, of Atlanta, a graduate of the Georgia School of Technology, the University of Illinois, and Rutgers University, was appointed Assistant State Geologist in June, 1934.

NATURE OF THE WORK

Investigations of Mineral Resources and Geology: The major work of the Division of Geology is the investigation of the mineral resources of the State. It is necessary to keep in touch with the mines and mineral industries to learn what they are doing and to see if they can be assisted in any way to increase their output and markets and to lower their costs. Newly discovered deposits of minerals must be investigated to ascertain if possible their commercial value. Technical reports and popular articles must be prepared, published, and distributed. One mineral at a time, or a group of related minerals, is selected for intensive investigation of the deposits throughout the State. The resulting report describes the geology and occurrence of the deposits, gives individual property descriptions, and makes recommendations as to the best means for developing the deposits. General reports on the geology or physiography of the State and geologic maps, the basic information necessary for an intelligent search for undiscovered mineral deposits, must be published. The series of 45 such reports or bulletins of uniformly high standard which have already been published has done much to increase the development of Georgia's mineral industry. A series of timely popular articles has been published in the department's monthly paper, the Forestry-Geological Review. Several of these have been reprinted as information circulars.

Clearing House for Mineral Information: The Division of Geology serves as a clearing house for geological and mineralogical information. People within the State write, call, or phone for advice in developing their mineral deposits, digging or boring water wells, or investing in mining companies. The mineral producers ask for help in developing new mining or treatment methods and finding new markets for their products. The Georgia Securities Commission often consults the State Geolgist on the advisability of allowing mining companies to sell stock within the State. Thousands of letters are received from all over the country asking for information on Georgia's mineral resources. Some of these can be answered by sending the printed reports, others by personal letters based on the experience of the Division's personnel. Hundreds of rocks and minerals from all parts of the State are sent in for identification and advice. In the past the personnel of the department included a chemist who made assays and chemical analyses of important samples sent in for identification or collected by the State Geologist and his assistants. Lack of finances has caused this service to be temporarily discontinued.

Publicity: Nation-wide publicity on Georgia's undeveloped mineral resources is obtained in several ways. The bulletins and information circulars and the Forestry-Geological Review are distributed to the principal public libraries and universities throughout this country and abroad and are reviewed in the principal trade journals. News items prepared by the Division of Geology on new developments in Georgia's mineral industries are sent out by Associated Press and International News. The growing interest of the public in such news is shown by the steadily increasing collection of clippings on Georgia minerals from papers in Georgia and elsewhere. Lectures and addresses on the State's mineral resources are frequently given to civic organizations and schools. The personnel of the Division are encouraged to write articles on Georgia geology and minerals for both popular and scientific magazines.

State Museum: The State Geolgist is the curator of the State Museum, now housed on the fourth floor of the capitol. This museum includes not only specimens of the rocks and minerals found in Georgia but displays featuring forestry, agriculture, birds and animal life, entomology, and Indian relics. The museum is now badly crowded and needs revision, modernization, and room for expansion, as recommended later.

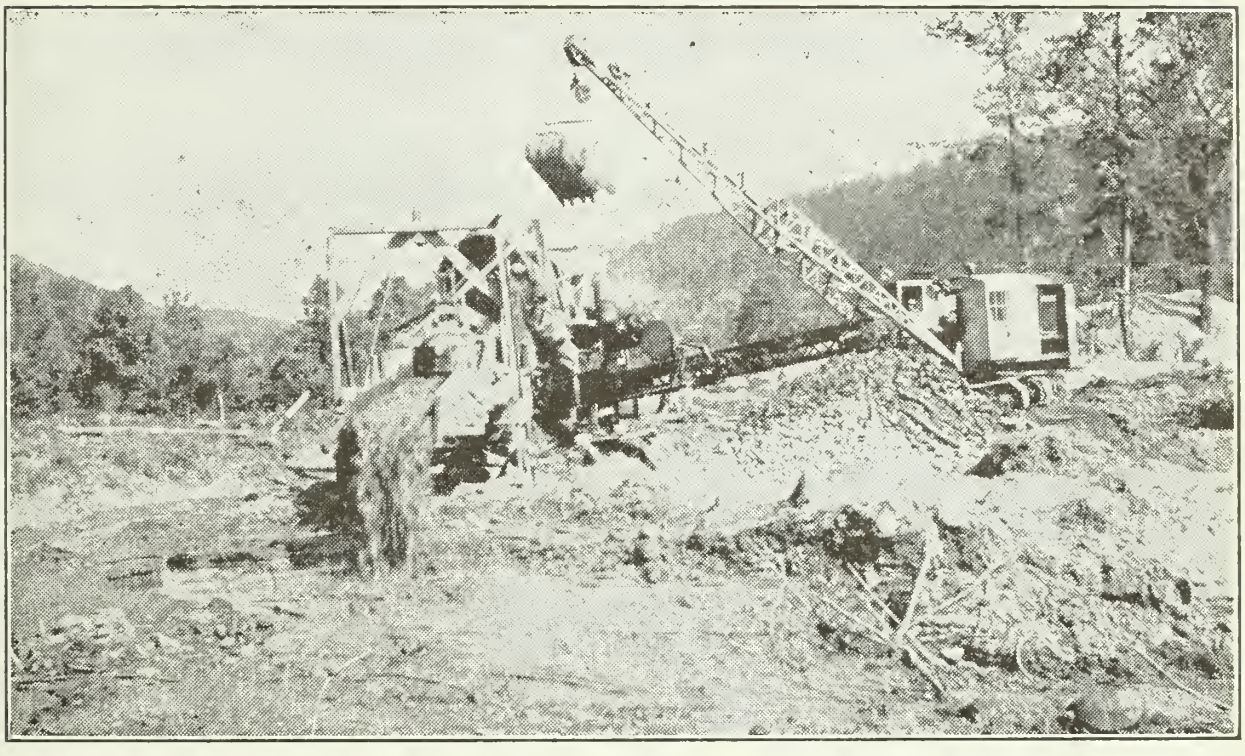
WORK ACCOMPLISHED IN 1933-1934

The work of the Division of Geology for the past two years was greatly handicapped by a large decrease in available appropriation. The expenditures, in round numbers, were $10,500 for 1933 and $12,750 for 1934 contrasted with $20,000 each for 1931 and 1932. The Division of Geology was able to operate under these reduced funds only by cutting all salaries 20 per cent, including a voluntary cut by the State Geologist, by granting one of the Assistant State Geologists a year's leave of absence without pay, by cutting out the services of the chemist for the division and the guide to the State Museum, by cutting down on the field work of the division, and by publishing only one small bulletin. Chemical analyses and assays are a very necessary part of the work of the division and this service should be restored as soon as possible.

COOPERATIVE WORK WITH THE UNITED STATES GEOLOGICAL SURVEY

The United States Geological Survey in 1934 received a grant from Public Works Funds for mineral and geological investigations in the southeastern states. The work in Georgia was in cooperation with the Division of Geology of the Georgia Department of Forestry and Geological Development. It included investigations of the gold deposits, the kyanite and vermiculite deposits, the bleaching clay deposits, and a study of the geology and underground waters of the Warm Springs region.

Gold: The funds available for the gold investigation were not sufficient to make a detailed study of all of the gold mining sections. The Dahlonega area was selected for detailed study of the relations between the geology and structure of the region in reference to the gold deposits because an adequate topographic map of this section was available and because there was more mining activity there at the time the investigation was made than in any other section. All other active mines and prospects in the State were visited, however. The general results of this investigation were printed in a series of five articles in the Forestry-Geological Review, later reprinted as an information circular.



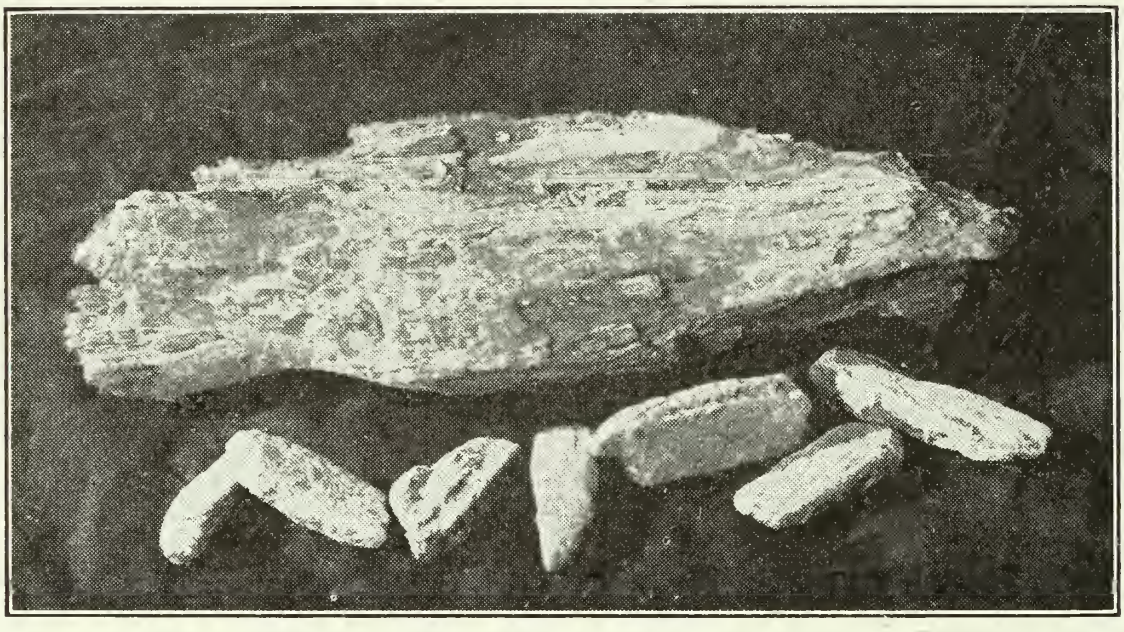
Stevenson Gold Placer Mine, Bear Creek, Walker county. The gravel from the drag-line excavator passes through a revolving screen, from which the coarse gravel passes out on a conveyor belt to a dump pile. The finer sand and gravel, containing the gold, go through the sluice box.

The detailed report will be printed by the United States Geological Survey.

Kyanite and Vermiculite: Kyanite and vermiculite are examples of minerals long known to science for which commercial uses have been developed in recent years. Kyanite is an aluminum silicate used in the manufacture of fire brick and other refractories to enable them to withstand extremely high heat. Vermiculite is a hydrous mica that has the property of expanding when heated to a very light, fluffy powder used as a heat insulator and in the manufacture of acoustical wall-board. Two kyanite mines were opened in 1934 in Habersham county and vermiculite was mined just across the State line in North Carolina, but the

extent of the deposits in Georgia was not known. The investigation of these minerals by the United States Geological Survey was undertaken at the request of the State Geologist. It resulted in finding large quantities of kyanite in north and middle Georgia. The publication of the detailed report (now in print) as a bulletin of the Division of Geology will be followed by a steady increase in the mining of this mineral. Small deposits only of vermiculite were found, but the published descriptions of these deposits may result in the discovery of deposits of more commercial value.

Bleaching Clays: Bleaching clays have long been one of the majo- mineral products of Georgia. They include the fullers earths of southf west Georgia used in refining mineral oils and the bleaching clays or middle Georgia used in refining vegetable oils. The investigation by



Massive Kyanite from Fannin county and Kyanite Crystals from Habersham county.

the United States Geological Survey revealed sizable extensions of these deposits and in addition located undeveloped deposits of several types of bleaching clays in south and northwest Georgia. There is every indication that Georgia's production of these clays will continue to increase.

Warm Springs Investigation: The United States Geological Survey, in cooperation with the Division of Geology of the Georgia Department of Forestry and Geological Development, made a topographic map and a geologic and mineral resource study of the Warm Springs district, embracing parts of Meriwether, Harris, Talbot, and Upson counties. G. W. Crickmay, Assistant State Geologist, was loaned to the federal survey to make the geologic investigations. An intensive study, still going on, was made of the ground water conditions of the part of the area im-

mediately adjacent to Warm Springs in an effort to determine the origin of the warm and cold springs. The resulting report, to be published by the United States Geological Survey, will be a guide for the future development of Warm Springs, now used for the therapeutic treatment of infantile paralysis.

PROJECTS UNDER WAY

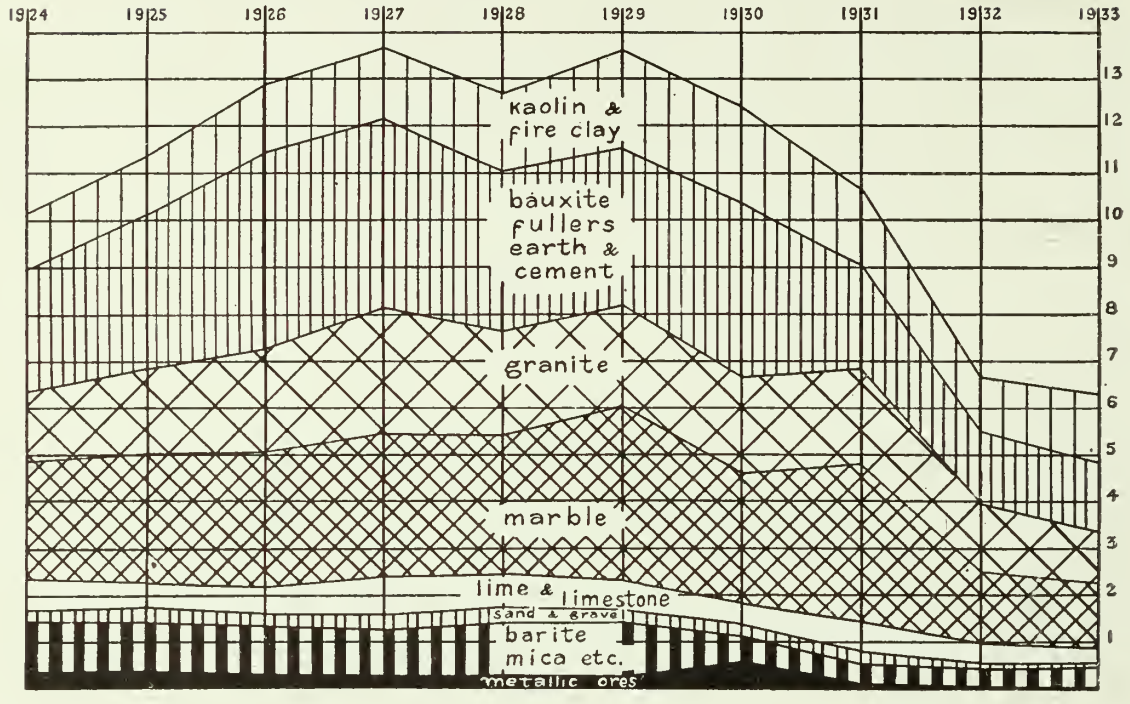
Geologic Map and Report: Mining men have long been asking for a detailed large-scale geologic map of Georgia showing the various types of rocks that underlie the State, together with a report describing the rocks, their structural relations, and their relation to the commercial minerals. Work on this was started in 1930. At the present time the complex crystalline rocks of the Piedmont and Mountain sections of middle and north Georgia have been mapped and the section of the report on them is being written. Further work is necessary on the Coastal Plain and the sedimentary rocks of northwest Georgia.

Mica and Feldspar: The State Geologist has nearly completed the field work for a report on the mica and feldspar deposits of Georgia. Minor studies that have been made on various other minerals have resulted in articles in the Forestry-Geological Review.

School Museums: The collection of rocks and minerals in the State Museum at the capitol attracts hundreds of visitors daily, including many school children. It is impossible, however, for school children from all over the State to come to Atlanta to see this museum. The Division of Geology has, therefore, undertaken the tremendous task of collecting a large number of specimens of some 70 common rocks and minerals found in Georgia for distribution as local museums in selected high schools throughout the State. Each specimen will be properly labeled and will be displayed on a painted wooden block. The only cost to the school will be that of a locked glass case or cases for the display and the transportation charges for shipping.

STATUS OF THE MINERAL INDUSTRY IN GEORGIA

The relative and total values of the principal minerals mined in Georgia from 1924 to 1933 are shown in Figure 1. The depression has been particularly hard on the building industries. This is reflected in the great decline since 1929 in the production of granite, marble, clay products, Portland cement, sand and gravel. The production of Georgia kaolin has shown less decline. This is due to the fact that Georgia kaolin has largely replaced the white clays formerly imported from England for use in filling and coating white paper and for ceramic uses. Georgia now furnishes over 60 per cent of the domestic consumption of white clay. Preliminary figures indicate that the production in 1934 will surpass all previous years.



Graph Showing Georgia's Mineral Production, 1924-1933.

Metallic ores include iron, manganese, gold and silver. With barite and mica are asbestos, talc, soapstone, slate and coal. Figures for ochre and clay products, which together average about $3,500,000, are not given. Prepared by G. W. Crickmay.

The production in 1934 will probably show a slight increase in several other minerals. The gold mining industry is having its greatest revival in some 20 or 30 years. The greatest need of the mineral industry in Georgia is for industries located within the State to manufacture for local markets the products for which the raw materials are now shipped elsewhere.

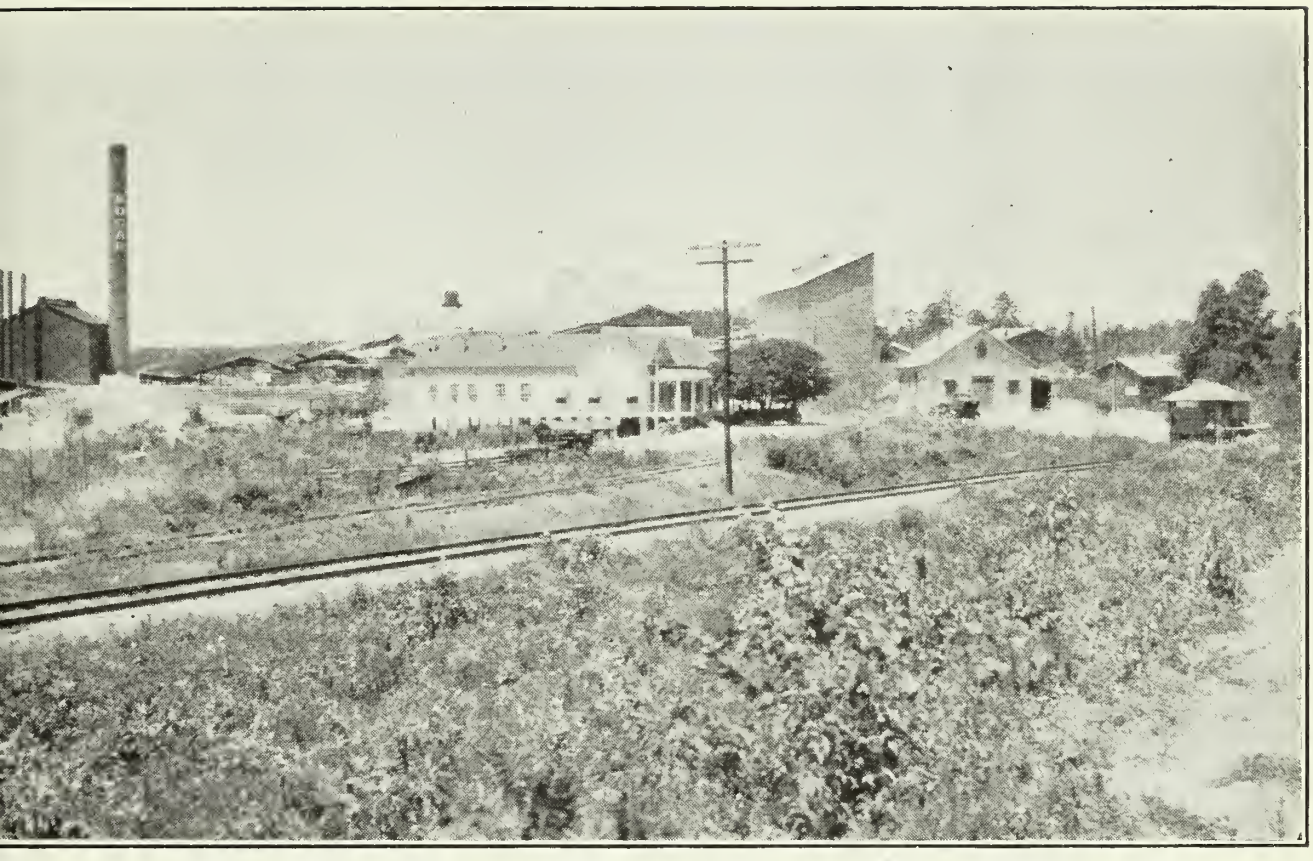
RECOMMENDATIONS FOR FUTURE WORK

Geologic Map

The work on the geologic map of Georgia and its accompanying report, described above, should be pushed forward as rapidly as possible in order that it may be ready for publication as soon as funds are available. The need for this map and report cannot be over-emphasized.

General Reports

The two most popular bulletins of the Geological Survey have been the general one on the Mineral Resources of Georgia and the educational one on the Physical Geography of Georgia that shows the origin of the physical features of the State and their relation to distribution of population, industry and agriculture. Supplies of these bulletins are low, and new and revised editions should be published as soon as possible.



in Washing Plant, Edgar Brothers Company near McIntyre, Wilkinson county

Granites

No report has been issued on Georgia granites since 1902, although granite quarrying is one of our major mineral industries. Many important deposits are not described in the early report. The Division of Geology has received many requests from the granite producers for such a report.

Guide to Scenery in Georgia

The varied scenery of Georgia is a potential natural resource that has long been neglected. Thousands of tourists annually pass through Georgia on their way to and from Florida. They should be induced to visit the points of scenic interest in Georgia rather than to hurry through along the shortest route. The Division of Geology has material on hand to prepare a Popular Guide to the Scenery and Geology along and close to the Dixie Highway, brief but well illustrated. Publication awaits necessary funds. Requests for popular guides of this type were made to the State Geologist by the secretaries of a number of Georgia Chambers of Commerce at their annual convention in Savannah in May, 1934.

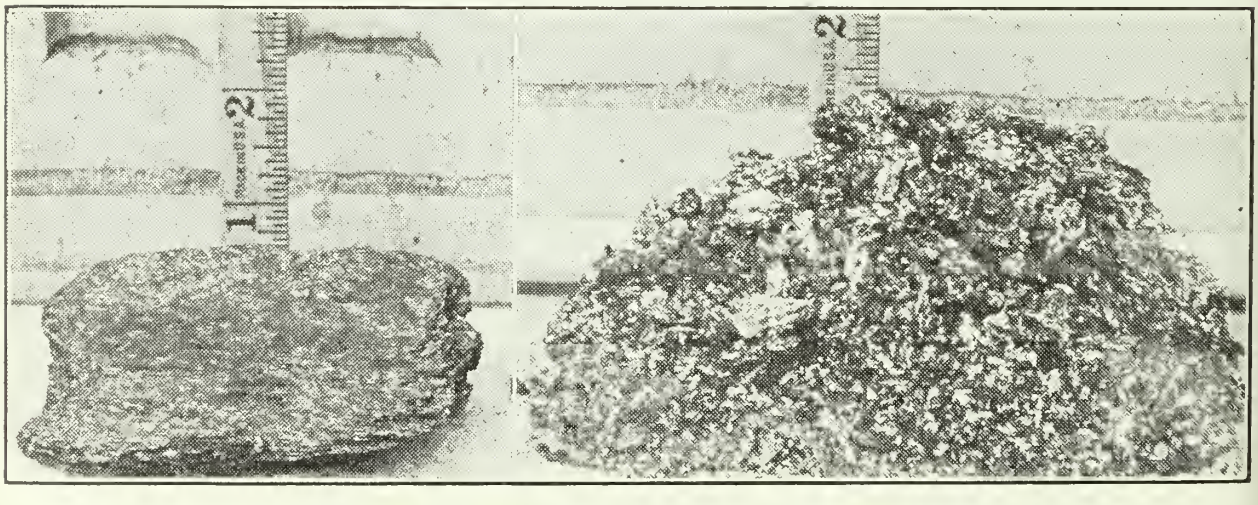
Geology of Georgia for Schools

The State Geologist has long desired to write an Earth History of Georgia for high school students. This will be a popular and non-technical illustrated story of geology as applied to Georgia for use in the schools and for adults with no knowledge of geology. It will be similar to the popular educational handbooks put out by several states.

State Museum

The State Geologist is the custodian of the State Museum on the fourth floor of the capitol. This museum includes exhibits of rocks and minerals, forestry, wild animal life and birds, agriculture, entomology, and archaeology. The Museum is viewed each year by thousands of visitors, both Georgians and people from other states who are passing through Atlanta. Its educational value is shown by the hundreds of school teachers who annually bring their classes to study the exhibits. The exhibits, while superior to many state museums, are crowded and poorly lighted. Many of them have not been changed for years. As soon as possible they should be modernized. Indirect lighting within the cases should be installed as soon as funds are available. The State Geologist suggests the appointment of a Museum Advisory Committee composed of the State Forester, the Commissioner of Game and Fish, the Commissioner of Agriculture, and the State Entomologist to aid him in bringing the exhibits up-to-date.

The State of Georgia will probably in the future build a capitol annex office building on the state-owned property facing the capitol on Capitol Square. When and if this is done provision should be made to devote an entire floor, preferably the ground floor, to a modern State Museum. This should contain adequate room for the expansion of the museum. The fund for equipping the building should contain provision for modern display cases. Provision should be made for a curator and for guides to show visitors through the museum.



Vermiculite from Lemon's Gap, Towns county.

Branch museums featuring the products of the region should be installed at the various State Parks. A start in this direction has been made with the Indian Museum at Indian Springs and the aquarium planned by the Game and Fish Department at the State Fish Hatchery at Macon.

Cooperative Stream Gaging

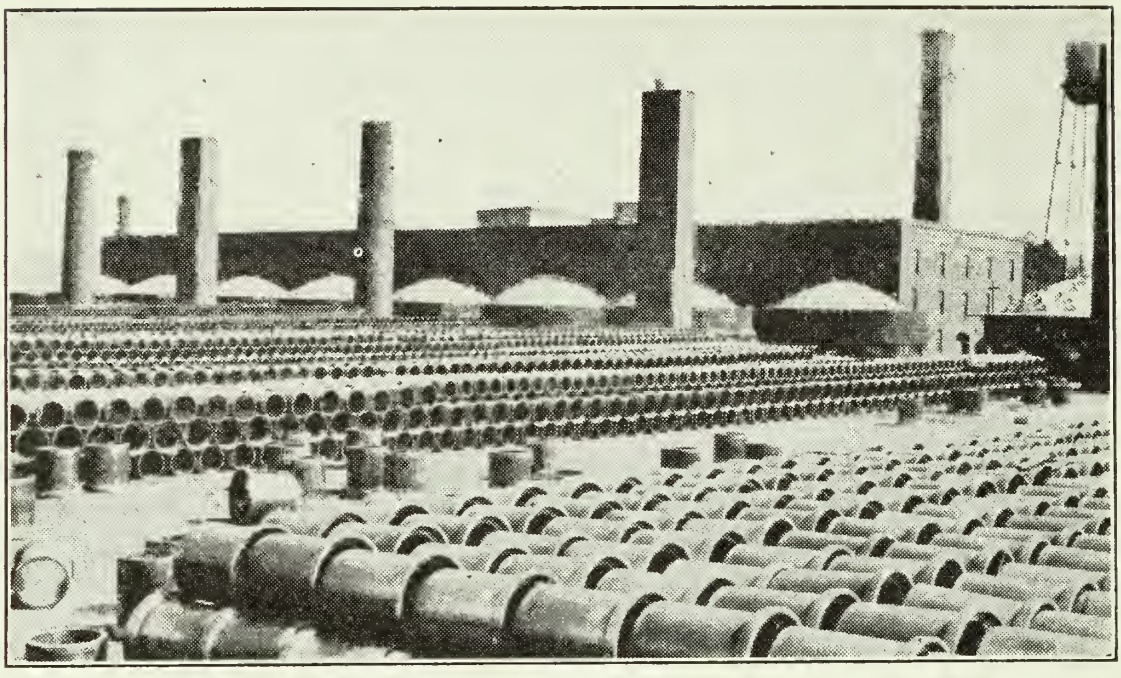
The measurement of the flow of the streams of Georgia will give information necessary for the proper development of the State. The information is necessary before any hydro-electric power developments can be planned. Most industries need large quantities of water and can be induced to locate in Georgia only if we have the information to furnish them of the supply of water that they can expect from any stream during times of low water as well as normal and flood-water times. For example, the Aluminum Company of America located their plants at what is now Alcoa, Tennessee, instead of in North Carolina as originally planned, because the State of Tennessee had for years been carrying on stream gaging measurements and could furnish them information on the flow of the streams, whereas North Carolina had no such information. The taxes from this industry to the State of Tennessee has been many times greater than the cost of this stream gaging and North Carolina is now carrying on such work.

Stream gaging information will save the Highway Department of Georgia many times the cost of such work. At present all highway bridges and culverts are designed with a very large safety factor to take care of possible floods. If the flow of the streams in flood time were known, this safety factor could be cut down and the bridges and culverts would cost less. Attempts in the past to cut down this safety factor without this information has resulted in costly replacements of bridges and culverts washed out by flood waters.

Such work to be of value must be continued over enough years to cover extra high floods and extra dry seasons. Georgia should start this work at once. The amount appropriated by the State will be matched by an equal amount from the United States Geological Survey and the work will be done by their experts under the supervision of the State Geologist and a federal engineer whose office would be located in Atlanta.

Cooperative Topographic Mapping

The topographic maps made by the United States Geological Survey are in great demand for all sorts of purposes. These maps are made on the scale of one inch equals one mile and very accurately show every stream, road, house, as well as the elevation and slope of the ground by means of contour lines that represent points of equal elevation. By means of these maps highways can be relocated in the office, eliminat-



Sewerpipe Plant near Flintstone, Walker county—Uses Georgia Clay.

ing all but the final stake-setting surveys: city and town water supplies and sewers can be planned; areas of stream valleys flooded by dams can be estimated; and all kinds of engineering, mining, and industrial projects can be laid out. Less than half of Georgia has been thus mapped, mostly in the northern part of the State, and many of these maps were made years ago on a different scale with poorer methods and need revision. No accurate maps of any kind have been made of many counties in Georgia.

So great has been the demand throughout the country for these maps in recent years that the United States Geological Survey has been forced to limit this work to States that will cooperate by paying half of the expenses. The only topographic map made in recent years in Georgia is that of the Warm Springs area, financed by a grant from Public Works funds. Georgia should appropriate enough, to be matched by an equal amount from the Federal Government, to map at least one or two areas each year. The work will be done by trained topographers under supervision of and in areas picked out by the State Geologist.

Increased appropriations for 1936 and 1937 will be necessary to accomplish all of this important work. The Division of Geology is anxious at all times to render service to the citizens of Georgia.

DEPARTMENT OF FORESTRY AND GEOLOGICAL DEVELOPMENT
FINANCIAL STATEMENT 1933

RECEIPTS:

Federal Government, matched funds, fire control	$36,398.79	
Federal Government, matched funds, nurseries	1,433.29	
Donation by Mrs. E. T. Comer, Savannah, Ga., for research	1,000.00	
From State Treasurer on appropriation, for operations	46,625.00	
F. G. Varner, rent on concession at Indian Springs for 1933	450.00	
Sale of automobile	159.00	
Sale of fire pumps, and miscellaneous	81.07	
Sale of seedlings (Savings account)	729.24	
Interest on Savings deposits	21.73	
Balances on hand: (from 1932)		
Federal funds	7,917.06	
Comer fund	824.53	
Savings account	275.39	
		$95,915.10

DISBURSEMENTS:

Division of Forestry	$61,156.70	
Division of Geology	10,438.79	
Division of Research	15,738.35	
Division of Parks	2,736.83	
Withdrawal from Savings	993.32	
	$91,062.99	

Balances on hand, Dec. 31:

Operations account	$ 4,818.07	
Savings account	34.04	
Comer fund	0.00	
		$95,915.10

DISBURSEMENTS FOR 1933

DIVISION OF FORESTRY:

Personal service	$24,770.40	
Travel, Division personnel and Commission (pro rated)	5,726.24	
Supples and materials	754.19	
Communications	1,545.55	
Printing, including Review (pro rated)	773.12	
Repairs	85.37	
Freight, express, hauling	43.99	
Subscriptions	11.00	
Bond of Treasurer (pro rated)	19.50	
Cooperation with Georgia Experiment Station	25.00	
Vocational Forestry Camp	1,521.69	
Reward	100.00	
T. P. O. Refunds	20,675.50	
Cooperation with Extension Service	2,799.18	
Equipment	108.48	
Miscellaneous	.50	
Nixon Forest Project	83.50	
Alexander Stephens Memorial Project	11.70	

Nurseries:

Personal service	675.00	
Unskilled labor	511.31	
Supplies	752.06	
Electric current	129.48	
Rent	13.60	
Express	8.67	
Equipment	2.00	
Miscellaneous	9.67	
		$61,156.70

DIVISION OF GEOLOGY:

Personal service	$ 8,606.33	
Travel, Division Personnel and Commission	1,016.19	
Supplies	259.16	
Communications	306.58	
Printing (pro rated)	223.97	
Freight and express	2.06	
Bond for Treasurer (pro rated)	11.50	
Subscriptions	13.00	
		10,438.79

DIVISION OF RESEARCH:

Personal service	$12,951.26	
Travel	311.45	
Supplies	1,643.42	
Communications	90.93	
Printing, Review (pro rated)	145.53	
Freight and express	71.46	
Electric current	2.10	
Bond for Treasurer (pro rated)	15.50	
Miscellaneous	1.43	
Common labor	505.27	
		15,738.35

DIVISION OF PARKS:

Indian Springs:

Personal service	$ 1,148.00	
Travel	98.33	
Supplies	57.54	
Communications	23.82	
Electric current	174.53	
Printing, Review (pro rated)	67.15	
Repairs	6.35	
Bond for Treasurer (pro rated)	3.50	
Equipment	171.00	
Permanent Improvements	906.76	
Miscellaneous	1.95	
	$ 2,658.93	

Vogel Park:

Equipment	77.90	
		2,736.83
Withdrawals from Savings account		993.32
Total Expenditures for Year		$91,062.99

DEPARTMENT OF FORESTRY AND GEOLOGICAL DEVELOPMENT
FINANCIAL STATEMENT, 1934

RECEIPTS:

Federal Government, matched funds, fire control	$47,124.91
Federal Government, matched funds, for nursery	1,240.27
From State Treasurer on appropriation	38,150.00
From F. G. Varner, concessionnaire, Indian Springs	100.00
Miscellaneous	79.37
Sale of seedlings	2,762.57
Balances on hand from 1932:	
Operations account	4,818.07
Savings account	34.04
	$94,309.23

DISBURSEMENTS:

Division of Forestry	$71,550.65	
Division of Geology	12,759.89	
Division of Parks	3,158.98	
Savings account	957.35	
	$88,426.87	
Balances on hand Dec. 31:		
Operations account	3,974.54	
Savings account	1,907.82	
		$94,309.23

DISBURSEMENTS IN 1934

FORESTRY:

Personal service	$28,833.27
Travel, Division personnel and Commission (Prorated)	3,979.14
Supplies	434.87
Communications	1,039.80
Printing including Review (pro rated)	659.63
Repairs and alterations	66.75
Rent	1.00
Freight, express, hauling	18.46
Subscriptions and dues	21.00
Cooperation with Georgia Experiment Station	100.00
Cooperation with Georgia Extension Service	1,900.00
Equipment	15.48
Bond of Treasurer (pro rated)	67.00
Unclassified	165.35
T. P. O. Refunds	33,794.43

Nurseries:

Unskilled labor	128.48	
Seed and supplies	204.30	
Electric current	73.26	
Rent	13.60	
Communications	1.21	
Repairs to equipment	3.75	
Equipment	26.31	
Miscellaneous	3.56	
		$71,550.65

GEOLOGY:

Personal service	$ 6,885.16	
Travel, Division personnel and Commission (pro rated)	934.58	
Supplies and materials	1,144.05	
Communications	327.23	
Printing including Review (pro rated)	1,231.56	
Repairs and alterations	173.96	
Rent of equipment for library project	94.00	
Freight and express	47.83	
Subscriptions	38.52	
Bond of Treasurer (pro rated)	22.00	
Equipment	1,732.00	
Unclassified	129.00	
		12,759.89

PARKS:

Indian Springs	$ 781.00	
Vogel Park	669.54	
Miscellaneous park expenditures	1,708.44	
		3,158.98
Disbursements from savings		957.35
TOTAL DISBURSEMENTS FOR YEAR		$88,426.87

REPORT

OF THE

Commission
Department of Forestry and
Geological Development

TO THE

Governor and General Assembly

OF THE

State of Georgia

1935-1936

CONTENTS

LETTER OF TRANSMITTAL

Atlanta, Ga., February 13, 1937.

To His Excellency,
Hon. E. D. Rivers, Governor,
State of Georgia,
Atlanta.

In accordance with Article 4, Section 23 of the Reorganization Bill enacted by the General Assembly of Georgia at its session in 1931, the Commission of the Department of Forestry and Geological Development herewith transmits the fcllowing report to you as Governor and to the General Assembly.

Respectfully,

RICHARD W. SMITH,

Secretary to the Commission.

COMMISSION OF
FORESTRY AND GEOLOGICAL DEVELOPMENT

1937

Chairman—Governor E. D. Rivers

Mrs. M. E. Judd, Dalton

Alex K. Sessoms, Cogdell

J. M. Mallory, Savannah

H. C. Kimbrough, Chipley

Perry Middleton, Brunswick

T. G. Woolford, Atlanta

Secretary—Richard W. Smith, State Geologist, Atlanta

REPORT OF THE DIVISION OF FORESTRY

By Elmer E. Dyal, State Forester

INTRODUCTION

Much progress has been made in forestry along many lines during the past two years. This advancement is due in part to the help and cooperation of the CCC Camps in Georgia. These camps have aided materially in the cause of forestry, reforestation and conservation.

The Division of Forestry has been taxed tremendously during these two years to carry on the expanded program called for in cooperating with the Federal Government, to the extent that the entire personnel has had to devote a great portion of their time to the additional activities in the carrying out of this program.

During the past two years, Georgia has been fortunate to the extent that only a small reduction has been made in the number of CCC Camps. This has been due largely to the fact that the number of acres in organized fire protection on privately owned lands, which was the basis for securing these camps, has not decreased but has increased each year. The reduction which has been made has been due solely to the normal reduction of camps throughout the United States.

During the biennial period, the state park system, which is under the supervision of the Division of Forestry, has expanded from six to eight parks. Federal aid has been secured in the enlargement of this program, to the extent that much development has been made in each of the eight parks.

The educational program with the vocational forestry schools has been continued during the past two years, with much more interest being shown by both the students and teachers. At the present time, the Division of Forestry is cooperating with more than 200 rural schools in carrying on an educational forestry program, whereby students are taught better practices pertaining to forestry, conservation, protection and reforestation.

The vocational forestry camp conducted annually has been carried on during the past two years with increased efficiency and a larger number of students participating than ever before.

The Forestry-Geological Review, published monthly by the department, has been published each month. It is being sent to every state in the Union and to twelve foreign countries. The mailing list has increased during the past two years from less than 3,000 to more than 3,500.

The demand for literature dealing with Georgia forestry has continued to increase. The supply has been practically exhausted and those asking for this type of information have had to be informed to this effect.

The Division of Forestry has continued services to the private landowners throughout the State, as far as has been practicable, in the development of timber protective organizations and the planning of the CCC program.

With the importance that forestry is playing in the land use problem of Georgia, it should receive much more consideration that it has in the past. The State should not leave the planning to the Federal agencies but should be in position to at least cooperate and give direction to such undertaking.

The State Forester expresses appreciation for the splendid cooperation of the Federal agencies, the many civic organizations and the vocational schools of the State in promoting forestry.

Tribute is paid and gratitude expressed by the State Forester to the Commission of Forestry and Geological Development for the guidance and cooperation, as well as the time given in dealing with the many problems that have arisen from time to time and their increased interest, in helping to promote a better forestry program for the entire State.

NEEDS OF THE DIVISION OF FORESTRY

It will be absolutely necessary that more funds be provided if the Division of Forestry is to cooperate with the Federal Government and private landowners in forest fire protection. Funds should be provided by the State in order to meet one half of the expenses incurred for fire protection, as the Federal Government is doing at the present time. This will enable us to cooperate with the timber owners on a 50-50 basis.

The educational department should be expanded quite a bit, to the extent that funds should be provided for the publishing of a great many bulletins, leaflets, posters, etc., for distribution to those who are seeking this type of assistance from us.

It is also imperative that two additional men be employed in order to carry on certain types of work and activities in the future that have not been carried on in the past.

The Division of Forestry has never been able to meet the demand for seedlings. In order to more nearly meet the demand in the future, it will be necessary to enlarge both of the State nurseries. To do this, additional funds will have to be provided.

In 1936, approximately five million seedlings were sold to the landowners of the State, orders for these seedlings coming from 78 different counties. More than ten million seedlings could have been sold if facilities could have been provided for the raising of them. It is our aim to grow approximately ten million seedlings during the coming season if additional funds can be provided.

In 1936, there were approximately five million acres of timberland in

organized fire protection. It is our aim to increase this amount by at least one million acres per year; but to do this, the assistance of another person specializing in this work will be necessary. If this additional person is not employed, it will be almost impossible for us to increase this acreage to any great extent, due to the fact that the entire personnel of the Department now has as many duties as it can supervise.

ADMINISTRATION

The Commission of the Department of Forestry and Geological Development allots and budgets to the different divisions the funds appropriated to the Department. The Division of Forestry has never exceeded the amount allotted to it.

The Division of Forestry receives the major part of its money for operation from the Federal Government under Section 2 and 4 of the Clarke-McNary Law, receiving in 1936, $69,620 from Section 2, and $1,600 from Section 4.

Personnel: The personnel of the Division of Forestry, at the present time, consists of a State Forester, Educational Manager, Assistant State Forester, eight District Foresters, Bookkeeper-Treasurer who is secretary to the Educational Manager, Clerk who is secretary to the State Forester, three clerks in district offices, one nurseryman and one Superintendent of State Park construction.

The staff members are as follows:

ELMER E. DYAL, State Forester, Atlanta
C. E. BOGGS, Educational Manager, Atlanta
JACK THURMOND, Assistant State Forester, Atlanta
T. P. HURSEY, District Forester, Rome
W. D. YOUNG, District Forester, Gainesville
R. R. EVANS, District Forester, Columbus
S. L. McCRARY, District Forester, Augusta
H. C. CARRUTH, District Forester, Macon
W. G. WALLACE, District Forester, Savannah
H. D. STORY, Jr., District Forester, Albany
R. D. FRANKLIN, District Forester, Waycross
MISS HAZEL E. NICHOLAS, Bookkeeper-Treasurer, Atlanta
MRS. JOHN Y. ROBERTS, Clerk, Atlanta
MISS MADELINE CULBRETH, Clerk, Waycross
MISS MILDRED WOOD, Clerk, Macon
MRS. W. L. DAVIS, Jr., Clerk, Albany
M. E. MURPHY, Nurseryman, Albany
E. H. SIMS, Superintendent of State Park Construction, Atlanta

The personnel of the Emergency Conservation Work in Atlanta consists of the following:

For Forestry camps on private land, Director of ECW who is Assistant State Forester, a Principal Clerk, Senior Clerk, Clerk-stenographer, under Clerk-stenographer, Assistant Clerk, Junior Clerk-stenographer, and under Clerk-typist.

For Park camps, a Superintendent of state park construction, Landscape Architect, Senior Clerk, Secretary and Stenographer, Assistant Clerk, and Typist.

FOREST FIRE CONTROL

The major activities of the Division of Forestry have been on forest fire protection. Much progress has been made in bringing forest areas of the State into timber protective organizations during the past two years.

At this time the State of Georgia has 4,251,000 acres under intensive and extensive fire protection. The protective activities are administered by the Division of Forestry through the various timber protective organizations throughout the state.

The forest area of Georgia is the largest of any state in Region 8, which includes eleven states. The total forest area of Georgia, exclusive of national forests, military reservations, and bird sanctuaries is 23,100,000 areas.

On January 1, 1937 the Division of Forestry had under its supervision ten CCC camps, nine of which are located in the Naval Stores belt in South Georgia. The one North Georgia camp is located in the Floyd County Timber Protective Organization area near Rome, Georgia.

The fact that only forest units belonging to timber protective organizations are considered eligible for CCC camp work has resulted in materially stimulating the interest in these organizations.

The timber protective organizations that have been fortunate enough to secure CCC work have received wonderful benefits in the development of their protection plans in that improvements put in by CCC camps on protected units have advanced the State's protection program beyond any expectation.

Improvements received consist of primary firebreaks, truck trails, which are used to facilitate quick access of fire fighters and equipment to forest fires, the construction of an adequate tower and telephone system to be used in the detection of fires, reporting and dispatching men for fire suppression.

Due to this condition, and also due to the fact that there has been a general reduction from time to time in the number of CCC camps in the United States, camps that were located on inactive timber protective organizations have been abandoned. There will be a further

Constructing Firebreak on Timber Protective Organization Land.

reduction in the number of camps, but organizations that are active and are carrying on their part of the protection program may avail themselves of the services of CCC camps as long as any camps remain under the supervision of the Division of Forestry and as long as there is justified work remaining to be done.

In addition to the 4,251,000 acres of land under organized protection, administered by the Division of Forestry, there are approximately 1,600,000 acres of timber land under the protection of national forests, national parks, military reservations, game refuges and biological survey. Other forest lands, consisting largely of unorganized farm woodlots, are given a measure of protection by their owners.

There are twenty-nine active timber protective organizations in the State engaged in fire protection work on 4,251,000 acres of forest land. The largest of the organizations are located in the Naval Stores belt of South Georgia.

The timber protective organizations working under the supervision of the Division of Forestry and with limited funds have made much progress in their protective program.

During the period January 1, 1935 to January 1, 1937 the twenty-nine timber protective organizations have purchased 17 tractors, 17 firebreak plows, 10 road machines and 15½ ton trucks. With this equip-

ment they have constructed 22,550 miles of 8-foot random firebreaks, and have maintained 1,850 miles of primary firebreaks and truck trails that were constructed by the CCC camps and turned over to them for maintenance.

Several timber protective organizations have funished the material and the CCC camps have constructed permanent TPO offices and headquarters.

The Suwannee and Consolidated Timber Protective Organizations have installed radio transmitters and receiving sets for use in forest fire protection. Suwannee Timber Protective Organization installed their radio system in 1933 and they now have 14 receiving sets on patrol trucks working admirably in connection with their tower and telephone system. The Consolidated Timber Protective Organization, with headquarters at Homerville, installed their radio system during the winter of 1936 and it is also proving a success in their fire protective system.

The Division of Forestry through the Timber Protective Organization, has accomplished much in placing four and one quarter million acres under protection. However, there still remains nineteen million acres in need of adequate protection.

The Division of Forestry has gone a long way with its limited funds and stands ready to cooperate with the owners of the nineteen million acres in need of fire protection when the funds become available.

EMERGENCY CONSERVATION WORK

Aid received through Emergency Conservation Work during the past two years has enabled the Division of Forestry to still further advance its program of forest protection. In addition to the aid received during the past two years, the State is grateful for aid received from ECW during the first two years of the program.

Work standards have changed since the beginning of Emergency Conservation Work in 1933. Higher standard truck trails and structures are now being constructed and more emphasis is being put on the construction of roads rather than fire breaks. As a result of the many miles of truck trail constructed by CCC Camps large inaccessible areas have been opened up and made accessible to fire fighting crews.

The Federal Forest Service states the policy on CCC work on privately-owned forest lands broadly as follows: "The Camps are supported by Federal funds and therefore are Federal Projects. While the State forestry agency, representing the Government, submits recommendations as to the location and purpose of all projects in the states, the entire set-up of each proposed camp is closely scrutinized by Federal officials whose decision is final in the matter and must be followed by State Forestry officials".

Type of Fire Tower Constructed by CCC Enrollees.

All work projects on private land are recommended by State Forestry officials: however, approval for construction is given by the office of the Regional Forester. No projects can be authorized by State officials until after approval is secured from the Regional Forester.

When the State obtained Emergency Conservation Work Camps at the beginning of the ECW program the Federal Government received assurance that all improvements resulting would be maintained by the State or cooperating private organizations.

Federal foresters point out that the best guarantee for maintenance lies in the amount of State forestry funds available for cooperative work with timberland owners. Such State forestry funds must be sufficient in amount to justify the State's guarantee that the protective improvements completed by the CCC Camps will be continuously maintained.

A summary of ECW activities on private lands, which the Division of Forestry administered from January 1, 1935 to January 1, 1937 is as follows :—

SUMMARY OF CCC ACTIVITIES ON PRIVATE LANDS

From January 1, 1935 to January 1, 1937

Bridges constructed	405
Bridges maintained	13
Lookout towers constructed	36
Lookout towers maintained	17
Other buildings constructed	11
Miles of telephone line constructed	775
Miles of telephone line maintained	642
Signs erected	177
Tool boxes constructed	31
Miles of truck trail constructed	750
Miles of truck trail maintained	724
Acres planted in trees	277
Acres of forest stand improved (thinning)	285
Man-days on nursery work	680
Bushels of cones collected	4,076
Man-days fighting fires	17,647
Miles of fire breaks constructed	2,707
Miles of fire breaks maintained	1,420
Miles of roadside and trailside fire hazard reduced	317
Acres of other fire hazard reduction	40,515
Man-days on fire presuppression and fire prevention	4,240
Acres of tree insect control	395
Acres of carpet grass planted	8,915
Man-days searching for missing persons	63
Man-days emergency work on flood protection	1,537
Number of experimental plots developed	7
Man-days drafting timber type maps	661
Miles of grade lines surveyed	47
Miles of linear surveys	8,088
Acres of timber type survey	5,280,757
Rods of fence erected	560

EDUCATIONAL WORK

The educational program of the Division of Forestry is in charge of an Educational Manager. It is his duty to cooperate with the Department of Vocational Education in carrying on cooperative forestry programs with the schools where vocational agriculture is taught through out the State of Georgia.

The Educational Manager is also in charge of a Vocational Forestry Camp that is held each summer; is editor of the monthly publication known as the Forestry-Geological Review; edits bulletins, leaflets and posters; prepares news items for release to the press and assembles and organizes other educational material for the Department.

Vocational Education Program: The Division of Forestry and the Division of Vocational Education entered into a cooperative program eight years ago for the purpose of giving practical forestry training to boys throughout the State on jobs dealing with the conservation and development of our forest resources. The Division of Forestry furnishes teaching material and supervises the instruction given by the teachers of vocational agriculture, pertaining to forestry. This cooperative program includes the following:

Group of Vocational Students.

1. Leasing of 10 or more acres of forest land by the school, on which correct forestry practices are carried out under the supervision of district foresters, in cooperation with teachers of vocational agriculture.

2. Teaching practical forestry to all farm boys enrolled in vocational agriculture.

3. Preparing and furnishing to teachers and pupils teaching material dealing with forestry.

4. Conducting a vocational forestry school camp. Free scholarships are given to one boy in each vocational school throughout the State for outstanding records in forestry work.

The camp is held each year in order to extend, under practical conditions, the teaching which has been carried on in the agricultural class rooms of the high schools. Instruction in the camp is conducted by members of the staff of the Division of Forestry, assisted by teachers of vocational agriculture.

As a result of this cooperative program during the past eight years, approximately 16,000 farm boys have been given practical training in many of the more common forestry problems with which farmers are confronted.

In order to assist in carrying out this program, teachers of vocational agriculture have been given practical forestry training by the district foresters and through special courses at the Agricultural College. Each year through this cooperative program thousands of trees are planted by boys on their home farms and thousands of acres of forest lands are protected from fire. A strong sentiment for the protection and preservation of our forest areas on the part of a large number of farm boys is being built. In fact, the boys being reached through this program are the farmers and foresters of the future.

The accomplishments of the vocational schools during the 1935–36 school year are listed below:

	1936	1935
Number of students studying forestry	2,972	1,253
Number of hours devoted to forestry per student	18	14
Pounds of seed collected	391	
Number seedlings planted by adult farmers	463,294	12,848
Seed beds made	48	35
Number of students with Home Projects	872	529
Teachers assisting with T. P. O. work	12	4
Number of column inches in newspapers	1,428	600
Miles of firebreaks constructed	2,620	592
Number schools having forestry exhibits	25	10
Seedlings grown on school forests	41,544	14,560
Seedlings grown other than on school forests	979,777	

It is the plan during the coming year for the teachers of vocational agriculture to increase their accomplishments along certain lines. More seed beds will be established. More seedlings will be planted by the students and by the adult farmers. More students will study forestry. Consequently, the cause of forestry will be advanced in a large measure. More can be accomplished toward the conservation and protection of the forest lands of our State through this type of educational program than in any other manner. The students studying forestry in the vocational schools have expressed themselves, that they had rather have any other part of their educational program discontinued than that part which deals with forestry. Of the more than 200 vocational

schools, in which this forestry program is being carried on, 45 are negro schools. Realizing that the negro as well as the white man can set fire to woods, the Division of Forestry thought it well not to neglect the negro children of the State and have cooperated with them on the same basis as the white schools. The negro teachers and students appreciate the cooperation and consideration that the Division of Forestry has shown them during the past several years. These teachers have been instrumental in planting a large number of seedlings and reducing the number of forest fires in their local communities. They have shown a splendid spirit and have been willing to carry out the suggestions in every detail as have been given them by the Educational Department of the Division of Forestry.

Vocational Forestry Camp: Each year a vocational forestry camp is conducted. The students attending this camp are selected on the basis of a competitive examination in forestry. The object of the camp is to bring together, annually, outstanding boys showing particular interest in forestry to receive more intensive training in practical forestry under the guidance of a staff of trained foresters of the Division of Forestry. Those who successfully complete the camp are given a vocational forester's certificate. Many of the students attending the vocational forestry camp have been given non-technical jobs by different forestry enterprises. Some have been assistant technicians in the forest survey conducted throughout the South by the U. S. Forest Service and others have obtained positions as foremen in several of the CCC camps in Georgia. In every instance, these students have proven themselves to be well qualified and have shown more ability than those who did not receive the vocational forestry course.

Forestry-Geological Review: The Forestry-Geological Review is published monthly by the Department. It gives the various activities of the Department and includes information that will be of interest and educational value to those who read it. Efforts have been made to include information in this publication that will be of material benefit to the readers along the various phases of forestry and geology. Of the 3,100 copies mailed monthly, 2,913 copies are distributed within the State, going to a number of timber owners in EVERY county. The publication is also mailed to every State in the United States and to twelve foreign countries. Those included on the mailing list are leading landowners, civic and business organizations, county agents, vocational teachers, mine and quarry interests, naval stores operators, lumbermen and others. Anyone wishing to receive the publication may do so free upon request. It is stimulating a great deal of interest in fire protection and other forestry practices, in bringing to their attention the best practices along these lines. It is also acquainting the people of Georgia, and others, with Georgia's mineral resources and is creating interest in the development of a system of state parks.

Prizes: As an incentive to the teachers of vocational agriculture and students in vocational schools, the Georgia Forestry Association

offers cash awards annually to the teachers and students doing the most outstanding work in forestry education. A prize of $50 is offered to the teacher doing the most outstanding work and a prize of $25 is offered to the teacher doing the second most outstanding work. An award of $5.00 is offered for five consecutive months to the student of vocational agriculture who writes for publication in the Forestry-Geological Review the best news article pertaining to his forestry program or the forestry program in his school. Much favorable comment has been received on the articles that have been written by the vocational students. These prizes are designated as the "Herty Prizes," in honor of Dr. Charles H. Herty.

Bulletins, Leaflets, Etc: Due to the lack of funds, scarcely any bulletins, leaflets, and other material have been published during the past two years. More requests have been received during this time for material and information pertaining to the better practices of forestry than the Department could supply. These requests have come not only from citizens of Georgia but from citizens of the entire United States. People throughout the United States have become interested in the type of forestry program being carried on in Georgia and are anxious to receive material from our State in order to incorporate part of the practices, as are being carried on in Georgia, in their forestry program. It is quite unfortunate that we are unable to meet all of these requests.

Exhibits: Many request have been received from civic organizations, fair officials, and individuals that the Division of Forestry prepare or assist in the preparation of an educational exhibit pertaining to forestry. The Educational Department has cooperated with these just as far as has been possible. Exhibits have been prepared and shown in many of the vocational schools, at the Macon State Fair for the past two years and at the Slash Pine Forestry Festival, held in Waycross, for the past two years. Funds have limited very much the number and size of these exhibits. Much good can be accomplished through this type of educational work in that it brings to the attention of those seeing the exhibits, in a manner that could not be done otherwise, new ideas and methods pertaining to the better practices of Forestry.

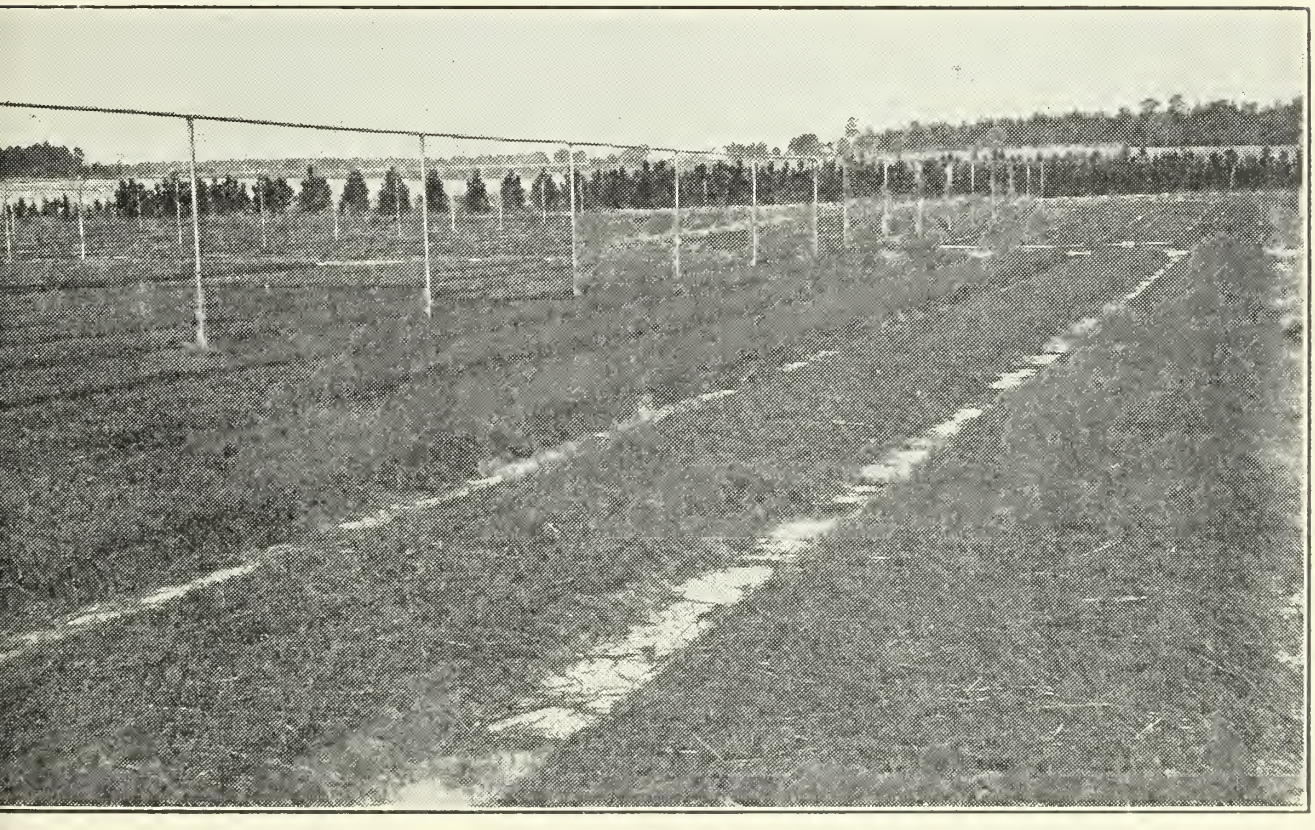
Much credit is due the Department of Vocational Education and the State Superintendent of Schools for their cooperation and assistance in carrying on the school forestry program.

TREE NURSERIES

The Division of Forestry, in cooperation with the Federal Government, operates two nurseries for raising seedlings of different species, to be distributed to the citizens of the State. One of these nurseries is located in north Georgia and the other one in south Georgia. They

are located in different sections of the State in order to raise different species of trees more successfully.

The demand for seedlings has increased from year to year and at no time has the Division of Forestry been able to supply the demand. Plans are being made to increase the facilities at both of these nurseries Equipment has already been installed at the South Georgia Nursery to make it possible to raise an additional two million seedlings during the next season. The nursery in north Georgia will also be expanded and equipment installed to make it possible to raise a larger amount of seedlings during the next season than has ever been raised at any previous time.



State Tree Nursery, Albany, Ga.

Requests for seedlings have come from 78 counties in Georgia. These counties are distributed throughout the entire State, showing that people in every section of the State are becoming interested in the reforestation program. A total of 176 orders has been received, varying from a small number of seedlings to several thousand in some instances. These seedlings are sold, in accordance with terms of the Clarke-McNary Law, at cost, making it possible for the landowners of the State to reforest their lands very cheaply.

The number of seedlings distributed has increased every year. The amount distributed for 1933 was 766,953; for 1934, 593,313; for 1935,

3,110,500; and for 1936, 4,376,200. These seedlings are distributed upon application to the State Forester and may be secured by any citizen in the State who places his order before the supply is exhausted.

FIRE STATISTICS

Forest fires in Georgia for the period of 1935 and 1936 were less prevalent than in the previous biennial period. The public is gradually developing sentiment against burning the woods, fewer are purposely burning their woods. Still there are some landowners who still burn for cattle, but this practice as well as burning in naval stores operations is gradually decreasing.

During the past two years much valuable assistance has been given to the landowners of the State in fighting forest fires by the CCC boys. During the period covered by this report a total of 17,647 man-days were spent by enrollees in fighting forest fires. Their efforts saved the timber landowner of Georgia many millions of young trees and many thousands of dollars of property loss.

A report of forest fire losses for the years 1935 and 1936 is given herewith.

Fire Statistics for 1935.

Number of fires, 12,452; total acres burned over 2,423,630.

Number of fires on areas of the Timber Protective Organizaton 2,401; acres covered 284,726; damage, $405,454; percentage burned; 6.2%. Number of fires on unprotected land, 10,141; acres covered 2,423,630; percentage burned 13%. The total damage to protected land was $405,-454 and to unprotected land $4,377,000.

Fire Statistics for 1936.

Number of fires 26,051; total acres burned over 5,741,623 acres.

Number of fires on areas of Timber Protective Organizations 1,411; acres covered 87,623 acres.

Number of fires unprotected land 24,640; acres covered 5,654,700 acres.

Total damage to protected land $89,824.

Total damage to unprotected land $6,331,700.

Percentage burned protected land 2.6%.

Percentage burned unprotected land 30%.

STATE PARKS

A system of State Parks located within easy reach of the citizens of the State of Georgia has been the goal of the Department of Forestry

and Geological Development for many years. This goal has been partially reached in the establishment of eight State Parks, namely:

Indian Springs—Butts County
Vogel—Union County
Alex. H. Stephens—Taliaferro County
Fort Mountain—Murray County
Pine Mountain—Harris County
Chehaw—Lee-Dougherty counties
Little Ocmulgee—Telfair-Wheeler counties
Santo Domingo—Glynn County

In the selection of the site of each of these parks, much thought was given to the suitability of the areas as to their forest growth. natural beauty, proximity to main highways, population to be served, historic, archaeologic and geologic interest, and the possibility for the development of out-door recreation.

The State Park System is being developed through the cooperation of the Department of Forestry and Geological Development of the State of Georgia with the Branch of Recreational Planning and State Cooperation of the National Park Service, Department of The Interior, United States Government. Since January 1st, 1935, two new parks have been added: Chehaw State Park in Lee and Dougherty counties with 800 acres, and Little Ocmulgee State Park in Telfair and Wheeler counties with 1,000 acres. Between the years 1933 and 1936 the number of State Parks in Georgia has been increased from three to eight. Of the eight State Parks, seven are Recreational areas, and one—Santo Domingo—is a State Monument.

The attendance in State Parks has increased from approximately 160,000 in 1933 to 605,000 in 1936. Following is a tabulation showing the attendance at Georgia State Parks for the year 1933:

Indian Springs	100,000
Vogel	50,000
Alex. H. Stephens	10,000
Total	160,000

Following is a tabulation showing the estimated attendance for the year 1936:

Indian Springs	250,000
Vogel	100,000
Alex. H. Stephens	75,000
Fort Mountain	25,000
Pine Mountain	100,000
Chehaw	25,000
Little Ocmulgee	25,000
Santo Domingo	5,000
Total	605,000

All of Georgia's State Parks are still incomplete, and all except Indian Springs and Santo Domingo still under construction. The increase in attendance is indicative of a still larger increase as additional recreational facilities are completed for use by the public.

The acreage in State Parks has increased from approximately 200 acres in 1933 to 5,000 in 1936. This 5,000 acres does not include 3,000 acres which are being donated to the State at the present time, nor 7,000 acres being acquired by the U. S. Government at Alex. H. Stephens and Pine Mountain State Parks. Below is a tabulation showing the status of the acreage in State Parks as of January 1st, 1937:

Park Name	Land Owned by State	Additional Land Being Acquired	Remarks
Indian Springs	158 Acres	5000 Acres	Proposed for acquisition by U. S. Government, but temporarily dropped.
Vogel	257 "	5000 "	State proposes to eliminate private holdings within master plan and to secure land use permit on about 4,800 acres within master plan from U. S. Forest Service.
A. H. Stephens	220 "	3000 "	By U. S. Government.
Fort Mountain	725 "	2000 "	Being donated to State. Deeds being made as fast as titles can be cleared.
Pine Mountain	1458 "	5000 "	By U. S. Government.
Chehaw	800 "	3000 "	Proposed for acquisition.
Little Ocmulgee	1000 "	1000 "	Acquisition of additional area to make possible the development of a large lake at this park is being rapidly completed.
Santo Domingo	350½ "	20 "	Being acquired by State.

The U. S. Government has made available to the State, through the National Park Service, ECW and RDP funds from 1933 and 1936, as follows:

1933	$ 225,000	Approximately
1934	1,350,000	"
1935	1,500,000	"
1936	1,000,000	"
Total	$4,075,000	"

The above funds were expended under the supervision of the National Park Service and all bills were paid by Finance Officers of the U. S. Government.

Despite the fact that the State has provided practically no technical personnel for design and supervision of construction, preliminary master plans have been completed for the above eight (8) State Parks. Tentative construction schedules and estimates have been submitted to the National Park Service for their approval on the work necessary to complete these eight State Parks.

A brief description of the work completed in each State Park follows:

INDIAN SPRINGS

Trails and roads have been built throughout the Park; picnic grounds provided; a stone arch entrance bridge constructed; the old wooden casino replaced by a new stone building; a stone museum building erected; the water supply system extended and improved; the comfort station remodeled; parking areas provided, and much landscape work and planting done.

VOGEL

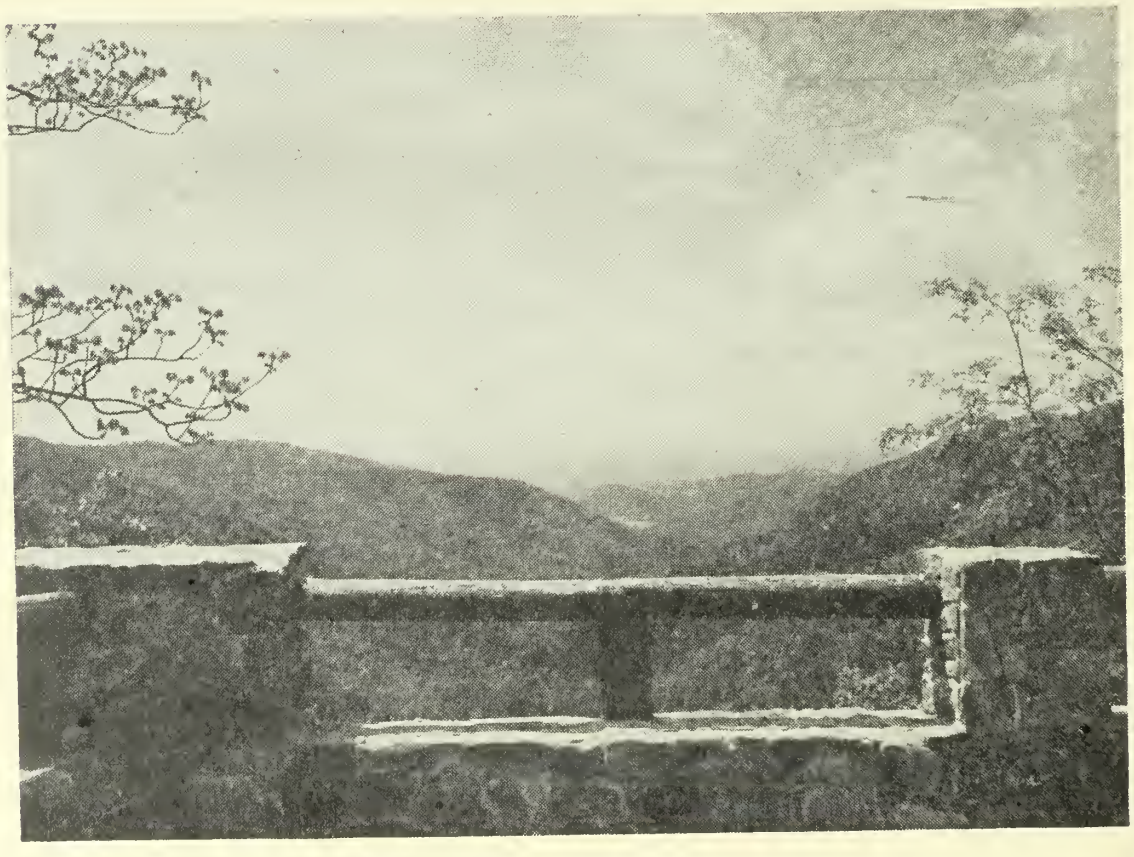
A large stone Inn is nearing completion at Neel Gap. In the Nottely Falls area, just north of Neel Gap open air fireplaces, picnic tables, comfort station, picnic shelter, parking areas and complete facilities for picnics have been provided. This area has been landscaped and planted with many thousands of trees and flowering shrubs. A trail shelter cabin has been constructed on the top of Blood Mountain on the Applachian Trail. Three and a half miles north of Neel Gap a large dam has been constructed, creating a 30-acre lake. In the Lake Area roads and trails have been constructed, and a bath house, caretaker's house and six vacation cottages have also been built. Water supply and sewerage disposal systems have been constructed and much planting and beautification work done. The lake has been stocked with rainbow trout.

ALEX. H. STEPHENS

Liberty Hall and its out-buildings, grounds and furnishings have been restored. A bath house, lake, observation and water tower, and comfort stations constructed. Three picnic areas with parking areas, shelters, open air fireplaces, barbecue pits, picnic tables, etc., have been completed. Several miles of trails and park roads have been constructed. Much landscape work and thousands of trees and flowering shrubs have been planted. Water and sewerage facilities have been installed.

An organized camp for 100 campers and a large lake are under construction.

Spring House
Indian Spring State Park, Butts County.



View Blood Mt. Gorge, Vogel State Park, Union County.

FORT MOUNTAIN

A park road from the State highway to a point near the top of Fort Mountain has been constructed. A parking area on Fort Mountain and picnic shelter built. Several miles of trail have been constructed and much clean-up work has been done. Investigation and plans for further work are now in progress. A stone observation tower has been erected on the top of Fort Mountain.

PINE MOUNTAIN

A large stone Inn has been completed on the top of Pine Mountain. Pine Mountain parkway from Tip Top to the Inn is rapidly nearing completion. Construction is in progress on the section of the parkway east of the Inn. A parking area, water supply and sewerage system for the Inn have been constructed. Six vacation cabins, custodian's house, water and sewerage systems have been constructed in the Lake Area. A large dam, creating a 20-acre lake is nearing completion in this area. A play area is also nearing completion. Several miles of roads and trails in the park have been constructed. Seven fish-rearing pools have been constructed. Much clean-up work and planting have been completed.

An organized camp for 100 campers and a large lake are under construction.

CHEHAW

An entrance road has been constructed, picnic area, picnic shelter, open air fireplaces, picnic tables and seats have been provided. A sewerage and water supply system is under construction. Several miles of trails have been constructed. Snags have been removed from the boat channel of Muckalee Creek. Much landscape work and planting have been completed.

LITTLE OCMULGEE

A main park entrance road has been constructed. A recreational building is rapidly nearing completion. A parking area is under construction. Much clean-up work, landscaping and planting have been done. Plans have been completed for a dam to create a large lake.

SANTO DOMINGO

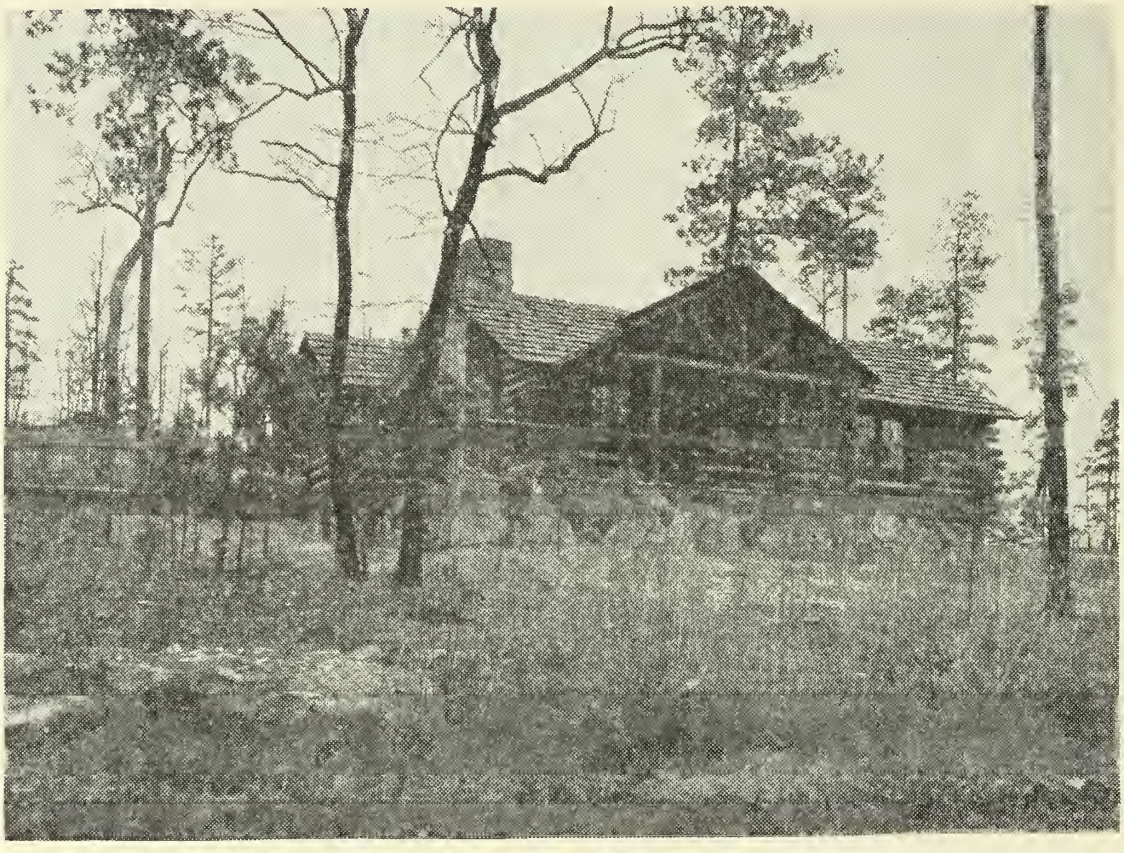
An entrance gate, a Spanish type Inn, foot trails, park road, water supply and sewerage disposal system have been constructed. Much landscape work and planting have been done in the Park. Trails have been marked with signs, directing visitors to points of interest. Large lagoons have been constructed and planted with water plants. An underground power system has been constructed. The ruins on this park have been preserved and marked.

Liberty Hall
Alex. H. Stephens State Park, Taliaferro County.

Picnic Shelter
Fort Mountain State Park, Murray County.

The Federal Government's cooperative arrangement with the various States to assist them in the creation of a system of State Parks, State Monuments, and Recreational Areas is based upon each State having an adequate administrative organization competent to administer and maintain their developments. During the construction period, the States must have sufficient technical help to properly design and supervise the construction of all improvements. The State must have sufficient funds to purchase equipment that the Federal Government will not purchase, and also to furnish some of the materials necessary in the larger jobs. The Department of Forestry & Geological Development has been severely handicapped in taking advantage of Government aid due to the small amount of State funds made available during the years 1933 to 1936, inclusive, for this work.

Unless a large increase in State appropriations for State Park work is made, there is grave danger that all CCC activities on State Parks may be stopped by the Federal Government. The small contribution of State funds to this work, shown in the financial statement for 1935 and 1936, should be contrasted with the $2,500,000 spent by the Federal Government for permanent improvements that must be maintained.



Vacation Cottage. Lake Area, Pine Mt. State Park, Harris County.

Lake Scene
Chehaw State Park, Lee-Dougherty Counties.

Woodland Trail
Little Ocomulgee State Park, Telfair-Wheeler Counties.

Inn
Santo-Domingo State Park, Glynn County.

REPORT OF THE DIVISION OF GEOLOGY

By Richard W. Smith, State Geologist

FUNCTIONS OF THE DIVISION OF GEOLOGY

The primary function of the Division of Geology is the survey and development of the State's mineral resources. This results in the creation of more taxable property, thus adding to the prosperity of the State. This cannot be done by mere enthusiastic statements that Georgia contains a wide variety of mineral resources, but by presenting the FACTS as to the location, extent, and commercial possibilities of these undeveloped mineral resources. The Division of Geology collects and publishes as many of these facts as its finances will allow. Reports are also published on the fundamental geological and physiographic information necessary for an intelligent search for new deposits and new minerals.

Far too much of our mineral wealth is now being shipped in the crude form to industries outside of the State that fabricate the raw material into finished products. When the people of Georgia realize the wealth that lies buried beneath their feet, they will be willing to furnish the capital to establish industries within the State that will convert the raw mineral wealth into more valuable finished products. The prosperity of Georgia demands and its resources deserve a better balance between agriculture and industries based on local raw materials.

PERSONNEL

The personnel of the Division of Geology consists of the State Geologist, two Assistant State Geologists, a secretary, and a porter.

State Geologist: Richard W. Smith, a graduate of the Massachusetts Institute of Technology and Cornell University, was Assistant State Geologist from 1926 until the death in October, 1933, of the late S. W. McCallie, former State Geologist. At that time he was appointed Acting State Geologist and in December, 1933, was elected by the Commission to succeed Mr. McCallie as State Geologist.

Assistant State Geologists: Geoffrey W. Crickmay, who has been Assistant State Geologist since 1930, is a graduate of the University of British Columbia and of Yale University.

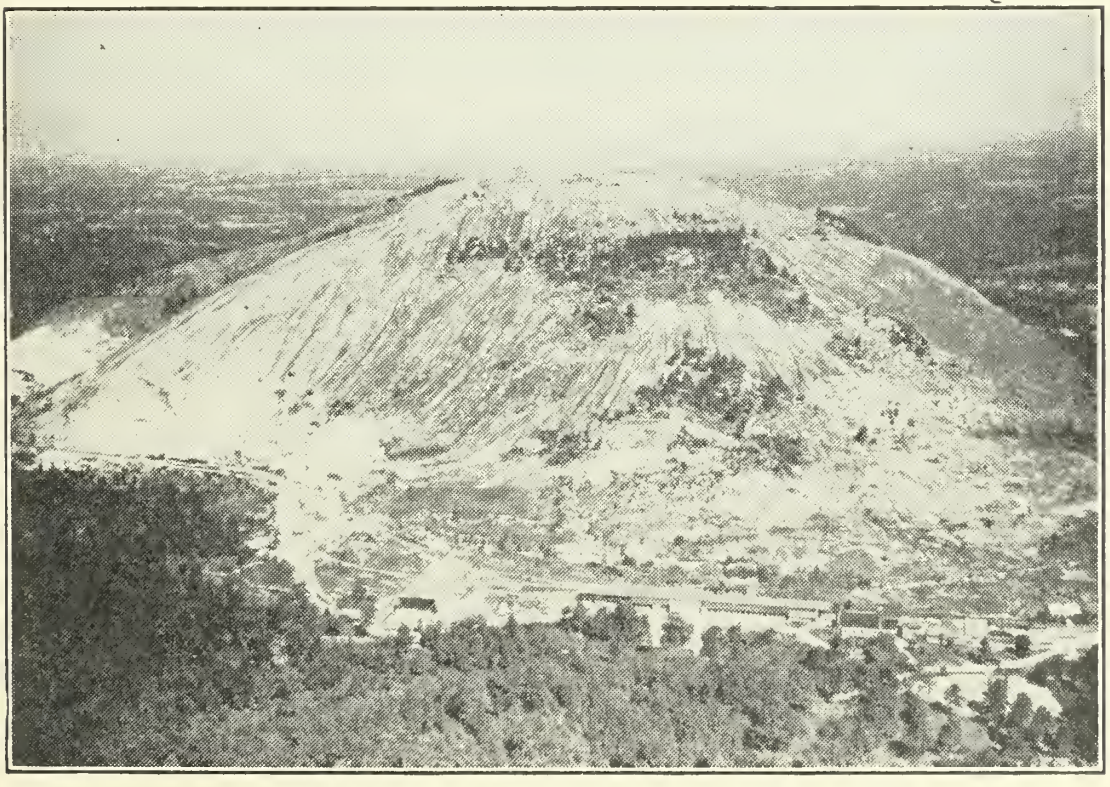
Lane Mitchell, of Atlanta, a graduate of the Georgia School of Technology, the University of Illinois, and Rutgers University, was appointed Assistant State Geologist in June, 1934. In September, 1936, he was granted a year's leave of absence to teach ceramics at the Georgia School of Technology during the absence of Dr. A. V. Henry.

NATURE OF THE WORK

Investigations of Mineral Resources and Geology: The major work of the Division of Geology is the investigation of the mineral resources of the State. It is necessary to keep in touch with the mines and mineral industries to learn what they are doing and to see if they can be assisted in any way to increase their output and markets and to lower their costs. Newly discovered deposits of minerals should be investigated to ascertain if possible their commercial value.

Technical reports and popular articles should be prepared, published, and distributed. One mineral at a time, or a group of related minerals, is selected for intensive investigation of the deposits throughout the State. The resulting report describes the geology and occurrence of the deposits, gives individual property descriptions, including thickness of deposits and overburden, and makes recommendations as to the best means for developing the deposits. General reports on the geology or physiography of the State and geologic maps, the basic information necessary for an intelligent search for undiscovered mineral deposits, should be published.

The series of 45 such reports of bulletins of uniformly high standard that have already been published has done much to increase the development of Georgia's mineral industry. A series of timely popular articles has been published in the Department's monthly paper, the



Air photo of Stone Mountain, DeKalb County, showing one of the large granite quarries at its foot. Photo by Percival Cobb, Candler Field.

Forestry-Geological Review. Several of these have been reprinted for wider distribution as information circulars. Papers on Georgia geology and mineral resources have been presented at national scientific societies.

Clearing House for Mineral Information: The Division of Geology serves as a clearing house for geological and mineralogical information. People within the State write, call, or phone for advice in developing their mineral deposits, digging or boring water wells, or investing in mining companies. The mineral producers ask for help in developing new mining or treatment methods and finding new markets for their products or new deposits of the minerals in which they are interested. The Georgia Securities Commission often consults the State Geologist on the advisability of allowing mining companies to sell stock within the State. Municipalities ask advice on possible sources of a city water supply. Thousands of letters are received from all over the country asking for information on Georgia's mineral resources. Some of these can be answered by sending the printed reports, others by personal letters based on the experience of the Division's personnel.

Hundreds of rocks and minerals from all parts of the State are sent in by property owners for identification and advice. In the past the personnel of the division included a chemist who made assays and chemical analyses of important samples sent in for identification or collected by the State Geologist and his assistants. Lack of finances has caused this service to be temporarily discontinued although in the most urgent cases samples are sent to outside chemists when funds are available to pay the cost.

Visitors to the office bringing in samples for identification and inquiring about Georgia's mineral resources have averaged 125 monthly. An average of 200 letters a month have been answered and an average of 100 bulletins a month have been distributed. No check was made on the number of inquiries answered by telephone or the number of copies of Review articles and information circulars distributed.

WORK ACCOMPLISHED IN 1935–1936

The work of the Division of Geology for the past two years was greatly handicapped by lack of appropriations. The expenditures, in round numbers, were $13,500 for 1935 and $13,600 for 1936 contrasted with $20,000 each for 1931 and 1932. The Division of Geology was able to operate under these reduced funds only by cutting all salaries 20 per cent, including a voluntary cut by the State Geologist for most of the time, by granting one of the Assistant State Geologists a year's leave of absence without pay, by cutting out the services of the chemist for the Division and the guide to the State Museum, by cutting down on the field work of the Division, and by limiting the output of published reports. Chemical analyses and assays are a very necessary

part of the work of the Division and this service should be restored as soon as possible.

COOPERATIVE WORK WITH THE UNITED STATES GEOLOGICAL SURVEY

The United States Geological Survey in 1934 and 1935 received grants from Public Works Funds for mineral and geological investigations in the southeastern states. The work in Georgia was in cooperation with the Division of Geology of the Georgia Department of Forestry and Geological Development. It included investigations of the gold deposits, the kyanite and vermiculite deposits, the bleaching clay deposits, and a study of the geology and underground waters of the Warm Springs region.

Gold: The gold investigation included visits to every known gold mine and prospect in Georgia, and detailed geologic studies of certain important mines and mining areas in Cherokee, Dawson, Lumpkin, and White counties. The general results of this investigation were printed in the Forestry-Geological Review and reprinted as an information circular, of which 3,000 copies have been distributed. The U. S. Geological Survey offered the detailed report for publication by the Georgia Division of Geology but, as much as a detailed gold report is needed, the offer had to be refused because of lack of printing funds.

Kyanite and Vermiculite: Kyanite and vermiculite are examples of minerals long known to science for which commercial uses have been developed in recent years. Kyanite is an aluminum silicate used in the manufacture of fire brick and other refractories to enable them to withstand extremely high heat. Vermiculite is a hydrous mica that has the property of expanding when heated to a very light, fluffy powder used as a heat insulator and in the manufacture of acoustical wallboard. The investigation of these minerals by the United States Geological Survey was undertaken at the request of the State Geologist. It resulted in the finding of large quantities of kyanite in north and middle Georgia. The report of the investigation was published early in 1935 as Bulletin 46 of the Division of Geology and has already resulted in a considerable increase in the amount of kyanite mined in Georgia. Further interest in the kyanite deposits of Georgia was aroused by a paper given by the State Geologist at a joint meeting in September, 1936, of the American Institute of Mining Engineers and the American Ceramic Society. The investigation of the vermiculite deposits was incomplete and the deposits should be further studied as soon as funds are available.

Bleaching Clays: Bleaching clays have long been one of the major mineral products of Georgia. They include the fullers earths of southwest Georgia used in refining mineral oils and the bleaching clays of middle Georgia used in refining vegetable oils. The trend of the petroleum industry is towards the use of activated bleaching clays,

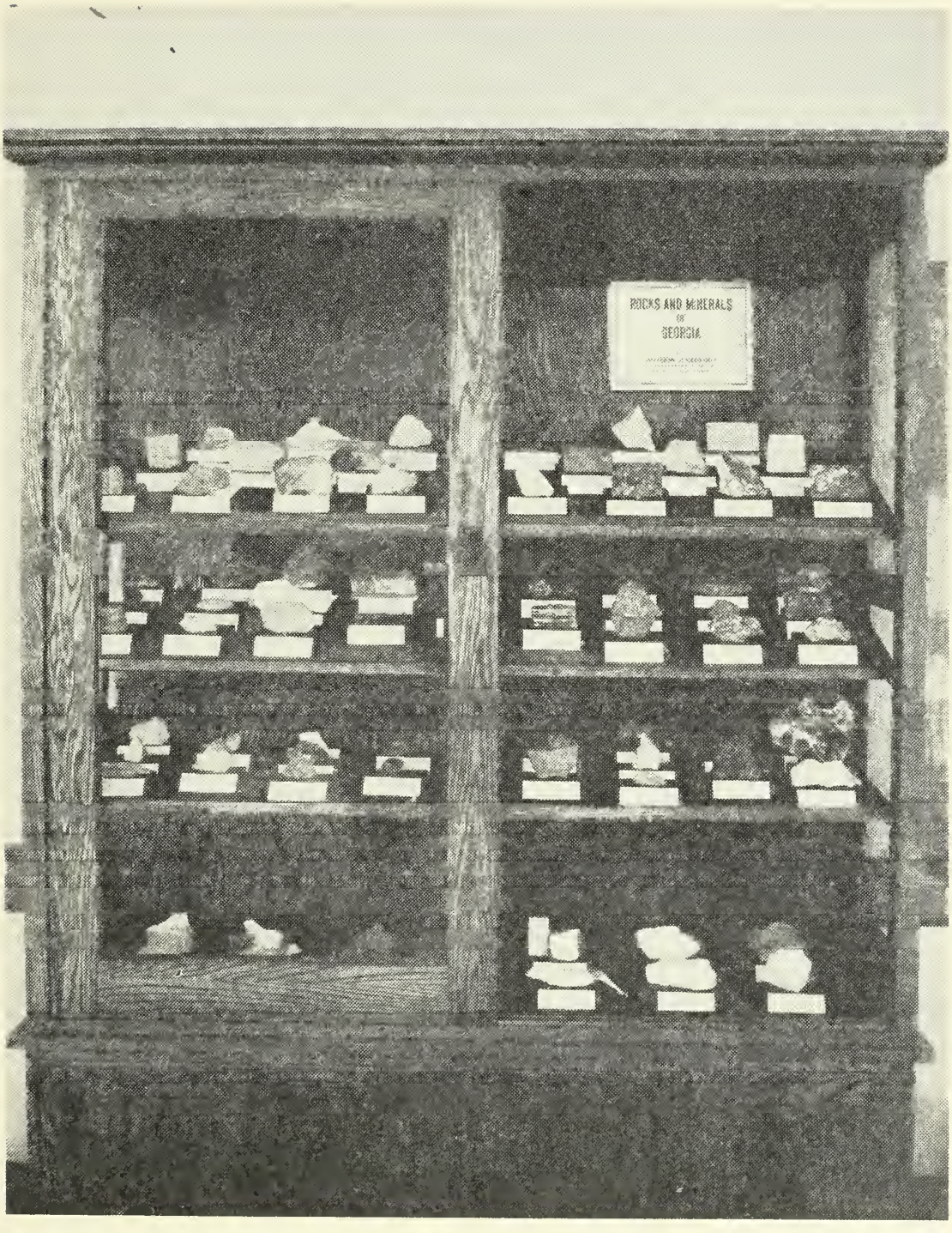
not at present mined in Georgia, and the production of fullers earth in Georgia is gradually declining. The investigation by the United States Geological Survey in 1924 and 1935 revealed deposits in middle and south Georgia of the activated clays, but was not in sufficient detail to show the size or extent of the deposits. Funds are urgently needed to make a study of these deposits if Georgia is to maintain her place as the leading producer of bleaching clays in the United States.

Warm Springs Investigation: The study of the geology, underground waters, and mineral resources of the Warm Springs area begun in 1934 was continued in 1935. A topographic map of the area, embracing parts of Meriwether, Harris, Talbot, and Upson counties, has just been published. The geologic report, including a study of the origin of the warm and cold springs in the area, will be published by the United States Geological Survey.

PROJECTS UNDER WAY

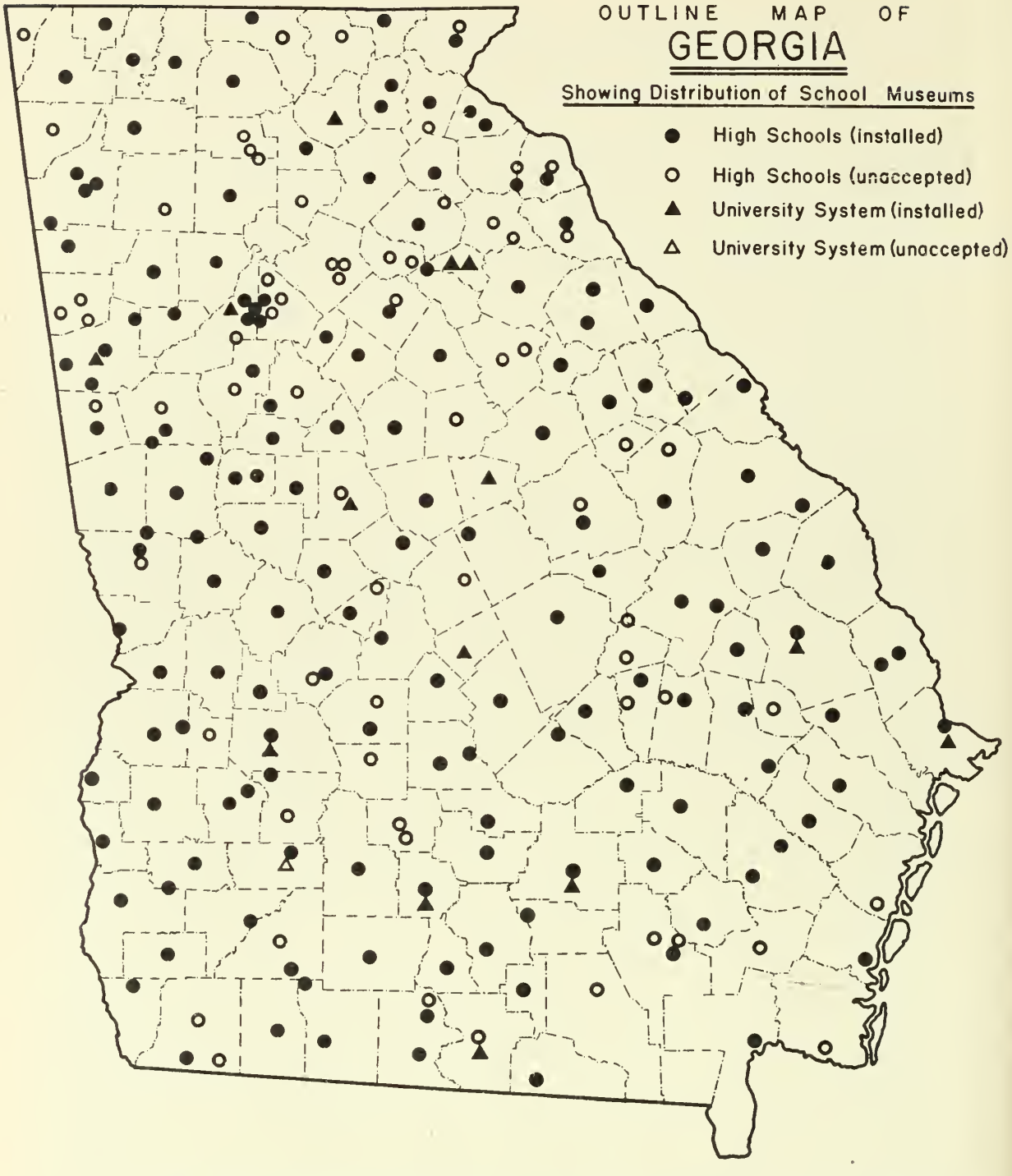
Geologic Map and Report: Mining men have long been asking for a detailed large-scale geologic map of Georgia showing the various types of rocks that underlie the State, together with a report describing the rocks, their structural relations, and their relation to the commercial minerals. Work on this started in 1930. The State Geologist has made a cooperative agreement with the United States Geological Survey whereby the State of Georgia will map and write the report on the northern half of Georgia and the United States Geological Survey will do the same for the southern half of Georgia. The Division of Geology has mapped the crystalline rocks of the Piedmont and Mountain section and the section of the report on them is completed. It is hoped that funds will be available to map the sedimentary rocks of northwest Georgia this Spring. The United States Geological Survey has remapped the geology of the Coastal Plain and is preparing this section of the report. Unless a further cooperative agreement can be made, the State of Georgia will have to bear the cost of printing the map, which will be about $5,000, and the cost of printing the report on the geology of Georgia, which will be about $2,500.

School Museums: The collection of rocks and minerals in the State Museum at the capitol attracts hundreds of visitors daily, including many school children. It is impossible, however, for school children from all over the State to come to Atlanta to see this museum. The Division of Geology has, therefore, undertaken the tremendous task of collecting a large number of specimens of 75 common rocks and minerals found in Georgia for distribution as local museums in the schools of the University System and in high schools throughout the State. A set has been offered to at least one high school in every county and approximately 165 of these sets were placed during 1935 and 1936, as shown in the accompanying map. Each specimen in these school museums is labeled and is displayed on a painted wooden block. The



A typical school museum in its cabinet—Columbus High School, Columbus, Georgia.

only cost to the school is that of a locked glass case or cases for the display and transportation charges for shipping. Many enthusiastic letters have been received from school superintendents telling of the value of these school museums in teaching the mineral resources of Georgia. The State Geologist hopes to place one of these museums in every high school in Georgia.



Map showing distribution by the Division of Geology of school museums containing 75 common rocks and minerals of Georgia.

Well Logs and Cuttings: The Division of Geology has recently assembled on standard forms the logs of all deep wells on record and is making a determined effort, through cooperation with well drillers, to get a complete log and well cuttings from all new deep wells drilled in the State. Through this information it is often possible to predict the depth necessary to drill for water and the amount and quality of the water that may be struck. The people of Georgia are asked to report to

the State Geologist any new wells that are being drilled. Report blanks for recording the log of the well and cloth sacks for keeping the well cuttings will be furnished the well driller free of charge. Such information on file where it is available to future drillers will be of invaluable service to the community.

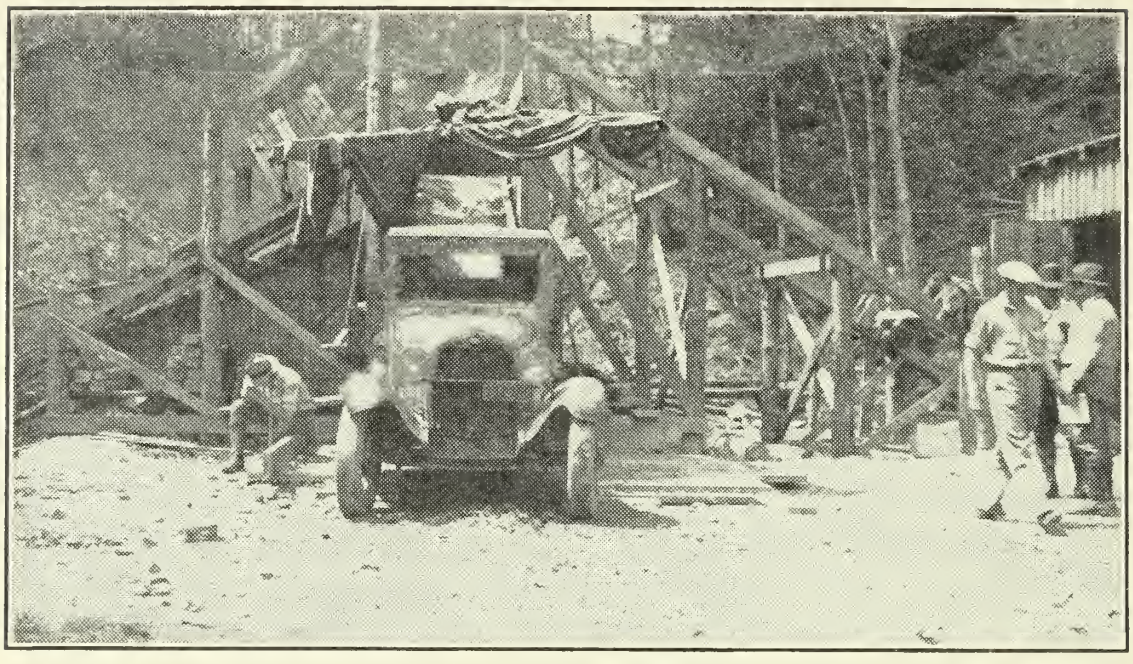
STATUS OF THE MINERAL INDUSTRY IN GEORGIA

The value of the mineral production of Georgia slumped from a peak of nearly $14,000,000 per year in the years 1927 to 1929 to a low of less than $8,000,000 in 1933. Since that time the value of Georgia's mineral production has shown a slow but steady increase, the figures for 1934 being slightly more than $8,000,000 and for 1935 nearly $10,000,000. The details for the 1934 mineral production were given in the Forestry-Geological Review for February, 1936, and the ones for 1935 will be given in an early issue of the Review. The State Geologist expects that the figures for 1936, when assembled, will total over $11,000,000.

Kaolin: The Georgia kaolin industry is especially flourishing and the 1936 production will be the largest on record. Recent improvements in processing the kaolin have greatly improved the product, allowing Georgia kaolin to largely replace the white clays formerly imported from England for use in filling and coating white paper and for ceramic uses. Georgia now furnishes over 60 per cent of the domestic consumption of white clay. The manufacture of refractories from Georgia kaolin is also increasing.

Building Stones: The production of Georgia granite and marble was especially hard hit during the depression, but is now staging a good recovery. The monumental granite industry of the Elberton district is especially flourishing and the stone is being shipped all over the United States.

Gold: Georgia's gold mining industry is having its greatest revival in some 20 or 30 years. The greater part of Georgia's gold production in the past has come from the stream placer deposits and from the weathered free-milling portions of the gold veins. Attempts to recover the gold from the deep unweathered sulphide portions of the veins have met with but little success, largely because the veins are generally low-grade, except for pockets and streaks of high-grade ore, and the recovery processes are expensive. The greatest boon to the gold mining industry in Georgia would be a centrally located custom milling plant and smelter to which the property owners of the many small veins could send their sulphide ore for recovery of the gold during the process of exploring the veins and blocking out tonnages sufficiently large to justify erecting a mill of their own. The assistance of the Federal Government should be sought in building and operating this custom mill and smelter.



Head frame of the Battle Branch Gold Mine near Auraria, Lumpkin County, one of the most successful underground gold mines now being operated.

RECOMMENDATIONS FOR FUTURE WORK

Geologic Map and Report

Very little additional work is needed to complete the manuscript of the geologic map of Georgia and its accompanying report, described above. The necessary funds should be provided to publish it as soon as possible. The need for this map and report cannot be over-emphasized.

Bleaching Clays

Sufficient funds should be provided as soon as possible for a thorough investigation, including prospecting and bleaching tests on the samples, of all types of bleaching clays in Georgia. As stated above, the petroleum industry is gradually turning from the use of fullers earth, in the production of which Georgia has led the United States, to other types of bleaching clays of which Georgia may have large deposits.

Granites

No report has been issued on Georgia granites since 1902, although granite quarrying is one of our major mineral industries. Many important deposits are not described in the early report. The Division of Geology has received many requests from the granite producers for such a report. The investigation should include a study of new uses for the wastes of the industry, particularly the fine granite dust.

Gold

A comprehensive investigation of the gold deposits of Georgia was made in 1934 and 1935 by the United States Geological Survey, who offered to furnish the Georgia Division of Geology a complete detailed report ready for publication. Such a report is badly needed as both of the old bulletins on the gold deposits of Georgia are out of print, but the Division of Geology did not have the funds for printing such a report. Funds should be made available to the Division of Geology at once to revise this report and print it.

General Reports

The two most popular bulletins of the Geological Survey have been the general one on the Mineral Resources of Georgia, and the educational one on the Physical Geography of Georgia that shows the origin of the physical features of the State and their relation to distribution of population, industry and agriculture. Supplies of these bulletins are low, and new and revised editions should be published as soon as possible. The popular Handbook on the Mineral Resources of Georgia is out of print and a new and revised edition should be printed in sufficient numbers to distribute to the schools of the State.

Guide to Scenery of Georgia

The varied scenery of Georgia is a potential natural resource tha has long been neglected. Thousands of tourists annually pass through Georgia on their way to and from Florida. They should be induced to visit the points of scenic interest in Georgia rather than to hurry through along the shortest route. The Division of Geology has material on hand to prepare a Popular Guide to the Scenery and Geology along and close to some of the main highways, brief but well illustrated. Similar guides to other tourist routes in Georgia could be prepared. Publication awaits necessary funds.

State Museum

The State Geologist is the custodian of the State Museum on the fourth floor of the capitol. This museum includes exhibits of rocks and minerals, forestry, wild animal life and birds, agriculture, entomology, and archaeology. The Museum is viewed each year by thousands of visitors, both Georgians and people from other states who are passing through Atlanta. Its educational value is shown by the hundreds of school teachers who annually bring their classes to study the exhibits. The exhibits, while superior to many state museums, are crowded and poorly lighted. Many of them have not been changed for years. As soon as possible they should be modernized. Indirect lighting within the cases should be installed as soon as funds are available. Some modernization of the geological exhibits has already been accomplished, including a very popular exhibit of fluorescent minerals.

The State of Georgia will probably in the future build a capitol annex office building on the state-owned property facing the capitol on Capitol Square. When and if this is done, provision should be made to devote an entire floor, preferably the ground floor, to a modern State Museum such as exists in other states. This should contain adequate room for the expansion of the museum. The fund for equipping the building should contain provision for modern display cases. Provision should be made for a curator and for guides to show visitors through the museum.

COOPERATIVE STREAM GAGING

The water flowing in Georgia's streams is her largest natural resource and one about which she knows little. In spite of popular belief, artesian water supplies are not always dependable. Georgia is the only state in the Southeast and one of only five in the whole United States that is not gaging the flow of her streams. Yet this information is a vital necessity for locating any large industry, for the planning of municipal water supplies, for designing bridges and their approaches, for controlling stream pollution, for planning any hydro-electric power development, for flood prediction and control, for soil erosion control for drainage of agricultural lands, for navigation control, and for the settlement of disputes concerning riparian rights. Chemical and bacterial analyses of the water flowing in the streams at various stages are also necessary for many of these uses.

Dr. Charles H. Herty, Georgia's well-known industrial chemist' says: "Georgia should be taken out of GUESSDOM into FACTDOM' Daily inquiries come into this office as to the volume of flow of our streams and the quality of the waters of the various sections of the State Unfortunately, I have to reply that we have practically no information on this subject. Yet to the paper-maker it is absolutely essential information. A great industrial development in the South is just ahead. Georgia should be prepared to get its share of this development. This is a matter of vital interest to every section of the State, for the records show that seventy per cent of the papermills in the United States and Canada are on locations not suited to navigation."

A minimum annual appropriation of $15,000 is necessary to start this work. The amount appropriated by the State will be matched by an equal amount from the United States Geological Survey and the work will be done by their experts under the supervision of the State Geologist and a Federal engineer whose office would be located in Atlanta. Such work to be of value must be continued over enough years to cover extra high floods and extra dry seasons. Georgia should start this work at once.

WATER

GEORGIA'S UNKNOWN NATURAL RESOURCE

Georgia's largest natural resource and the one about which she knows least is the water supply in her streams and underground. The volume of water that a stream carries varies from day to day, month to month, and year to year. Daily measurements over a period of years are necessary to get the FACTS about the flow of our streams

GEORGIA IS THE ONLY STATE IN THE SOUTHEAST THAT IS NOT COLLECTING THESE VERY NECESSARY FACTS

LOOK INSIDE THIS CASE TO SEE WHY THESE FACTS ARE NECESSARY

STREAM FLOW MEASUREMENTS ARE NECESSARY FOR:

(1) INDUSTRIAL WATER SUPPLIES
(2) MUNICIPAL WATER SUPPLIES
(3) DESIGNING OF BRIDGES AND HIGHWAYS
(4) CONTROLLING STREAM POLLUTION
(5) WATER POWER
(6) FLOOD PREDICTION AND CONTROL
(7) SOIL EROSION CONTROL
(8) DRAINAGE
(9) NAVIGATION
(10) RIPARIAN RIGHTS

READ ON AND SEE WHY!

INDUSTRIAL WATER SUPPLIES

CAN GEORGIA GET ANOTHER LARGE PAPER MILL LIKE THIS!

UNION BAG AND PAPER CORPORATION'S NEW PLANT AT SAVANNAH, GEORGIA PHOTO BY ATLANTA CONSTITUTION

Dr. Charles H. Herty has shown that paper of all kinds nd rayon can be made from Georgia pine and gum. Vater in large quantities is just as necessary as wood n locating a paper mill. Georgia is not now gaging he flow of her streams, adjoining states are.

OTHER SOUTHERN STATES WILL GET THE FUTURE PAPER AND RAYON MILLS UNLESS GEORGIA WAKES UP!

Read on and see what Dr. Herty has to say about this

IS GEORGIA A BACKWARD STATE?

EVERY STATE IN THE SOUTHEST BUT GEORGIA IS MAKING APPROPRIATIONS FOR MEASURING THE FLOW OF THEIR STREAMS

Tennessee has 100 stream gaging stations.
Virginia has 85 stream gaging stations.
North Carolina has 60 stream gaging stations.
Florida has 45 stream gaging stations.
South Carolina has 21 stream gaging stations.
Alabama has 39 stream gaging stations.

GEORGIA HAS MORE STREAMS THAT SHOULD BE GAGED THAN ANY OF THESE STATES AND HAS MORE NAVIGABLE STREAMS, LARGELY UNDEVELOPED THAN ANY STATE IN THE UNITED STATES.

GEORGIA DOES NOT KNOW THE FACTS ABOUT THE FLOW AND QUALITY OF HER STREAMS IN THIS RESPECT GEORGIA IS A BACKWARD STATE

GAGE OUR STREAMS!

Four of the 64 posters of the new exhibit in the State Museum showing the need for measuring the flow of Georgia's streams and analyzing their water.

COOPERATIVE TOPOGRAPHIC MAPPING

Accurate maps are necessary for many kinds of agricultural, industrial, and engineering activities. The most accurate maps made in this country are the topographic maps made by the United States Geological Survey, and they are in great demand for all sorts of purposes. These maps are made on the scale of one inch equals one mile and very accurately show every stream, road, house, as well as the elevation and slope of the ground by means of contour lines that represent points of equal elevation. By means of these maps highways can be relocated in the office, eliminating all but the final stake-setting surveys; city and town water supplies and sewers can be planned; areas of stream valleys flooded by dams can be estimated; and all kinds of engineering, mining, and industrial projects can be laid out. Less than half of Georgia has been thus mapped, mostly in the northern part of the State, and many of these maps were made years ago on a different scale with poorer methods and need revision. No accurate maps of any kind have been made of many counties in Georgia.

So great has been the demand throughout the country for these maps in recent years that the United States Geological Survey has been forced to limit this work to states that will cooperate by paying half of the expenses. The only topographic map made in recent years in Georgia is that of the Warm Springs area, financed by a grant from Public Works funds. Georgia should appropriate enough, to be matched by an equal amount from the Federal Government, to map at least one or two areas each year. The work will be done by trained topographers under supervision of and in areas picked out by the State Geologist.

COOPERATION WITH GEORGIA ENGINEERING EXPERIMENT STATION

In addition to finding the location and extent of Georgia's mineral resources, much needs to be done in finding new uses for these minerals by carefully supervised experimental research work on them. The State Geologist recommends that this be done by establishing a mineral fellowship, under the direction of the State Geologist, at the Georgia Engineering Experiment Station located at the Georgia School of Technology. The Division of Geology should pay the salary and part of the expenses of a research man at the Engineering Experiment Station who would devote his whole time to research on working out new uses for Georgia minerals. By this method new industries using local raw materials could be induced to locate in Georgia.

All of this very necessary work toward developing and advertising the mineral resources of Georgia cannot be done on the small appropriations that the Division of Geology has received in recent years. A budget has been submitted asking for an appropriation for geologic work in 1937 and 1938 of $65,000 per year, exclusive of cooperative Federal funds. Twice this amount could be spent with great advantage to the State.

The Division of Geology has accomplished much in 1935 and 1936 with its very limited funds. It has answered thousands of inquiries about the State's mineral resources and has published and distributed a number of articles, information circulars and bulletins on various minerals. It has distributed 165 museums of common rocks and minerals of Georgia to schools all over the State. Other projects under way will bear fruit in later years.

DEPARTMENT OF FORESTRY AND GEOLOGICAL DEVELOPMENT
STATEMENT OF RECEIPTS AND PAYMENTS
YEAR ENDED DECEMBER 31, 1935
RECEIPTS

REVENUE:

Grants from U. S. Government		$ 67,758.76
Gifts for Operations		500.00
Interest on Savings Account		20.65
Rents		65.97
Fees		20.00
Sale of Nursery Seedlings	$ 1,806.19	
Refunds	48.00	1,758.19
TOTAL—REVENUE RECEIPTS		$ 70,123.57

NON-REVENUE:

Transfers from State Treasury for Operations	$ 41,750.00	
Outlay (Alex. H. Stephens Park)	2,500.00	
Transfer from Nursery Seedling to Maintenance	1,000.00	
TOTAL–NON-REVENUE		45,250.00
TOTAL–RECEIPTS		$115,373.57
BALANCES–JANUARY 1, 1935:		
For Regular Maintenance Account	3,974.60	
For Nursery Seedling Account	1,908.20	5,882.80
TOTAL		$121,256.37

PAYMENTS

GOVERNMENTAL COST EXPENSE:

Personal Service	$ 38,563.69
Travel Expense	6,914.87
Supplies and Materials	1,621.86
Communication	1,598.17
Heat, Light, Power and Water	301.62
Stamping, Printing, Binding and Publicity	1,888.63
Repairs and Alterations	225.45
Rents	45.50
Insurance and Bonding	100.00
Grants	51,929.31
Equipment	2,001.60
Miscellaneous	310.98
TOTAL	$105,501.68

GOVERNMENTAL COST—OUTLAY

Land–Alexander H. Stephens Park	$ 1,500.00	
Equipment	77.45	1,577.45
		$107,079.13
Transfer from Nursery Seedling to Maintenance Account		1,000.00
		108,079.13

BALANCES—DECEMBER 31, 1935:

Outlay	$ 922.55	
Maintenance Account	10,254.82	
Nursery Seedling Account	1,867.29	
Santo Domingo Park Account	132.58	13,177.24
		$121,256.37

DISBURSEMENTS IN 1935

FORESTRY:

Personal Services		$ 26,164.05
Travel Expense		5,368.93
Supplies and Material		442.92
Communication		1,214.20
Heat, Light, Power and Water		.00
Printing, including Review		817.28
Repairs and alterations		6.25
Rents		18.50
Bond for Treasurer		67.00
Grants: Georgia Experiment Station		25.00
Vocational Forestry Camp		720.73
T. P. O. Refunds		51,183.58
Equipment		84.17
Miscellaneous		29.35
		$ 86,141.96

NURSERY:

Personal Services	$ 1,008.90
Supplies and Material	491.31
Heat, Light, Power and Water	141.52
Printing	34.50
Repairs and Alterations	50.35
Rents	1.00
Equipment	1,073.67
Miscellaneous	95.36
	$ 2,896.61

GEOLOGY:

Personal Service	$ 9,860.00	
Travel Expense	1,261.04	
Supplies and Material	603.47	
Communications	355.62	
Printing including Review	523.36	
Repairs and Alterations	166.50	
Rents	26.00	
Equipment	519.03	
Freight and Express	41.95	
Subscriptions	91.65	
Bond for Treasurer	22.00	
Miscellaneous	50.92	
		$ 13,521.54

PARKS:

Personal Service	$ 1,530.74	
Travel Expense	284.90	
Supplies and Material	84.16	
Communications	28.35	
Heat, Power, Light and Water	160.10	
Printing including Review	513.49	
Repairs and alterations	2.35	
Bond for Treasurer	11.00	
Equipment	324.73	
Miscellaneous	1.75	
Lands-Stephens Memorial Park	1,500.00	
Equipment " " "	77.45	
		$ 4,519.02
TOTAL DISBURSEMENTS FOR YEAR		$107,079.13

FORESTRY AND GEOLOGICAL DEVELOPMENT
DEPARTMENT OF FORESTRY AND GEOLOGICAL DEVELOPMENT
FINANCIAL STATEMENT, 1936

RECEIPTS:

Federal Government, matched funds, fire control	$ 65,812.50
Federal Government, matched funds, for nursery	1,573.66
From State Treasurer on appropriation	48,750.00
From concessionnaires, Indian Springs & Alex. H. Stephens Parks	399.15
Miscellaneous	356.76
Sale of Seedlings	6,344.50
Interest on Savings Account	28.39
Balances on hand from 1935:	
Operations account	8,266.25
T. P. O. Reserve Fund	2,889.15
Savings Account	1,866.91
	$136,287.27

DISBURSEMENTS:

Division of Forestry	$ 91,821.92	
Division of Geology	13,637.77	
Division of Parks	6,037.20	
Savings Account	1,731.73	
	$113,228.62	
Balances on hand Dec. 31:		
Operations Account	14,912.65	
T. P. O. Reserve Fund	6,295.91	
Savings Account	1,850.09	
		$136,287.27

DISBURSEMENTS IN 1936

FORESTRY:

Personal Service	$ 26,643.60
Travel, Divn. personnel and Commission (Prorated)	7,900.92
Supplies	579.14
Communications	1,533.71
Printing including Review (prorated)	1,909.79
Repairs and alterations	155.02
Rent	38.00
Freight, express, hauling	45.47

Subscriptions and dues	33.50	
Equipment	1,088.63	
Bond for Treasurer (prorated)	36.85	
Miscellaneous	1,143.72	
T. P. O. Refunds	45,807.59	
		$ 86,915.94

NURSERY:

Personal Service	$ 1,410.00	
Unskilled labor	1,677.14	
Seed and supplies	500.25	
Electric current	171.90	
Communications	59.74	
Repairs to equipment	92.28	
Equipment	2,647.80	
Miscellaneous	78.60	
		$ 6,637.71

GEOLOGY:

Personal Service	$ 9,886.75	
Travel: Divn. personnel and Commission (prorated)	1,045.74	
Supplies and material	939.64	
Communication	341.80	
Printing including Review (prorated)	637.48	
Repairs and alterations	19.82	
Rent of equipment for library project	30.00	
Freight and express	51.92	
Subscriptions and dues	103.32	
Bond for Treasurer (prorated)	12.10	
Equipment	461.76	
Miscellaneous	107.44	
		$ 13,637.77

PARKS:

Personal Service	1,849.67	
Travel: Divn. personnel and Commission (prorated)	1,267.94	
Supplies	270.19	
Communication	65.65	
Electric current	259.61	
Repairs to equipment	13.93	
Rent	50.00	
Equipment	921.80	
Equipment-Alexander H. Stephens Park	922.33	
Miscellaneous	416.08	
		$ 6,037.20
TOTAL DISBURSEMENTS FOR YEAR		$113,228.62

BIENNIAL REPORT

EPARTMENT OF NATURAL RESOURCES

1937-1938

BY

R. F. BURCH, COMMISSIONER

INCLUDES REPORTS OF DIRECTORS OF THE
DIVISIONS OF PARKS, WILD LIFE, FORESTRY AND MINES,
MINING AND GEOLOGY

LETTER OF TRANSMITTAL

January 9, 1939

To His Excellency
Honorable E. D. Rivers
Governor of State of Georgia

Dear Governor Rivers:

Herewith I respectfully transmit to you as Governor of Georgia, the first Bi-ennial Report of the Commissioner of the Department of Natural Resources.

The period covered by this report extends from the date this department was established, March 5, 1937, to January 1, 1939.

This report includes a statement by the Commissioner, and reports of the activities of the four divisions of this Department.

As Commissioner, I express my sincere appreciation to you for your keen interest and great service in launching and promoting the development of this new Department.

Respectfully,

R. F. Burch,
Commissioner

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BI-ENNIAL REPORT, 1937-1938

DEPARTMENT OF NATURAL RESOURCES

R. F. Burch, Commissioner

INTRODUCTION

The Georgia Department of Natural Resources was established March 5, 1937 by an act of the General Assembly. Under this act the office of Commissioner of the Department was created and four integrate divisions of the Department were established as follows: Division of Forestry; Division of Mines, Mining, and Geology; Division of State Parks, Historic Sites, and Monuments; and the Division of Wild Life. Each of these divisions is headed by a director, and the directors, with the commissioner, comprise the Administrative Staff.

The new Department of Natural Resources is the realization of plans to which Governor Rivers gave much thought and effort. To him grateful acknowledgment is made for valuable advice in launching the new organization.

The Department immediately created much public interest, evidenced by numerous demands made upon it, indicating a growing appreciation of the importance of the value of Georgia's natural resources, and a realization of the State's increasing dependence on their development.

Georgia's wealth in forests, minerals, water power, wild life, and opportunities for recreation are indeed great. This state ranks among the first in variety and abundance of commercially important minerals. No state has a greater number of tree species, nor greater acreage of forest and potential forest land. None holds greater possibilities for developing wild life of fields, forests, streams, and coastal waters. Nowhere are there richer possibilities for recreation than extend from Georgia's mountains to the sea.

The full development of these resources presents a great opportunity and involves a great task. Plans have been laid and developments are under way for carrying out a long-time program. The nature of the work varies widely. Not only between the divisions, but within the divisions. Much of the work requires the services of technically trained men.

The first step in developing natural resources must be to ascertain their nature and extent. But little progress would result if this Department stopped at that point. Progress must be made to the point

of revealing the various practical uses to which the natural resources can be put, hence the importance of research even to the extent of showing how production problems can be solved. A notable example of this type of service is the work of Dr. Charles H. Herty in solving production problems of making paper from southern woods.

Though all information about the State's natural resources may be ascertained, if the knowledge is not widely disseminated and made available to those who may be interested in their development, the task is incomplete. Education, or dissemination of information is, therefore, essential for the development of resources.

The impetus given conservation in the state and nation within the last few years, resulting from a more general realization that conservation is a social as well as economic necessity, necessarily increased the need for adequate public relations and educational efforts. In seriously attempting to meet this obligation the Department encountered a severe tax upon its financial resources which rendered the fulfillment of some essential activities impossible.

FUNCTIONS OF THE DIVISIONS

The Commissioner has endeavored to coordinate the work of the various divisions of the Department, as required by statute, to enhance their efficiency and has succeeded to the extent that cooperation has been tendered—without cooperation there can be no coordination.

Briefly outlined, the Division of Forestry has as its chief objective the growing of wood and the promotion of its various uses. To this end reforestation, forest fire protection, forest management or culture, and marketing, must be promoted. Lands no longer needed or suited to producing agricultural crops should find their chief use in growing timber, and when so employed, much of the state's most destructive soil erosion will be stopped.

The Division of Mines, Mining, and Geology has as its chief functions the location of commercial deposits of minerals, their exploration, their adaptation singly or in combination to producing useful products, and developing prospects that are inviting to miners and manufacturers. Georgia's deposits of clay, granite, marble, cement, iron, gold, barite, copper, talc, bauxite, shales, asbestos, coal, graphite, kyanite, manganese, mica, ocher, pyrite, flag stone, marls and other minerals present a great array of useful deposits for development.

Of great importance to Georgia is that these minerals be processed as far as possible within the state. It is gratifying to note that one

of our divisions has been able to convince manufacturing companies of the economy of establishing treating or manufacturing plants in Georgia in preference to shipping ores elsewhere to be treated.

The Division of Wild Life carries the responsibility of enforcing laws governing hunting and fishing, and of operating six fish hatcheries, one quail hatchery, and game reserves. The 94 game protectors are undertaking to enforce game and fish laws in Georgia's 159 counties. More than 100 fish and game clubs have been formed to build up public sentiment favorable to law observance and for increasing the supply of wild life.

The essential purpose of the Division of Parks is to provide wholesome, outdoor recreation under pleasant environment, to the end that human values may be enhanced. Rapid progress has been made in recent years in establishing state parks, and judged by the park patronage, these recreation centers are meeting a public need.

This Division has also undertaken to survey and designate the many historic sites of Georgia to be suitably marked. Being one of the original colonies, Georgia is rich in history, but it has been slow to mark its many historic sites where treaties have been signed, battles fought, notables have lived, where historic buildings and prehistoric structures, including mounds, are located. Setting apart such sites and making them accessible, will not only develop a greater appreciation of Georgia by Georgians and pride in the state, but will attract many visitors who also will obtain greater appreciation through greater knowledge of the state's historic background.

NATURAL RESOURCES RESERVES

Early in your administration the Commissioner suggested for your concurrence, state acquisition and ownership of outstanding archaeologic, historic, and scenic beauty spots before they were exploited and completely destroyed, in order that they might not only be enjoyed by present-day Georgians, but also might bless future generations. The Commissioner has met with marked success in this endeavor. Through his efforts more of these sites have been donated the state for restoration and preservation than were acquired for the period from the founding of the State to the advent of your administration.

An unusual tract, Kolomoki Mound site in Early County, of 1000 acres was donated by public-spirited citizens and municipal and county authorities. Archaeologists tell us this is one of the key sites in the nation, and one of the few that has not been disturbed.

One thousand acres along historic Shoulder Bone Creek in Hancock County was donated for park purposes, by two philanthropic Georgians, Hon. Wiley Moore and Hon. Preston Arkwright. An important adjunct to this park site is the Indian mounds on a tract donated by public-spirited citizens of Sparta, Georgia.

An historically important tract of 800 acres was deeded the State by the Macon County Commissioners. This is the famous Miona Springs site, consisting of six springs of enormous flow of health giving waters, each containing entirely different minerals.

The Sittons Gulch site, a veritable little grand canyon in Dade County was donated the State by Dade County authorities. There are 1500 acres in this tract.

Black Rock Mountain site, a scenic masterpiece in Rabun County was donated by county authorities—a 700 acre tract.

St. Marys River State Park site was donated by county authorities in Charlton County. This tract contains one thousand acres valuable as a state forest, and has great recreational possibilities.

Crooked River Park site in Camden County gives the state its only water front park and, as such, possesses unusual recreational facilities. This tract of 600 acres was deeded by county authorities, and as a supplement, we have the old Santa Maria Spanish Mission site deeded the State by Rayonier, Inc., pulp mill, Fernandina, Fla. This is a dual purpose site—scenic and historic.

A thousand acre tract in Wayne County near Jesup was deeded the State by its county commissioners. This is primarily a state forest and wild life area.

A thousand acre state forest tract was donated by the county commissioners of Appling County. This is being developed as a forest demonstration project and is the hub of the Division of Forestry's activities throughout Southeast Georgia, being headquarters for the district forester.

A site of historic importance—the Governor Troupe home site—in Treutlen County, was donated the State by Hon. James Fowler of Soperton, 780 acres being in this tract.

Deeds to the famous Old Magnolia Springs site in Jenkins County are being held in escrow for the State, pending some compliances by State officials.

The magnificent and awe-inspiring erosion canyons in Stewart County are being purchased for donation to the State for park sites.

In addition to these, a contest of several months to have the Department of Natural Resources designated as the future manage-

ment agency of a 40,000-acre Coastal Flatwoods tract near Waycross, culminated successfully. The Department has signed a contract for fifty years with the privilege of a forty year renewal, which is tantamount to ownership. This is a fine timbered tract and has unlimited wild life and recreational possibilities. All proceeds from the sale of anything from the tract accrue to the Department without any limitations. This tract will be held inviolate as a wild life refuge until it is thoroughly stocked, then hunting privileges will be granted on a portion of the area. The Commissioner procured five deer of the Virginia White-tail variety, same as our native deer, from the National Forest Service from the Pisgah Forest Reserve, for the purpose of crossing and introduction of new blood on this refuge. Twenty German Fallow deer have also been procured by the Commissioner out of the Little St. Simons herd of Philip Berolzheimer, for release on the Coastal Flatwoods area this spring.

The Coastal Flatwoods area and all the smaller state owned areas will be demonstrations of forest multiple use practices, closely linking forestry, game, fish, and outdoor recreational activities, and bringing these several conservation practices close to the home, the school, and the local people.

RESEARCH IN PAPER MAKING

The General Assembly appropriated $10,000 in the special session of 1938, to the Herty Laboratory and allocated $10,000 of the appropriation to forestry for the laboratory, for furthering the investigations of Dr. Charles H. Herty in making paper from southern woods. The death of Dr. Herty has not stopped this work. Plans which he had made are being carried out. On foundations, which he laid, the project can safely proceed. His great work should be carried on to the ultimate goals he sought. Already many millions of dollars have been invested in Georgia as the result of his work, and this is probably only the beginning. He has established the fact that all species of southern pines, and some of the hardwoods, are adapted to making newsprint, book paper, and rayon. His pulp and paper laboratory at Savannah, now known as the Herty Laboratory, has been the scene of momentous discoveries of new wealth of southern forests.

Dr. Herty would want no greater monument than a pulp and paper laboratory dedicated to continuing his research into new uses of southern woods. It is, therefore, to be hoped that appropriations may be made through years to come to materialize all his dreams of forest wealth.

COOPERATION

Grateful acknowledgment is made of the assistance given by the State Department of Education in financing the publication of a booklet entitled "Georgia's Natural Resources", edited by this Department, and subsequently inaugurating a program of Conservation Education in the Public Schools of the State for the first time in its history. This should be supplemented with a visual education program, for it is self-evident that until the public opinion of over three million people comes to parallel the regulations established for proper use of natural resources, and correct conservation practices, these regulations can not serve the full purpose for which they were created.

With much gratification, it can be stated that harmonious, and effective cooperation has been maintained with various federal agencies. The United States Forest Service, the National Park Service, the U. S. Geological Survey, the Civilian Conservation Corps, the Biological Survey, and the Soil Conservation Service are among the federal agencies rendering valuable service in numerous ways.

State agencies have assisted this Department, which in turn has helped to carry out cooperative programs.

The Department of Vocational Education is also cooperating in conducting a forestry project. The Division of Forestry has prepared a bulletin designed for the special teaching this department requires, and rendering technical service in the management of school forests.

The Department also cooperates with the State Department of Education in providing the schools with samples of minerals, and in giving moving pictures and lectures covering various subjects in the natural resources' field.

The Commissioner has cooperated with the University of Georgia in establishing the Chair of Archaeology at that Institution, by procuring gifts from Hon. Wiley Moore and other interested parties to assist in defraying the expense.

Cooperation with branches of the University of Georgia in which in many instances federal agencies are also included, is carried on.

Information developed by the Planning Board has been quite helpful to this Department, and assistance is received and given whenever needed, by the State Department of Agriculture, the Board of Entomology, the Highway Department, and other state agencies.

Numerous communities have aided this Department in developing local enterprises such as parks, recreation centers, monumental sites, natural resources reserves, etc. Nor has cooperation been limited to

state, federal, and local agencies, but individuals have been quite generous, notably in donating funds for erecting historical markers, and in providing land for various uses, such as forest demonstrations, and wild life propagation.

A generous contribution which the Commissioner secured from Hon. Wiley Moore enabled us to inaugurate a program for marking historic sites in Georgia, which had been too long neglected.

Through the Commissioner's efforts, Mr. Bell, Commissioner of United States Bureau of Fisheries, was induced to accept a site for a Federal Fish Hatchery, in North Georgia, which will be maintained and operated at Federal expense for the purpose of restocking lakes and streams of that area. The site for the hatchery was donated by citizens of Rabun and Habersham counties and a gift was obtained from the Georgia Power Company to aid in developing the project.

The Department has furnished speakers to the schools of the State, all civic organizations, and other agencies interested, acquainting them with the conservation and development of our natural resources, endeavoring to enlist their aid and at the same time, to make Georgians more conservation-conscious.

Innumerable minor services to the Divisions of this Department have been rendered, such as procuring poles and materials for power line from Baxley to Forestry Headquarters two miles from town, also a similar service to Santa Domingo State Park. These services were vital inasmuch as the Divisions did not have money to defray expenses involved.

STATE NATURAL RESOURCES MUSEUM

The Natural Resources Museum, quartered on the fourth floor of the State Capitol Building, presents specimens of minerals, trees, wild life, artifacts of prehistoric people, agricultural products, entomological life, soil conservation, mineral products, and the Herty products of paper and rayon. The Museum is impressive, educative, and a credit to the State of Georgia.

Annually thousands of people from all parts of Georgia, from other states, and from foreign lands visit the Museum. Many reveal keen interest and appreciation, even prolonging their visits to learn more of the natural resources there displayed.

Throngs of students and their teachers come from various parts of the state to see the exhibits and learn something of the state's wealth of natural resources.

PERSONNEL OF THE COMMISSIONER'S OFFICE

The personnel of the Commissioner's office consists of six employees: The Commissioner; a publicity director who serves all four divisions as well as the Commissioner's office; attorney; an educational manager who handles school projects and publications of the Department; a curator of the Natural Resources Museum, and a secretary.

From April 1, 1937 until the end of the fiscal year June 30, 1938, the expense of the Commissioner's office was $14,878.55. This covers salaries, traveling expenses, office equipment and supplies.

REPORT OF THE DIVISION OF PARKS

Charles N. Elliott, Director

The Division of State Parks has the responsibility of administering state parks, developing the recreational possibilities of the State, marking historic sites and creating wide appreciation of these attractions to the end that Georgians may enjoy them, and people of other states and nations may be attracted to them.

This Division was created by legislative act effective March 5, 1937, and began operation April 1, 1937. Previously the state parks were administered by the State Forest Service. Except for one park at Indian Springs, the state park movement is of recent origin, and coincident with the formation of the Civilian Conservation Corps which provided assistance much needed by the State in developing a park program.

PURPOSES IN CREATING THE DIVISION OF STATE PARKS

The creation of the Division of State Parks is primarily due to Governor E. D. Rivers. The reasons actuating the existence of this division as one of those comprising the Department of Natural Resources are best given in an address of Governor Rivers to the 1939 session of the General Assembly from which the following is quoted.

"When the Division of State Parks was created in March, 1937, and made a part of the Department of Natural Resources, the Governor and General Assembly had several purposes in view.

"One of those was the establishment of some branch of State Government which could fully cooperate with the National Park Service, Civilian Conservation Corps, and other agencies toward the development of an adequate park and recreation system for the State of Georgia. At that time the number of State Park CCC Camps in Georgia was being decreased for the simple reason that in this State no agency had been created to assume responsibility for the development, maintenance, and operation of State Parks, and for the expenditure of federal funds on those parks. Up to that time the development of parks had received supervision of a State Department whose many other duties prevented it from devoting much attention to park development. Consequently, the National Park Service had at its own expense maintained an office in the State Capitol for the supervision of Georgia's state parks. Fortunately, the National Park Service had been able to assume this expense but with the decrease of its personnel this burden fell upon the shoulders of the State.

"Because there was no state parks department, state park CCC camps were being taken away from this state and placed in adjoining states where the National Park Service was receiving proper and adequate cooperation. Georgia was in danger of losing its state park camps, each of which, in dollars and cents, was worth approximately a quarter of a million dollars each year to the State, and of sustaining the greater loss of its state park program, the value of which to the future welfare of Georgia could not be estimated in any terms.

"Another important reason involved in creating the Division of State Parks was to provide the State with authority and power to set aside and preserve its areas of scenic splendor. While not deploring a wise use of our natural resources, some beauty spots of Georgia should be preserved. Eventually they may mean more to our people than the small amount of commercial products which could be derived from them. These beauty spots will not only provide some place for our own people to visit and enjoy, but it has been proved that they will bring large numbers of visitors from other states and other nations, and will mean financial gain to the State.

"Another purpose for establishing the Division of State Parks was to provide an organization authorized to locate and properly mark historic sites of this State. There had never been any organized effort to do this. Many markers of various kinds and descriptions, sponsored by various organizations, had been erected in Georgia, but there was not even a complete list of the marked historic sites of this state. Nor did the markers have any uniformity or conventional design. There was definite need for uniform markers along our highways for designating or directing travelers to historic or scenic sites. The roadside markers erected by some of the states had brought an influx of tourists which meant millions of dollars. As an example, the United States Tourist Bureau recently published figures showing that the tourist industry in Georgia in 1937 was worth approximately 58 millions of dollars to the State. In such states as Pennsylvania, New York, and Massachusetts, where the principle attractions are the historic sites, the tourist trade in 1937 amounted respectively to 327 millions, 846 millions and 204 millions. Even New Jersey, a state far below Georgia in scenic values and in size, had a tourist year valued close to 183 millions of dollars.

"One of the most serious considerations in the establishing of a parks division of State government was to provide adequate recreational facilities for our people. Year by year, as highway and transportation facilities improved, more and more people sought some place

to go, some pleasant and beautiful spot where family and friends could enjoy their outings without trespassing or being disturbed. The Legislature realized too, that many of the larger towns and cities in Georgia had no way of providing adequate recreation for their people. Some parks and playgrounds were provided, but there was definite need for some place where children could be taken and kept for a week or two weeks, where they could be taught organized work and organized play; taught the value of clean minds and bodies. All children who are a part of future Georgia are entitled to these privileges, just as much as those who have the financial resources to enable them to enjoy a private summer camp. Many civic organizations in many of the larger cities are attempting to do for the boys and girls of their cities what we want to do for the state as a whole. We felt that if we could aid in some small way by giving some boy or girl inspiration to make of himself or herself a successful citizen, or to keep boys or girls out of our prisons or eleemosynary institutions, then the creation of any division of state government would be justified.

"With those purposes and ideals in mind, we wrote the Division of Parks into the law creating the Department of Natural Resources.

"Many of you know already that when the parks division was created, only one state park legally belonged to the State. That was Indian Springs State Park, of twelve acres, which, in 1825, had been ceded directly from the Creek Indians to the people of Georgia, and which had been later placed by the Legislature under the supervision of the Department of Forestry, at the time the Department most closely related to recreation.

"With the advent of the CCC, when the National Park Service was making an effort to distribute their allotted quota of camps geographically and equally among the states, the Forestry and Geological Commission began to accept land for recreational purposes. Some of these lands, all in small tracts, were outstanding in scenic attractions; others were important historically. The movement was a favored one.

"Although deeds were accepted and Civilian Conservation Corps Camps were established, the State could not legally accept the land. There was no provision in the law to allow the forestry department to take land for any purpose other than for forestry, Therefore, the deeds could not be accepted by the attorney general's office. They had not even been recorded in the counties where the land was donated.

"Therefore one of the first jobs of the newly created Division of Parks was to rewrite all deeds in a form approved by the attorney general's office, have them signed again and recorded. The total acreage of these lands for which new deeds were drawn was 4,973½ acres."

GENERAL OBJECTIVES

The general objectives of this Division are defined in the act creating the Department of Natural Resources, approved March 5, 1937, and found on Page 264 et seq. of the Georgia Laws of 1937.

Briefly stated, they are as follows: (1) To control and manage all parks and recreational areas acquired by the State. (2) To survey, in cooperation with other agencies, the State's present park and recreational resources and facilities, the need for them, to what extent the need is being met, and to determine lands suitable for inclusion in the state park system. (3) To acquire by purchase, lease, agreement, or condemnation such land as it deems necessary for proper inclusion in the system. (4) To accept gifts of land, money, or other property to be used in extending, improving, or maintaining the state park system. (5) To make expenditures for the care, supervision, improvement, and development of the state park system. (6) To cooperate with other agencies in matters relating to acquiring, planning, establishing, developing, improving, or maintaining any park, parkway, or recreational area. (7) To contract and cooperate with other groups or agencies to protect, restore, preserve, mark, maintain, or operate any historic, scientific, or archaeologic site. (8) To construct and operate suitable public service facilities in the areas in the system. (9) To provide and maintain recreational facilities and conduct programs in connection therewith. (10) To appoint local or regional councils to advise with the division upon certain areas. (11) To establish and enforce rules for protection of peace and property in areas in the system. (12) To plan and conduct a program of information and publicity as to scenic, recreational, historical, archaeological, or scientific places within the State. (13) To cooperate with the State Highway Department in the establishment and maintenance of roadside parks and development for enjoyment of the travelling public.

WORK PERFORMED

Work performed and results obtained during the 21 months since the creation of the Division of State Parks is presented briefly. To go into details of organization and operation is unnecessary, except

to say that the operation and maintenance funds from the State have been very limited, being only a portion of the $50,000 set up in the 1937 appropriation bill. This, together with the income from the various parks has been used for personnel, purchase of necessary equipment for 20 cabins, three inns, bath houses, boathouses, necessary swimming and safety equipment for lakes, for publication of booklets and pamphlets to acquaint Georgians with their scenic, historic and recreational areas and to bring visitors from other states—all too inadequate to accomplish results in proportion to the real merit of the plans outlined by the last regular session of the State Legislature.

Within twenty-one months, five parks, scattered throughout the State, have been opened to the public. These parks, which offer a fine cross section of the scenic, historic, and recreational advantages of Georgia, in two summer seasons attracted well over a million visitors from Georgia, from every state in the Union, and from some foreign nations.

The facilities offered were far from being adequate to meet the demands made upon them. Within two weeks after Vogel Park, in the Blue Ridge, was opened for the summer, every one of the seven cabins available had been reserved until the middle of September. This was in spite of the fact that no cabin was reserved for longer than two weeks or a shorter time than one week during the summer months. The picnic tables and benches at Indian Springs State Park, with enough space to accommodate one thousand picnickers, were usually completely occupied on Sunday afternoon and people stood in line waiting for tables on which to spread their lunches. Liberty Hall, the home of Alexander H. Stephens, had registration from surprisingly distant points, and the tavern on the crest of Pine Mountain had gratifying success in the number of visitors. Santo Domingo State Park on the coastal highway was a stopping point for many of the travelers who came through from north to south.

By dint of borrowing equipment and supplies from other state agencies and government agencies, and buying much bargain and second hand equipment, which was entirely good, the cost of equipping the five state parks was approximately $20,000.

The gross returns from the operations of two seasons of four parks during the summer of 1937 and five parks during the summer of 1938, was approximately $33,000. Santo Domingo State Park produced ess than $20.00 of this amount, due to lack of adequate facilities. This gross income went into the purchase of supplies, maintenance of buildings and other park equipment, payment of salaries for nec-

essary seasonal personnel and other expenditures to make the parks operate smoothly, safely, and for the pleasure and convenience of those who sought recreation.

REQUESTS FOR INFORMATION

In 1937 the United States Tourist Bureau designated the Division of State Parks as the official Information Bureau for the State of Georgia. All requests for information about Georgia which came in to the Tourist Bureau, were forwarded to the Division of State Parks. All letters and cards addressed to the State Tourist Bureau, State Publicity Department, and all other official designations which most states maintain to promote travel, are referred to this Division. Most of the other southern states make large appropriations for promoting tourist business. The State of Tennessee, for instance, spends $50,000 each year in the preparation and circulation of state publicity and promotion of tourist travel. Requests for information about the scenic and historic interests of the State also come to this Division.

The Division received letters from persons wishing to buy old colonial homes, or plantations. Such letters were mimeographed and sent out to all Chambers of Commerce and Boards of Trade in the State, with the request that information be supplied to the interested parties. Requests for data on agricultural problems, the number of rooms in the State Capitol, Georgia species of snakes, sites for camping and health resorts—all were handled directly or referred to the proper agencies for answer.

PUBLICITY AND PUBLICATIONS

To meet the demand for literature about Georgia's historic and beauty spots, thirteen publications were prepared for distribution. Many requests for literature came from such far away places as Honolulu, London, England, and Sidney, Australia. The Atlanta Journal Rotogravure Section ran a full page of pictures of Georgia Parks each week for eight weeks and carried additional pictures from time to time. A thousand extra copies were given to the Division of Parks, and were mailed over the United States. The Atlanta Journal magazine section carried a number of stories on the parks of the State. The Atlanta Constitution carried several feature articles on the parks, one series of stories by Elmer Ransom, well known author, and a number of pictures in its rotogravure section. The Atlanta Georgian promoted a contest in naming the Vogel State Park Lake, besides providing additional features dealing with the

State's beauty spots. Other papers of the State carried feature articles of historic and scenic interest, prepared by the Division.

Among the articles appearing in magazines of national circulation and describing Georgia's state parks, were "Liberty Hall", published in "Tours and Detours", the Standard Oil Company Magazine; "Home of Nunehi", a story of Vogel State Park, published in "American Forests"; an article on Santo Domingo State Park, in "Architectural Concrete", published by Portland Cement Corporation; "Georgia State Parks" published in "Builder", issued by the Junior Chamber of Commerce of Georgia, and a story of the state's parks, which appeared in "Behind the Wheel", an American Automobile Association publication.

Seven radio programs were prepared and given by the Division of State Parks. Outstanding among these, and ones which brought letters from listeners in many parts of the nation were the Easter Sunrise Service, a devotional from a mountain top in northern Georgia; a dramatic sketch of the life of Alexander H. Stephens; and an international broadcast in three languages, given from New York.

A colored film of the state parks and other scenic areas, was made and distributed to many of the schools of the State, and used in connection with lectures by members of the Division.

A contest for amateur photographers was sponsored by the Division for the three best photographs of scenes in state parks submitted, and prizes were given. The pictures were published.

Auto bumper strips advertising parks were donated by interested citizens for Indian Springs and Alexander H. Stephens parks. Appropriate highway signs were erected at advantageous points, including approach, directional, and entrance signs

Splendid cooperation of the State Department of Education has enabled this division not only to contribute to a bulletin entitled "Georgia Natural Resources", but to reprint separately that portion contributed by this Division, into an attractive pamphlet profusely illustrated and entitled "Thy Woods and Temple Hills".

PUBLIC MEETINGS

Every invitation to appear before a civic club, garden club, school, or other organization, to tell the story of Georgia's park system has been accepted. Some seventy-five such engagements have been filled. Several annual banquets and meetings of such organizations as the Georgia Federation of Woman's Clubs and the Georgia Park and Recreation Association have been held in one of the state parks.

Two organizations have been effected as a result of the efforts of the Division of State Parks. The Butt's County Historical and Archaeological Society was organized in May, 1937, to cooperate with this Division in operating the museum at Indian Springs State Park. The Georgia Park and Recreation Association to bring to the people of Georgia a truer appreciation of the beauties of their state, was organized in February, 1938.

Close cooperation has been maintained with governmental agencies and societies in the promotion of recreational work. In June, 1938, the Director of the Division was elected to the Board of Directors of the National Conference of State Parks.

HISTORIC MARKERS

The historic marker program is well under way. To meet the need of a complete inventory of the state's historic sites, both those which had been marked as well as those unmarked, the Division secured a WPA project to study the historic sites, select the most important ones in each county, and prepare inscription for a series of markers which would be comparable to those of some of the well marked states. Sufficient WPA personnel was assigned to this work and placed under the division historian. Well over two thousand sites have been studied and the ground work is being laid for a real system of markers for Georgia. Since each marker will be lettered for the highway, and numbered on that highway, a comprehensive plan is being worked out whereby each marker will fit into a related system. The cost of these markers would ordinarily be around $50.00 each. The Division of State Parks has worked out an arrangement whereby Georgia Tech will furnish its own foundry, the WPA, skilled labor, and the State Highway Department, transportation, which reduces the cost to be borne by the sponsoring organizations and counties to less than $7.00 per marker. Several counties and organizations have already agreed to donate sufficient funds to provide materials for the portion of the marker system in their counties. Massachusetts, New York, and Virginia have appropriated several hundred thousands of dollars for their historic marker systems, but by this arrangement Georgia can have an equally fine system without great cost to the State.

COOPERATION WITH OTHER STATE AGENCIES

The Division has cooperated with the Vocational Department of the State Department of Education in erecting a camp in Newton County for the Future Farmer's organization in Georgia. Three or

four thousand boys will use this camp each summer, after the completion of adequate buildings. Services of the Division have been offered to help teach these farm boys about the natural resources and natural advantages of the State.

The Division collaborated with the State Highway Department in the preparation of the new colored scenic and pictorial maps of the State of Georgia.

STATE BUILDING IMPROVEMENTS

The State Capitol and Governor's Mansion were turned over to the Division of Parks for operation and renovation. Two special appropriations were provided by the General Assembly for this purpose. The mansion, which was in a condition both disreputable and a discredit to the State of Georgia, and also dangerous because of faulty gas furnace connections and rotting timbers and beams, was repaired and painted. A WPA project was secured and the Capitol painted inside. Upon examination, the Capitol roof was found to have three layers of roofing material and the accumulated weight was so much that it was breaking the timbers which held it up. This was removed and a new roof put on. The House and Senate chambers were renovated and adequate light and ventilation systems installed. A new project has been submitted for the painting of all office space in the Capitol.

PARK PROGRAM EXPANSION

In addition, the parks program is expanding. In 1937, when the Division of State Parks was created, the State owned eight parks, containing less than five thousand acres of land. Today the Division of Parks owns, is operating, seeking to develop, or is collaborating with the other state and government agencies, in the development of eighteen state park and recreational areas with a total acreage of 32,000 acres. Negotiations are under way at the present time for eight additional areas, having a total of some 31,000 acres more. All state park land has been, and will continue to be donated to the State. As fast as possible, the Division is developing recreational facilities which are so much in demand by our people. Development work has been slow because of lack of funds with which to purchase materials to go into the construction of cabins, bathhouses, lakes, picnic tables, benches, outdoor fireplaces and shelters, as well as to provide water, sewerage and lights. Progress is being made, but not to the extent demanded by our people.

The National Park Service advises that new CCC camps may be secured if the State will furnish the money with which to supply sufficient materials to keep the CCC enrollees busy. If Georgia can not furnish the money for materials, then those camps will be placed in states which do have enough interest to furnish materials to match CCC labor. The Division is informed that with each $10,000 per year that the State appropriates for construction material that the federal government will give us a National Park Service CCC Camp, worth exactly $250,000 per year to the state. In other words, our share in all projects of this kind would amount to 4 per cent of the total cost. To date, the State has not contributed that much, or even a fraction of that much. The State must do its share if it expects to continue to participate in the program of providing recreation for our people.

The surface is barely scratched in establishing public parks and playgrounds in Georgia. It must be realized that there is a big job ahead in teaching Georgians more about the history of their own state, more about the background of their heritage. If the job of providing sufficient clean recreation for our children as well as our adults is properly done then we will develop clean bodies and clean minds in the generation now on its way to maturity, and in so doing, jails and asylums will be depleted and the charity wards of our hospitals less needed.

RECREATION IN NATURAL RESOURCE RESERVATIONS

Land is now being accepted from some counties of the State as Natural Resource Reservations. On this land three purposes are to be served. (1) Forestry demonstration, to show the landowner of the section how trees may be planted, the species which should be used, and how they may be managed after being planted to produce the greatest profit. (2) Protection of the game of the reservation, in order that it may multiply and overflow into the county and into adjoining counties, and always afford an abundance of game in those areas in which the reservations are located. (3) The reservation of the most attractive spots on the areas for recreational facilities, for the use of those who come for an outing, and for those who come to see the forestry demonstration work or the game management activity. Revenue taken in from the recreational features will partially pay for the upkeep of the reservation.

ORGANIZATION OF THE DIVISION

The Division commenced active operation on April 1, 1937. In assuming control of the areas already acquired and partially developed as state parks many problems were met. First, it was found that the state's title to many of the areas was unsatisfactory, inasmuch as land had previously been acquired under an act authorizing the state to accept land for forestry purposes only. New deeds were taken in some cases and in other the original deeds revised. Each park was found in great need of improvement and additional facilities before it could be opened to general public use. The cabins and inns were incomplete and unfurnished; water, light, fire protection, and sewerage facilities were inadequate. The parks had depended for maintenance upon the efforts of park caretakers and concessionaires. Consequently, the developed areas had suffered and required much renovation to be brought into attractive condition.

Under the Director were formed two branches; one, the branch of plans and designs, responsible for planning all construction work and for preparation and submission of the plans to the National Park Service for park development to be carried out by the Civilian Conservation Corps and Emergency Relief Administration. The other, the branch of operations, consists of a chief under whom work park superintendents and rangers in the parks ready for operation.

Four parks were opened to the public for the summer of 1937. These were Indian Springs State Park, near Jackson; Vogel State Park, near Blairsville; Alexander H. Stephens Memorial State Park, at Crawfordville; and Santo Domingo State Park, on the coastal highway near Darien. Pine Mountain State Park, near Chipley, was opened for the summer of 1938, and its inn, as well as the inn at Vogel were opened to the public for the first time.

PARKS IN OPERATION, THEIR FACILITIES AND REQUIREMENTS

Vogel State Park is located on U. S. Highway 129 and Georgia 11, approximately one hundred miles from Atlanta. It lies within the boundaries of the Chattahoochee National Forest, in the heart of the Blue Ridge Mountains, and contains approximately three hundred acres of wooded mountain slopes and valleys. The park has a forty acre lake, with swimming, boating, and fishing facilities; cabins available for renting; a boathouse with concession facilities; an inn affording hotel accommodations; picnicking facilities; several miles of trails; and many points of scenic and historic interest.

At the present time, there is an outstanding need for the following additions to the park: Staff quarters, servants quarters, superintendent's residence and office; twelve additional cabins and a telephone system.

Indian Springs State Park is located on U. S. Highway 42, approximately sixty miles south of Atlanta. It contains the site of the famous health-giving mineral spring, known as Indian Springs, and covers an area of approximately one hundred and sixty acres. At the present time the park is equipped with a museum for Indian relics, a casino, facilities for medicinal baths, a playground for children, picnicking facilities, and several miles of attractive trails. Hotel accommodations adjoin the park.

The present needs include a swimming pool, a water and sewage system, superintendent's residence, and additional picnicking facilities.

Alexander H. Stephens Memorial State Park is located on the Augusta Highway, Ga. 12, approximately one hundred miles from Atlanta. The park area includes around two hundred and seventy-five acres and contains the home of Alexander H. Stephens, Vice-President of the Confederacy. The park facilities include a three-acre lake for swimming and boating, tennis courts, children's wading pool, lookout tower, baseball diamond, picnicking facilities, several miles of trails for hiking, and convenient hotel accommodations.

In order to advantageously operate this area, there is a need for rest rooms at Liberty Hall, a pavilion, a superintendent's residence and a telephone system.

Santo Domingo State Park is located on U. S. Highway 341, approximately three hundred miles from Atlanta, near Brunswick. The area of the park is approximately three hundred and fifty acres. The site of famous disputed ruins, the origin of which has not yet been determined, is located in the park. Facilities include a Spanish inn, picnicking accommodations, several miles of trails for hiking, and wide opportunities for nature study and for the study of Georgia's early history.

Needed facilities at this area include a superintendent's residence, extension of the water system, a telephone system, and four cabins of slave quarter design.

Pine Mountain State Park is located on Georgia Highway No.18, near Chipley, approximately seventy-eight miles from Atlanta. A park tavern and four stone cabins are located at the top of the mountain, affording hotel accommodations to tourists. In the valley is a twenty-acre lake with fishing, swimming and boating facilities. A group of log cabins is located around the lake. These are available

to vacationists. Several miles of mountain trails are available for hiking. Lying on the crest of the mountain range is the famous Pine Mountain parkway, affording extensive views of the surrounding country.

At the present time, there is a great demand for a swimming pool; a day use area with picnicking facilities, bathhouse, comfort stations; a boat dock, and additions to the tavern.

Chehaw State Park lies on Georgia Highway 3, near Albany, and approximately one hundred and fifty miles from Atlanta. This park is a day use area with facilities for picnicking and hiking. A superintendent's residence has been erected and comfort stations are available. In an attractively landscaped area is located a large lagoon with rustic bridge and trails on the several small islands.

This park requires a museum, a boathouse and dock, a swimming pool and a casino for adequate service to the public.

FINANCIAL STATMENT FOR PERIOD OF JULY 1, 1937—JUNE 30, 1938.

RECEIPTS

Income

Transfers from State Treasury		
Appropriation	$37,000.00	
Emergency Fund	4,000.00	$41,000.00
Rents and Concession and Sales		
Indian Springs	7,480.18	
Vogel	3,977.72	
Pine Mountain	210.00	
Santo Domingo	9.61	
A. H. Stephens	576.97	
Capitol Square Soda Company	1,243.37	
Telephone (U. S. Gov't)	98.00	13,195.85*
Donations		
Indian Springs	42.00	
Pine Mountain	200.00	242.00
Total Income Receipts		$54,437.85
Non-Income		
Transfer from Forestry Division		195.12
Total Receipts		$54,632.97

PAYMENTS

Governmental Cost

Personal Services		30,720.28
Travel Expense		3,698.18
Supplies		7,216.82#
Communication		735.94
Heat, Light, Power, Water		428.17
Printing		721.38
Repairs		506.41
Rentals		300.04
Insurance		131.70
Equipment		3,950.83#
Miscellaneous		
Subscriptions and dues	29.60	
Laundry	165.39	194.99
Total Governmental Cost Payments		$48,604.74

Non-Governmental Cost

Transfers to Commissioner's Office		2,503.50
Total payments		51,108.24
BALANCE, JUNE 30, 1938		3,524.73
Total		54,632.97

*Net earnings—much needed equipment and supplies were purchased by the park concessionaires from maintenance and operation funds at the park.

#These figures do not include the purchase of equipment and supplies by the park concessionaires.

REPORT OF THE DIVISION OF FORESTRY

Frank Heyward, Director

On March 5, 1937, the bill creating the Department of Natural Resources in which the Division of Forestry was included, was signed by the Governor and became a law. State Forester Elmer Dyal resigned and was succeeded on March 22, by Frank Heyward, Jr.

In order to increase the efficiency of the field personnel a radical change was effected by closing or relocating several of the district offices. Formerly, district offices were located at Rome, Gainesville, Augusta, Columbus, Macon, Albany, Waycross, and Savannah. According to the new organization plan the state was divided into four districts thereby reducing by half the former number. District offices were retained in Gainesville, Macon, and Albany and a new office was opened at Baxley. Instead of being located at one extreme or another of its specific district, under the reorganization each district office was located as nearly as possible at the geographical center of the district. A district forester, who under the new law creating a Department of Natural Resources, must hold a college degree in forestry, was placed in charge of each district, and depending upon the amount of work centering in that district, assistant district foresters were appointed. Thus, the present field personnel consists of the following: Gainesville—District forester and one assistant; Macon—District forester and one assistant; Albany—District forester; Baxley—District forester and two assistants.

The four districts into which the State is divided are approximately delimited by a line separating Carroll and Heard, Newton and Jasper, and Lincoln and Columbia Counties; another line separating Chattahoochee and Stewart, Bleckley and Dodge, and Burke and Screven Counties; and finally by a north and south line between Pulaski and Dodge, Irwin and Coffee, and Lowndes and Echols Counties. Thus the Gainesville and Macon Districts roughly include the Piedmont and mountainous portions of the State whereas the Albany and Baxley districts include the Coastal Plain.

Although each district is not in itself a homogenous unit from the standpoint of topographical and forest conditions, these and other conditions determining the problems of the technical staff assigned to the district are not so diversified as to warrant subdividing the districts into smaller units. From the standpoint of supervision from the Atlanta office having only four districts headquarters is ideal. As the Division of Forestry increases in size it is proposed to subdivide each district into units each under the supervision of an assist-

ant district forester. The number of district foresters, each directly accountable to the Atlanta office, would, however, be unchanged.

FIRE PROTECTION

In spite of the fact that Georgia's forests constitute one of her most valuable resources the wanton destruction by fires each year continues to run into millions of dollars. However, increased interest of the public in fire protection is evident each year. Unquestionably the most far reaching event in the history of Georgia's forestry development was the ratification by a majority of 4 to 1 in the November general election, of a Constitutional Amendment giving to the individual counties the right to appropriate funds for forest fire protection. At least 10 counties are now planning to avail themselves of the provisions of this amendment in a determined effort to prevent further destruction by forest fires.

Another event of much importance to the fire program in southeastern Georgia was the completion of the district headquarters on the Baxley Demonstration Forest. A residence, office building, warehouse, and machine shop were erected with CCC funds. Coming into the telephone exchange in the office are trunk lines connecting the Baxley office with the majority of the fire protection organizations widely distributed over about 5 million acres of land. The district forester is, therefore, able to contact over the state's own metallic circuit telephone lines the various fire organizations throughout the district. A probable development in the near future, pending only the construction of one additional line, will be the distribution over telephone to all fire organizations daily weather reports received from the U. S. Weather Bureau at Jacksonville.

The Coastal Plains TPO with headquarters at Brunswick, installed during 1938 a 500 watt radio transmitter for the purpose of contacting all fire trucks in Glynn, McIntosh, Brantley, and Camden Counties. The transmitter is controlled by a licensed radio operator who is on duty or available for call, 24 hours out of the day. Test calls are broadcast to all trucks at 30 minute intervals throughout the day and fire calls at any time a fire occurs.

The Camden Protection Unit with headquarters at Colesburg, broadcasts fire calls to its trucks through the transmitter at Brunswick by remote control. The two headquarters are connected by a metallic telephone line and a microphone is attached to the telephone switchboard at Colesburg. When a fire occurs, the dispatcher at Colesburg rings the dispatcher or radio operator at Brunswick and

the Brunswick operator plugs Colesburg into the radio transmitter through the telephone switchboard. The fire call is then broadcast directly from Colesburg through Brunswick and to the trucks back in Camden County.

Including the Coastal Plains TPO there are now three radio broadcasting stations in South Georgia whose sole function is forest fire control.

Of further significance in the State's fire control program is the purchase of six firebreak units. Each unit consists of a crawler type tractor and two plows, one for constructing new breaks and one for renewing old breaks. These units which have plowed 5,175 miles of new firebreaks to date, are financed by charging the landowners on a mileage basis the actual cost of construction which amounts to approximately $2.00 per mile. These units, being self liquidating, will cost the State nothing.

In north Georgia outstanding progress has been made in organizing protection units on a county-wide basis. Five of these counties were the first in the State to attempt fire control on a county-wide basis. The number and size of fires have been materially reduced in the protected areas and plans are now being completed for operation of these county units on a more adequate budget, inasmuch as the units have been poorly financed in the past.

At the present time there are 18 fire protection units in the State representing 3,363,441 acres. This comprises only about one-sixth of Georgia's total forest land. Nine of these units consist of counties protected on a county wide basis. This is important inasmuch as it is generally recognized that an entire county can be more economically and effectively protected from fire than groups of individual properties distributed over one or more counties as is the case with the Timber Protective Organizations. Now that counties have the legal right to appropriate funds for fire protection, there is a general movement in most of the Timber Protective Organizations to reorganize on a county basis. This movement will without doubt greatly increase the area under protection in the State and will also increase the effectiveness of fire protection.

In December, 1937 the State assumed its first full responsibility in fire protection on any specific area. In Camden County the old TPO requested the State to assume responsibility for detecting and suppressing all fires on about 175,000 acres. The Camden Protection Unit is now functioning smoothly and is on a par with any other organization in the State. The organization functions on a 12 month basis and is well equipped with an excellent telephone and tower

system as well as fire trucks with short wave radio. At the present time there are 9 fully equipped fire trucks in this unit. Four of these are owned by the State and the remainder by private landowners.

In addition to the Camden unit the State is now responsible for the fire—organizations in Emanuel, Jeff Davis, and Appling counties and the portions of Bacon and Pierce formerly comprising the Hurricane Creek TPO, a grand total of slightly less than 1,000,000 acres.

In all counties operating under the state's supervision on a county-wide basis there exists an advisory board consisting of representatives from the Board of County Commissioners, the landowners, and the Division of Forestry.

Another development forming an important step in fire control during the past two years, has been the construction of fire organization headquarters for the Grand Bay TPO at Lakeland, the Wayne County TPO at Jesup, Coastal Plains TPO at Brunswick, and the Camden Protection Unit at Colesburg.

In addition to the six firebreak units mentioned above the Division of Forestry has purchased 16 fully equipped fire trucks. Each truck is equipped with a pressure pump and water tank, back pumps, in addition to rakes, fire flaps, axes, and other hand tools. These trucks are operated in the fire protection units under state supervision.

Second only to passage of the Constitutional Amendment permitting counties to participate in fire control, was the sustained drive participated in by every agency and individual interested in forestry to have Congress increase, the federal appropriation for fire control from $1,655,000.00 to $2,500,000.00 for the country as a whole, the amount authorized by the existing law but never appropriated. The State of Georgia played an important part in the movement which resulted in the Congress appropriating $2,000,000 of the $2,500,000 requested. It is fully expected that the 1939 Congress will appropriate the full amount authorized by law and take further action by increasing the authorization to $9,000,000.

Undoubtedly the greatest need in connection with Georgia's fight against fires is a substantial state appropriation earmarked for use in counties who wish to organize on a county-wide basis. A sum of at least $100,000 to be used at a rate of 1 cent per acre for each acre of forest land in the county would enable dozens of counties not now able to finance fire protection to organize immediately. A sum of 5 cents per acre would be needed for counties in the Coastal Plain and lesser amounts for counties further north. At 5 cents per acre, the county would raise 2 cents, the federal government 2 cents cents and the state 1 cent.

The backbone of Georgia's fire protection activities is still the Civilian Conservation Corps. During the past bi-ennial period two camps have been removed leaving a total of 6 camps whose activities are confined to fire control on privately owned forest lands. These camps, supported with federal funds, have completed the following activities since January 1, 1937.

Bridges constructed	266
Lookout towers constructed	21
Other buildings constructed	9
Miles telephone lines constructed (metallic trunk circuit)	228
Miles telephone lines constructed grounded circuit	340
Rod fence	2,600
Miles foot trails constructed	17
Miles truck trails constructed	724
Acres planted in trees	400
Acres of forest stand improvement (thinning)	385
Pounds tree seed collected	10,205
Mandays on nursery work	580
Mandays fighting fires	16,864
Miles of firebreaks constructed	1,268
Acres of carpet grass planted	4,210
Mandays searching for missing persons	150
Mandays drafting timber type maps	1,687
Acres timber type survey	3,802,306
Acres general cleanup	860

Of outstanding importance are the fire organization and district headquarters already mentioned. These buildings are evaluated at approximately $22,000.00, and would have been impossible without CCC funds

Fire control improvements, particularly headquarters buildings, towers, and telephone lines resulting from CCC activities have advanced the state's program in fire protection into a far more efficient organization than would have been possible for many years had the State alone been compelled to finance this work.

FORESTATION

One of the most important activities of the Division of Forestry is producing tree seedlings and distributing these to landowners throughout the State. In 1937-38, 15,000,000 seedlings were distributed.

With the creation of the new Division of Forestry, immediate plans were made for a great increase in nursery production. Through the fine cooperation of the citizens of Albany, Dougherty County turned over to the Division of Forestry 65 acres of land, under long term lease, to be used in increasing the size of the Albany nursery now called the Herty Nursery. New overhead irrigation equipment costing approximately $6,000.00 was installed placing a total of 25 acres under irrigation.

As a result of this expansion, the nursery output of 3,225,000 for 1937-38 was increased to 13,000,000 seedlings for the planting season of 1938-39.

At the end of the 1937-38 planting season, the small nursery at Neel's Gap in north Georgia was permanently abandoned and a new site was selected at Flowery Branch, Hall County. The town of Flowery Branch and the officials of Hall County turned over to the State on long term lease basis 75 acres of fine land to be developed as a nursery. During this, the first year of operation, the output was 1,750,000 seedlings.

At the Flowery Branch Nursery the following species of trees are grown: Loblolly pine, shortleaf pine, slash pine, black locust, and black walnut. These species, with the exception of slash pine are native to north Georgia. At the Herty Nursery slash and longleaf pines are the only species grown.

Interest in slash pine has increased tremendously following the late Dr. Herty's experiments showing the suitability of this tree for the production of white paper. Slash pine is a hardy tree which has proved to be adaptable to all sections of the State with the possible exception of high mountains. Plantations of slash pine from five to seven years old are growing well in many sections of north Georgia. After giving the matter much study the Division of Forestry has decided upon a policy of recommending the planting of slash pine in many portions of the State; provision is made, however, for the planting of this tree in admixture with loblolly pine in the northern sections. Thus, in those portions of the State considerably north of a line approximately through Augusta, Macon and Columbus, the Division recommends that slash and loblolly pines be planted on the same area in alternate rows. When the seedlings have developed into trees large enough to be thinned, which they will in 12 to 18 years after the establishment of the plantation, the species which has developed the better will be left to compose the residual stand and the inferior of the two will be removed in the thinning. This policy has several advantages because loblolly pine, although native to north

Georgia, is frequently attacked by a tip moth, whereas slash pine has so far proved to be immune to this insect. On the other hand, slash pine with its heavy foliage would appear to be in some danger from sleet storms which occassionally visit north Georgia. Thus, if the tip moth materially damages the loblolly pine the entire stand is not impaired; similarly if sleet materially damages the slash pine, the loblolly pine will probably remain to form the residual stand.

At the present time there is a tremendous state-wide interest in the planting of pine trees. The Division of Forestry has records of at least one pine plantation having been established in each county in the State with the exception of Lincoln County, since 1933. As further evidence of the great interest in tree planting although the State increased its last year production of tree seedlings from 3,225,000 to approximately 15,000,000, the present supply has been found to be entirely inadequate to supply all of the demands within the State. Further large expansion is planned.

An interesting fact pertaining to Georgia's forest tree nurseries is that after the present year the nurseries will be entirely self-sustaining, and no funds from the regular Division of Forestry appropriation will be used for developing nursery facilities.

The trees are sold to the public at cost of production. This year the price is $2.00 per thousand trees delivered to the nearest shipping point. This very low cost is possible on account of large scale production and the use of mechanized equipment. All operations from bed forming to lifting the seedlings are carried out by means of equipment motivated by tractor. After the beds are formed, a mechanical seeder plants the seed in drills which run lengthwise of the beds. After the seedlings have attained the height of a few inches, the beds are weeded by a gang plow having seven small plow blades each about 3 inches wide and each of which passes between the rows of seedlings. The use of mechanized equipment has effected a tremendous saving in labor and has meant the saving of thousands of dollars to the landowners in the cost of seedlings they buy.

Plans are now being formulated for the development of the Flowery Branch nursery through the cooperation of the Soil Conservation Service CCC Camp at Buford and by means of a WPA project. After its completion, this development will be one of the most aesthetic in the State. Winding trails and picnic grounds will be provided in the ravine and among the hills which adjoin the actual nursery site, on which a beautiful forest growth is already present.

The Division of Forestry has received excellent cooperation in the distribution of planting stock from the State Agricultural Extension Service. Both of the extension foresters and many county agents have been instrumental in selling millions of trees throughout the State.

MANAGEMENT AND FORESTATION

In 1938 a technically trained forester was employed full time for the purpose of working with landowners and giving them specific information regarding the management and utilization of their forests. This forester has made suggestions to a large number of land owners regarding thinning, methods of cutting, and the most remunerative methods of harvesting their forest crops. Although these services are frequently afforded by district foresters, this is the first time that the State has employed a full time man for this particular field of work.

Another important activity in the field of forest management has been the inspection throughout the State of various pulpwood cuttings. The Division keeps in close contact with the woods operations of various pulp mills drawing upon Georgia's forest resources. The increase in the standards of cutting practices employed by pulpmills during the past year has been highly encouraging, although there still remains much to be desired in this respect regarding not only pulpwood cuttings but cuttings of sawmills and of landowners themselves.

DEMONSTRATION FORESTS

Of much importance to the Division of Forestry was the acquiring of 980 acres of high quality forest land in Appling County for the establishment of a demonstration forest. The City of Baxley and Appling County donated to the State in fee simple this fine acreage of land. This property, on which is located the office of the District Forester already described, is to be used as a demonstration ground of various forest practices including firebreak construction, methods of planting, thinning, and timber stand improvement.

More recently the Division of Forestry was authorized to assume responsibility of the development and management of the 33,000-acre resettlement area tract which was turned over to the Department of Natural Resources. This large area will also be used for demonstration purposes. The main activity, however, to be conducted on this property for a number of years will be fire protection in order to build up the growing stock. Most of this area is devoid of growing

stock and a number of years must pass before the trees will be old enough to be used for demonstration purposes.

EDUCATION

For ten years the Division of Forestry has cooperated with the State Department of Vocational Education in conducting a forestry project with schools having teachers of vocational agriculture, of which there are now 380 located in 142 of the 159 counties, and 275 of which are white and 105 negro schools.

School forests are required for the project. The Division of Forestry advises vocational teachers in the selection of woodland for school forests and makes management plans to be followed for their development. Ten-acre tracts are obtained for school forests usually with a ten-year lease.

As a result of this forestry project, thousands of rural boys annually learn to identify trees; the various uses of their woods; how to collect and care for tree seed; how to operate a tree seed bed to produce planting stock; how to plant tree seedlings; methods to use in fire control; principles of thinning and pruning; how to estimate the volume of standing timber, and how to harvest and market timber.

As a means of intensifying and broadening student knowledge of forestry, this division conducts an annual forestry camp, allowing one student to attend from each school carrying on the forestry project. The camp has proven very popular and rivalry among students for camp scholarship is keen.

Valuable assistance in promoting school forestry has been rendered by the Georgia Forestry Association. Each year this citizens organization awards cash prizes to both white and colored vocational teachers for doing the best work in forestry.

The Georgia Forestry Association has also sponsored an essay contest in both high and elementary public schools of Georgia, the subject of which was "Why Georgia Counties Should Support Forest Fire Protection". In this contest, the Division of Forestry participated by deciding the winners.

The service rendered by the Division of Forestry to vocational schools, constituted practically the only public school forestry activity until 1938 when the State Department of Education took steps to provide teaching material for a required course in natural resources for all public high schools of the State. To this end a bulletin entitled "Natural Resources of Georgia", treating of forestry, minerals, wild life, and parks, was issued by the State Department of Edu-

cation. The Division of Forestry prepared material on forestry for this publication.

As a result of this forward step by the State Department of Education all high schools in the state are now in position to give instruction in the elements of forestry.

PUBLICATIONS AND EXHIBITS

Because of the limited funds available, few publications have been printed. An urgent need for teaching material for use of teachers of vocational agriculture has been met by issuing a bulletin entitled "Vocational Forestry", a publication designed primarily for teaching forestry jobs.

A bulletin entitled "Georgia's Forests and Their Resources" was issued as a reprint from the bulletin "Georgia's Natural Resources". Manuscripts for other bulletins have been prepared but for lack of funds have not yet been printed. Timely information has been issued as mimeographed circulars dealing with pulpwood cutting and small sawmill operations.

Many requests for forestry exhibits have been received, but in only a few instances was the division able to comply, usually cooperating with the U. S. Forest Service in setting up joint exhibits.

IN MEMORIAM

Forestry in Georgia suffered a tremendous loss by the death of Dr. Charles H. Herty. Dr. Herty's inspiring leadership in the field of fire protection and reforestation was to a great extent responsible for the increase in public interest in forestry throughout not only Georgia but the entire South. It was largely through Dr. Herty's efforts that the Constitutional Amendment pertaining to county-wide participation in fire protection received such universal support by the public. The Division of Forestry feels that it has lost its best friend by the passing of Dr. Herty.

This Division also suffered the loss of Joel Rice, an efficient district forester at Baxley, by auto accident. His untimely death deprived the Division of the benefits of a capable and conscientious forester.

COOPERATION

One of the high lights of the work of the Division of Forestry has been the close cooperation with the various forestry organizations throughout the State particularly the Regional Office of the United

States Forest Service, the Extension Service in Athens, the Georgia School of Forestry, Georgia Forestry Association, and the Slash Pine Forestry Association. The Division of Forestry is glad to acknowledge the great help which it has received on various technical matters particularly fire control, nursery production, and forest management from the Regional Office of the United States Forest Service. The close cooperation with the U. S. Forest Service has enabled the Division of Forestry to broaden the scope of its work materially.

PERSONNEL OF THE DIVISION OF FORESTRY

Technical

January 1, 1939

FRANK HEYWARD, JR. . . . . Director
R. D. FRANKLIN . . . . . Assistant Director in charge of Fire Protection
H. D. STORY, JR. . . . . Assistant Director in charge of Forestation
H. C. CARRUTH . . . . . Assistant Director in charge of Forest Products and Management
T. P. HURSEY . . . . . District Forester, Gainesville
W. D. YOUNG . . . . . Senior Asst. District Forester, Gainesville
W. G. WALLACE . . . . . District Forester, Macon
L. C. HART, JR. . . . . Asst. District Forester, Macon
J. S. CROSS . . . . . District Forester, Albany
G. M. MOSELY . . . . . District Forester, Baxley
J. E. PHILLIPS . . . . . Asst. District Forester, Baxley
W. W. HOOD . . . . . Asst. District Forester, Baxley

Non-Technical

C. A. WHITTLE . . . . . Educational Manager
M. E. MURPHY . . . . . Nurseryman, Albany
A. D. KING . . . . . Nurseryman, Flowery Branch
D. H. HAMMOND . . . . . Mechanic
MISS HAZEL E. NICHOLAS . . . . Secretary to Director
MRS. MILDRED MANHECK . . . . Clerk
LISTER W. HARRELL . . . . . Bookkeeper
MISS FANNIE LEE KENIMER . . Stenographer, Gainesville
MRS. VIRGINIA PIRKLE . . . . . Stenographer, Macon
MRS. FRANKLIN JEFFERSON . . . Stenographer, Albany
MISS MADELINE CULBRETH . . Stenographer, Baxley

FINANCIAL STATEMENT, JAN. 1–JUNE 30, 1937

Balance on hand January 1, 1937		$23,058.65
Receipts:		
From Federal Government Section 2	42,585.39	
From Federal Government Section 4	1,128.73	
From Sale of Seedlings	5,442.68	
From Miscellaneous	185.10	
From State Appropriation	7,307.83	56,649.73
		79,708.38
Disbursements for Jan. 1 thru June 30, 1937		58,444.39
Balance on Hand July 1, 1937		21,263.99

Detail of Disbursements Jan. 1 – June 30, 1937

Personal Service	13,990.88	
Travel	4,219.40	
Supplies	254.94	
Communications	809.14	
Printing	388.43	
Freight and Express	7.58	
Ice	4.00	
Miscellaneous	255.99	
Exhibit Material Expense	50.00	
T. P. O. Refunds	34,315.75	
Refunded to State Treasury	265.59	54,561.70

Nurseries

Personal Service:		
Salaries	1,047.33	
Unskilled labor	1,960.59	
Power, Light, etc	75.88	
Supplies	355.42	
Miscellaneous	172.57	
Refunds on seedling orders	270.90	3,882.69
		58,444.39

RECEIPTS

Grants from U. S. Government		75,898.28
Transfers from State Treasury		91,522.00
Earnings of Agency:		
Sale of Nursery Stock	6,824.34	
Plowing Service (Fire Breaks)	8,604.77	15,429.11
Total Income Receipts		182,849.39
Balance, July 1, 1937		21,263.99
Total		204,113.38

PAYMENTS

Personal Service	41,983.37	
Travel Expense	14,919.09	
Supplies	2,894.80	
Communication	1,830.66	
Heat, Light, Power, Water	17.63	
Printing	529.46	
Repairs	2,311.21	
Rents	164.50	
Insurance	45.45	
T. P. O. Refunds (Timber Protective Organizations)	61,488.48	
Equipment	15,706.32	
Miscellaneous: Freight, express, drayage, subscriptions, dues, etc	442.94	
Transfers to:		
Herty Foundation	27,400.00	
Parks Division	195.12	
Geology Division	2,178.90	
Commissioner's Office	5,186.66	34,960.68
		177,294.59

NURSERIES

Personal Service	7,893.10	
Travel Expense	146.96	
Supplies	1,217.08	
Communications	93.87	
Light, Heat, Power and Water	258.26	
Printing	60.92	
Rent	59.40	
Repairs	278.05	
Insurance	71.01	
Equipment	9,946.08	
Miscellaneous	209.12	
Total		20,233.84
		197,528.43
Balance, June 30, 1938		6,584.95
Total		204,113.38

REPORT OF THE DIVISION OF WILD LIFE

Joe D. Mitchell, Director

INTRODUCTION

The duties of the present Director of the Division of Wild Life of the Department of Natural Resources began March 5, 1937 and this report covers that part of the biennial period ending with December 31,1938, which I respectfully submit.

This Division is endeavoring to conduct its affairs on sound principles, applying the same economy practiced by any well regulated business.

When entering on the duties of Director of this Division, it was found that there was an indebtedness of approximately $42,000, and in order to function in any manner it was necessary to obtain a loan of $30,000. Available funds for the purchase of equipment for introducing higher standards of efficiency were, therefore, very limited and many improvements and plans for enlarging the service have had to wait for financial assistance.

The Division of Wild Life has the responsibility of developing the State's game and fish resources, and to this end, it is empowered to enforce the laws designed to protect and regulate the take of wild life.

Georgia has very favorable natural conditions for developing wild life of the forest, fields, streams, lakes, and coastal waters. The public attitude is becoming increasingly favorable to conserving and developing the State's wild life. Only adequate funds are needed to make rapid progress.

FISH HATCHERIES

This Division has six fish hatcheries located at the following places: Magnolia Springs Hatchery, Millen; Bowen Mill Hatchery, Fitzgerald; Tufts Spring Hatchery, Macon; Ways Hatchery, Ways Station; King's Ferry Hatchery, King's Ferry; Summerville Hatchery, Summerville.

The hatchery at Summerville is devoted to the propagation of speckled and rainbow trout and is a cold water hatchery, while the others are warm water hatcheries.

The Division's records for 1938 reveal that 1,014,460 fish were released in streams of Georgia. These were obtained from state and federal hatcheries and from inactive waters. In addition, 700,000 shad were hatched by the joint activity of the Division and the U. S.

Bureau of Fisheries at a newly established hatchery on the Ogeechee river.

At the outset the Director considered it necessary to know the condition of the several hatcheries and the possibilities of increasing their production. Through the cooperation of the U. S. Bureau of Fisheries, Mr. C. B. Grater made a study of the plants at Ways, Millen and Fitzgerald. His suggestions were very helpful. From these and other studies it developed that there is much room for improvement at many of the hatcheries and there is doubt of the economy of undertaking to continue some of them.

Through the period of present operations with little funds available, attention has been given to the hatcheries in the following manner:

Henry Ford Hatchery, Ways—Three rearing pools have been completed at an approximate cost of $500. Each is about one-half acre in size.

It was found that the depth of the water in the larger ponds was only 12 to 18 inches, and that they had a rank growth peculiar to the section. It was found that this vegetation had no food value and that thick scum formed in the shallow water killed fish when it was lowered.

To meet this situation in both of the large ponds, Mr. Henry Ford gave assistance. It is estimated that at an expenditure of not over $1,000 this condition can be corrected.

Magnolia Springs Hatchery, Millen—A spillway has been built, following which rearing pools should have been constructed, but the work is being deferred awaiting developments of a proposed transfer of adjoining lands to the Department of Natural Resources.

Bowen Mill Hatchery, Fitzgerald—Improvements consisting of a better distribution of the water to the rearing pools and other recommended improvements have been made through the cooperation and assistance of the Ben Hill County Commissioners.

Summerville Hatchery, Summerville—With little other than maintenance cost this hatchery with splendid cooperation of the Bureau of Fisheries allotting 250,000 rainbow and brook trout, successful production was obtained.

EXPECTANCY OF WARM WATER HATCHERIES

In order that those interested in propagating large-mouth bass may have an authoritative statement on the possible yield of a hatchery, the following statement by C. F. Culler, District Supervisor, U. S. Bureau of Fisheries, Lacross, Wisconsin, if given:

"It is believed that if some of the information could be had, the average production of black bass per acre, which is now approximately 6,500, could be increased to double this number."

The warm water hatchery acreage in Georgia is approximately as follows: Ways Hatchery, 25 water acres; Bowen Mill Hatchery, 30 water acres; Magnolia Springs Hatchery, 35 water acres, a total of 90 warm water acres.

According to Mr. Culler's estimate of expectancy there should be 1,170,000 fish produced under favorable conditions in Georgia's 90 warm water acres, but under normal conditions there would be 585,000.

REDUCING CASUALTIES

Believing that the casualties can be materially reduced, which in the end results in increased production, the direction of this Division is encouraging the community wild life clubs to construct small rearing pools about 50 by 120 feet in size, at an estimated cost of $150 each. Properly fertilized, the pools will produce enough food to bring the small fry, during the period of four or five months, to 5 or 6 inches in length, and be in better shape to protect themselves from their natural enemies when released into the streams. It is advised that the pools be constructed as close to a stream as possible thereby lessening the cost of transportation.

In addition to reducing casualties, this method has another distinct advantage. When transporting the fry to the rearing pools, from ten to twelve thousand can be handled, while if held in the hatchery until 5 to 6 inches long the average load would be only nine to twelve hundred, so that it is apparent that a short haul from pool to stream is an economical measure.

Unsolicited letters from different sections of the state give encouragement to this Division by their reports of increase of fish population.

QUAIL HATCHERY

At the quail farm at Doraville, a modernly equipped quail hatchery is operated. During the period of the present supervision, 10,705 birds have been distributed from the hatchery over the State. From figures assembled for 1937, it was revealed that casualties at the hatchery ran about 30 per cent and the cost per bird distributed was about $1.25.

Operation of a quail farm is, therefore, a somewhat expensive method of restocking and is adopted by some states only as a necessity.

An error made by the former Game and Fish Department, in locating a hatchery building on land not obtained for the purpose. The land-owner has agreed to sell the land occupied by the building, but lack of funds has thus far prevented the consummation of the deal which involves $500.

DOVE SEASON

At a meeting of the Chief of the Bureau of the Biological Survey, and wild life officials of the southern states, held at Jacksonville, Florida in March of 1938, a discussion centered around a question of changing the open season for the mourning dove. The Director of this Division presented the viewpoint of local sportsmen who had requested an extension of the season.

It was held by Dr. Pearson of the U. S. Bureau of Biological Survey that the season from November 20 to January 31 would interfere less with early breeding, and at the same time insure the taking of birds of desirable size than would any other period of similar duration. In substance he stated that from the biological point of view it would not be advisable to open the season on mourning doves during the month of February, and recommended the most nearly ideal season from the standpoint of the birds themselves to be December 15 to January 15.

DEER AND BEAR SURVEY

An effort has been made by the field men of this Division to obtain the approximate deer and bear population of the State. The number of each animal shown by counties is as follows:

Deer and Bear Population for 1937:

County	Deer	Bear	County	Deer	Bear
Baldwin	21	.....	Burke	1	.....
Banks	3	.....	Butts	2	.....
Ben Hill	10	.....	Calhoun	125	.....
Bibb	6	8	Camden	300	.....
Brantley	50	.....	Charlton	250	38
Bryan	2000	.....	Chattahoochee	10	.....
Bulloch	500	25	Clinch	25	.....

Deer and Bear Population for 1937, Cont'd.

County	Deer	Bear	County	Deer	Bear
Columbia	.....	1	Monroe	.....	5
Dawson	35	.....	Montgomery	10	.....
Decatur	50	.....	Pickens	25	.....
Early	50	.....	Quitman	8	.....
Echols	25	.....	Richmond	1	.....
Fannin	20	.....	Screven	500	25
Gilmer	20	.....	Seminole	50	.....
Grady	200	.....	Stewart	12	.....
Houston	12	20	Telfair	250	.....
Irwin	150	.....	Towns	30	.....
Jasper	5	3	Twiggs	8	10
Jeff Davis	250	.....	Union	30	.....
Jenkins	25	3	Ware	145	35
Liberty	2500	.....	Webster	10	.....
Long	2000	10	Wheeler	12	.....
Lumpkin	25	.....	White	25	.....
McIntosh	2500	25	Wilcox	20	.....
Marion	25	.....	Wilkinson	21	.....
Miller	100	.....			
			Total	12,452	208

This information was assembled for use of the U. S. Biological Survey. In the absence of data prior to 1937 no comparison can be made with previous years.

GAME LAW CHANGES DESIRED

Numerous sportsmen and others interested, desire certain changes or amendments to existing laws which would provide that the turkey and deer season open the same date, to wit, November 15.

Another suggested change is that the open season for taking shad be advanced to January 1 or 15th. This would more nearly conform to the season now in effect in Florida and South Carolina, where by reason of early catches they are able to obtain top prices not possible in Georgia.

As Director, I concur in both the suggested changes.

RECORDS OF GAME TAKEN

Based on the records of the field men of this Division, the animals on which the law requires reports, the number of deers killed during the season of 1937-38 was 71. The number of marsh hens killed during the season of 1937 was 38,230 and for the year of 1938 up to and including September 27, the number was 33,304.

While no records of the total number of quail killed are kept, based on estimates of field men, the quail population has increased to a very noticeable extent, this being in part attributed to better control of forest fires.

COASTAL GEORGIA

It will be noted from the auditor's report that during the twelve months ending December 31, 1936, as compared with the fiscal year ending June 30, 1938, there was a slight decrease in coastal fisheries revenue, of less than $500.

The coastal section offers wonderful opportunities from the standpoint of commercial fisheries.

With our limited equipment consisting of two motor-driven boats, the problem of patrolling Georgia's 100 miles of coast line and 1000 miles of sounds, tidal rivers and creeks, is difficult. To properly patrol these waters the Division should have at least four crafts such as the smaller of the present type, one to be stationed at each of the following points: Savannah, Darien, Brunswick, and St. Marys. To acquire such a fleet would mean an outlay of some $4,800. The Director has no doubt that it would be a profitable investment. Negotiations are in progress, looking to assistance from the Department of Commerce in supplying necessary equipment. Should this fail the State it will be proposed that the State supply the same as a necessity.

Our coastal area has great possibilities for oyster production. A start has been made toward establishing new oyster beds and in restoring old ones to productivity. This has not progressed rapidly. Investigations of probable cost and method of financing have not been completed. In June of 1938 the matter of restoration of oyster beds was taken up with the Bureau of Fisheries of the Department of Commerce and a preliminary survey was released through the bureau's publication "Oyster Investigations of Georgia".

According to the publication the following localities were designated as particularly suitable for oyster culture: Oyster Creek, Tybee Island, Black River, Burnside Island, Neville Creek, Ossabaw Island,

Sunberry Creek, Midway River, Blackshear River, Sapalo Island, Dead River, Folly River, and surrounding marshes, and Doboy Island and vicinity.

The East Georgia Planning Council mapped poluted areas as lying north of Tybee, around Savannah, Thunderbolt, and an area between Jekyll and Saint Simons Islands, and up Turtle River above Brunswick.

With limited equipment, the first step toward oyster bed restoration being taken is to enforce the provisions of the leases which require the lessee to deposit each year the number of bushels of shells equal to 25% of the number of bushels of oysters taken from the leased ground. The report of the Bureau of Fisheries states that if this provision is reasonably enforced it will be of great benefit in maintaining the natural beds and preventing their depletion. With the proposed additional equipment this division will be in better position to enforce the provision.

Improved methods of oyster culture require setting aside sufficiently large areas suitable for cultivation of oysters; improving the bottoms by dredging out the accumulated debris and reinforcing them where necessary, by planting shells and gravel; establishment of spawning grounds; collection of seed oysters on suitable bottoms below low water marks, and protecting the beds from attacks of oyster enemies.

Having looked into the probable cost, the conclusion has been reached that at this time the funds of the Division will not permit it to qualify for an allotment which federal authorities are willing to grant.

Relative to the needs of coastal waters, the following is taken from the report of the East Georgia Planning Council:

"1. Regulation of seasons for commercial catch with the object of reducing the drain on the supply.

"2. Systematic replanting of oysters, restoration of depleted beds, and establishment of new beds in suitable localities.

"3. Thorough patrol of all fishing waters in order to rigidly enforce conservation laws and regulations, and that adequate funds be provided therefor."

In concluding this discussion of coastal fisheries, it is gratifying to report every indication of increased poundage of shrimp this season compared to the previous one.

WILD LIFE PROTECTION

Georgia's 159 counties are patrolled by 94 protectors, or field men, at a cost of $8,586 per month. These men have been selected

not only because of their qualifications as protectors, but because of their love of nature and their desire to be helpful in protecting Georgia's wild life.

As a result of their efforts, the number of prosecutions is 620, listed by counties, as follows:

COUNTY		COUNTY	
Appling	4	Columbia	0
Atkinson	0	Cook	0
Bacon	0	Coweta	0
Baker	0	Crawford	0
Baldwin	0	Crisp	3
Banks	8	Dade	0
Barrow	0	Dawson	6
Bartow	10	Decatur	4
Ben Hill	4	DeKalb	14
Berrien	0	Dodge	0
Bibb	0	Dooly	0
Bleckley	0	Dougherty	0
Brantley	6	Douglas	1
Brooks	0	Early	0
Bryan	27	Echols	0
Bulloch	10	Effingham	9
Burke	4	Elbert	1
Butts	4	Emanuel	7
Calhoun	1	Evans	1
Camden	3	Fannin	0
Candler	1	Fayette	6
Carroll	1	Floyd	1
Catoosa	0	Forsyth	0
Charlton	4	Franklin	0
Chatham	5	Fulton	20
Chattahoochee	0	Gilmer	0
Chattooga	0	Glascock	0
Cherokee	0	Glynn	0
Clarke	8	Gordon	0
Clay	0	Grady	2
Clayton	2	Greene	14
Clinch	0	Gwinnett	10
Cobb	0	Habersham	0
Coffee	4	Hall	2
Colquitt	5	Hancock	0

COUNTY		COUNTY	
Haralson	0	Pickens	0
Harris	1	Pierce	2
Hart	2	Pike	5
Heard	1	Polk	6
Henry	12	Pulaski	0
Houston	5	Putnam	0
Irwin	11	Quitman	0
Jackson	7	Rabun	3
Jasper	0	Randolph	1
Jeff Davis	0	Richmond	11
Jefferson	11	Rockdale	1
Jenkins	11	Schley	0
Johnson	0	Screven	25
Jones	0	Seminole	0
Lamar	1	Spalding	10
Lanier	0	Stephens	0
Laurens	12	Stewart	0
Lee	0	Sumter	6
Liberty	12	Talbot	0
Lincoln	0	Taliaferro	0
Long	77	Tattnall	12
Lowndes	1	Taylor	4
Lumpkin	14	Telfair	0
McDuffie	0	Terrell	0
McIntosh	4	Thomas	0
Macon	0	Tift	19
Madison	3	Toombs	1
Marion	4	Towns	1
Meriwether	6	Treutlen	0
Miller	0	Troup	4
Mitchell	0	Turner	0
Monroe	0	Twiggs	0
Montgomery	4	Union	3
Morgan	23	Upson	1
Murray	0	Walker	0
Muscogee	0	Walton	0
Newton	11	Ware	0
Oconee	1	Warren	0
Oglethorpe	2	Washington	5
Paulding	2	Wayne	4
Peach	0	Webster	0

COUNTY		COUNTY	
Wheeler	0	Wilkes	0
White	10	Wilkinson	3
Whitfield	1	Worth	22
Wilcox	10		
		TOTAL	620

EDUCATION

Every agency at our command for disseminating information on wild life is being employed. Through the splendid cooperation of Mr. C. A. Whittle, Educational Manager of the Department of Natural Resources, the Division is distributing his excellent booklet dealing with Georgia's wild life. It is also gratifying to report that the State Department of Education is using the publication as teaching material in the public schools.

This Division has displayed exhibits at fairs, winning several blue ribbons, and as often as possible lectures have been delivered and motion pictures shown on wild life over the State.

COOPERATION

This Division gratefully acknowledges cordial cooperation with other state agencies and the many courtesies shown. The Director of this Division gladly offers each state agency his full support and cooperation.

This Division is grateful to the U. S. Bureau of Fisheries, the United States Forest Service, and the Bureau of Biological Survey for their friendly and cooperative attitude. This Division expends approximately $7,000 in connection with cooperative agreements between this Division and federal agencies in promoting wild life. In fact there is assurance of cooperation in every activity related to the welfare of wild life in field and stream.

REPORT OF THE DIVISION OF MINES, MINING AND GEOLOGY

Captain Garland Peyton, Director

FUNCTIONS OF THE DIVISION OF MINES, MINING AND GEOLOGY

The following principal functions of the Division of Mines, Mining and Geology are based on an interpretation of the wording and spirit of the Act creating the Department of Natural Resources of which this Division is a component:

1. To initiate and conduct studies and surveys of the mineral resources of the State and their commercial utility. To conduct a mineral survey of the State and to catalog each and every mineral occurrence and deposit, together with its location, production, method of working, name of owner and agent, and other detailed information capable of being tabulated and published for the use, guidance, and benefit of the mineral industry of the State and the people in general and deemed necessary in compiling mineral statistics of the State.

2. To conduct as a continuing project, a geological survey of Georgia, either as a department undertaking or in cooperation with other designated agencies.

3. To cooperate with Federal or other agencies for the performance of such work in Georgia as shall be deemed of value to the State of Georgia and of advantage to the people of Georgia and under such rules, terms and conditions as shall be arranged between the Commissioner of the Department of Natural Resources and these agencies.

4. To serve as a bureau of information concerning Georgia geology, minerals, and mineral industries. To encourage and actively cooperate in educational programs which have bearing upon the character and importance of the natural resources of the State.

5. To collect specimens and samples for deposition in the State Museum or for exhibition elsewhere; to collect photographs, models, drawings of appliances in the mines, mills and metallurgical plants of the State, and to file in such a manner as to be readily viewed or used by the people of Georgia.

6 To maintain a library of literature describing the geology and mineral deposits of Georgia.

7. To make qualitative examinations of rocks, specimens, and mineral samples.

8. To make quantitative determinations of ores and minerals, when submitted for the purpose by citizens of the State.

9. To study minerals and ores, additional uses for the State's minerals to meet the ever-changing and increasing demands of modern industry, to explore the possibilities for their beneficiation, and for improved treatment and processes so that otherwise low-grade ores may become of commercial value; and to devise new, different, or more appropriate mining procedures.

PERSONNEL

The personnel of the Division is composed of the following groups or classifications: Regular technical staff, regular office staff, special part-time employees, who render services common to all divisions, W. P. A. personnel assigned to the Division and U. S. G. S. personnel participating in the cooperative water investigation in Georgia, and a prorata share of whose salaries and expenses is paid through the Division.

Regular Personnel

The regular personnel of the Division consists of the Director, three Geologists, one Assayer-Chemist, a Secretary, a Librarian and a Porter as follows:

Captain Garland Peyton.....Director
Captain J. Thomas Adair.....Assayer-Chemist
Doctor A. S. Furcron.....Geologist-Mineralogist
Mr. A. C. Munyan.....Geologist-Stratigrapher
Mr. Richard W. Smith.....Economic Geologist
Miss Margaret Gann.....Secretary
Mrs. Ella J. Watkins.....Librarian
Willie Cliett,(colored).....Porter

The individuals composing the technical staff of the Division are professional men of the highest type and with many years of diversified training and experience in the arts and sciences—especially in the fields of chemistry, minerals, metallurgy, and geology. Their versatility and adaptability are attested by the unusually varied list of activities participated in successfully by them. They, individually and collectively, possess imagination and perspective necessary to the proper appreciation and understanding of the broad economic picture of the practically unlimited possibilities of Georgia's mineral resources, and to encourage and facilitate their development and exploitation along lines consistent with good business practices.

Departmental Personnel

The following persons render valuable services common to all divisions:

Mr. C. A. Whittle.....Educational Director
Mr. Jere N. Moore.....Public Relations Counsel
Miss Annette McLean.....Curator of the Museum

U. S. Geological Survey Personnel

The following technical personnel of the U. S. G. S. are engaged in the surface ground water investigation now in progress in Georgia and financed cooperatively by the State of Georgia and the Federal Government.

Mr. Francis M. Bell..... District Hyd. Engineer
Mr. Melvin R. Williams..... Assoc. Engineer
Mr. Raymond F. Conard.....Jr. Engineer
Mr. John L. French.....Jr. Engineer
Mr. Jack M. Carns.....Jr. Engineer
Mrs. Effie T. Workman.....Sr. Clerk
Mr. Theron Z. Chastain.....Recorder
Mr. J. Edwin Heatherly.....Recorder

Federal W. P. A. Personnel

The following persons who are paid by the Works Progress Administration have been assigned by that Agency to the Division of Mines, Mining and Geology to carry on a most worth while and somewhat varied project in connection with minerals and mineral statistics.

Miss Willie P. Hardy.....Stenographer
Miss Opal A. McClain.....Clerk
Miss Ruth Rockmore.....Jr. Clerk
Mrs. Isla Philen.....Sr. Stenographer
Mrs. Kate Jarrell.....Typist
Mrs. Ruth Kirby.....Research Assistant
Mr. Leonard Loyd.....Research Assistant
Mr. Roscoe E. Bachellor.....Research Assistant
Mr. H. H. McHan.....Supervisor
Mr. Byron Clough.....Draftsman
Mr. Jacob Goldstein.....Research Assistant
Mr. Lee O'Bannon.....Research Assistant

Separations

Dr. G. W. Crickmay, formerly Assistant State Geologist with the Division resigned September 1, 1937, to accept the position of Associate Professor of Geology at the University of Georgia, Athens, Georgia.

Mr. Lane Mitchell, formerly Assistant State Geologist, who was granted a year's leave of absence in September, 1936, resigned during the interim to accept a position as Assistant Professor of Ceramics at Georgia School of Technology, Atlanta, Georgia.

NATURE OF THE WORK

Studies and Surveys of the Mineral Resources of the State. The major work of the Division of Mines, Mining and Geology is the investigation of the mineral resources of the State. It is considered both desirable and well worth while to keep in touch with the mines and mineral industries, to learn what they have been doing, and to see if they can be assisted in any way to increase their out-put and markets and lower their costs, as well as to examine new mineral discoveries with view to determining their commercial availability. Unquestionably thousands of dollars have been made or saved by investors who have sought and acted on our advice in this connection.

In the past, too many commercial operators failed to keep records of their operations, with the result that much valuable information and data are not available. One of the aims of this Division is to cooperate with mineral producers with a view to obtaining such records and data and preserving them for future reference in the files of this Division.

Technical reports and popular articles should be prepared, published, and distributed. One mineral at a time, or a group of related minerals, is selected for intensive investigation of the deposits throughout the State. The resulting report describes the geology and occurrence of the deposits, gives individual property descriptions, including thickness of deposits and overburden, and makes recommendations as to the best means for developing the deposits. General reports on the geology and physiography of the State and geologic maps, the basic information necessary for an intelligent search for undiscovered mineral deposits, should be published.

The series of 47 such reports or bulletins of uniformly high standard that have already been published has done much to stimulate interest in the development of Georgia's mineral industry. A monthly paper, formerly published by the Department of Forestry and Geological

Development and which usually contained timely popular articles on Georgia's mineral resources, was discontinued in March, 1937. A number of such articles have been reprinted from time to time to meet the popular demand for them. Special scientific papers on different phases of Georgia's geology and minerals have been prepared and presented at various scientific societies.

Clearing House for Mineral Information. The Division of Mines, Mining and Geology serves as a clearing house for geological and mineralogical information. People within the State write, call or phone for advice in developing their mineral deposits, digging or boring water wells, or investing in mining companies. The producers ask for help in developing new mining or treatment methods and finding new markets for their products or new deposits of the minerals in which they are interested. The Georgia Securities Commission often consults the Director on the advisability of allowing mining companies to sell stock within the State. Municipalities ask advice on possible sources of a city water supply. Thousands of letters are received from all over the country asking for information on Georgia's mineral resources. Some of these can be answered by sending the printed reports, others by personal letters based on the experience of the Division's personnel.

Literally hundreds of rocks and minerals from all parts of the State are sent in by property owners for identification, analyses and/or advice. For a number of years past it was found impracticable to maintain a laboratory and to employ a chemist to make assays and chemical analyses on samples of rocks, minerals and metals sent in by the citizens of the State or collected by the members of the staff of the Division. We are pleased to announce that this service has now been resumed. The Division has a laboratory fairly adequately equipped and an assayer-chemist to make quantitative analyses. Supplementing this with additional equipment, a research technologist, or one or two assistant chemists would enlarge the scope of our services to the public.

WORK ACCOMPLISHED

NEW BUSINESS

During the biennium 1937-1938 the Division of Mines, Mining and Geology aided in the establishment of six new manufacturing plants, at least forty-one new mining operations, and in the attraction of an estimated total of $10,115,000 in new investments to Georgia. It is

not our desire to detract or in any sense to depreciate the cooperation and efforts exerted by other organizations or individuals toward the accomplishment and realization of these new industries. It is believed, however, that we might be justified in making a comparison between the value of this new business and the total net appropriation made available to this Division during the period in which this new money was brought into Georgia. Such a comparison indicates that for each dollar of appropriation spent by this Division $179.00 of new investment accrued to the State. It is certain, in this connection, that the foundation and groundwork for an appreciable amount of additional money has been laid and that much of it is bound to be realized sometime in the near future.

GEOLOGIC MAP OF GEORGIA

Mining men have long been asking for a detailed large-scale geologic map of Georgia showing the various types of rocks that underlie the State, together with a report describing the rocks, their structural relations, and their relation to the commercial minerals. This geological map of Georgia was completed in 1938. The map, when published, will be the first modern geological map of the State. At present the map is being drafted for publication in the offices of the U. S. Geological Survey in Washington.

The new map will portray, for the first time, the geological features of middle and northwestern Georgia. The geology of the Coastal Plain has been revised and the formations mapped. The map is to be published on a scale of 8 miles to the inch; its dimensions will be approximately 42 by 36 inches. All formations will be printed in color. A total of 69 formations have been recognized for the State, each of which will be portrayed on the map by a separate color and name. Twenty-six formations are mapped in the Coastal Plain, twenty-five in the middle and northern section, and eighteen in northwest Georgia. These figures may be compared with those of the old geologic map of the State published in 1908. On this map nine formations were recognized: five from the Coastal Plain, one in the middle and mountain section, and three in northwest Georgia. It is obvious that the old map has long since been useless.

The large amount of geological work necessary to the completion of this map was done by members of this staff in cooperation with members of the United States Geological Survey.

The geological work upon the Crystalline Area of middle Georgia and a part of the work upon northwest Georgia was completed by

this Division. A member of this staff spent three months in the fall of 1937 and one month in the spring of 1938 working in cooperation with a geologist from the Federal Bureau upon the geology of the Coastal Plain.

In middle and north Georgia, rock types, such as granites, gneisses, marble, quartzite, and other rocks are portrayed; their distribution, locality, geologic age, and other features are shown. In northwest Georgia, the folded sedimentary rocks, such as limestones, shales, sandstones, and other rocks, useful in the manufacture of Portland cement, bricks and tiles, glass, and other products, are described and accurately portrayed on the map.

The geology of the Coastal Plain has been revised and the formations remapped in greater detail. The map for that area will show the positions of each rock type such as limestone, sand and gravel, kaolin, fullers earth, and marls which can be utilized for commercial purposes. It will provide a means for the future prospecting of the above minerals in a more intelligent manner. Then, too, it also furnishes a basis for subsurface geology in the search for oil and gas and in the investigation of the underground water resources.

The new map of the State of Georgia will serve as a base for wide varieties of detailed studies. It will be of particular value to those engaged in the development of our mineral resources and industries. Structural interpretation, which may be read from this map, will serve in many ways, particularly in the drilling of wells or in following the distribution of valuable formations.

CHEMICAL AND ASSAY WORK

A total of 2,031 assays and analyses were made by the Assay Office and Laboratory during the period from its establishment in July, 1937, through December 31, 1938. This period includes the time spent in setting up the necessary apparatus as well as time lost in moving the laboratory to its present location at 196 Central Avenue. During the period from February 1 to December 31, 1938, 1090 assays were made. These assays represent approximately 950 different samples of ore from many different localities upon which the quantity of gold and/or silver in value or amount per ton was determined.

There were 941 determinations made upon approximately 265 different samples of Georgia minerals and waters from every section of the State. These chemical determinations according to the total of the separate analyses made are as follows: Lime (CaO), 154; Magnesia (MgO), 118; Iron (Fe_2O_3), 105; Alumina (Al_2O_3), 103;

Titanium (TiO_2), 19; Moisture (H_2O), 38; Loss on Ignition, 51; Phosphorous (P_2O_5), 9; Free Carbon Dioxide (CO_2), 3; Sulphur Trioxide (SO_3), 5; Manganous Oxide (MnO), 14; Ferrous Oxide (FeO), 2; Sodium Oxide (Na_2O), 6; Potassium Oxide (K_2O), 8; Lead (Pb), 3; Zinc (Zn), 2; Nickel (Ni), 1; Chromium (Cr), 5; Carbon Dioxide (CO_2), 12; Silica (SiO_2), 153; Ferric Oxide and Alumina (Fe_2O_3 and Al_2O_3), 31; Manganese (Mn), 29; Dissolved Solids, 17; Barium Sulphate ($BaSO_4$), 9; Chlorine (Cl), 6; Volatile Matter, 2; Ash, 2; Specific Gravity, 4; Copper (Cu), 18; Bromine (Br), 3; Sulphur, 3; Bicarbonate, 12.

In addition to the above analytical work the laboratory designed and built the equipment for the experimental production of fused silicates and particularly of the insulating material, rock wool. The laboratory facilities for experimental investigation of our natural resources have been exceedingly meager and it is believed that results of economic importance can be obtained by access to more adequate equipment to carry on the work in progress. From time to time we have been called upon to verify certain phases of new metallurgical and ore dressing processes. In so far as our facilities and equipment would permit we have complied with these requests.

MINERALOGICAL AND PETROGRAPHICAL WORK

It is estimated that members of the staff have identified, in the field and laboratory, around 10,000 specimens of minerals, ores, and rocks during this period. This work has ranged from routine identification of hand specimens to detailed optical studies carried out in the laboratory.

Within the last year the two petrographic microscopes have been supplemented by the addition of a good binocular microscope, and a metallographic microscope. The binocular is of special use in the examination of mineral grains, such as pan sands from gold or other mineral deposits; well log samples, where a study of mineral grains or foraminifera is necessary to identification or correlation of rocks, etc. The metallographic microscope affords opportunity for the study of polished ores under reflected light, which type of study is often a necessary prerequisite to the development of proper methods of flotation or milling of ores.

The wide variety of technical problems which are met in the mineralogical laboratory may be illustrated by the following examples: A certain granite had been eliminated in a northern market because it is said that it is a "gneiss." Mineralogical studies and analyses of

physical properties show that it has all of the properties of a true granite so that the term is a misnomer. This work proved that Georgia granite is equal to any granite from the North.

Before testifying in the Governors' Freight Rate Case on talc and soapstone, a member of the technical staff made a detailed petrographic study of the materials. To do this, it was necessary to study rock thin-sections under polarized light. He carried the evidence with him to Washington in the form of five small glass thin-sections carefully wrapped in an envelope. Had his testimony been disputed by any other technical witness while on the stand, he was prepared at any moment to pull out the envelope and face them with the source of information.

INDUSTRIAL DEVELOPMENT

Examination of Mining Properties. It is estimated that members of the technical staff have examined at least 800 mines, mining properties and prospects within the last two years. This involved work ranging from that of preliminary inspection to thorough geological study of the deposits. It has been necessary to advise methods of prospecting and mining, and to suggest suitable machinery and milling methods. Many specimens of minerals, ores and rocks were collected for laboratory study during the course of the work.

Kaolin—New Plants. The results of investigations dealing with kaolin have been very gratifying to the Division. Bulletin 44-A, "A Supplement to the Sedimentary Kaolins of Georgia," was welcomed by the Georgia producers and by the kaolin consumers of the United States. Even before its publication, some of the contained recommendations were acted upon by out-of-State producers who have now constructed a new kaolin processing plant at Sandersville, Georgia, at a cost of $175,000. This plant will process kaolin so that a finished product will be manufactured in the State instead of in the North as formerly.

Another large kaolin refining plant has been erected and a new mine opened just south of Macon since the publication of Bulletin 44-A; they are now in full production. The Division of Mines, Mining and Geology can, therefore, claim exclusive credit for bringing to the State more than $300,000 in new investments in kaolin alone.

Innumerable samples of all types of kaolin have been submitted to the Division for examination and testing. The best of these have

been investigated in the field and recommendations made to the owner or prospective operator for the most economical methods of mining and producing the kaolins. A great deal of money has been saved prospective operators of such deposits by advising against opening them up when the technical staff believed that the value of the material or size of the deposit did not justify the investment. Since new properties are being discovered continually, this service should be extended and enlarged at every opportunity in order to save the citizens of Georgia much money, and to guide them to the best investments.

Fullers Earth. The production of bleaching clay, of which fullers earth is the foremost representative in Georgia, has been more or less static for the past few years because of the increased use of a new material for this purpose. However, the newly discovered process does not produce a better bleach than does fullers earth. Recognizing this to be fact, the Division of Mines, Mining and Geology has undertaken to contact the consumers, past, present and potential, in order to show them that Georgia's fullers earth is the equal of any in the world. This activity has been more or less hampered because of a lack of sufficient funds to advertise the value of the mineral. Nevertheless, the Division has aided in obtaining at least $10,000 worth of new business for the producers of the State.

Bauxite. Members of the Division's technical staff have prepared a preliminary report on the bauxite reserves of Georgia. Bauxite, from which the metal aluminum is obtained, occurs in the three geologic provinces of the State. A large tonnage of this ore has been produced in Georgia in the past, but at present the production is very low. The study of the bauxite reserves was undertaken in order to try to determine why production has fallen off so greatly, and also to determine whether there still existed in the State sufficient amounts of bauxite ore to warrant a renewal of mining operations. This report was a statistical study of bulletins and mining records preserved in the offices of the Division of Mines, Mining and Geology. It involved very little new field work, without which complete information cannot be accurately obtained.

The result of the investigation demonstrates that there are vast reserves of good bauxite ores still remaining in Georgia, and that it is commercially feasible to mine the material. However, much field work on the actual deposits is necessary before definite recommendations can be made for mining the richest and most extensive properties.

The figures compiled by this study show that there are a minimum of 5,683,912 tons of bauxite containing less than 50 per cent of alumina, and that there are a minimum of 2,319,935 tons of bauxite containing more than 50 per cent alumina remaining in Georgia as an untouched reserve. Many properties known to contain high grade ore have not been prospected, thus the number of tons in them would greatly increase the above figures.

It can readily be seen that Georgia possesses an extremely valuable mineral which so far has been virtually untouched. A complete investigation of the bauxite deposits of the State is urgently needed so that the State may acquire full value from its mineral resources. Before any industry will consider an investment, as great a knowledge as possible of the situation is required beforehand; this service can be rendered by the Division of Mines, Mining and Geology if funds are provided with which to do the work.

Petroleum. The first important and progressive step toward scientific and adequately financed oil prospecting took place in 1937 and continued actively until the summer of 1938. One of the major petroleum companies made a detailed geophysical study of the Coastal Plain area, where it obtained results satisfactory enough to justify the drilling of the first deep test well two miles east of Offerman in Pierce County, Georgia. The officers and technical staff of the company making the survey and drilling the test well requested, and received, the full cooperation of the Division of Mines, Mining and Geology. A member of the State's technical staff was on hand during all operations, working with the company officials to obtain the most complete and detailed information possible. When the well proved to be a dry hole, the company turned over the scientific data secured from it to the State for its files, but has required that this information be kept in confidence until the company gives permission to release it.

The fact that the well information cannot yet be published leads to the belief that additional prospecting will be undertaken in the future. It is hoped that several more wells will be drilled for this purpose very soon. The type of rocks found in the Coastal Plain of Georgia are known to contain commercial quantities of oil and gas at other localities where they occur; consequently, there is a possibility that similar conditions may be found in Georgia.

The information obtained from the recent test well in Pierce County will not only be valuable to future petroleum prospecting but will also be of great use in the underground water survey now being carried on by the Division. The well penetrates all of the formations

of the Coastal Plain and therefore can be used as a sort of "yardstick" for the correlation of strata occurring in other wells in that area.

The Division of Mines, Mining and Geology, therefore, should be given much credit for securing for the State not only many valuable scientific facts but also an enormous investment of new money in Georgia. It is estimated that Georgia has received at least $3,000,000 in outside money brought in to the State by these activities. This figure will be materially increased by the payment of rentals which are being maintained at present.

Whiteware Industry. The Division of Mines, Mining and Geology has been interested in helping two new whiteware and pottery plants establish themselves in Georgia. The whiteware factory is now being erected in south Georgia, while the pottery plant is already under production in north Georgia. It is estimated that the initial investments required to start these businesses is about $600,000. This figure does not include the overhead expense of purchases, maintenance, or salaries which are necessarily quite large and which would, therefore, increase the sum shown above.

Miscellaneous Manufacturing Plants. The Division has been requested to furnish a great deal of information to the managements of two new industries wishing to establish plants in Georgia. One of these, a large insulation concern, asked for and received a preliminary market survey, together with a raw mineral resource report before it would consider the first steps toward building a plant in the State. The other concern, which manufactures a high grade roofing material, has received aid from the Division in locating and testing those minerals required in its manufacturing process. The insulation plant is estimated to represent an investment of $5,000,000, while the roofing plant probably amounts to around $1,000,000.

EDUCATIONAL WORK

School Museums. The collection of rocks and minerals in the State Museum at the Capitol attracts hundreds of visitors daily, including many school children. The Curator of the Museum reports that between three and four thousand adults and school children per month inspect this exhibit.

It is impossible for school children from all over the State to come to Atlanta to see this museum. The Division of Mines, Mining and Geology has, therefore, undertaken the tremendous task of collecting a large number of specimens of 75 common rocks and mineral found in Georgia for distribution as local museums in the schools of

the University System and in high schools throughout the State. Four hundred and forty-six sets have been accepted in 1935-1938. These sets are also available to grammar schools. Some sets have been accepted by Chambers of Commerce, Boy Scout and Girl Scout Camps, libraries, museums and other worthy organizations. The distribution of school museums by years is given below:

1935	1936	1937	1938
49	125	177	95
10.9%	28.1%	39.8%	21.2%

The sets were distributed as follows:

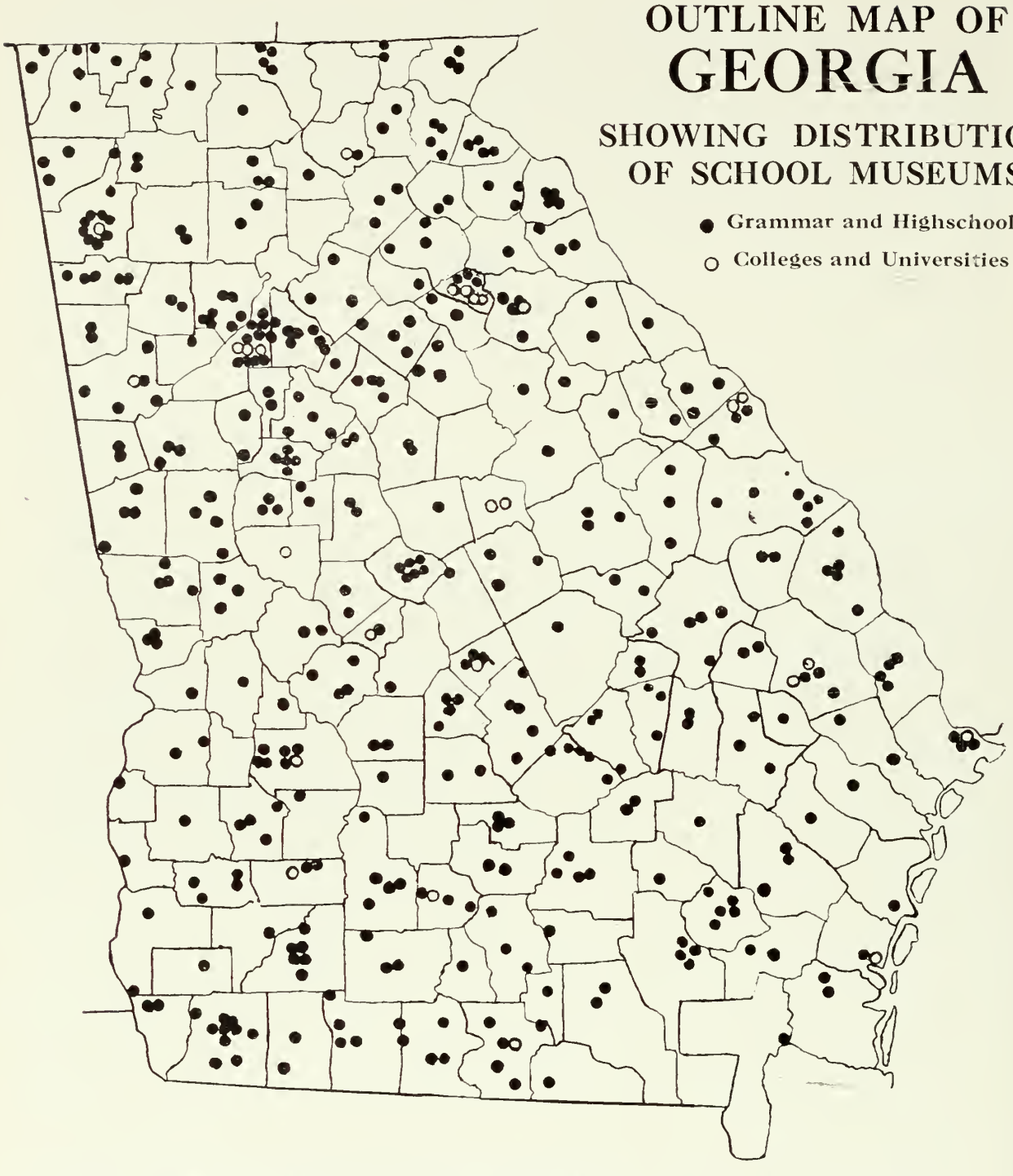
College and Universities	14
High Schools	338
Grammar Schools	56
Camps, Libraries, etc	38
Total	446

Since the needs of the high schools are gradually becoming fulfilled, grammar schools will be encouraged to install this exhibit. The accompanying map illustrates the distribution of museum sets in the State.

Each specimen in these school museums is labeled and is displayed on a painted wooden block. The only cost to the school is that of a locked glass case or cases for the display, and transportation charges for shipping. Many enthusiastic letters have been received from school superintendents telling of the value of these school museums in teaching the mineral resources of Georgia.

Capitol Displays. The Division has added greatly to its fine museum which is maintained on the fourth floor of the State Capitol building in Atlanta. This museum attracts many thousands of visitors each year, thus is one of the main points of interest to tourists, school children, and citizens of Georgia.

The Division desires to express its appreciation for the valuable cooperation it has received from Miss Annette McLean, Curator of the Museum. Her knowledge of minerals and her understanding of the services performed by this Division, together with her keen interest and friendly attitude, have been most helpful in stimulating interest in and promoting greater appreciation for Georgia's mineral resources.



Map showing distribution by the Division of Mines, Mining and Geology of school museums containing 75 common rocks and minerals of Georgia

One of the most educational and interesting exhibits is the Fluorescent Display which has been greatly augmented by the addition of more Georgia minerals than formerly. Also new ultra-violet lamps have been installed in the cabinet in order to increase the brilliance of the fluorescent phenomenon. This permanent exhibit has proved to be so successful that a portable display has been constructed for use at Fairs, both State and National, and at other gatherings where such displays can be of educational service to the public, and where

Georgia mineral products can be advertised to the advantage of the State.

Two displays of mineral resources of Georgia were constructed during 1938 for use in the museum and have been received with great interest on the part of the museum visitors. One of these shows the actual mineral mounted on a large board with colored ribbons leading from the specimen to localities spotted on a large outline map of Georgia. The regions possessing commercial quantities of minerals now being mined in the State thus are graphically shown to the observer. The other display has been constructed on a similar board on which a large outline map of Georgia has been painted. Mounted on the map are 125 small electric-light bulbs which, in turn, are connected to push-buttons near the base of the board. The electric bulbs are placed on the map to correspond to the State-wide occurrence of the commercial minerals. The 20 push-buttons each have a separate label such as Bauxite, Kaolin, Gold, etc., and when they are pressed, one at a time, light up the bulbs on the map to show the location of the various minerals in Georgia. These two displays are in the office of the Curator of the Museum.

A series of colored, transparent photographs depicting the mineral resources and mining operations in Georgia have been mounted in glass cases in the museum for display purposes. These pictures cover a wide variety of operations, and it is planned to change them at intervals in order to keep them always up-to-date.

Motion Pictures. The Division of Mines, Mining and Geology, following the modern trend of visual education, has begun a collection of a series of motion pictures on the many different types of mining now practiced in Georgia. These pictures show the mining methods used in each industry, as well as the finished products manufactured during the process. It is hoped that the different reels can be employed for a wide variety of purposes, including such items as grammar, high school and college lectures, advertising the advantages of establishing new industrial plants in Georgia, attraction of tourists to the State, and for safety programs for the miners themselves.

The pictures have been taken on negative strips so that as many positive prints as necessary can be made from the original, thus permitting a wide distribution of the films through the State and over the Nation. It is believed that this program will emphasize and draw attention to the economic opportunities now existent in Georgia and will be a direct cause of materially increasing the wealth of the State as a whole. Additional funds should be added to the appropriation so that this project may be expanded and enlarged.

Lectures. The Director and members of the technical staff are called upon to make explanatory talks about the mineral resources of Georgia on many occasions. This service is performed willingly because it is felt that such discussions are of educational value to the groups before which the speech is presented. It also affords an opportunity to advertise the mineral resources of the State. During 1937 and 1938, lectures were given before: Radio, Rotary, Kiwanis, Chamber of Commerce, High School, University, Chemical, Engineering, Geological, Mineral, Vocational, Technical, 4-H, and Forestry groups; and the following scientific societies: The American Association for the Advancement of Science, The American Association of Petroleum Geologists, The American Institute of Mining Engineers, The American Ceramic Society, and The Geological Society of America.

Exhibits. The Division of Mines, Mining and Geology prepared and built a series of exhibits for the Southeastern Fair, and for the Rural-Urban Convention held in Atlanta. This exhibit consists of a portable fluorescent box, a "Chest of Gold," various mineral specimens, and the two boards now on display in the Capitol Museum showing the state-wide distribution of commercial minerals. There have been many favorable comments on this display and many requests for its use in other places. Using these articles as a nucleus, it is hoped that a larger and better display can be assembled for the New York World's Fair beginning in 1939, because of its great advertising value to the State.

Georgia Mineral Society. The staff of the Division has taken pleasure in fostering and helping the organization of the Georgia Mineral Society outside of regular office hours. This society is composed of persons having an interest in the collection and identification of all Georgia minerals; it counts among its members many successful mining operators of the State. There are regularly scheduled meetings once a month at which eminent speakers are presented to talk upon the minerals of the State and mining problems confronting the operators. An all-day field trip is also conducted once a month so that the members will have the opportunity to collect new mineral specimens and observe mining processes all over the State. The technical staff of the Division aids the members in the identification of minerals and in search for new minerals. This activity, while strictly extra-curricular, is believed to aid in the solution of problems faced by the operators of mining properties, and in the mineral development of Georgia.

PUBLICATIONS ISSUED

List of Publications. In December, 1937, the Division printed a revised list of its publications which have been issued during the fifty years of its service to the State. Forty-seven regular bulletins upon the minerals and rocks totaling 11,000 pages have been issued during this period. There have been also nine information circulars, and 61 articles published in the Forestry-Geological Review. This excludes many articles published in scientific journals by members of the technical staff.

For the convenience of the public the Division of Mines, Mining and Geology keep for sale a stock of topographic maps on sections of Georgia. These maps are published by the U. S. Geological Survey and the U. S. War Department, 89 such maps being listed.

Directory of Georgia Mineral Producers, December, 1937. This mimeographed report lists the names and addresses of the mineral producers in the State, type of minerals produced, and location of the mine or mines operated. It contains outline maps of the State which show the location of mineral properties; it also contains a statistical summary of mineral production which shows tonnage and values.

This report at the time of its publication (December, 1937) showed that there were at that time 306 individuals or companies actively engaged in mine development and mineral production. The Division is now engaged in a revision of this report for 1937-38.

Mineral Resources of Georgia, 1938. The Department of Natural Resources, in cooperation with the State Department of Education, prepared in 1938 a bulletin on "Natural Resources of Georgia." This publication was published by the State Department of Education as a part of the Georgia program for the improvement of instruction in public schools. A section of this work relating to Georgia's mineral resources (pages 121-222) was prepared by the Division of Mines, Mining and Geology.

Two thousand copies of the section on mineral resources were later printed by this Division for free circulation.

One of the most useful and popular of the series of technical bulletins issued as a Geological Survey of Georgia has been Bulletin 23. A preliminary Report on the Mineral Resources of Georgia was first issued in 1910 and entirely revised in 1925. This report was supplement by a short Handbook of the Mineral Resources of Georgia. The need has long been felt for a publication on this subject that would be less technical than Bulletin 23 and yet would contain more

information than was given in the Handbook. The Division of Mines, Mining and Geology, therefore, welcomed the opportunity offered by the Department of Education to write the section on the mineral resources for a school text on the Natural Resources of Georgia. The entire staff participated in the writing, each member covering the minerals with which he is most familiar, and freely criticizing and helping with the other sections. This book has proven so popular that the edition may soon become exhausted.

Bulletin 44-A, A Supplement to the Sedimentary Kaolins. Kaolin, which is a white clay used for filling and coating high-grade paper, rubber, and linoleum, and which is also used in the manufacture of excellent firebrick and other refractory products, constitutes the largest single mineral industry of Georgia.

Since 1929, when the Georgia Geological Survey issued Bulletin 44, complete and detailed information concerning the status of this industry had not been compiled until 1937, when a survey of the business was made by the Division of Mines, Mining and Geology. The information secured from that investigation was assembled in the form of a bulletin and was issued in September, 1938, as Bulletin 44-A, entitled "A Supplement to the Sedimentary Kaolins of Georgia."

Bulletin 44-A, when used in conjunction with Bulletin 44, will serve as an accurate guide to ownership of properties underlain by deposits of kaolin; to companies and individuals mining and processing kaolin; and to the names and types of products manufactured by each. The bulletin also makes recommendations for areas to be prospected. An addenda lists the more recent changes in the production and ownership of bauxite deposits of South Georgia.

Bulletin 44-A has been mailed to a large percentage of the libraries of the United States and is in the hands of the present and potential users of kaolin in this country. By this means Georgia kaolin is advertised to the consumers with authentic facts and figures.

Recent Petroleum Activities in Coastal Plain of South Georgia. During the year of 1937 and half of 1938 there was a great deal of activity in south Georgia on the oil and gas possibilities of that area. Many of the major petroleum companies sent representatives to the State to investigate the chances of production and, in addition, to lease many thousands of acres. The Division of Mines, Mining and Geology can take direct credit for bringing to Georgia many firms and investors dealing in oil properties by means of the paper "Recent Petroleum Activities in Coastal Plain of Georgia." That paper was delivered before the American Association of Petroleum Geologists, annual meeting in the spring of 1938 by one of the Division's staff members.

The paper includes a discussion of the underground structures of the Coastal Plain and lists possible areas for drilling and geophysical prospecting.

Stratigraphy of Coastal Plain of Georgia. The United States Geological Survey and the Division of Mines, Mining and Geology have been cooperating to map the geology of south Georgia. A preliminary paper on the geologic conditions of the area was prepared jointly by the two agencies for presentation at the annual meeting of the American Association of Petroleum Geologists in 1938. This paper accompanied the one on the petroleum activities in Georgia and was intended to give some of the more important geologic relationships as affecting the search for oil and gas in the State.

Tripoli Deposits of Georgia, Information Circular No. 9, January, 1937. This report describes the tripoli deposits of northwest Georgia. This study shows that the current impression that Georgia tripoli is inferior to tripoli from other states is not true. The development of these deposits is suggested.

The Warm Springs of Georgia, Their Geologic Relations and Origin: U. S. Geological Survey, Water Supply Paper 819, by D. F. Hewett and G. W. Crickmay. This study of the several warm springs near Warm Springs, Georgia, was done in cooperation with the U. S. Geological Survey. This report, done at the request of President Roosevelt, was published by the U. S. Government. Methods are pointed out whereby the flow of the main spring at Warm Springs could be increased.

Map of the Okefenokee Swamp. A map of the Okefenokee Swamp was published as a special supplement to the Forestry-Geological Review in 1937. This great swamp is one of the most unique natural features of the State. The area has been of special interest since it became a wild life refuge.

WORK IN PROGRESS

MINERAL RESOURCES

Kaolin. The recently completed work on Bulletin 44-A, "A Supplement to the Sedimentary Kaolins" brought out the fact that additional research on kaolin was advisable. Consequently the Division has begun a study of methods for improving the quality of kaolin for its present uses in the manufacture of paper, rubber, ceramics, and refractories. This research work includes the bene-

ficiation of the kaolin, and in addition, the utilization of the waste material for some purpose. Great quantities of stained, or discolored kaolin must be discarded at present because of the lack of suitable means for bringing it up to the required color standards. If the Division can succeed in discovering some method or process for such beneficiation of the waste kaolin, it will have added many thousands of dollars to the State's income.

Another project on kaolin is also under way in cooperation with the U. S. Bureau of Mines at the Electro-Technical Laboratory of the Tennessee Valley Authority at Norris Dam, Tenn. That laboratory has tested kaolins from several States in the vicinity of Norris Dam. Georgia kaolin, however, has not been used in the investigations until just recently, when an arrangement was made by the Division with the U. S. Bureau of Mines to conduct an exhaustive series of tests on the use of Georgia kaolin for whiteware, and chinaware products. This work, it is hoped, will eventually lead to the establishment of additional whiteware and chinaware plants in Georgia.

Fullers Earth. The use of fullers earth for bleaching purposes has long been known. Georgia produces some of this ore for this purpose, but there are vast deposits of high-grade fullers earth which cannot be mined at present chiefly because the market does not exist. Therefore, it is logical to conclude that what is needed is a new type of market, or use for the material. Consequently, the Division has started an investigation to search for absolutely new uses for fullers earth. The most important one, which may prove of considerable value, is the use of the light-weight fullers earth for insulation purposes. The final form of the insulation has not been determined yet, for a great deal of work is required to find the most suitable binders, matrices, and combinations of the fullers earth with other insulating minerals and substances. This research work has a chance to succeed only if sufficient funds are provided to adequately finance it. The results will fully justify any expenditures of this kind.

Bauxite. The Division has made a beginning towards the use of bauxite, the ore of aluminum, for other purposes. Large quantities of low-grade ore exists in Georgia but at present it cannot be mined because of economic reasons. Nevertheless, the Division staff believes that there is a cheap method for beneficiating this ore, and raising it to commercial standards. It is also believed that several new uses may be found for the material not heretofore considered. A great deal of careful study is required for this problem which is

thought to be of prime importance to the economic future of Georgia.

Rock Wool. Rock wool is a heat insulator produced from a certain type of impure limestone. It may also be produced from other materials. Actually it is a glass which has been spun into fine threads. The material is prepared by melting a suitable type of rock in a cupola furnace, that is, a type furnace used in ordinary iron manufacture. This material escapes from a small orifice in molten condition where it is blown into a fine wooly product by steam or air.

About a year ago, this Division began a study of the rock wool resources of Georgia. No rock wool is at present manufactured in Georgia, although we have large potential markets. This material is imported to Georgia from such states as Ohio and New York, thus adding considerably to its purchase price. It is not manufactured in Alabama, Georgia, Florida, North Carolina or South Carolina. Georgia is the ideal location for such a plant. In our investigation we find that rock wool can be manufactured in northwest Georgia, probably in certain localities in middle Georgia, and most certainly in south Georgia. Northwest Georgia, with its large undeveloped deposits of limestone and shale, close to such markets as Atlanta, Chattanooga and Birmingham, and near our own coal deposits, is an ideal location for such a plant. Certain marble deposits of Piedmont Georgia also afford possible locations, and this Division is considering the possibility of preparing rock wool by combining waste marble with granite waste.

South Georgia is an excellent location for such a plant, thus we should have the Florida trade. In this part of the State, it may be prepared from impure limestones and fullers earth.

We believe that this industry could have a great future in our State. We, therefore, urge that plants be erected at proper localities for the manufacture of this product.

Limestone. The term limestone is a very general one, including, as it does, both consolidated and unconsolidated rocks composed of a greatly varying amount of lime intermixed with sand, clay, and magnesium in various proportions. The material is used for many purposes, among which are: a source of lime, for riprap, railroad ballast, road metal, concrete aggregate, furnace flux, and fertilizer. Some special kinds of limestone will form rock wool (See above).

Recently the attention of the members of the technical staff of the Division of Mines, Mining and Geology has been directed toward the development of the vast limestone deposits which exist in the State for use as fertilizer. Inquiries made of agricultural authorities indicate a rich potential agricultural lime market in Georgia.

The three main areas of the State are all well supplied with large limestone deposits, yet much lime is purchased from without the State.

The northwestern section possesses, perhaps, the most easily accessible and largest limestone deposits. Samples collected from that area indicate the occurrence of many varieties of limestone which can be used for almost any agricultural purpose.

Limestones and marbles occur locally in middle Piedmont Georgia. The deposits will grind or burn to good agricultural lime, and this section is in great need of lime for that purpose.

The Coastal Plain of Georgia also has large, widespread beds of limestone thought to be suitable for use by the farmer, and for many other purposes. The limestone samples collected so far indicate that the material of this area will probably be easier to grind than that of other areas since it is considerably softer and less consolidated.

A great deal of additional field work in locating suitable deposits, and many more chemical analyses are needed before this work can be successfully completed. The Division is collecting all possible information on grinding and pulverizing machinery in order to be able to determine the amount of capital investment required to start such a business, and thus to make such material available to the farmer at lowest cost.

Flagstone. The Division is actively engaged in the development of the flagstone industry. This industry has a promising future. There is now considerable demand for flagstone in every city in Georgia. In former years, flagging was used for paving purposes only, but in modern building its principal uses are as stone veneering and as decorative walks in the construction of residences.

The use of flagstone as a veneer is increasing rapidly in popularity, thus the demand for this type of stone is now much greater than the supply.

The Division is gathering data on quarry locations, quality, and variety of flagstone. Because of cost of transportation, the industry will be a decentralized one; for this reason, many producers will not be in direct competition with each other.

War Materials. In the event of war all mineral industries are revived; thus production is greatly increased. Certain minerals known as war minerals are in great demand at such times. Should this country become involved in a war, or should a European war break out, very many minerals present in Georgia would be in great demand. We plan to particularly investigate in 1939 the following minerals in view of the additional demand for them in the event of war:

Chromite, used to make hard stainless steel for steel plating; manganese, used to manufacture hard steel, batteries, etc.; iron ores; tin used in plating iron, etc. Pyrite, mined during the World War will be mined again in Georgia if we become involved in war; its particular use will be in sulphuric acid manufacture. Copper, used in the manufacture of shells, detonators, wire for generators and motors, etc.; coal, found in northwest Georgia and used in the manufacture of coke and as steam coal would increase in value; petroleum, used by modern battleships because it has been found to have greater fuel value than coal, thus the cruising area of the ship is increased 40 percent or more; fullers earth, used as a filler in the manufacture of dynamite and explosives; talc and kaolin, used as fillers in the manufacture of rubber; bauxite, a source of aluminum. Aluminum is essential in the manufacture of airplanes, automobiles, shell casings, etc. Japan is now making her shell casings out of aluminum. Mica, barite, asbestos, and other products also have important war uses.

Sub-surface Structural Map of South Georgia. The oil and gas activities of 1937 and 1938 have shown the great need for a map of the structural geologic conditions of the Georgia Coastal Plain. The search for petroleum depends, to a large degree, upon the attitudes of the rock formations in which oil and gas are thought to occur. That is, domes, terraces, and stratigraphic traps are likely places for the accumulation of oil and gas. Therefore, a structural map showing these features is very desirable and necessary to intelligent prospecting. Consequently, the technical staff of the Division of Mines, Mining and Geology has undertaken to prepare such a map. This work is progressing satisfactorily and should be completed sometime during 1939. The finished map will be of great use not only to future oil and gas operations but also to persons wishing to locate private or public water wells.

REPORTS IN PROGRESS

Report upon the Geology and Mineral Resources of Northwest Georgia. A geologic report upon the rocks and minerals of Northwest Georgia is being prepared. This area of the State includes the Paleozoic formations of Polk, Bartow, Floyd, Chattooga, Gordon, Murray, Whitfield, Catoosa, Walker and Dade counties. These counties contain much of the limestone, shale, and sandstones of North Georgia useful in cement, brick and tile, and lime manufacture; the large ore deposits of Bartow, Polk, and other counties; and the commercial coal deposits of Dade and Walker counties. This report

will be particularly useful when used in conjunction with the new geological map of the State.

Report upon the Geology and Mineral Resources of Middle Georgia. A report upon the rocks of middle Georgia between the Coastal Plain and the Paleozoic sedimentary rocks of northwest Georgia has been prepared and is now in type-written form. This report was prepared by a former member of the technical staff of this Division, who is now at the University of Georgia. It is practically ready for publication, embracing about 150 typewritten pages.

The report discusses at length, and for the first time, all of the 25 formations and rock types of the area. These formations include valuable marble deposits, quartzites, granites, and building stones, flagstones, and include a wide variety of ore deposits. This report, when published, accompanied by the new State geological map, will be an important contribution to the geology of Georgia.

Geologic Report on the Coastal Plain. The Division of Mines, Mining and Geology has been co-operating with the U. S. Geological Survey in the preparation of a geologic map of the Coastal Plain area. This map has now been completed, and a report written in full explanation of the map. The report covers in detail each of the 26 geologic formations. Each formation is discussed concerning the location of its outcrop, its lithology, paleontology, correlation with other formations in the United States, and for the mineral resources which it may contain. There are approximately 250 typewritten pages in the report; there will also be illustrations of the more important subjects. This report has been completed and now awaits funds for its publication.

These reports are very important to Georgia because they will act as a good advertising medium for the mineral wealth of the State. It is anticipated that they will be more popular than any others ever issued by the Division. Therefore they should be published as quickly as possible.

PUBLICATIONS PLANNED

Gold. Bulletin 4-A, on the gold deposits of Georgia, was published in 1896 but is now out of print. A later publication, Bulletin 19 on gold deposits, is likewise out of print. The first gold report proved to be the most popular publication of the survey. Because this publication is no longer available for distribution, and because of the great renewal of interest in our gold deposits, a third report on the gold deposits of Georgia is planned. Considerable work has been done by members of this Division upon the subject, much new

information having been gathered within the last year. The opening of many new mines has exposed many features of practical and technical interest. The many recent assays of our gold ores also has increased our knowledge of these deposits.

The new report will repeat the best features of the publications that are not now available, discuss the many new mining operations, and rediscuss the geology of the gold deposits in light of recent scientific developments.

Other Reports. Reports on glass sand, rock wool and ground water also are planned.

COOPERATIVE WORK WITH THE UNITED STATES GEOLOGICAL SURVEY

Underground Water Survey. The Division of Mines, Mining and Geology inaugurated on July 1, 1938, a program, in cooperation with the U. S. Geological Survey, Water Supply Division, for the joint study of the underground water resources of Georgia. Funds set aside by the State Bureau are matched dollar for dollar by the Federal Bureau; thus making it possible for the State to obtain at least twice as much information per dollar as could be secured otherwise.

This survey has been started in two separate critical areas in south Georgia, which are believed to constitute the most pressing need at present. These areas are those along the eastern seaboard and in the west-central portion of the Coastal Plain. Both are regions in which flowing artesian wells occur. They were selected because they act as a focal point for the investigation, and also are the areas in which the major industrial developments are taking place. The study is directed so that complete information will be finally obtained on reserves; and so that quantity, quality, and availability may be predicted with almost positive certainty. The Director has asked for and received complete cooperation from those persons and companies now engaged in drilling water wells or in developing the water resources of the Coastal Plain. These individuals have agreed to furnish complete logs and well samples for investigation. Therefore, much detailed information will materially aid final knowledge of these resources.

The cooperation of the Division has been requested in many instances by State agencies, County agencies, and cities of Georgia. The State Board of Health and the Division work hand in hand for the development of better and safer public water supplies. Many new wells have been located at public request and adequate water

supplies have been obtained in almost every instance. One outstanding example of the services, which have been and are now being rendered to the municipalities, is in the case of Albany, Ga., which has requested the Division to supervise the technical construction of additional wells for its public water supply.

The underground water survey in middle and north Georgia represents a new field in water study. Hundreds of towns and small cities in this section of the State must derive their water supply from deep wells or from surface streams. Proper location of wells is necessary in order to reach an abundant supply of pure water. Although many deep wells may cost around $2,000, the proper location of those wells may reduce that figure. Much money is lost where wells are drilled in improper locations and thus turn out to be dry holes. It is believed that this Division has saved local towns, cities and private individuals thousands of dollars within the last year through its assistance in proper well location.

This investigation, when completed, will supply the people of Georgia with a report of inestimable value for health and industrial purposes.

Surface Water Investigation. The need for intensive study of the water resources of Georgia was apparent many years ago. Georgia was one of the first States to recognize the potential value of her water resources; efforts have been made spasmodically to initiate a comprehensive program for this purpose. It was, however, only within the last five years that the pressing need for such a program became greatly apparent. Information about quantity, quality, use, control, or removal of water for activities related to water power, steam power, navigation, drainage, flood control, bridges, highways, municipal water supplies, sewage systems, soil erosion control, forestation, wild life sanctuaries, flood predictions, and public buildings became more urgently required. All indications point toward a period of great industrial expansion and economic progress for Georgia, consequently basic information of this type is necessary.

The General Assembly in 1937, passed a small appropriation for a co-operative water investigation, which, when matched by an equal amount from the U. S. Geological Survey, permitted work to begin March 1, 1937. As it was evident that the funds available were not adequate to undertake all of the broad program outlined above, it was necessary to modify the work to some degree. Therefore it was decided to establish stream gaging stations only on the largest streams, confining the quality of water studies to these same streams.

Accordingly, 53 river measurement stations have been established and continuous records of stage and discharge are being obtained. As funds permit, staff gages are being replaced by automatic recorders to increase the accuracy of the results, thus reducing the annual operating cost. Discharge records have been computed through the year ending September 30, 1937, and are now being prepared for publication. Records for the year ending September 30, 1938, are now being computed. Provisional records have been furnished to Federal, State, and many private agencies.

Complete mineral analyses of the water at each gaging station have been made and are now in course of publication. Daily samples for a one-year period at six gaging stations were collected and analyzed. Sixty-six public water supplies have also been analyzed.

The establishment in Atlanta of an office of the Water Resources Branch of the U. S. Geological Survey has brought unexpected, but advantageous, results to the State. For example, the U. S. Army, which is charged with studies for flood protection and navigation on the Coosa, Chattahoochee, and Flint Rivers, has transferred a total of $3,200 to this office for obtaining additional stream flow information. Likewise, the Federal Emergency Administration of Public Works, realizing the need for such information, and the need for the contruction of permanent recording stations, made an allotment of $21,000 to this office for that purpose. These funds are not available for normal operating expenses, but serve to illustrate the numerous advantages accruing to the State of Georgia even with only the small State appropriation of $15,000 set aside for the water studies. This money would not have been available had not the cooperative program been in effect.

WORKS PROGRESS ADMINISTRATION PROJECT

The Division of Mines, Mining and Geology is cooperating with the Works Progress Administration upon a project organized to collect, develop, and distribute knowledge upon the mineral resources of Georgia.

This project, which includes a number of workers, is under the direct supervision of the technical staff of the Division. A great deal of valuable work has been accomplished to date. This work has been honored by officials of the Works Progress Administration who have recognized it as a model project.

Mineral Resources of Georgia Counties. This work consists of checking the records of the various mineral deposits of the State

which, when complete, will show the mineral resources of each of the 159 counties in detail, as well as describe such deposits. It is the object of this work to plot these deposits on a map of each county. It is hoped that this data will be fully assembled in book form where it may be either mimeographed or printed.

Geographical Dictionary of Georgia. This project involves the compilation of a geographical dictionary, or gazetteer, of the State of Georgia. This work will list and locate all mountains, towns, elevations, creeks, branches, fords, ferries, and other geographic features of the State. It will discuss the origin of names, the meaning of Indian names, with such legends relating thereto as will be unearthed. This involves the study of a vast number of maps, reports, and other sources of information in the library of the Division. Although this work is still incomplete, the U. S. Board of Geographical Names has already had occasion to make use of it, accepting information from this work as authentic and as such has entered it in its report.

Technical Laboratory Assistance. During the last year, an appreciable amount of assistance has been given to the laboratory of the Division of Mines, Mining and Geology by members of the Works Progress Administration staff. This work has enabled us to handle a larger amount of analytical work which has been demanded of us by the public. It has permitted additional surveys of the possibilities for new industries within the State. Initial data has been obtained to substantiate the belief that Georgia offers every opportunity for the manufacture of rock wool. The investigation of every new deposit of both metallic and non-metallic ores was accomplished through the availability of the cooperative assistance.

These workers have also assisted in the preparation of school museum sets. They receive bulk samples of Georgia ores and rocks which are collected by the staff geologists from typical occurrences in the State. They break the specimens into convenient sizes, number them, wrap them in mimeographed labels, which correspond with the additional printed labels, and pack them for shipping. One worker is engaged in the correspondence and other technical work necessary for the distribution of these museum sets.

Library Program. It is not possible in a small space to completely describe the large amount of additional and valuable work done on this project. Examples would include the copying of old and sometimes rare reports which have not been printed. Sometimes but a single copy of such reports may be in existence. Many operators and other individuals have cooperated with this Division by lending us their copies which may be typed and preserved in files for future

use. The Division's library of some 15,000 volumes has been catalogued and cross-indexed by the Dewey Decimal system. This includes the reports of the U. S. G. S., the U. S. B. M., the Coast and Geodetic Survey and of the Smithsonian Institute; most of the States' geological publications and miscellaneous geological, and mineralogical works. Duplicate and want lists are mimeographed and sent out to the geological libraries all over the country and some 1,700 volumes have been added to the library in this manner. At the present time a fourth want list and duplicate list is being prepared to send out for further exchange of books. Many publications vital to the Division are out of print and can be obtained in no other way except through these exchange lists.

Mineral Description Files. A card-catalog file, cross-indexed by minerals and by counties, has been made on all recorded mineral deposits in Georgia. Chemical analyses and assays are filed on separate cards. This enables one to locate immediately any known mineral deposit by name or by location.

Bibliography. A cross-index file or bibliography has been made of all mineral publications which describe the geology and mineral resources of Georgia.

Well Logs. Copies have been made on printed forms of all available logs of deep wells of Georgia. These are filed for information on deep wells; they are available for ground water studies, stratigraphic work, oil prospecting, etc.

Catalog of Museum Specimens. A card catalog indexed by minerals and cases has been made for the minerals and rocks exhibited in the State Museum on the fourth floor of the Capitol.

Photographs. Members of this project assist in the mounting of our large collection of photographs of mines, mining properties, etc. These mounted photographs are filed under subject and counties. With this system one may now find all the pictures of any subject or from any county.

STATUS OF THE MINERAL INDUSTRY

Introduction. The mineral production of Georgia for 1937, according to incomplete returns made by the producers to the U. S. Bureau of Mines, the U. S. Bureau of Census, and the Georgia Division of Mines, Mining and Geology, was valued at $14,268,281, an increase of about 11.5 per cent over that of 1936. If we add to this the value of the water produced at municipal water plants and of electricity produced by hydro-electric plants we get a total of $29,-

871,233. The individual figures, as far as it is possible to reveal them, are shown in the table below.

These figures show that Georgia mineral producers are well on the road to recovery from the Depression, during which Georgia's mineral production reached a low of $7,695,583 in 1933. Georgia ranked first among the states in 1937 in the value of its production of raw clay (kaolin) and fullers earth; second in the production of monumental granite and ground mica; and third in the production of barite, bauxite, and marble.

The mineral production of North Georgia, although noteworthy for the variety of minerals produced, is exceeded in value by the clays, clay products, fullers earth, and sand and gravel of South Georgia.

Barite. Barite is a heavy white mineral used in the manufacture of lithopone for use in paint, blanc fixe for use in paint and as a filler, and barium chemicals. Ground barite is used as an inert filler in many industries and as an ingredient in glazes and enamels; granular barite is used in the manufacture of glass. A comparatively recent and important use is as a heavy medium in mud used in drilling deep oil wells in areas of high gas pressure. All of the 1937 production came from the Cartersville district of Bartow County.

Bauxite. Bauxite, the oxide of aluminum, was first discovered in America in 1887 near Rome, in Floyd County, Georgia. Since that time it has been mined in Floyd, Bartow and Polk Counties in northwest Georgia, and in Wilkinson, Macon, Randolph, Schley, and Sumter Counties in middle Georgia. The production in 1937 came from two mines in Macon County and one each in Bartow and Floyd Counties. It was largely used in the manufacture of alum salts for use as a water conditioner.

Cement. Portland cement was manufactured from limestone and either shale or clay at two plants, one in Polk County and one in Houston County.

Clay (kaolin). Georgia produces over 66 per cent of the kaolin mined in the United States for use as a filling and coating clay in the manufacture of paper; as a filler in the manufacture of rubber, oil cloth, and other products; and for use in the manufacture of china and other white ware. Its use in these products is largely replacing the English clay formerly used. It is also used in the local manufacture of high-grade fire brick and other refractories. This sedimentary kaolin was mined in 1937 in the following counties, named in order of the value of production: Twiggs, Wilkinson,

Washington, Richmond, Baldwin, Glascock, Houston, Taylor, and Hancock. The 1937 production was the largest in history.

Clay Products. The production of brick, sewer pipe, tile, and pottery from Georgia clays showed an increase in 1937 of more than 27 per cent over that of 1936. Common and face brick and structural tile are manufactured from the alluvial clays of middle Georgia. Sewer pipe, structural and roofing tile, and common and face brick are made from the shales of northwest Georgia. Fire brick and other refractories are manufactured from kaolin. Jugs, churns, and art pottery are made at some 16 small potteries scattered throughout Georgia. The State is gradually waking up to the opportunity to manufacture pottery on a large scale in Georgia using Georgia kaolin and other raw materials from the Southeast. A whiteware floor- and wall-tile plant has been in successful operation for several years at Macon. Local capital is being raised for a dinner ware plant at Gordon, and a California pottery has built a branch at Atlanta to manufacture luncheon and kitchen ware, flower pots, and garden pottery.

Coal. Only one coal mine is reported in operation in Georgia: that of the Durham Land Company on Lookout Mountain in Walker County.

Flagstone. The production of the small but growing flagstone industry, shown in the table as miscellaneous stone, comes mostly from Pickens County, where a thin-bedded quartzite with micaceous partings can be quarried in large thin sheets showing a variation in colors that makes it admirably suited for use as steps and walks in gardens and for paving outdoor terraces and porches.

Fullers Earth. Although Georgia is still the largest producer of fullers earth, a variety of bleaching clay used mainly in refining oils, the production has been declining for several years until 1937, when it showed a sizable increase. The production from Decatur and Thomas Counties is used with mineral oils, whereas that mined in Twiggs and Wilkinson Counties is used mainly with vegetable oils. A new use for fullers earth that may develop into considerable importance is for aiding in the clarification of water in municipal and industrial water conditioning plants.

MINERAL PRODUCTION OF GEORGIA FOR 1937

MATERIAL	1937 Tonnage	Change From 1936	1937 Value	Change From 1936	Average Value Per Ton
Clay (Kaolin):					
Paper & China Clay, etc	423,065	+15.2%	$3,332,851	+20.6%	$7.88
Refractory uses	80,667	+0.1%	213,208	+36.6%	2.64
Clay Products			3,641,371	+27.2%	
Granite:					
Monumental and building stone	64,750	+39.2%	987,344	+15.7%	15.25
Other uses	1,141,290	+32.9%	1,015,787	+10.3%	0.89
Marble	24,810	−63.4%	1,041,124	−43.8%	4.20
Bauxite*		−2.9%		−3.5%	6.80
Fullers Earth*		+10.2%	2,293,994	+21.0%	10.90
Portland Cement*		+9.8%		+2.4%	1.51 (per bbl.)
Limestone		+7.1%		+11.2%	1.07
Lime*	518,974	−3.7%	614,980	+36.8%	7.80
Miscel. Stone*		−70.6%		+63.0%	7.90
Talc		+4.5%		+30.3%	6.58 (ground)
Slate*	25,922	−33.7%	240,562	−31.5%	7.05
Mica and Sericite Schist*		+83.4%		+14.3%	15.75 (ground)
Sand and Gravel	540,392	+72.1%	295,823	+111.0%	0.55
Barite	71,944	+87.2%	404,404	+95.9%	5.52
Manganese ore:	(long tons)				
+35%Mn	689	−81.9%	11,423	−76.9%	16.60
10%−35%Mn	4,045	+48.8%	19,668	+77.4%	4.86
5%−10%Mn	5,492	+1,187.0%	8,791	+844.5%	1.60
	(long tons)				
Iron Ore	14,593	+154.5%	19,130	+66.6%	1.31
Coal*		−55.2%		−54.5%	2.32
Ocher*	14,470	0.0%	101,788	+9.6%	
Kyanite*		+20.0%		+30.0%	
Gold and Silver:					
Gold:	(fine oz.)				(per fine oz.)
Placer	521.43	+71.3%	25,995	+65.1%	35.00
Lode	221.29	+52.2%			
Silver:					
Placer	23.00	+109.0%	38	+80.9%	0.78
Lode	26.00	+52.9%			

Total Value of Mineral Production	$14,268,281	+11.5%
Value of produc. of Municipal Water	1,725,102[⊕]	
Value of Water Power (hydro-electric)	13,877,850[#]	+7.5%
GRAND TOTAL	$29,871,233	

*–Less than three producers so production and value cannot be shown separately.
[⊕]–Valued at $0.065 per thousand gallons at the plants.
[#]–Valued at the source of production at $0.01 per kilowatt-hour.

Gold and Silver. The increased interest and activity which was manifest in connection with mining and prospecting for gold and silver, following the increase in the price of gold from $20.00 to $35.00 per troy ounce, continued to gain momentum during 1937-38. This inducement, together with the fact that modern mining and treatment methods, such as drag-line excavators, froth flotation and jigging, has rendered certain previously worked placers and other low-grade gold deposits valuable commercially which were not commercial prior to the advent of these modern facilities.

The production of gold in Georgia in 1937, the last year for which definite figures are available, showed a gain of 65 per cent over that of 1936. It is expected that 1938 will show a corresponding gain over the year 1937. All together a total of more than 50 gold mining and prospecting operations were conducted in some 20 counties in Georgia during 1937-38. Of this total approximately 40 were new operations and resulted in the expenditure of approximately $130,000 for labor, machinery, mining rights and materials. The only silver produced was that associated with gold.

Granite. Georgia's production of granite continued to increase in 1937. Georgia is second among the states in the production of monumental and building granite, which comes mostly from the Elberton, Stone Mountain, and Lithonia districts. Curbing stone and paving blocks are produced principally in the Lithonia and Stone Mountain districts. The several large, and many small, producers of broken and crushed granite are widely scattered throughout north Georgia. The twenty-four counties producing granite in 1937 were, in order of the value of their production: Elbert, DeKalb, Warren, Madison, Fulton, Habersham, Henry, Dawson, Lumpkin, Oglethorpe, Banks, Union, Towns, Stephens, Coweta, Rabun, Cobb, Dawson, Greene, Columbia, Bartow, Carroll, Morgan, and White.

Graphite. No graphite had been produced in Georgia since 1928 until, late in 1937, the Southern Mining and Milling Company, at Clarkesville, Georgia, began to experiment with the recovery of

graphite from a kyanite-mica-graphite schist from which they had been producing kyanite and mica for several years. They made no commercial production of graphite in 1937 but have produced a considerable amount in 1938.

Iron Ore. Georgia was for many years a large producer of iron ore and pig iron, but in recent years has not been able to compete with the Birmingham District in Alabama, where iron ore, coal, and limestone for flux are found in close proximity. Since pig iron ceased to be manufactured in Georgia, a very small amount of iron ore has been mined in northwest Georgia and shipped to Birmingham. The production of iron ore in 1937, most of which contained a small amount of manganese, came from 12 producers in Bartow County and nine producers in Polk County, and showed a considerable increase over that of 1936.

Kyanite. Kyanite, an aluminum silicate used in the manufacture of high-grade refractories, was produced in Georgia for the first time in 1933. An investigation in 1934 by the U. S. Geological Survey, in cooperation with the Georgia Division of Geology, resulted in the discovery of a large U-shaped body of kyanite-mica-graphite schist in Habersham and Rabun Counties. The Southern Mining and Milling Company of Clarkesville is now operating several mills producing kyanite from this schist, with by-products of ground mica and graphite.

Lime and Limestone. The only plant reporting a production of lime in 1937 was in Bartow County. The production of limestone (including crushed and ground marble) in 1937 came from the following ten counties, named in order of the value of their production: Houston, Gilmer, Bleckley, Pickens, Fannin, Twiggs, Bartow, Polk, Whitfield, and Catoosa. The larger part of the production was used as a road material, but limestone, both crushed and ground, was used for many other purposes.

Manganese. The production of manganese and manganiferous iron ore, used principally in the production of alloy steels, came from 16 producers in the Cartersville District of Bartow County and one producer each in Floyd and Wilkes Counties. The 1937 production of high-grade manganese ore was considerably less than that of 1936, but the production of low-grade manganese ore and manganiferous iron ore showed a large increase over that of the previous year.

Marble. The Georgia Marble Company, with quarries in Pickens and Cherokee Counties, was the only producer of marble in 1937. The production included a small amount of serpentine or verde antique.

Mica and Sericite Schist. Only a very small production of sheet mica was reported from Georgia in 1937, but the production of ground mica recovered as a by-product from the mining of a kyanite-mica-graphite schist in Habersham County and of sericite schist from Pickens County showed a considerable increase. These are used principally as a filler and for the manufacture of artificial roofing.

Ocher. Ocher, a hydrated iron oxide used in the manufacture of linoleum, oil cloth, and as a coloring for mortars, was produced by three companies in the Cartersville District of Bartow County.

Sand and Gravel. Sand and gravel are produced at several large pits in middle and south Georgia and a large number of small pits widely scattered throughout the State. Most of it is used for structural and paving purposes, but blast sand is produced by three companies, molding sand by two companies, filter sand by two companies, and glass sand by one company. The production figures reported in the table are by no means complete because much of the production comes from small pits that are intermittently operated and of which no records are kept.

Slate. Slate granules for use in the manufacture of artificial roofing were produced by one company in the northern part of Bartow County. There has been no recorded production of roofing slate in Georgia for several years.

Talc. Three companies near Chatsworth in Murray County reported a production of ground talc and talc pencils used for marking iron and steel. The talc pencils from Georgia are said to be the best manufactured in the United States.

Water and Water Power. Water, although not often thought of as a mineral, is in reality our most important mineral resource, without which our civilization would not be possible. It differs from our other mineral resources in two ways: first, it is liquid at ordinary temperatures; and second, its supply is not exhausted by use, as is the case with all other minerals, but is continually being renewed. Not only is water itself an article of commerce, as domestic and industrial water supplies, but it is a source of energy for the manufacture of electricity (hydro-electric power).

The Georgia Department of Public Health estimates that the municipal water systems of the State in 1937 produced 17,544,637,500 gallons of water from surface supplies and 10,533,900,000 gallons of water from deep wells, a total of 28,078,537,500 gallons of water. The average cost of production is probably about six and a half cents per thousand gallons, which would give a total value at the plants of $1,725,102.

The amount of electricity for public use generated by water power in Georgia in 1937 increased slightly over that reported for 1936. The value was figured at one cent per kilowatt-hour, the approximate value of the electricity at the source of production.

DIVISION OF MINES, MINING AND GEOLOGY OPERATING ACCOUNT

January 1, 1937 to June 30, 1937

Balance on Hand January 1, 1937	$	860.81
Receipt from State Appropriation		7,089.15
Total Receipts	$	7,949.96
Total Disbursements		7,932.41
Balance operating account June 30, 1937	$	17.55

Stream Gaging Account:

Balance on Hand January 1, 1937		None
Received from State Appropriation	$	7,500.00
Total Receipts	$	7,500.00
Total Disbursements		5,338.65
Balance Steam Gaging account June 30, 1937	$	2,161.35

Disbursements January 1, 1937 to June 30, 1937

Geology:

Personal service	$	5,789.70
Travel and subsistence		1,200.94
Supplies and materials		282.18
Communication		194.60
Printing		234.40
Freight and express		33.62
Equipment		21.13
Miscellaneous		175.84
	$	7,932.41

DIVISION OF MINES, MINING AND GEOLOGY
OPERATING ACCOUNT

July 1, 1937 to June 30, 1938.

Balance on hand July 1, 1937	$	17.55
Receipts from State appropriation		33,300.00
Refund from Public Service Commission one-half expenses A. S. Furcron		37.10
TOTAL RECEIPTS		33,354.65
Total disbursements		31,525.05
Balance operating account July 1, 1938		1,829.60

STREAM GAGING ACCOUNT:

Balance on hand July 1, 1937	2,161.35
Received from State Appropriation (regular)	12,180.66
Special Appropriation	2,000.00
Total Receipts	16,342.01
Total Disbursements	16,297.86
Balance Stream Gaging Account July 1, 1938	44.15

Disbursements July 1, 1937 to June 30, 1938.

GEOLOGY:

Personal Service	$	18,319.26
Travel and Subsistence		3,536.12
Supplies		2,243.38
Communication		356.56
Printing		427.44
Freight and Express		63.20
Equipment		1,964.17
Repairs and Alterations		1,003.30
Miscellaneous		386.62
Commissioners Office		3,225.00
	$	31,525.05

HALF A CENTURY OF SERVICE

1889-1939

The Geological Survey of Georgia will observe its fiftieth birthday this year. On November 23, 1939, the Survey will have completed fifty years of continuous service. This is indeed an unusual and enviable record—one which surely is deserving of fitting and proper observance. Such a means of observance is available in the form of the first real geologic map of Georgia which has just been completed. The publication of this map with the various geological formations portrayed in colors would be most appropriate as a memorial to half a century of uninterrupted service, as well as filling a long-felt need for geologic information in this form. The map should be accompanied by the report which gives the details of the geology shown on the map.

In this connection it might be interesting to point out the fact that many of the functions now performed by other divisions of the present Department of Natural Resources were originally performed by the Division of Geology. In other words, the present Department of Natural Resources has evolved from a nucleus, or beginning, which originally consisted of only one agency—the Geological Survey of Georgia.