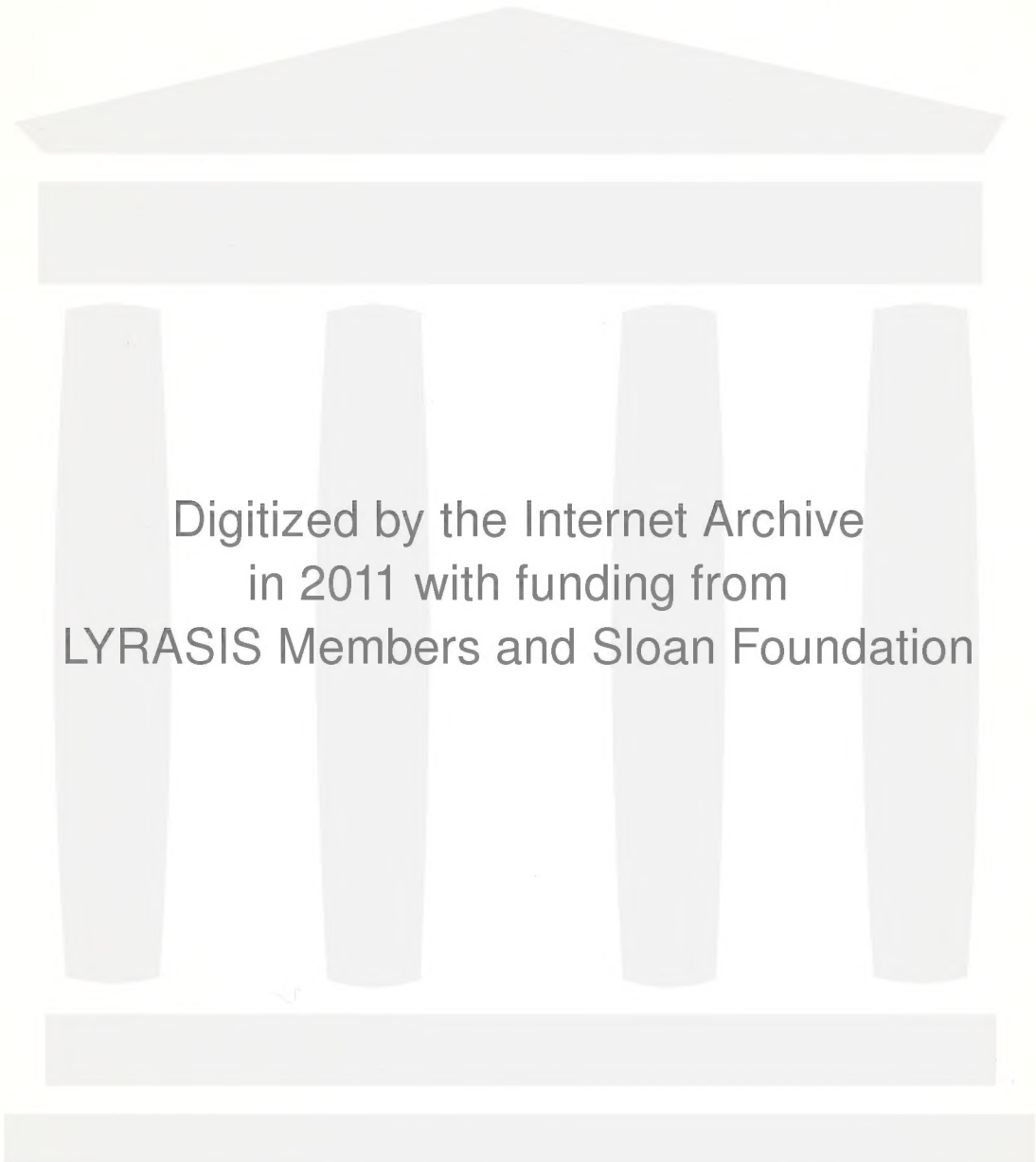

MANAGEMENT PLAN

for

STONE VALLEY EXPERIMENTAL FOREST

by

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State College, Pennsylvania
June, 1949

I N D E X

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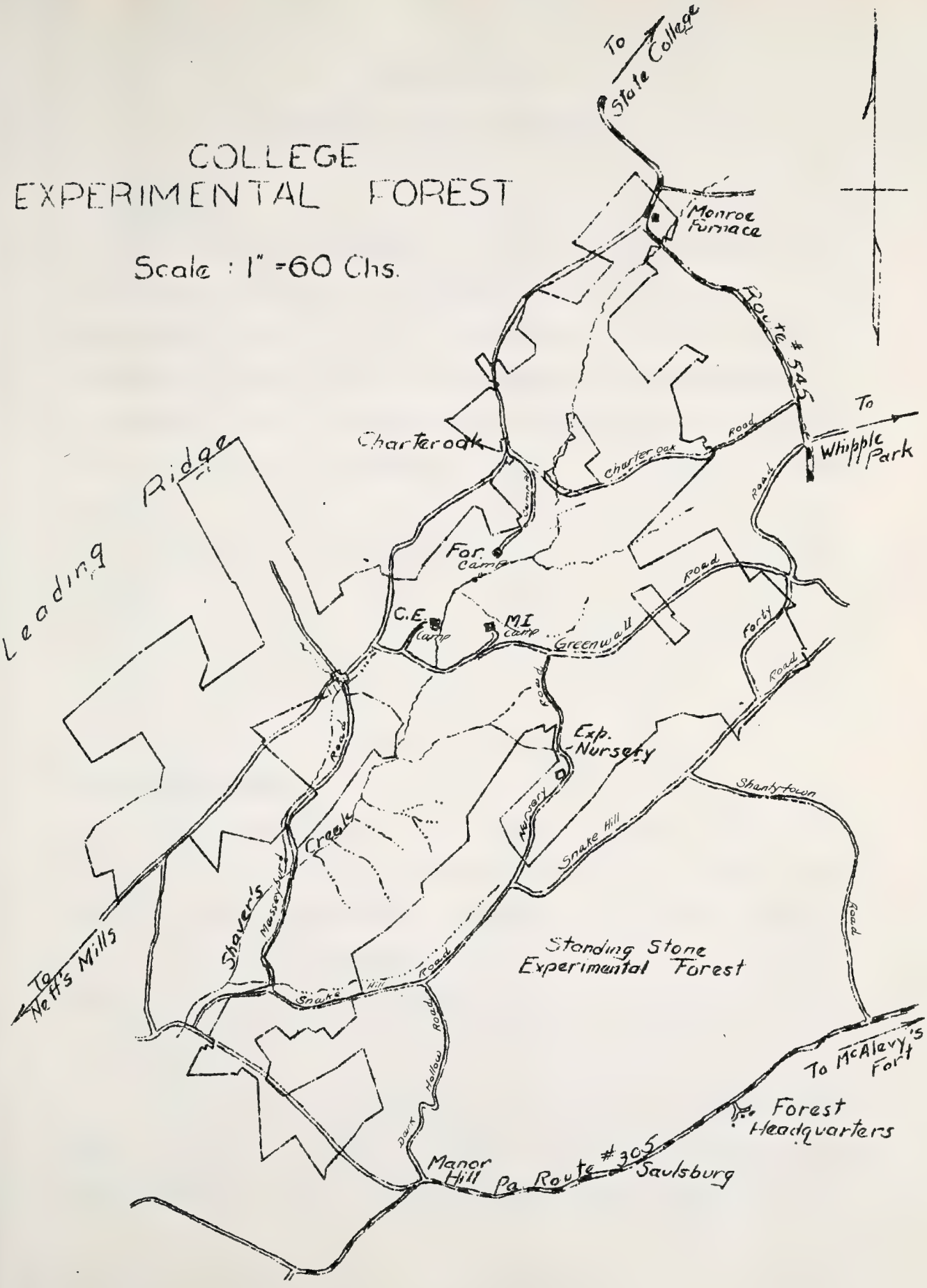
COLLEGE EXPERIMENTAL FOREST

Scale : 1" = 60 Chs.



PART ONE

GENERAL INFORMATION AND HISTORY

1. Ownership

The Stone Valley Experimental Forest is in the ownership of the Federal Government, which through the agency of the Forest Service, has leased the area to The Pennsylvania State College for a period of 99 years. The land was acquired by the United States in connection with the Pennsylvania Land Project L-PA-4. The deeds of the various tracts acquired are recorded in the Huntingdon County Court House. A list of these tracts is given together with the cost of the lands in the appendix of this management plan. According to this list the total area is equal to 4,920 acres, while the area as computed from the newly established map was found to be 4576 acres. The discrepancy is due to the inaccuracies of the early tracts as well as to inaccuracies of the present survey.

2. History of Area

The first white settlers, in Huntingdon, Brush Creek Valley and a number of smaller villages and areas were included in the original grant of land to William Penn, made by King Charles II of England in 1681. The settlement of the Pennsylvania west of Pittsburgh progressed but slowly. Barree Township was set off in 1767. Huntingdon County was formed in 1787.

Stone Valley takes its name from the Standing Stone Creek which flows into the Juniata River at the county seat of Huntingdon. In the early days of the History of Pennsylvania, Indians of the Iroquois

Cribb erected on the present site of the town of Cumberland a tall stone pillar to designate a meeting place for tribal conferences. This pillar is responsible for the name Standing Stone. A trapper and Indian trader by the name of Peter Hover gave his name to the creek which unites with the Juniata River at Petersburg. Peter Hover, who lived on the west bank near the mouth of the creek, was murdered about 1765.

The College Experimental Forest lies entirely within the Shaver Creek drainage basin and in the township of Barree, with a few acres in the adjoining townships of Porter and Tell. Barree Township was formed by the Cumberland County Court in 1767. It originally embraced all the land of Huntingdon County west of Jack's Mountain and Stirling Hill and also the greater portion of Blair County. In those years the people of the outlying area were rebelling against the taxes imposed upon them by the mother county. Isaac Barre defended the colonists in a speech on the Stamp Act delivered to the British Parliament in 1765. It is supposed that the name of Barre was given to the township in honor of Colonel Isaac Barre. The present size of the township is 24 square miles.

Because of many Indian raids during the years 1755 - 1758 and 1775 - 1783, Barree Township had few settlers prior to 1800. After that date the population increased rapidly. Here and there scattered farms sprang out of the wilderness. After 1830 large numbers of farmers began to clear and cultivate the lower rolling knolls which had supported excellent stands of mixed hardwoods and softwoods. The rather deep soil (3 feet) was well drained and free from stones and

rocks. It could usually be filled [illegible] more quickly. Pasturage became of more, as it failed, or [illegible] more practical. The principal crops were timothy, wheat, corn, oats, barley and potatoes. Livestock was also raised.

Interesting never was a large industry in Carroll County, although it was carried out rather extensively over a period of more than one hundred years. The first mills were driven by water power, obtained by building dams in the fast flowing streams. Power from the water wheel was transmitted through wooden wheels [illegible] teeth to the vertically suspended up-and-down saw. These mills produced only a few hundred board feet per day. The ruins of such a mill, owned by D. H. Mightner, can still be found on Beaver Creek a short distance from the present Charbo fish community building. With the advent of steam engines the up-and-down water mill gave way to the circular steam mill. Later, gently, the cutting of timber progressed much more rapidly.

Throughout this section all logging followed the practice of "high-grading," that is to say only the best quality or a removal in each cut. This has resulted in large areas being poorly stocked with inferior tree species. In addition to this, the destruction of most of the chestnut blight has further reduced the value of the existing stands of timber. An early record indicates that one of the largest trees ever cut in this region was a sugar maple in nearby Shelby County in 1875. It is true had a circumference of more than 12 feet. It had been logged for more than 50 years and during this time it yielded 1700 pounds of maple sugar. No hardwoods approaching this size can now be found in or near the area of the Experimental Forest.

The early discovery of iron ore in the area led in 1845 to the construction of the Pioneer Iron Smelting Furnace at the foot of Turkey Mountain on land now included within the College Experimental Forest. This furnace was built by General James Irvin and was operated by him for several years. Later Mr. George T. Johnston Company carried on the operation. The furnace was of the quarter pattern and had a good capacity. However, the stock was necessarily short and only soft ore could be smelted. The reduced iron in the form of pigs was hauled over Stone Mountain by Iberia teams to the town of Bellerville, where it was made into castings for stoves of the Philadelphia pattern. The metal produced was gray-iron and especially well suited for castings. In 1871 the operation of the furnace was discontinued due to the unfavorable location. Today all that remains of the settlement, which once included several log houses and a store, is the old stone furnace stack.

The cutting of trees for charcoal for the smelting of iron ore hastened the rapid deterioration of the surrounding forests. The second growth timber which had grown up following the first logging was cut practically clean. When the sprouts grew again to pole size, they were cut once more. As a result of these successive heavy cuttings and the effects of frequent fires, most of the acre or less even-aged stands of today are very defective. The great number of charcoal hearths, scattered throughout the Experimental Forest, indicate the importance of charcoal burning in earlier times. Mr. Henry Hightower, a 75 year old resident of Harrykiry still recalls the times when he helped to cut charcoal wood at the rate of 37 cents per cord.

The census figures of 1850 showed Barnes County with a population of 2,465 persons and post offices at Valley City, Baldwin and Rose Hill. In comparison, the census of 1840 revealed a population of only 311 persons. Valley City was named for Mr. Rockwell Valley, a member of the wealthy Valley family which lived at that place for more than 30 years (1833-1863). Baldwin was named for one Henry Mitchell Baldwin who got cattle here late about 1835. He operated a brewery in Baldwin and had previously built a sawmill in 1816. The place was originally called Rose Hill. Valley Hill was so called because of its location on one of the early, regularly traveled trails of this section. Cherry Oak was named for a large red or black cherry wood near the present rural intersection; there is no evidence that this tree had a more important historical significance.

Fairly persistent bull of the many kinds of timber valued and a country of deer, squirrels and rabbits were plentiful, as were foxes, both gray and red.

In 1925 an attempt was made to strike oil, but drilling ceased at about 600 feet with no oil in sight.

The last half of the nineteenth century saw the period of the greatest relative prosperity for farmers living in Cherry Valley. The decline of the farmer's began when the light, silty soil which was so easily furrowed, suffered increasingly from severe erosion. In many places the top soil was completely washed away and poverty and bankruptcy became more and more common. The natural impoverished a very drought stricken incapable of growing productive crops. Many began to abandon their farms and to seek employment elsewhere. Local taxes could no

longer be collected to support the local governments. Finally, in 1934 the United States Resettlement Administration decided to establish a land utilization unit in Stone Valley. Farmers on submarginal lands were given an opportunity to sell their farms for cash or to exchange them for better land elsewhere. Through the use of emergency relief funds, township roads were built, timber stands improved, abandoned fields were planted with trees, buildings and other improvements were constructed. Through these activities employment was supplied to many jobless and needy residents of the area.

The land acquired by the Resettlement Administration later came under the jurisdiction in turn of the Farm Security Administration, the Bureau of Agricultural Economics and the Soil Conservation Service. It finally came under the administration of the United States Forest Service which made it available to The Pennsylvania State College for research and instruction. The area has been turned over to the College under a 99 year lease dated May 17, 1940. A copy of this lease is found in the appendix.

1. Location, Extent, etc.

The entire area of the College Experimental Forest is located in Huntingdon County, Pennsylvania. The major part of the forest lies in Barree Township and only small parts extend into Kant Township and into Jackson Township. The small inholded localities comprising a few houses only, namely Charter Oak and Centerburg, lie 10 and 12 miles to the northeast of Petersburg. The road distance from Charter Oak to State College is 23 miles. One mile south of Charter Oak is the Forestry Camp consisting of a large lodge, a tool shed with water pump and garage, a

machinery and two cabins with cabins utilized by students taking summer field work.

A number of good roads make the forest easily accessible. At the foot of Bunny Mountain near Duncan Furnace, a well-maintained road branches off Highway Route 545, leading through Charter Oak and Pennsylvania to Petersburg. At Charter Oak, the Charter Oak Road turns off to the east leading back to Highway 545 which it joins 1 1/2 miles south of Duncan Furnace. A short distance from Charter Oak, the Forestry Camp Road turns off to the right from the Charter Oak Road. East of Pennsylvania at the old Cabin place the Greenhill Road turns southeast and passes across the forest as in to Route 545. The Civil Engineering Camp and the Mineral Industries Camp are both reached by this road. Not quite half way between the Cabin place and Route 545, the Forestry Road leads south from the Greenhill Road to the Pine Hill Road near the southern boundary of the forest. At Pennsylvania, the Pennsylvania Road leads south to the Pine Hill Road. The Pine Hill Road itself runs northwest from Route 545 (Petersburg to Waterye Fort) along Arnold Run to Route 545. Running through the southeast corner of the property, Susquehanna Road connects the Pine Hill and Greenhill Roads.

The boundary of the contiguous area is extremely irregular, the total length being equal to 33 miles. It embraces an area of 4576 acres, not including two small alienated pieces of 42.4 and 37.4 acres respectively. The circumference of a quadrat of equal area would measure only 33 per cent of the actual length of the property boundary. A section of the topographic sheet of the Allenville quadrangle, showing the boundaries of the property, is shown as Figure 1.


Soballs Gap
Ridge
Valley
Clarksburg
B M
1057
Mansfield
Run
B A X T E R
B M
857
Armand
Run
305
Mount Hill
B M
895
Sunshine
Hollow
Lick
Run

6. Topography and Drainage

The topography of the area which lies between the two major mountain ranges, the Tussey and Stone Mountains, is extremely variable and irregular. The name Penns Valley which is applied to the countryside around Centre Dale and Centreville does not refer to a clearly defined valley. The Penn Experimental Forest lies within the watershed of Elever Creek. This creek is fed during the wet seasons by a number of small tributaries which wind in an irregular course around innumerable ridges and "knobs". There is, however, a general tendency for the more important ridges to run in a northwest-southeast direction. These major ridges are broken up by steep ravines and gullies. In the east central portion of the forest, a section which was extensively devoted to agriculture, the slopes are more gentle, giving the countryside a rolling appearance. A section of the forest extends in the northwest to the summit of Leading Ridge with an elevation of 1600 feet above sea level. Just beyond Leading Ridge lies Tussey Mountain which rises to more than 2000 feet. Stone Mountain to the south of the area reaches about the same elevation. The part of the broad "valley" between these two mountain ranges which comprises the Experimental Forest has an elevation ranging from 750 feet on Elever Creek to 1037 feet on Leading Ridge.

Elever Creek flows through the forest in a general southwesterly direction. It unites with the Juniata River at Petersburg, Pennsylvania. During periods of extreme drought, Elever Creek has been known to go nearly dry, although it usually maintains a fairly good flow throughout the year. The width of this stream varies from a few feet up to 60

and 70 feet in some places. The little streams which feed the main creek become dry during the summer months, only a few arise from permanent springs. Arnold Run, near the southern boundary of the forest, has several fine springs. Butterbaugh Run, in the south central part, flows through Butterbaugh swamp which is permanently wet. Henderson Run flows into Arnold Run in the southern portion of the forest. Henderson Run originates within the northeastern part of the forest; it joins Slover Creek north or southeast of the property.

There is a strong indication that excessive deforestation and clear cutting of this area has resulted in a lowering of the water table during the last century. Old residents tell of a number of fine springs which have dried up. The exposure of the dampish shale soil in this valley must inevitably tend toward the establishment of more xerophytic conditions.

1. Climate

The climate of Central Pennsylvania is of the humid continental type, generally characterized by rather severe winters and warm summers. The extremes between summer and winter temperatures are large, while the rainfall is rather evenly distributed throughout the year.

The closest meteorological station which has been in operation for many years is the station located at The Pennsylvania State College. Data on the maximum and minimum daily and mean monthly temperatures for State College are summarized in Table 1. The average monthly precipitations are listed in Table 2.

Table 2. Mean daily maximum and minimum temperatures for each month, [illegible], 1897 - 1926.

	Mean monthly Max.	Min.	Mean daily Max.	Min.	Mean
	°F.	°F.	°F.	°F.	°F.
January	53	-2	34	19	27
February	54	-2	35	19	27
March	66	9	45	27	36
April	80	32	56	37	46
May	86	39	70	48	59
June	89	48	78	56	67
July	92	48	81	60	71
August	91	45	79	58	69
September	87	39	73	52	63
October	78	26	61	41	51
November	67	14	48	30	39
December	55	4	37	23	30

Table 3. Average monthly precipitation (1897-1926) and relative humidity (1923-1927), State College.

	Precipitation	Relative Humidity
	Inches	per cent
January	3.06	90.2
February	2.80	77.4
March	3.39	81.0
April	3.45	75.2
May	3.08	72.4
June	4.13	78.7
July	3.00	75.5
August	3.57	81.9
September	3.42	82.5
October	2.72	78.0
November	3.30	84.7
December	2.77	91.7
	38.19	

Some meteorological observations have recently been made at the headquarters of the Standing Stone Experimental Forest. When comparing the averages obtained for the years 1941 and 1942 with the corresponding data from State College, it appears that the temperatures entrance south of Tuscarora Mountain are somewhat higher than at State College. The means of the maximum daily temperatures are about 2 - 4 degrees higher for the valley floor than for State College; the means of the minimum daily temperatures are about 2 - 4 degrees lower at Standing Stone. The same holds true for the extreme monthly temperatures, the differences being still somewhat more accentuated.

When comparing the monthly rainfall of the two stations, it appears that Standing Stone receives a higher amount of precipitation than State College. While for the two years 1941 and 1942 the average annual rainfall at the College was equal to 39.6 inches, the average for Standing Stone was equal to 47.1 inches. The differences vary, however, considerably from month to month and not too much reliance should be placed in this comparison.

The prevailing winds, as recorded for two years at the Standing Stone Experiment Forest, come from a northwestern direction from March to September. In October, November and December the main winds come from the west and in January and February northwestern winds prevail.

6. Geology

A knowledge of the geology of Stone Valley is very helpful for a better understanding of the existing topography, the formation of the area, as well as of plant cover, forest types and land use. Up to the present time no geologic map of the Allensville quadrangle has been

prepared by the U. S. Geological Survey. On the other hand, the geology of the neighboring Bellefonte quadrangle to the north and the Tyrone quadrangle to the east have been thoroughly studied and good geologic maps are available. The information contained in the geologic publications concerning these two quadrangles is a great help in studying the geology of the Penn Valley area. In recent years much work has been done within the experimental forest itself by the Department of Geology of The Pennsylvania State College. A not yet completed map prepared by Professor Dunlap actually plots the geology of the entire experimental area. A photographic copy of this map has been colored and inserted in this management plan.

The Penn Valley area lies in the Ridge and Valley section of the Appalachian Province. This section, which lies south of the Appalachian Plateau is characterized by relatively flat plains and steep strongly folded beds of stratified rocks, sandstone, shale, limestone and dolomite. The Penn Valley area lies south of the outcroppings of the hard Tuscarora quartzite on Nittany Mountain and Leading Ridge. The complicated tectonic structure of the area shows a series of synclines and anticlines as is apparent from the accompanying geologic map. Any detailed explanation of these folds would become too involved and so shall, therefore, restrict ourselves to a brief description of the various strata underlying the soils of the area. Beginning with the youngest strata, these are:


Shallow Gap
Valley
Ridge
Mountain Furnace
Mason Hill
Manor Hill
Hollow
Creek
1300
1400
1500
1600
1700
1800
1200
1100
1000
900
800
600
305

Tully Creek Shale. About 50 feet thick. A soft, calcareous, argillaceous olive-black shale, weathering to flaky yellow-green shale with thin layers of impure limestone near the base.

Moscow-Ludlowville (Limestone and shale, 50 - 60 feet thick). Upper Ludlowville shale (100 feet thick), Middle Ludlowville (30 - 50 feet thick). These strata are made up of red shale and limestone, also green shale and gray limestone. They occur on the area in the form of narrow bands underlying the Tichenor Limestone and Shale.

Tichenor Limestone (20 feet thick) and Shale. Tichenor Shale (20 - 30 feet thick). The Tichenor formation on which the forestry building is located overlies the thin-bedded gray Tichenor Shale. The intermittent thin limestone and sandstone of the Tichenor Shale is included with the Tichenor formation.

Penfield Limestone (15 - 25 feet thick). A ferruginous, hard, gray limestone with beds of hematite which have been mined. Belongs to the Clinton formation.

Vernon Shale (700 - 800 feet thick). This shale which belongs to the Clinton formation is of a purplish color. The shale is extensively used for the surfacing of local roads. It underlies the greater part of the soils of the experimental area.

Oneida Red Sandstone (75 - 125 feet thick) and Sherburne Sandstone (450 feet thick). The Oneida Sandstone is

[illegible] Tuscarora [illegible]. It overlies the Tuscarora sandstone, a very dense and hard, thick-bedded, light gray sandstone which is partly silicified to quartzite. The two formations appear on the upper part of Reading Ridge on the Appalachian Forest.

[redacted] In addition to these two formations there is alluvial material in deposited along streams. This is shown in blue color on the map.

2. Soils

In view of the very limited geology of the area, a similar situation must be expected with regard to soils. Changes of the soil are, however, not only due to changes of the geologic strata of the bedrock, but also to topography, exposure, vegetation and other factors. Colluvial materials and alluvial erosion have carried, in many instances, a mixture of different parent material from which the soils developed. The soils found on different geologic strata may often be practically the same, while in other cases quite different soils are found on one and the same strata. At the present time the data necessary to classify these various possibilities are not available. No soil map has so far been prepared. A great deal of field work will be necessary before such a map can be made.

For the practical management of the forest in the immediate future a soil map is hardly required, but for many kinds of future experimental work it will be of great value. A soil map will be established at the first opportune time after the war. Separate soil maps will be made for each block. The following description of the soils of the area is

quite general. Two have been made of the paper by L. D. Alderfer and M. S. Beattie, which discusses some of the physical properties of the soil but also contains a general description of the prevailing soil type.

Most of the soils within the experimental area represent a gravelly loam generally described as a hilly soil, the parent materials of which originated from the folded, yellow and red, fine-textured, acidic-earthy and Siluro-Devonian Shales. The Gilpin profile is quite shallow; it lacks a well defined subsoil or B-horizon, as that the surface soil or A-horizon rests upon weathered fragments of the C-horizon. The A-horizon rarely exceeds 6 inches in depth. The total profile depth is about 12 to 18 inches, although it may be more shallow on badly eroded places. Outcrops and exposures are also said to be extensive. This accounts for the roughly broken relief of some of the soils. The profile of this soil generally consists of a type sequence of gravelly-silty loam which rests upon fragments of the soil material. The general fertility level is quite low, as manifested in the sparse growth of the existing stands. Organic matter content is low, due to a very low vegetation-producing capacity and the rapid rate at which organic matter is utilized by erosion and immediately following cultivation. Wind water forces cause the soils to surface erosion is very rapid. The whole profile is yellow to yellow-brown or sharp-brown fine in the parent material is mottled with gray and yellow colors. Values determinations of soil acidity by pH for the Gilpin gave values ranging from 4.3 to 6.0, the majority of the determinations being close to 5.0.

On the more extensive Hills Creek Flats and Pendleton Flats, remnant better soil types develop, probably belonging to the Woodburn and Calapooia series. The better areas of these soils may represent an almost brown forest soil, with higher humus content and a lesser degree of acidity. A slight development of the B-horizon may be present. After agricultural use these soils have, however, suffered from severe erosion and often degenerated to a shallow soil of the Clayton type. Better soils are found, of course, along the creeks and on river bottoms where the deposit of alluvial material has to create a deeper and richer soil, capable of supporting such hardwoods as black walnut, cascara, ash, and yellow poplar.

<u>5. Natural vegetation and forest types</u>

Before the settlement of the area by early farmers in the middle of the 19th century, practically the entire area of these Valley soils have been covered by fine oak and pine forests with other hardwoods and conifers on the better sites.

The region represents the transition zone between the northern hardwood and oak regions and between the oak-pine and oak types. On steep slopes with southern and western aspects, oak and pitch pine are dominant; on slopes with northern and eastern aspects, hemlock and beech, often in mixture with oak and white pine. In the moister coves and draws, such typical northern hardwoods as sugar maple, cucumber, birch, and beech are present. Tulip poplar also appears along with red maple, ash, and walnut.

No remnants of the original forest now remain within the boundary of the project. Because of this it is difficult to reconstruct the

forest types which once covered the ridges and valleys. The only virgin tracts in the vicinity of the Experimental Forest are on State Forest Land about 12 miles east of the highway which passes through the northeast corner of the Kansas Furnace block. Three tracts, known as the Alan Seeger and Rotwalker State Forest Memorials, show stands of old growth hardwood and white pine with such hardwoods as white oak, chestnut oak, yellow poplar, cucumber, black gum and others. Old inhabitants of Pennsylvania recall that the surrounding ridges were once covered by trees of this of chestnut, chestnut oak and pitch pine. Relatively the finer types in the valleys and bottom lands, which were logged off first and which, therefore, are no longer rare based by living people, differed considerably from the ridge type. Here white oak, red oak, and scarlet oak took the place of chestnut oak; white pine and hemlock, the place of pitch pine. On moist sites were found such valuable species as oak, yellow poplar, black walnut and cucumber. Red maple, sugar maple, hickory and beech were scattered throughout the area, the beech probably being confined to the better sites.

Due to extensive logging operations the present aspect of the forests has changed considerably from that of the past. In general it can be said that many of the better species, hardwoods as well as softwoods, have given way to trees of inferior quality. White pine and hemlock, while still present are confined to some few areas as along Tionesta Creek. On abandoned farms a Virginia pine or white cedar pine form nearly pure stands; white pine occurs only in isolated spots. It is unknown to what extent the former two species prevailed in the original forest.

A considerable change in the composition of the forests, especially on the ridges, was brought about through the effects of the chestnut blight which completely destroyed one of the most characteristic species of this region. The place of the extinct is now taken by black oak, red maple and others.

In Table 3 is given a list of all woody plants occurring on the property. The tables showing the number of trees by species and diameter classes (see Part II and Appendix) naturally refer to the present status of the forest and can hardly be more than an indication of the percentage distribution of species in the original stands.

The large number of species and the great variety of associations of species present on the area make it difficult to distinguish clearly defined forest types. For management purposes only a few such types are being recognized. A brief description of these is contained in the following:

(a) Chestnut oak type. Chestnut oak is the predominant species. Other components are black oak, scarlet oak, white oak, red maple and hickory, together with some pitch pine and Virginia pine. This type is confined to the upper portions of the ridges.

(b) Mixed oak type. Gradually merging into the chestnut oak type, stands of mixed oak occur immediately below the chestnut oak type. Chestnut oak is still an important species in these stands, with black oak, scarlet oak, red oak and white oak as the other constituents. Red maple and hickory, with some white pine and hemlock occur within this type.

Table 3. List of trees and shrubs found on the Oak Lane Experimental Tract.

Key — Trees not native are marked with a double asterisk . . . . .**
Trees native to the area but not native to the College Experimental Tract with a single asterisk . . . . . *

Scientific name	Common name
(1) Trees, Softwoods	
Juniperus virginiana, L.	Eastern red cedar
Larix decidua, Mill.	European larch
Picea abies, (L.) Karst.	Norway spruce
Pinus austriaca, Mill.	Austrian pine
Pinus banksiana, Lamb.	Jack pine
Pinus densiflora, Sieb.	Japanese red pine
Pinus echinata, Mill.	Yellow pine
Pinus pungens, Lamb.	Table mountain pine
Pinus resinosa, Ait.	Red pine
Pinus rigida, Mill.	Pitch pine
Pinus strobus, L.	Eastern white pine
Pinus sylvestris, L.	Scots pine
Pinus Virginiana, Mill.	Virginia pine
Tsuga canadensis, (L.) Carr.	Eastern hemlock
(2a) Trees, Hardwoods	
Acer negundo, L.	Box elder
Acer pensylvanicum, L.	Striped maple
Acer platanoides, L.	Norway maple
Acer rubrum, L.	Red maple
Acer saccharum, Marsh.	Sugar maple
Acer saccharinum, L.	Silver maple
Acer spicatum, Lamb.	Mountain maple
Aesculus hippocastanum, L.	Horsechestnut
Amelanchier canadensis, (L.) Medic.	Juneberry
Betula alnoides, L.	Swamp or Asiatic birch
Betula lenta, L.	Cherry birch
Betula lutea, Michx.	Yellow birch
Carpinus caroliniana, Walter.	Blue beech
Castanea dentata, (Marsh) Borkh.	American chestnut
*Centaurea scabiosa, L.	Greater knapweed
*Clethra alnifolia, L.	Sweet pepperbush
Cornus alternifolia, L.	Alternate-leaf dogwood
Cornus florida, L.	Flowering dogwood
Crataegus spp.	Hawthorns

Table 2. List of trees and shrubs (continued)

Scientific name	Common name
Malus pumila virginiana, L.	Carolinian
Fagus grandifolia, Ehrh.	American beech
Prunus americana, [illegible]	Wild plum
Prunus nigra, Marsh.	Canada plum
Gleditsia triacanthos, L.	Honey locust
Carya cordiformis, (Wang.) K. Koch	Bitternut hickory
Carya glabra, (Mill.)	Pignut hickory
Carya ovata, (Mill.) K. Koch	Shagbark hickory
Carya tomentosa (Lam.) Nutt	Mockernut hickory
Juglans cinerea, L.	Butternut
Ulmus rubra, L.	Slippery elm
Tilia [illegible], L.	American linden
Liriodendron tulipifera, L.	Tulip tree
Magnolia acuminata, L.	Cucumber tree
Morus rubra L.	Red mulberry
Myrica cerifera, Marsh.	Bayberry
Ostrya virginiana, (Mill.) K. Koch.	Hop hornbeam
Platanus occidentalis, L.	American sycamore
Populus alba, L.	White poplar
Populus candicans, Ait.	Balm of Gilead
Populus deltoides, Marsh.	Cottonwood
Populus grandidentata, Michx.	Large toothed aspen
Populus nigra, var. italica, Du Roi.	Lombardy poplar
Populus tremuloides, Michx.	Trembling aspen
Prunus americana, Marsh.	Wild plum
Prunus avium, L. Moench	Sweet cherry
Prunus cerasus, L.	Sour cherry
Prunus pensylvanica, L. f.	Pin cherry
Prunus serotina, Ehrh.	Black cherry
Pyrus coronaria, L.	Oregon crab
Pyrus communis, L.	American crab apple
Pyrus malus, L.	Common apple
Quercus alba, L.	White oak
Quercus bicolor, Willd.	Swamp white oak
Quercus borealis var. maxima (Marsh.) Ashe	Red oak
Quercus coccinea, Muenchh.	Scarlet oak
Quercus ilicifolia, Wang.	Bear oak
Quercus montana, Willd.	Chestnut oak
Quercus palustris, Muenchh.	Pin oak
Quercus velutina, Lam.	Black oak
Rhododendron maximum, L.	Great laurel
Robinia pseudo-acacia, L.	Black locust
Salix babylonica, L.	Weeping willow
Salix nigra, Marsh.	Black willow

Table 3. List of trees and shrubs (cont'd)

Scientific name	Common name
Sassafras albidum, (Nutt.) Nees	Sassafras
Viburnum acerifolium, L.	Arrowwood viburnum
Tilia americana, L.	American basswood
Ulmus americana, L.	American elm
Ulmus rubra, Muhl.	Slippery elm

(All) Shrubs

Alnus incana, (L.) Moench	Speckled alder
Alnus rugosa, (Du Roi) Spreng.	Smooth alder
Amelanchier laevis, Wieg.	Allegheny serviceberry
Andromeda polifolia var. glaucophylla, (Link) DC.	Bog rosemary
Aronia arbutifolia, (L.) Ell.	Red chokeberry
Aronia melanocarpa, (Michx.) Ell.	Black chokeberry
Benzoin aestivale, (L.) Nees.	Spice bush
Berberis thunbergii, DC.	Japanese barberry
Berberis vulgaris, L.	Common barberry
Ceanothus americanus, L.	New Jersey tea
Celastrus scandens, L.	Climbing bittersweet
Cephalanthus occidentalis, L.	Button bush
Cornus alternifolia, L.	Pagoda dogwood
Cornus amomum, Mill.	Silky dogwood
Cornus paniculata, L. Her.	Panicled dogwood
Cornus stolonifera, Michx.	Red-osier dogwood
Corylus americana, Mill.	American hazelnut
Corylus cornuta, Marsh.	Beaked hazelnut
Elaeagnus umbellata, Thunb.	Autumn olive
Euonymus atropurpureus, Jacq.	Burning bush
Gaylussacia baccata, (Wang.) K. Koch.	Black huckleberry
Gaylussacia frondosa, (L.) T. and G.	Dangleberry
Hamamelis virginiana, L.	Witch hazel
Ilex verticillata, (L.) Gray.	Deciduous holly
Kalmia angustifolia, L.	Sheep laurel
Myrica carolinensis, Mill.	Bayberry
Rosa carolina, L.	Pasture rose
Rosa multiflora, Thunb.	Multiflora rose
Rubus allegheniensis, Porter.	Blackberry
Rubus idaeus var. strigosus, (Michx.) Maxim.	American red raspberry
Salix discolor, Muhl.	Pussy willow
Sambucus canadensis, L.	American elder
Spiraea alba, Du Roi.	Meadowsweet
Spiraea tomentosa, L.	Steeplebush
Staphylea trifolia, L.	American bladdernut
Symphoricarpos albus, (L.) Blake.	Common snowberry
Taxus canadensis, Marsh.	Canada yew
Vaccinium angustifolium, Ait.	Low sweet blueberry
Vaccinium corymbosum, L.	Highbush blueberry
Viburnum acerifolium, L.	Mapleleaf viburnum
Viburnum alnifolium, Marsh.	Hobblebush
Viburnum cassinoides, L.	Withe-rod
Viburnum dentatum, L.	Arrowwood
Viburnum lentago, L.	Nannyberry
Viburnum opulus var. americanum, Ait.	American cranberry bush
Viburnum prunifolium, L.	Blackhaw
Viburnum rafinesquianum, Schult.	Downy arrowwood

Table 3. [illegible] (continued)

Scientific name	Common name
Rosa acicularis, Lindl.	Prickly rose
Rosa gymnocarpa, Nutt.	Baldhip rose
Rosa nutkana, Presl.	Nootka rose
Rosa pisocarpa, A. Gray	Clustered rose
Rosa woodsii, Lindl.	Woods rose
Rubus idaeus, L.	Red raspberry
Rubus leucodermis, Dougl.	Blackcap
Rubus parviflorus, Nutt.	Thimbleberry
Rubus pedatus, Smith	Five-leaved bramble
Rubus spectabilis, Pursh	Salmonberry
Rubus ursinus, Cham. & Schlecht.	Pacific blackberry
Salix amygdaloides, Anderss.	Peachleaf willow
Salix bebbiana, Sarg.	Bebb willow
Salix commutata, Bebb	Undergreen willow
Salix exigua, Nutt.	Sandbar willow
Salix geyeriana, Anderss.	Geyer willow
Salix lasiandra, Benth.	Pacific willow
Salix lucida, Muhl.	Shining willow
Salix scouleriana, Barratt	Scouler willow
Salix sitchensis, Sanson	Sitka willow
Sambucus racemosa, L.	Red elderberry
Shepherdia canadensis, (L.) Nutt.	Soapberry
Spiraea betulifolia, Pall.	Birchleaf spirea
Spiraea douglasii, Hook.	Douglas spirea
Spiraea lucida, Dougl.	Shiny-leaf spirea
Symphoricarpos albus, (L.) Blake	Common snowberry
Symphoricarpos mollis, Nutt.	Trailing snowberry
Syringa vulgaris, L.	Lilac
Taxus brevifolia, Nutt.	Pacific yew
Vaccinium caespitosum, Michx.	Dwarf blueberry
Vaccinium membranaceum, Dougl.	Big huckleberry
Vaccinium ovalifolium, Sm.	Oval-leaf blueberry
Vaccinium parvifolium, Sm.	Red huckleberry
Vaccinium scoparium, Leiberg	Grouseberry
Vaccinium uliginosum, L.	Alpine bog blueberry
Viburnum edule, (Michx.) Raf.	Squashberry
Viburnum pauciflorum, Pylaie	Mountain viburnum
Viburnum trilobum, Marsh.	American cranberry-bush
Vitis californica, Benth.	California wild grape
Vitis riparia, Michx.	Riverbank grape
Vitis vinifera, L.	Common grape

(c) Mixed hardwoods with softwoods. Two more valuable hardwoods, such as ash, tulip, poplar, cucumber, black walnut, sugar maple and basswood are confined to the valley bottoms with deep soils and higher moisture. Together with these mixed hardwoods we find all the oaks previously mentioned, as well as black gum, red maple, aspen, beech, birch, etc., all hickory. In many places the jack and white pine become the predominant species within this type. Hemlock occurs in heavily wooded or northern slopes. These two softwoods are, however, found throughout this type.

(d) Old field type. Virginia and table mountain pine with some white pine and pitch pine are naturally restocking the old fields of the area. With the large amount of abandoned farmland in the Stone Valley area, this forest type attains major importance.

It must be remembered that American chestnut, which once was a most important and characteristic species of the region, has now nearly disappeared due to the effects of the chestnut blight. Very dead snags of this species are still found throughout the forest.

PART TWO

RECENT ROAD CONSTRUCTION

1. Subdivision of the forest reserve

a) Location survey and maps. The first boundary survey of the entire area was made by the Resettlement Administration of the United States Department of Agriculture. The resulting map, drawn to the scale of 10 chains to 1 inch was finished in 1936. It proved to be very useful for a general reconnaissance of the area, but since it showed no information details except a few roads, it was decided to make a new survey of the area. This was found necessary also because the Resettlement map cut final property sections arbitrarily. These corners were made when copying the calculated bearings onto the map. As the first land survey could not be used, therefore, to restore the property lines. However, all corners of the property were clearly and permanently established by this survey. These corners are numbered as consecutively from 1 to 36 and have been designated as P. C. 1, P. C. 2, etc. Some of the markers are concrete blocks, some pipes bearing the number of the station. In a few cases rock outcrops take the place of pipes or monuments. Where possible, trees near a monument have been marked with three blazes. Notes encountering the boundary of the property run in the field of the following Registered Engineers at the Department of Forestry.

A control transit traverse following the road location was made in 1936 by R. H. Perry of the Department of Civil Engineering of The Pennsylvania State College, under the Resettlement Administration. The stations of this survey were designated as T-1, T-2, etc. Unfortunately these stations were not permanently

established [illegible] have been done on this area by

Lott. The stations T-37 at the intersection of the Sycamore and Nursery Roads and T-39 on the east side of the Nursery Road were definitely located and control by iron pipes. The distance between these two stations (17.10 chains) has been used as a base line for the new survey. Another line between T-37 and T-39 could not be located but it was possible to calculate the true bearing of this line from T-37 to T-39. This true bearing was found to be N 29° 24' E.

[illegible] established a considerable number of permanent boundaries of the Nursery tracts. A list of these boundaries with observations is in the files of the Department Forestry.

Using Survey's branch control as a base map, the Department Administration carried out a study design of the entire area in 1936 under the direction of [illegible] from the Department of Forestry of the College. This study [illegible] to determine the [illegible] of the tracts of 5 chains to 1 inch. This map, while sufficiently accurate for the purpose it was to serve, does not show property boundaries or its bicos; also, the information would be considered stale by now since it was, therefore, not [illegible] to use it for detailed [illegible] work.

b) New survey of area. Some of the [illegible] new survey of the area [illegible] from the practicality of [illegible]. In addition to the above mentioned there it was not possible to use any of the previous maps to permit an accurate subdivision of this area into blocks and compartments with well defined boundaries. Because of the many types of land present, often [illegible] formerly [illegible] blocked areas, it was found advisable to subdivide the entire area into

several separate units or blocks. Seven such blocks were originally established. How each block was separately adjusted is as follows:

The boundary of one block was surveyed with transit and chain, starting from the base line on the Hershey Road between the points T-32 and T-33. The traverse was plotted in a system of rectangular coordinates. The error of closure of each block was distributed over the entire boundary in direct proportion to the differences in latitude and departure of successive stations. However, after having subjected the coordinates of the stations of the first block, the coordinates of the stations on the common boundary of the two blocks were not equal, the error of closure in the second block being distributed over the remaining stations only. These errors of closure were of No appreciable amount, rarely distributed over as many as 100 to 200 stations. In each block to the scale of 5 chains to 1 inch these errors are all of little significance.

In the files of the Department of Forestry is found a description of the boundary of Block No. 1 the bearings and length of all lines between U. S. Point 32 and 33. None of the distances computed at the time when the original boundary survey was made do not exactly check with the new measurements made in subdivision.

c) Subdivision of forest into blocks and compartments. The area has been divided into 7 separate units, designated as blocks. Each block is identified by an appropriate Roman numeral. The location may be described briefly as follows:

(1) Seneca Creek Block. Lying in the north-central portion along Seneca Creek on the eighteenth depth portion, this block embraces

zone of the best timber land of the forest. It is bounded on the north by Greenwell Road; on the east by Forestry Road; on the southeast by the main forest boundary along Armand Ridge; on the south by the Snake Hill Road; on the northwest by Honeybury Road, Tyler Ridge, and Beaver Creek.

(5) Gilford Block. Lying to the northeast of the Beaver Creek Block, this block is bounded on the north by Greenwell Road; on the east by the main forest boundary along Snake Hill Road and private farm lands, and on the west by the forest boundary and the Nursery Road. The large area of nearly level within this block is known as the Pittsenbaugh Swamp.

(7) Dawn Block. Included within this block are the sites of the Forestry, Civil Engineering, and Mineral Industries Camps. The boundary on the north is formed by the Chester Gap Road, on the east by the main forest boundary, on the south by Greenwell Road, and on the west by the boundary road and the main forest boundary.

(8) Quarry Furnace Block. This block receives its name from the old Quarry Iron Furnace. The boundary is very irregular in outline and consists of the main forest boundary on all sides except the south, where it borders the Chester Gap Road.

(9) Loyalty Ridge Block. This block occupies a portion of the south side of Loyalty Ridge and parts of the rolling land in the valley. The boundary is coincident with the main forest boundary on the northeast, northwest, and southwest sides. On the southeast the boundary is an artificial line between stations T. C. 9 and T. C. 10.

(6) Honeybury Block. This block consists mainly of abandoned farm lands which contain very little natural forest cover at the

present. The boundary is along the main forest boundary except from the artificial line between stations C. S. 9 and C. S. 16 on the north. The boundary on the east is formed by the Petersburg Road, Greenwell Road and by Beaver Creek.

(7) Snake Hill Block. On the southern extremity of the Experimental Forest, this small block takes its name from the location of Snake Hill. On the north the boundary is formed by the Snake Hill Road, on all other sides by the main forest boundary.

The main land cover types in each block of their acreages are summarized in Table 4. The areas within each of the four main types, (approximately planted, plantation, hardwood, and miscellaneous, have been determined from the map of each block by planimeter. The elimination of areas within the open and partially stocked land types and within woodland types unsuitable for cutting. According to these determinations about 7/10 of the total area of 4670 acres is forested. Of this about 3/10 is hardwood which has come in on old fields. One eighth of the total area has been planted.

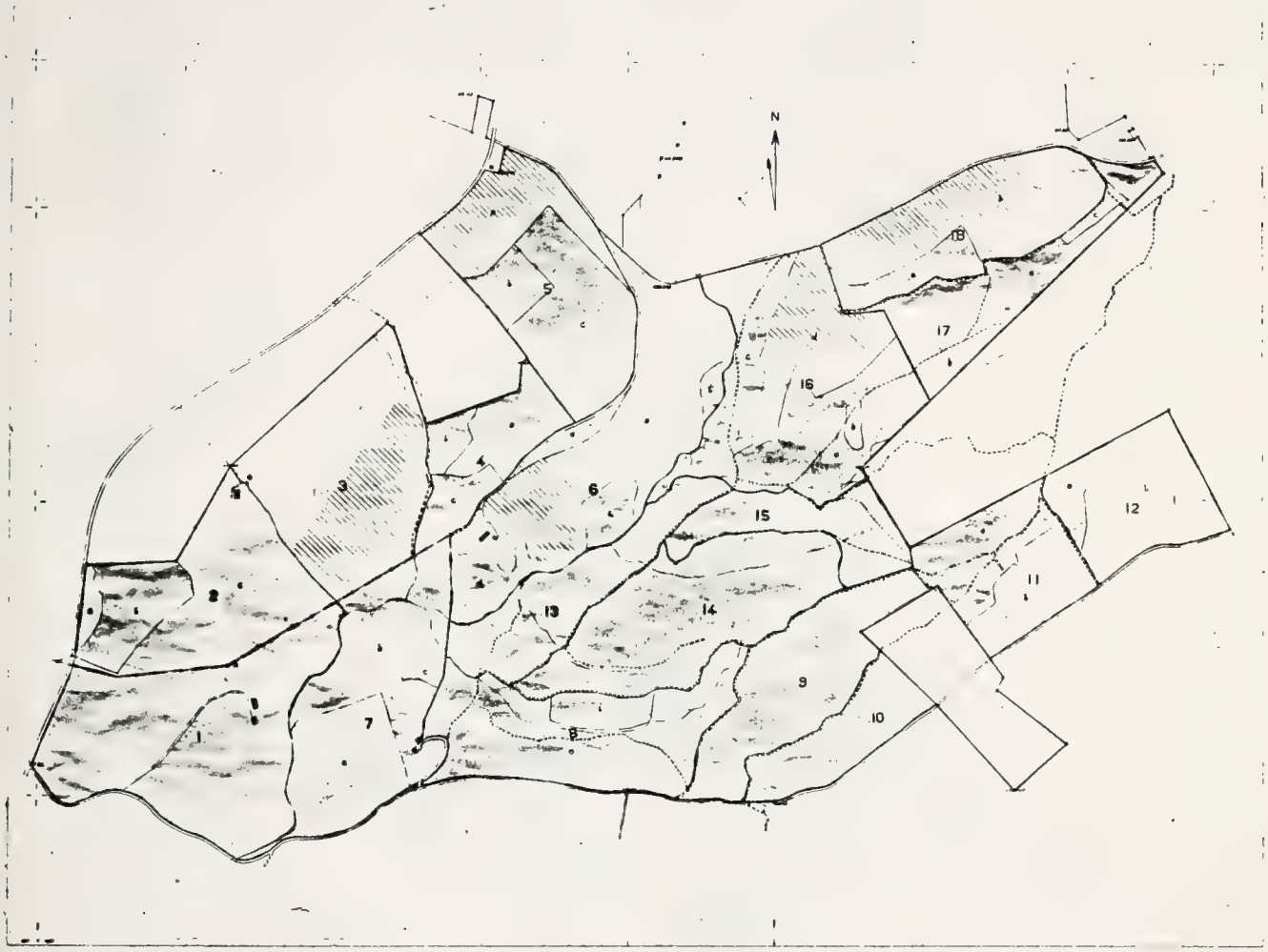
The blocks have been further subdivided into compartments varying in size from 16.5 acres to 215.0 acres. The boundaries of these compartments are for the most part natural boundaries. Artificial boundaries have been marked with white paint. On the maps of each block the compartment boundaries are marked in red. Photographic copies of these maps are inserted in the following pages of this manuscript. While the compartment boundaries are permanent boundaries, distinctions between stands which became necessary during the process of cruising are not considered permanent, and they have been entered in the maps with pencil

Table 4. Summary of areas by blocks. (Detailed area tables by compartments are given in the appendix.)

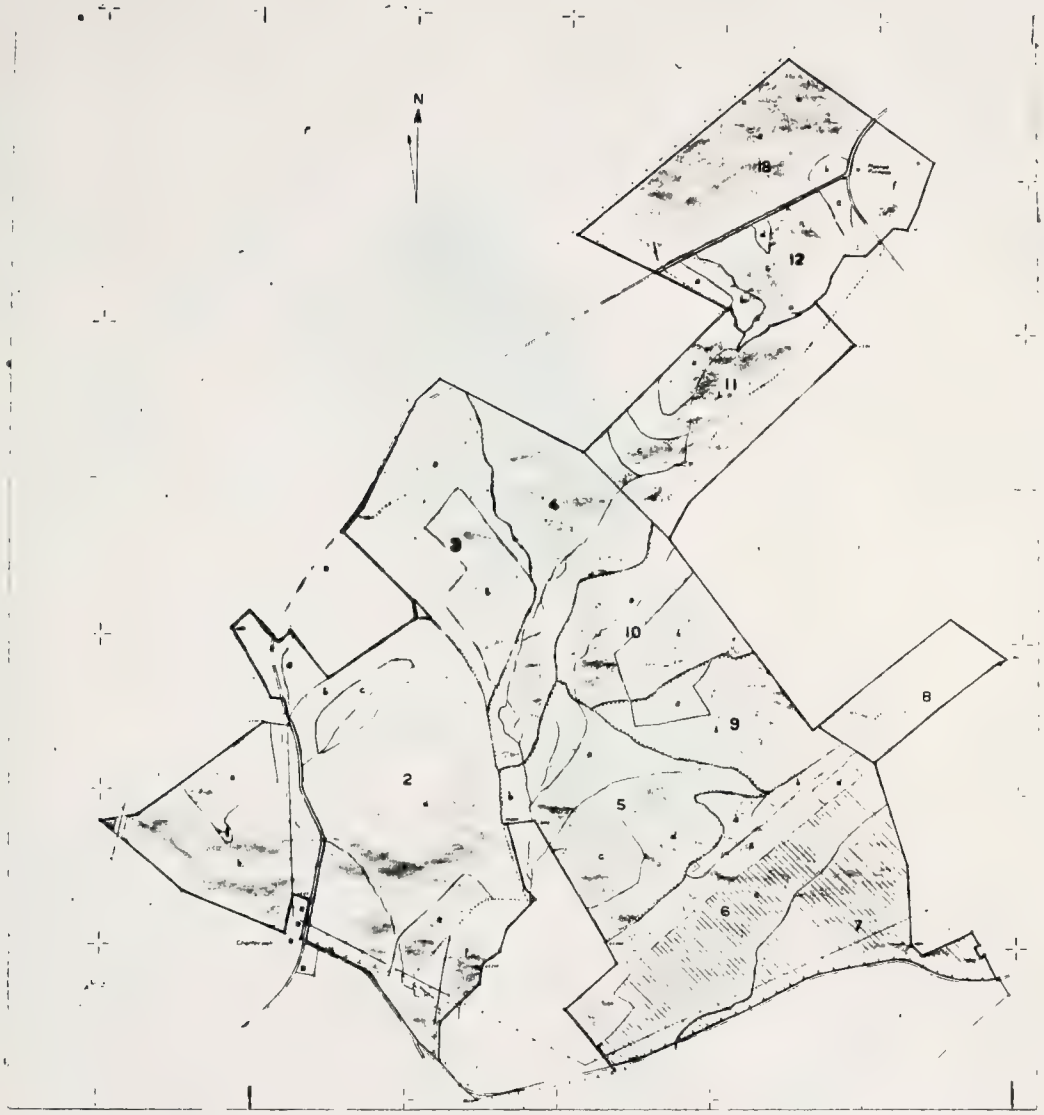
Block	Non-partially stocked			Plantations	Woodlands		Misc.	Total
	Open	Naturally Stocked	Planted		Natural	Old Field		
Beaver Creek	43.9	5.4	7.0	9.5	607.2	176.2		872.1
Milford	306.4	28.3	8.0	45.3	220.7	62.9	0.5	672.1
Camps	261.2		94.8	20.8	321.5	146.5	2.4	847.2
Spruce Furnace	52.5	98.5	24.4	38.4	320.4	90.6	0.5	625.3
Reading Ridge				64.9	185.4	3.1	4.5	277.9
Jessesyburg	478.1	13.5	16.8	377.7	23.6	43.7	13.0	966.6
Snake Hill	217.5		26.5		69.8	2.0		315.8
Total	1359.6	145.7	179.3	576.8	1768.5	525.0	20.9	4576.0
	29.7%	3.2%	3.9%	12.6%	38.6%	11.5%	.5%	100.0%

Block I Beaver Creek

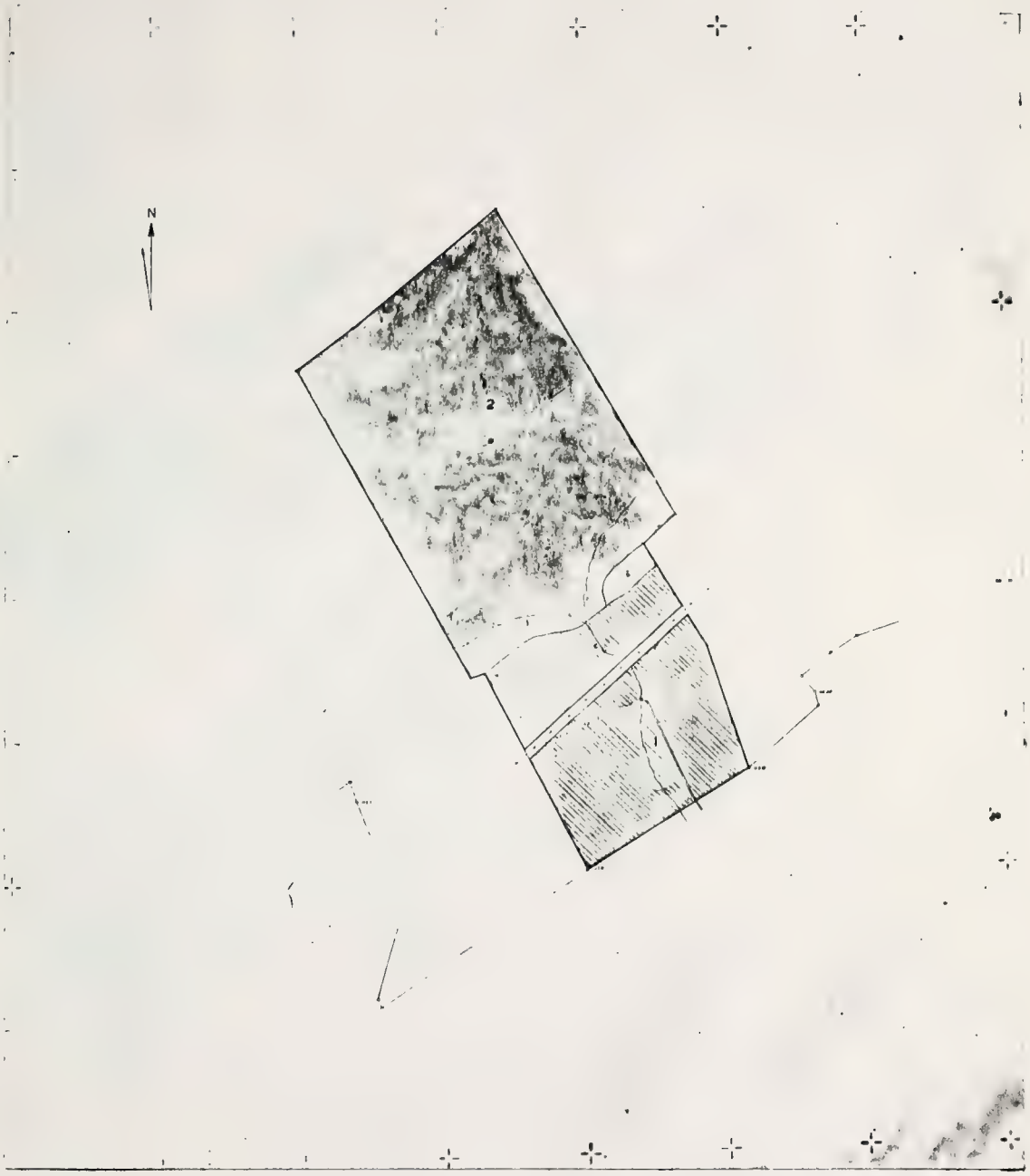
Block II. Gifford



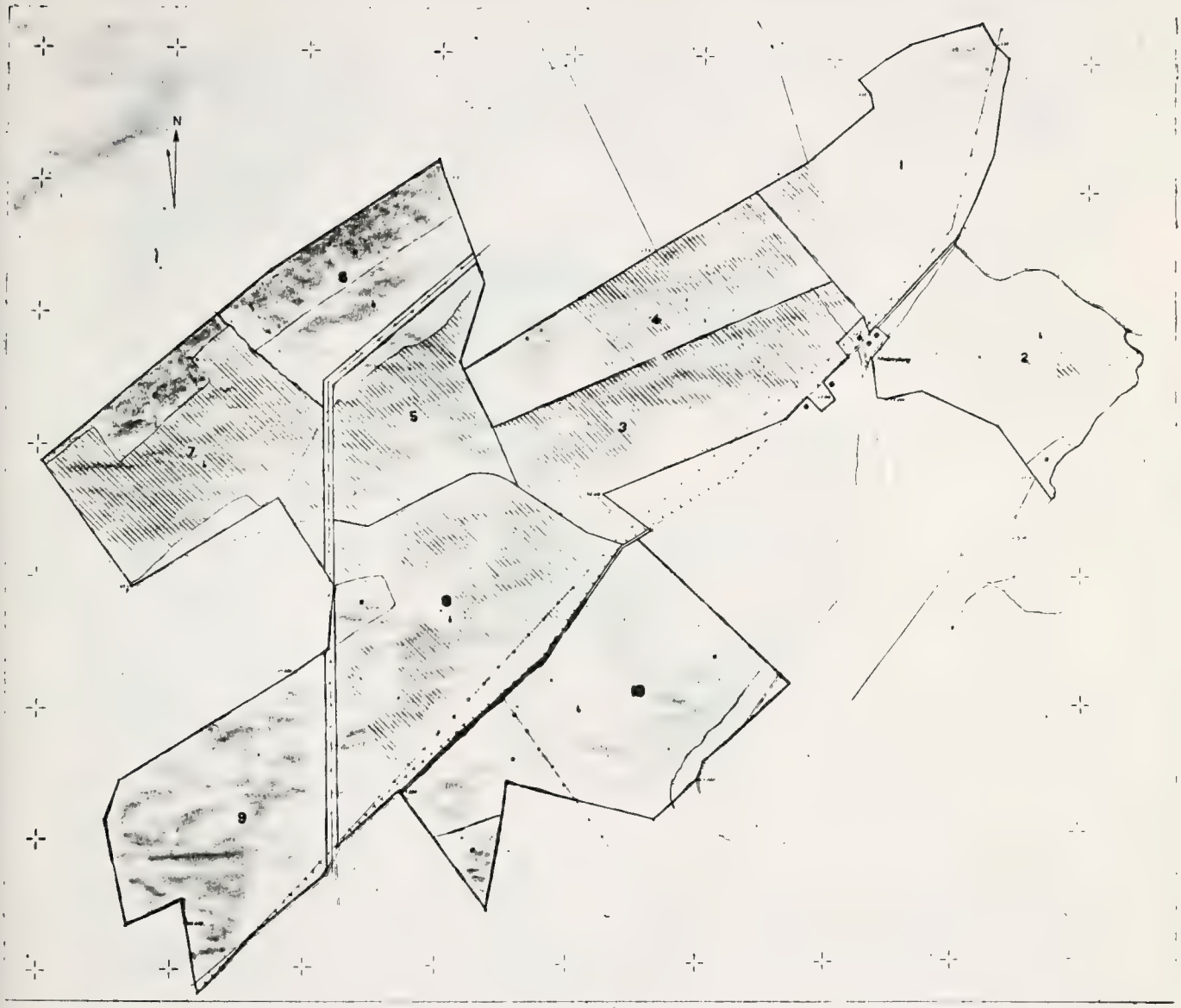
Block III. Carpa



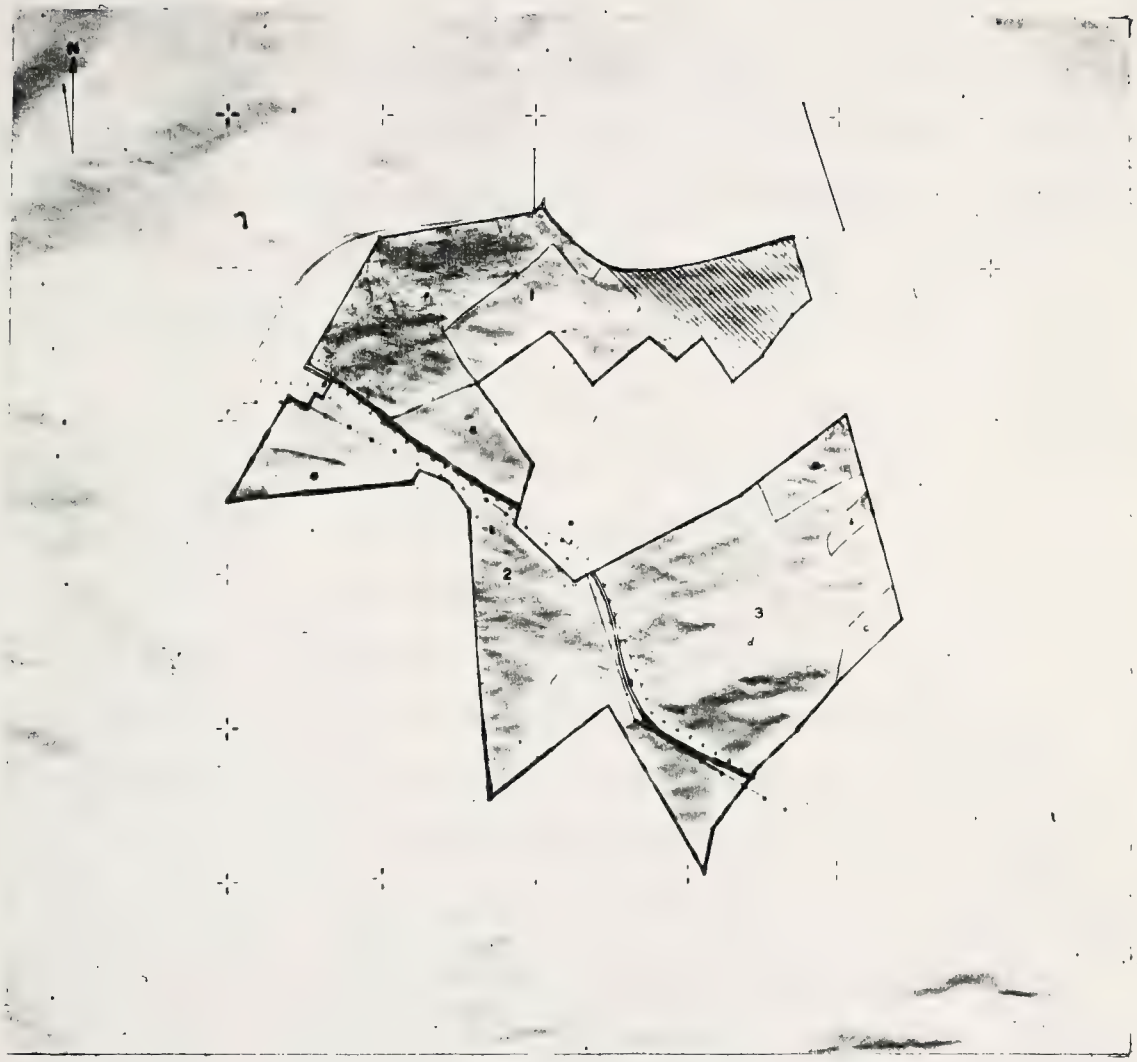
Block IV. Pearce Farmsteads



Plan 7. Lowling Ridge



Block VI. Daaeyburg



Block VII. Chalo Hill

only. In the field the actual boundaries have been marked with blue paint. A detailed area table of each block, showing the area of each compartment and block, segregated by types of land, is given in the Appendix.

d) Maps.

(1) The photographic copy of a portion of the topographic sheet of the Albemarle Quadrangle, U. S. Geological Survey, drawn as a general orientation map for the area of land surrounding the experimental forest. The photograph is an enlargement showing the area on a scale of 1 inch to 2 miles. (See page 7 of this management plan).

(2) A geologic map of the area has been prepared using the same enlarged photograph of the topographic sheet as a base. This map is affiliated with the geologic description of the area. (See page 12).

(3) The necessary and immediate basis for this management plan is the map prepared are the separate sheets of each block drawn to the scale of 1 inch to 5 chains and based on the survey previously discussed. The forested areas on these maps have been indicated in green color, the open fields in yellow color; plantations made in the open fields are indicated by diagonal lines drawn with a green crayon. Future plantations will similarly be indicated by lines drawn in different directions or at different angles. Compartment boundaries are shown in red crayon, their termination in small ovals. Photographic copies of these maps are included in this present management plan (page 30).

A series of other maps will be prepared at an appropriate time in the future. These will include:

(1) An estimation map to a scale of 1 inch to 20 chains. A map drawn to this scale was made from the original property survey, but it should be revised and reduced by redrawing the block maps of the various blocks.

(2) Soil map.

(3) Forest cover type map.

(4) Topographic maps for each block to a scale of 1 inch to 5 chains.

2. Site quality.

Because of the irregular topography of the area it is practically impossible to segregate the forest stands into site classes which would be of use in the management of the forest. This is already brought out by the geological site classes a great change in the geologic strata over very short distances. The importance of the geologic character of the bedrock in relation to the fertility of the site has already been discussed in the sections devoted to geology and soils.

For a general appraisal of the average site quality of the area, use is made of the height measurements taken in the various blocks. By comparing the measured height with the yield table data for the upland oak forests (Palmer, 1937) the average site index of the area is estimated to be around 50. The site index for the poor sites is probably in many places as low as 40. Along Shaver Creek and on other bottom land sites the site index may be as high as 60 or 70.

A comparison of the height of the larger Virginia pine trees with the data given in the yield table of that species prepared by

McIntyre (1953) holds that it is for this species the average site index of the old field areas lies between 45 and 50.

The generally poor condition of the stands has a tendency to lower the apparent site index as measured by tree height. After the removal of many defective and suppressed trees, the average height of the remaining trees will be greater for a given diameter or age class and the resulting site index would accordingly be somewhat higher.

3. Forest inventory, fall 1941.

a) Method of sampling and tree criteria. Two main methods of sampling have been used in the various blocks of the forest. The method employed primarily was varied according to the contemplated intensity of management. However, the same basic diameter limit of measurement of 7 inches was applied in all cases. The subjects of sampling used for the various blocks are as follows:

Block A-1. A one hundred per cent or 100 per cent cruise of all stands where it was attempted one half or more of the various trees in these 7 inches and over. All trees so measured were in the up-hill side. In some compartments the point of measurement was marked with a bark scribe. In order to speed up the work, this practice was later discontinued and the trees were marked with chalk only. Care was taken to measure the trees at a constant height of 4 1/2 feet above the ground; measurements at a future date should be made in exactly the same way in order to insure accurate growth determinations. The area measured by accounts 4071.3 acres which is equal to 40 per cent of the total area of the block.

Block A-2. A one hundred per cent cruise was made of

all well stocked strips. The total area covered amounts to 41.0 acres. This represents only 16 per cent of the total area of the block.

Cacao Block. According to estimate, the entire block was mapped and divided into compartments and stands. Each sufficiently well stocked stand was then outlined by running strips 1 rod wide at right angles to the main-natural dimensions of each compartment. The strips were laid out at about equal intervals of 6 chains which resulted in a coverage of 2.7 per cent of the area. The field work was done by a two-man crew. While one man was running the line by hand compass, the other measured all trees falling within the 1-rod strip. The width of the strip was continuously checked with a pole 1/2 rod long. Any tree the center of which was within the reach of the pole was measured. The diameters were measured only 4 feet from the up-hill side. Each plot was plotted on the map from which the length was determined to the nearest 1/10 of a chain. Slope of the intervening land is negligible, it is easy to determine in the field the beginning and the end of each strip.

The computation of the volume by stands and compartments and a recapitulation of the basic data is shown in the Appendix. The standard error of the calculated volume was determined in each compartment as well as for the entire block. The area of a strip was taken as the weight of the average volume per acre of the strip.

Out of 647.4 acres in the block, 250.8 acres were cruised.

Young Timber Block. A total of 12 cruiser days, 10 chains apart, was run across the entire block. The bearing of these lines, running more or less at right angles to the main direction of the block, is N 60° W. Two-fifth acre sample plots were laid out and measured

at intervals of 6 chains. The interior detail of the blocks, as well boundaries, roads and creeks, was taken at the time of running the cruise lines and laying out the sample plots. The map was then drawn up and the area divided into strata and compartments. The volume of each stand or compartment was determined separately by first adding up the stand tables of the plots lying on one end the same line. The estimated error of the volume of each compartment was determined by comparing the volumes per acre of each line. The number of plots measured on a line represents the weight of the calculated average volume per acre of that particular line.

The area of the measured plots is equal to 5.0 per cent of the forested area of the block bearing sufficient volume for measurement.

Location Block. The same method of cruising was applied as in the Osaya block. The chains were run from the border of Compartment 2, Stand a , to the boundary on the top of Location Ridge. An area of 7.7 acres out of the 181.4 acres of Stand a were thus covered. This represents a 4.2 per cent cruise.

Location Block. The area was mapped and divided into compartments. Since there are only young plantations there, no cruise was made.

Sakia Hill Block. Although partly covered by scrub land, this block has not been cruised. For the purpose of any exploitation in future work, the area was divided into working units.

b) Number of trees by species and diameter classes. In Table 5 is shown the percentage distribution of trees 7 inches in diameter and over by species for the cruised area of five blocks. With respect to the accuracy of these percentages it must be remembered that only the

at intervals of 6 chains. The interior detail of the blocks, streams, boundaries, roads and creeks, was taken at the time of running the cruise lines and laying out the sample plots. The map was then drawn up and the area divided into strata and compartments. The volume of each stand or compartment was determined separately by first adding up the stand tables of the plots lying on one of the cruise lines. The statistical error of the volume of each compartment was determined by comparing the volumes per acre of each line. The number of plots measured on a line represents the weight of the calculated average volume per acre of that particular line.

The area of the measured plots is equal to 5.0 per cent of the forested area of the block bearing sufficient volume for measurement.

Lowlying Block. The same method of cruising was applied as in the Ouaps block. The chains were run from the bottom of Compartment 2, Stand a , to the boundary on the top of Lowlying Ridge. An area of 7.7 acres out of the 182.4 acres of Stand a were thus covered. This represents a 4.2 per cent cruise.

Beaudesert Block. The area was mapped and divided into compartments. Since there are only young plantations there, no cruise was made.

Duke Ave Block. Although partly covered by scrub-land, this block has not been cruised. For the purpose of any exploitation in future work, the area was divided into working sections.

b) Number of trees by species and diameter classes. In Table 5 is shown the percentage distribution of trees 7 inches in diameter and over by species for the cruised area of five blocks. With respect to the accuracy of these percentages it must be remembered that only the

data for the Beaver Creek block and the Gilford block are based on a one hundred per cent inventory. The existing percentage of the other areas was somewhat below 5 per cent. The prevalence of hardwoods is manifest in all blocks. Chestnut oak is the most important species in all blocks except in the Beaver Furnace where white oak and white pine are both more important components of the stand. In the Beaver Creek block, hemlock is a close second. An area on the old field slope of Virginia pine over into reasonable size, the proportion of softwoods will increase considerably. Future thinnings and improvement cuttings will in this effect a gradual change in the composition of the stands, giving the softwoods and the more valuable hardwoods preference over inferior species.

For future comparisons it will be interesting to refer to Tables 6, 7, 8, 9, and 10 showing the number of trees by species and components for each block. Tables showing the number of trees by species and diameter classes for each component have been carried up only for the Beaver Creek and Gilford blocks, on which one hundred per cent enumeration were made. The tables are given under the heading of Plant and Stock Tables in the Appendix.

For the determination of growth for softwoods and hardwoods it is necessary to know the number of trees by diameter classes in each block. This information is contained in Table 11 which shows number of trees by diameter classes separately for softwoods and hardwoods. In each block the number of hardwoods is higher throughout the various diameter classes than the corresponding number of softwoods. It should be remembered that only the data for the Beaver Creek Block and the Gilford Block are based on a one hundred per cent census.

Table 5 Percentage distribution of number of trees 7 inches in diameter and above by species for each block.

Species	Clover Brook	Milford	Bangs	Monroe Furnace	Leading Ridge
White pine	10.5	9.0	6.9	18.1	2.7
Virginia pine	7.9	3.9	6.6	2.0	1.0
Table Mt. pine	.9		.6	1.8	
Pitch pine	.8	.2	.9	4.9	3.9
Hemlock	16.5	.2	4.5	6.9	.5
Tot l softwoods	36.6	13.2	22.9	33.8	8.1
White oak	9.8	16.3	7.0	15.8	12.6
Chestnut oak	18.9	22.3	36.7	10.3	26.0
Black oak	3.5	14.7	14.5	7.3	30.9
Red oak	6.7	4.6	3.6	3.0	3.8
Scarlet oak	5.4	3.8	.3	4.4	.8
Hickory	3.6	3.3	3.4	3.3	.9
Red maple	3.9	6.8	3.9	4.1	2.0
Sugar maple	1.3	.2	1.2	.7	.2
Yellow poplar	.4	2.7	.4	3.1	.9
Ash	1.3	1.9	1.0	1.5	.2
Elm	1.0		.6	1.0	.2
Birch	1.2	.1	.3	.7	2.0
Dogwood	.7		1.0	.2	
Cucumber	.3		.3	.1	.3
Black gum	.7	.2	.6	.2	2.4
Beech	2.4			.1	
Cherry	.3	.2	.1	.5	
Black locust					
Aspen	.7		.9	.2	
Black walnut	.2	.3		.6	
Misc.	.1			.3	.7
Tot l hardwoods	63.3	86.7	76.9	67.2	91.9
TOTAL	100.0	100.0	100.0	100.0	100.0

Table 6 . Turner Creek Block - Number of trees by species and compartments. Material 7 inches in diameter and above. Area cultured - 407.3 acres

Species	Compartments											Total
	1a	3a	4a	7	12a	13	14a	16	17a	17b	19a	
White pine	249	105	1071	247	297	730	463	42	76	2	26	3559
Virginia pine	77	54	672	32	19	458	162	3	64	924	251	2697
Table Mt. pine			22			128	1			9	1	161
Pitch pine	2	1	57	5		60	36	3	34	85	8	291
Hemlock	-	17	920	897	809	1143	1076	1024	50	2	2	5907
Red Cedar						1						1
-												
Total softwoods	328	209	2434	1781	1178	2480	1736	1068	224	922	290	12356
White oak	4	21	329	109	632	990	72	1041	524	13	220	3999
Chestnut oak	1	14	926	478	1495	2	1139	1033	422	9	227	6056
Black oak	22	57	83	40	173	15	83	175	139	9	106	898
Red oak	20	37	924	201	930	115	209	240	32	9	11	2938
Scarlet oak	5	26	14		404	3	277	100	215	8	59	1031
Hickory		4	220	277	295	118	68	260	7	7	13	1268
Red maple	1	9	147	36	615	384	159	411	6	1	25	1667
Sugar maple	4	7	123	173	102	48	12	57	3			528
Yellow poplar		1	25	51	11	15	23	17	3		1	148
Ash			39	50	143	117	2	66	10		1	429
Elm	2		61	157	4	65	27	6	6		1	349
Birch		1	128	14	49	55	67	72	4			390
Basswood		1	59	60	6	77	11	20	6			240
Cucumber			20	19	24	39	5	35	1			143
Black gum			2	6	111	35	3	84	3		3	249
Beech		2	43	121	345	219	10	71	2			813
Cherry	1	2	10	1	6	31	30	7			1	91
Black walnut	6	4	75	117	3	50	30	1	1			287
Ironwood	1	2	21		1	7	6	4				42
Butternut		2	40	19		6		11	1			79
Dogwood			1		1		1					3
Hop			2									2
S. Y. oak				107								107
Chinquapin			1		2			1				4
Apple						2						2
Juneberry						1		2				3
Black locust	2		1									3
Aspen	1	2	30	6	60	34	14	4	99	1	26	279
Sycamore								1	8			9
Willow						1						1
Total hardwoods	98	196	3605	2147	5116	1779	2398	4493	1436	57	1164	23562
TOTAL	426	440	5729	3428	6294	4260	4009	5561	1660	1469	1674	35918

Table 7 Gilford Block - Number of [illegible] species and components.
Unbottled [illegible] in diameter and above. Area cutting—640 acres.

Species	Components								Total
	1a	5a	8a	8c	9a	9d	9e	10	
White pine		13	67	147	147	122	41	33	571
Virginia pine	3	13	17	8	63	59	4	6	249
Table Mt. pine								1	1
Pitch pine			2	2	3	4		3	14
Hemlock		3		4			4		11
Total softwoods	3	29	106	329	213	178	49	33	847
White oak	1.3	81	33	120	320	61	39	2	1042
Chestnut oak	257	236	101	422	197	62	179	57	1507
Black oak	200	73	62	214	240	33	60	45	935
Red oak		15	4	47	144	30	13	2	255
Scarlet oak	179	0	26	22	116	5	1	1	370
Hickory	3	29	5	178	23	30	6	4	278
Red maple		1	26	124	125	21	36	6	339
Sugar maple		5		5					10
Yellow poplar			33	28	14	36	8		119
Ash		2		10	3	60	3		78
Elm									
Birch				1	2		1		3
Basswood									
Sourwood									
Black gum		2		6		10			18
Beech									
Cherry	2	1		2	5			1	11
Black locust									
Aspen						2			2
Black walnut	1	21	1	13			2		38
Persimmon			1						1
Total hardwoods	443	619	314	1359	1708	401	324	80	5326
TOTAL	446	648	420	1688	1921	579	373	113	6173

Table 8 Cargo Block - Carbon [illegible] 1 [illegible] 7 inches in diameter and above. Area collected--0.270 acres.

Species	Compartments									Total
	8a,b	9	10	13	17	14	15	17a	18a	
White pine	13	2	2			3	5	3	1	29
Virginia pine	32	4	14			10	4	4		66
Table Mt. pine		2	3							5
Pitch pine	5	1			1					7
Hemlock	6					25	3	1		35
Total softwoods	71	9	19		1	46	12	7	1	166
White oak	12	3	2	4	2	17	2	7	3	54
Chestnut oak	23	74	23	25	17	61	30	22		269
Black oak	17	24	14	13	1	27	5	16	1	118
Red oak	10			20		1	10	10	2	43
Scarlet oak		2		1		1				4
Hickory	6	1	5			12		2		26
Red maple	14	1	1		3	7	1			27
Sugar maple	2					3		1	3	9
Yellow poplar						1		2		3
Ash				1		2		3	4	10
Elm	1						2		3	6
Birch	1					1				2
Dogwood						1		7		8
Cucumber	2									2
Black gum	4	1				1				6
Beech										
Cherry			1							1
Black locust										
Aspen			1				1	4	1	7
Black walnut										
Total hardwoods	90	106	44	54	26	135	51	81	18	605
TOTAL	161	115	63	54	27	181	63	88	19	771

Table 9 . Kanawha National Forest -- Number of trees by species and compartments. Diameter 7 inches in diameter and above. Age class 6--20+ years.

Species	Compartments														Total
	2a	3 ,b	4	5a	6o	8	9a	9b	12a	12b	13a b,c	13a b,c	13c		
White pine	14	34	24	33	1		47	1	3	30	10	42	6		236
Virginia pine	9	11	1	2	3										26
Table Mt. pine	4	10									9				23
Pitch pine	7	25	5		1		6			6	8	4			64
Hemlock			22	22	2			1	13		4	15			79
Total softwoods	34	72	52	59	6		53	2	16	36	31	61	6		428
White oak	1	8	41	11		4		23	57	6	60	30	17		259
Chestnut oak	1	20	2	6	16	5		6	12	1	22		49		133
Black oak	6	22	20	1	23	7		2	11	3	9	5	20		118
Red oak	1	1	6	4	11	2		22	1		37	3	1		91
Scarlet oak			23	1	3			2	10		13		3		57
Hickory			2	1	5			5	4	7	4		2		30
Red maple		3	4	4	1			23	3	2	6	13	5		64
Sugar maple			3	3	2			1							9
Yellow poplar	3	1	3	1	2			6	1		7	2	10		40
Ash	2		3	2				9	1		1	2			20
Elm			1	5				5	9						20
Birch			2								2	4	1		9
Dogwood				1					1						2
Cucumber									1						1
Black gum				1							1				2
Beech		1													1
Cherry	1		2					3		1					7
Black locust															
Aspen	1								2						3
Black walnut	1				1	2		1	2						3
Sycamore									1						1
Ironwood											1				1
Serviceberry												2			1
Total hardwoods	16	54	144	42	67	20		118	126	20	172	59	111		875
TOTAL	50	126	196	94	73	30	53	114	134	56	203	120	117		1304

Table 10. Loudon High Block - Number of trees by species and components. Intercept 7 inches in diameter and over. Area enlarged—7.741 acres.

Species	Components		Total
	2a		
White pine	16		16
Virginia pine	6		6
Table Mt. pine			
Pitch pine	29		29
Hemlock	3		3
Total softwoods	48		48
White oak	76		76
Chestnut oak	154		154
Black oak	199		199
Red oak	58		58
Scarlet oak	5		5
Hickory	5		5
Red maple	12		12
Gray maple	1		1
Yellow poplar	3		3
Ash	1		1
Elm	1		1
Birch	12		12
Dogwood			
Cucumber	3		3
Black gum	14		14
White walnut	4		4
Total hardwoods	544		544
Total	592		592

Table 11. Number of trees for softwoods and hardwoods by diameter classes.

Diameter at breast height	Akron Ranger District (1)		Milford District (2)		Ouray District (3)		Ponderosa Ranger District (4)		Sanding Ridge District (5)	
	Soft-woods	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods
Inches	number		number		number		number		number	
8	6438	9535	300	2031	52	227	247	335	22	295
10	3052	5243	252	1032	56	157	123	204	13	144
12	1441	2000	160	765	32	79	65	71	6	40
14	687	1024	50	450	2	35	16	37	3	20
16	360	568	32	260	5	11	10	13		16
18	177	269	12	141		6	4	4	1	9
20	97	165	8	100			2	4	1	1
22	33	73	3	42		2				
24	14	32		30			1	1		
26	4	31	2	20				1		
28	1	12		14		1				
30	1	6		9						
32		2								
34	1	3								
Total	12236	21160	847	5093	166	603	468	678	48	544
Per cent	36%	64%	14%	86%	22%	78%	30%	70%	8%	92%

	Area of square	4.7.3 acres		Total area excluded	407.3 acres
2	" "	84.0 "		" " "	84.0 "
3	" "	9.300 "		" " "	230.3 "
4	" "	13.4 "		" " "	246.4 "
5	" "	9.321 "		" " "	166.4 "

of the local cubic foot volume table. The inaccuracy is caused by the difference in the amount of elevation, and the clearing cutting of soils would result in a great variation of site quality within the forest; in some cases, within one watershed. Trees of the same species and of a given diameter growing on different sites may contain exceedingly unlike different cubic foot volumes. An accurate volume table could only be obtained by constructing different tables for the various species and site conditions. However, for purposes of forest management, absolute accuracy of the volume tables is unnecessary. In order to facilitate computations between the structure and growth of various stands, also, to simplify initial as well as current records, it is decided to construct a single, average, cubic foot volume table applicable to all species and site conditions.[1] Since volume, growth, and yield will all be expressed in units of this table, it is necessary that the diameter at breast height of all trees marked for cutting be recorded and entered in a felling record. The amount of timber cut is then measured in the same units as the standing growing stock itself.

The volumes per tree as listed in Table 12 by 2-inch diameter classes were obtained by fitting a straight line to the original average volumes on logarithmic paper. Volume per tree can, therefore, be expressed as a function of diameter at breast height as follows:

$$V = k \cdot D^b$$

or, in logarithmic form

$$\log V = \log k + b \cdot \log D \quad ,$$

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1 This is in accordance with the current practice of the continuous inventory system, which, in principle at least, is applied to the present plan.

Table 12. Log 1 cubic foot volume tables; average volume per tree for all species combined.

Diameter at breast height	Volume per tree	Diameter at breast height	Volume per tree
Inches	cu. ft.	Inches	cu. ft.
6	4.050	22	82.90
8	7.005	24	99.60
10	12.100	26	120.03
12	17.10[illegible]	28	142.3
14	22.70	30	166.8
16	30.07	32	193.4
18	38.28	34	222.7
20	48.40	36	254.1

$$\log V = -1.1[illegible]24 + 2.3[illegible] \cdot \log D.$$

the numerical values of the constants being

$$\log K = -1.1803$$

$$b = 2.3068$$

In order to facilitate the calculation of stock tables, a table of cubic volumes was constructed. This table is given in the appendix together with some further details on the construction of the average local volume table. Based on a large number of height measurements, which are also listed in the appendix, the local volume table was obtained from J. H. Ambrosenti's cubic volume tables (Forest Service Department of Forestry and Mines, 1937).

d) The actual cruise. A summary of the actual volume on the cruised areas of each block is given in Table 13. The area cruised over the entire forest is equal to 1273 acres, representing 56 per cent of the forested area and not including the plant clearing which in turn cover 28 per cent of the entire area of the Experimental Forest. The average volume per acre in trees 7 inches in diameter and over is equal to 1114 cubic feet, the total volume being equal to 1,418,100 cubic feet. Since only the better stands have been cruised in the various blocks, the average volume per acre fluctuated within a rather narrow range. The actual differences in the stocking of the various blocks is better brought out by comparing the total volumes on the relative forested areas of the various blocks. First, the volume in the 4 and 6 inch classes on the cruised areas of each block was estimated by diameter classes by plotting the volume in each diameter class against diameter at breast height and by extending the bell shaped curve towards the origin of coordinates, reading the volume in the 4 and 6 inch diameter

Table 13. Volume in cubic feet material 7 inches in diameter and over.

Block	Area surveyed	Cubic foot volume total	Cubic foot volume per acre	Volume distribution[1]) small timber	medium timber	large timber	Number of trees per acre
	acres	cu.ft.	cu.ft.	per cent	per cent	per cent	
Beaver Creek[2])	407.3	580,000	1477	64	32	4	83
Oakland[3])	84.3	114,200	1360	53	37	10	75
Otter[4])	370.7	347,600	1070	63	17	1	83
Prince Furnace[5])	345.4	326,000	943	63	16	3	77
Lordship (Ridge[6])	165.4	161,700	1060	72	28		76
Total	1373.3	1,429,100	1114				

1) Small timber 7-13 inches, medium timber 13-21 inches, large timber 21 inches and over.

2) Data based on 100 per cent cruise.

3) Data based on 1.6 per cent cruise.

4) Data based on 3.7 per cent cruise by strips.

5) Data based on 5.0 per cent line plot cruise.

6) Data based on 4.2 per cent cruise by strips.

diameter on the entire plot curve. For the entire area this volume is estimated at 64,000 cubic feet, which is nearly one half of the volume in trees larger than 7 inches. The net, or cubic volume of the total volume (including that contained in trees smaller than 7 inches) on the forested areas of each block which have not been cruised. A summary of the volumes obtained from the forest cruise and from these estimates is given in Table 14. The total volumes given in that table have been rounded off to the nearest 10,000 cubic feet. The table also gives the corresponding volumes per acre.

For the [illegible] consideration and for purposes of future cruising and determination of increment, only the volumes obtained by actual cruising will be of further use. These volumes have been summarized by blocks in Tables 15, 16, 17, 18, and 19. Since only the yield on the areas cruised will be utilized in regulation, they will be omitted in these tables which [illegible] tentative basis for the regulation plan of the battle contained in the chapter on future management.

A final table on page 61 shows the volume for merchantable and [illegible] by diameter classes for each block. This table represents another summary of the 20 actual block tables given in the appendix. It shows for each block in a single two percent distribution of volume by diameter groups. With the exception of the Gifford block less than 5 per cent of the total volume is contained in trees of 22 inches in diameter and over. The volumes as given in Table 20 will be used for the calculation of volume increment.

Table 14. Summary of measured and estimated cubic foot volume of merchantable (not including plant #1 and portable sawmill fields).

	PLACE							
	Beaver Creek	Gilford Camps		Monroe Furnace	Landing Ridge	Massey-burg	Snake Mill	
Area	acres							
Cruised	447.3	84.0	250.2	246.4	185.4			1213.3
Not cruised	246.0	100.6	217.8	64.6	2.1	67.3	71.6	1020.3
Total	693.3	280.6	468.0	411.0	188.5	67.3	71.6	2233.5
Total volume in cubic feet	thousand cubic feet							
On cruised areas in 4 and 6 inch class (estimated)	300	30	190	170	110			600
On cruised areas in trees 7 inches and over (measured	510	110	270	330	100			1430
Sum of above	700	140	470	500	210			2030
On areas not cruised in trees 3 inches and over (estimated)	240	190	110	30	—	40	70	500
Total	940	340	580	530	310	40	70	2530
Volume per acre in cubic feet	cubic feet							
On cruised areas in 4 and 6 inchclass (estimated)	670	390	610	690	980			920
On cruised areas in trees 7 inches and over (measured	1277	1360	1070	940	1100			1230
Sum of above	1767	1750	2680	1403	1100			1450
On areas not cruised in trees 3 inches and over (estimated)	600	530	500	500	—	600	1000	550
Total	1350	850	1130	1340	1650	600	100	1170

Table 15. Forest Type 1: Block - Volume in cubic feet b. compartments; outside 7 inches in diameter and above.

Compartment and Stand	Area	Cubic foot volume[1]) total	per acre	Volume distribution[2]) small timber	medium timber	large timber	Number of trees per acre
	acres	cu.ft.	cu.ft.	per cent			
1a	5.1	6173	1132	72	26		77
3a	4.4	6934	1400	66	30	4	102
4	60.2	83012	1302	63	33	4	84
7	41.3	64700	1369	49	45	6	83
11a	7.2	10334	1435	61	35	4	90
12	49.7	67733	1362	62	32	6	86
14a	54.4	69611	1276	64	33	3	74
16	60.8	83532	1368	68	30	2	80
17a	24.1	19331	699	82	16	2	90
17b	8.8	10213	1161	97	1		119
19a	23.9	16319	683	96	4		79
Total	407.3	520824	1277	64	32	4	83

1) Wood on 100 per cent cruise.

2) Small timber 7-13 inches, medium timber 15-21 inches, large timber 23 inches and over.

Table 16. Clifford Block - 7 thru 12 cubic feet by compartments, material 7 inches in diameter and over.

Compartment and Stand	Area	Cubic foot volume[1]) total	Cubic foot volume[1]) per acre	Volume distribution[2]) small timber	medium timber	large timber	Number of trees per acre
	acres	cu.ft.	cu.ft.	per cent			
1a	14.5	7680	530	70	3		90
5a	13.7	19368	1899	29	53	19	64
6a	7.7	7700	1070	37	60	3	100
8a	20.4	24378	1193	60	38	2	73
9a	20.0	29305	1466	70	27	3	98
9d	7.8	9440	1221	60	34	6	74
9e	5.5	11700	2305	22	41	38	60
10a	1.6	2976	1904	47	39	14	93
Total	81.1	114470	1350	53	37	10	76

1) Based on 100 per cent cruise.

2) Small Mbo 7-13, medium timber 13-21, large timber 21 inches and over.

Table 17. Compartment - 7 inches in cubic feet by compartments, selected 7 inches in diameter and above.

Compartment and Trial	Area	Cubic foot volume[1])		Volume distribution[2])			Number of trees
		Total	per acre	small timber	medium timber	large timber	per acre
	acres	cu.ft.	cu.ft.		per cent		
8 a,b	50.5	6360±1000	110±20	70	22		64
9	30.8	4000±900	130±30	67	25	8	63
10	20.0	1600±400	100±20	61	35		82
11a	10.6	1400±300	66±30	95	5		75
12a	7.1	700±400	100±60	85	11	3	74
14	56.6	5360±1000	95±20	90	10		85
15	20.0	1600±300	74±20	100			70
17a	21.7	2900±400	130±20	88	12		120
18a	9.3	600±300	70±50	87	13		62
Total	350.3	26000±2000	107±12	80	17	3	80

1) Based on a 3.7 per cent cruise by strips, areas calipered in the various compartments ranged to 1.4%, 1.7%, 0.7%, 0.7%, 0.2%, 0.2%, 0.1%, 0.0% and 0.3% acres.

2) Small timber 7-13 inches, medium timber 13-21 inches, large timber 21 inches and over.

Table 18. Nourse Furnace Block - Volume in cubic foot by compartments; material 7 inches in diameter and over.

Compartment and Stand	Area	Cubic foot volume[1]) total	Cubic foot volume[1]) per acre	Volume distribution[2]) small timber	Volume distribution[2]) medium timber	Volume distribution[2]) large timber	Number of trees per acre
	acres	cu.ft.	cu.ft.		per cent		
2a	7.0	4500± 1500	640±210	75	25		53
3a,b	51.0	31100± 1000	610± 20	81	19		48
4	45.2	40700± 6000	900±150	87	13		78
5a	26.0	36900± 9700	1420±370	66	34		94
6a	20.1	17700± 4700	880±230	91	9		73
8	16.7	8300± 2600	470±150	100			50
9a	4.7	7500± 1900	1600±400	95	5		138
b	25.0	23200± 4000	920±160	66	34		69
10a	19.2	23000± 2600	1200±130	82	18		96
b	14.4	15300± 2900	1060±200	89	11		93
11a,b,c	45.7	50300± 7400	1100±160	81	15	4	102
12a,b,c	29.1	24700±15100	1300±800	67	20	13	94
13a	44.3	24100± 7000	540±160	92	8		54
Total	346.4	330600±23000	94± 67	80	16	2	75

1) Based on a 5.0 per cent line plot cruise. Areas calipered in the various compartments equal to 1.0, 2.6, 2.0, 1.0, 1.0, 0.4, 0.4, 1.0, 1.4, 0.6, 2.0, 1.2, and 2.0 acres.

2) Small timber 7-12 inches, medium timber 13-21 inches, large timber 21 inches and over.

Table 19. Loading Ridge Stand - Volume in cubic feet by compartments; material 7 inches in diameter and over.

Compartment and Stand	Area	Cubic foot volume[1]		Volume distribution[2]			Number of trees per acre
		total	per acre	small timber	medium timber	large timber	
	acres	cu.ft.	cu.ft.				
2n	185.4	19,700	106	72	28		76
Total	185.4	19,700	106	72	28		76

[1] Based on a 4.2 per cent cruise by strips. Acres cultivated: 7.741 acres.

[2] Small timber 7-13 inches, medium timber 13-21 inches, large timber 21 inches and over.

Table 30 . Cubic foot volume of softwoods and hardwoods by dbh roter classes.1/

Number of trees per eight	Kauri Point		Whirinaki		Opuna		Upper Rangitaiki		Lowlands Area	
	Soft-woods	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods
Indices	cu.ft.	cu.ft.	cu.ft.	cu.ft.	cu.ft.	cu.ft.	cu.ft.	cu.ft.	cu.ft.	cu.ft.
8	48310	75203	3630	16598	647	2078	1648	4340	173	2306
10	41360	62234	3306	17569	739	3072	1610	2957	130	1701
12	30077	64517	2016	15163	423	1736	1307	1446	101	965
14	19717	34413	1665	10218	97	746	459	1162	86	672
16	13364	30213	1190	10245	195	429	372	992		625
18	9279	18022	625	7230		336	305	291	51	460
20	3039	13079	319	6072			61	262	65	65
22	1690	9930	244	3429		162				
24	1305	6180		2790			210	130		
26	477	2976	242	1710				130		
28	142	1649		1091		142				
30	269	1001		1501						
32		357								
34	220	648								
Total	171300	346641	14401	307749	2070	7949	5985	14965	614	7325
Per cent	33%	67%	12%	88%	21%	79%	28%	72%	9%	91%
Small timber	64%		93%		80%		80%		79%	
Medium timber	32%		37%		17%		18%		20%	
Large timber	4%		10%		3%		2%			

1/ Obtained by multiplying number of trees given in Table 11 by volume per tree; the volumes refer to the areas actually cut-over in each block. The data for the Opuna, the Upper Rangitaiki, and the Lowlands Ridge Blocks have not been weighted according to the acreage of the various compartments in each block. The data in this table are used for calculating the percentage distribution of volume by diameter groups, by softwood and hardwood, and for determining growth in each block.

The acreage of the cut-over areas is given in Table 13 .

4. Growth

The current growth of the forest was determined separately for the calipered blocks as a whole by taking increment borings distributed at random over the entire area of each block. The length of the core covering the 10 years from 1933 to 1942 was measured in each case. A total of 1312 borings were taken of which 671 were from softwoods and 631 from hardwoods. The largest number of borings (447) were secured from the Beaver Creek Block for which diameter increment was studied separately for each species. It soon became apparent that on the basis of the sample taken it would not be possible to establish significantly different growth curves for the various species and it was decided, therefore, to calculate the average diameter increment "I" separately for softwoods and hardwoods. Otherwise, in the other blocks, the data were grouped in this fashion without making a preliminary analysis by species. The resulting average diameter increments including bark increment are shown in Figure 3. These values are balanced by fitting to the calculated averages a straight line or a parabola. The balanced diameter increments are given in Table 11. Having use of the established logarithmic volume equation, the average volume increment "I_v(%)" in per cent of volume was calculated for the midpoint D of each diameter class by the formula

$$I_v\,(\%) = \frac{I}{D} \cdot b \cdot 100$$

where b = 2.3026 as given in Table 12. The resulting growth percentages are given in Table 12. By multiplying these values with the corresponding volumes given in Table 10 the total volume increment of each block is easily obtained. A summary of the results is given in Table 13. The

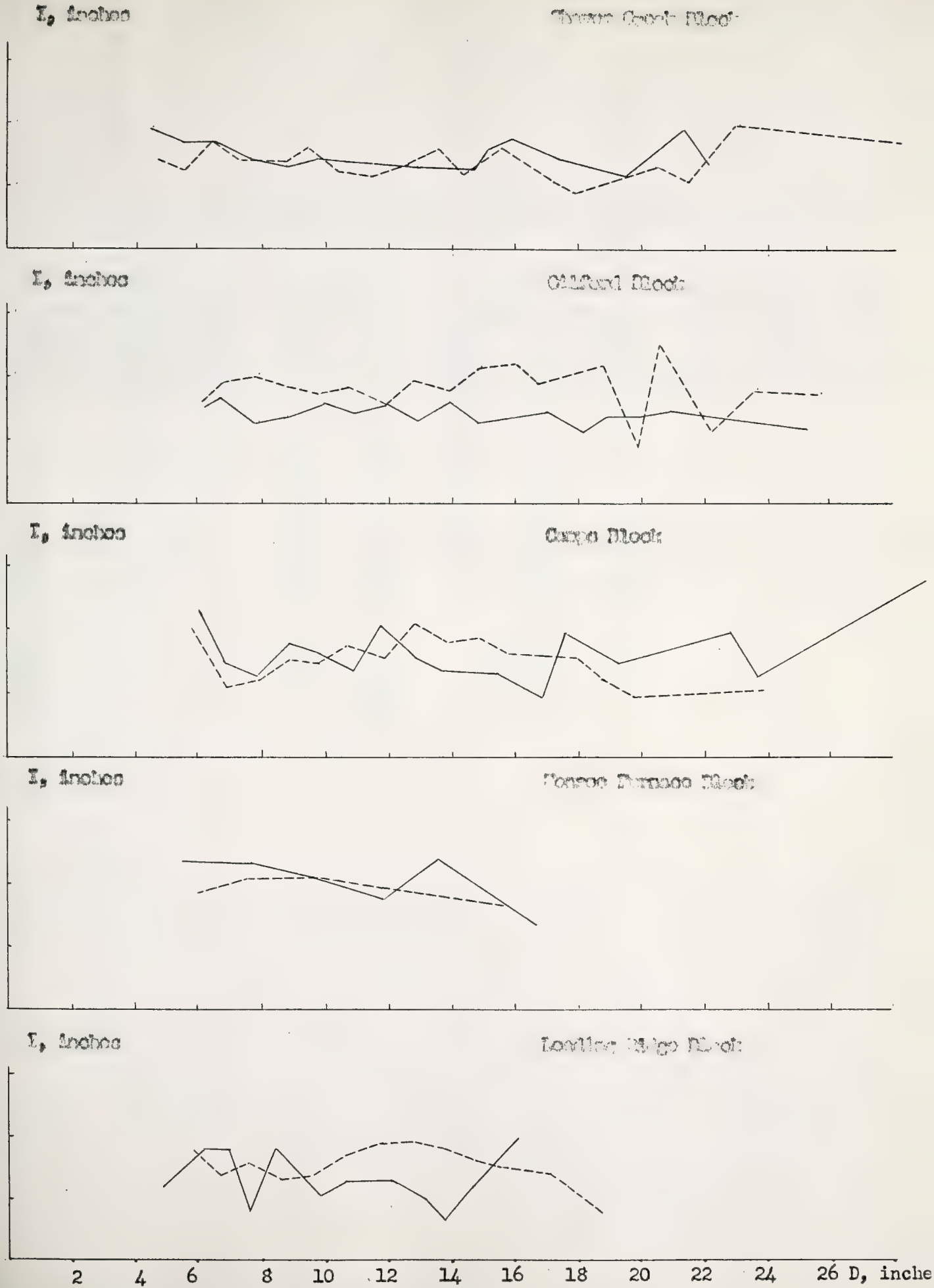


Fig. . Diameter increment by diameter classes. — Softwoods

Table 21. Balanced average annual diameter increment for softwoods and hardwoods (including bark increment).

Diameter at breast height	Dynes Creek		Milford		Kenpa		Kenpa Swamp		Loading Ships	
	Soft-woods	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods
Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches	Inches
6	0.140	0.148	.140	.190	.143	.147	.211	.235	.139	.157
10	0.140	0.145	.147	.198	.135	.146	.206	.213	.139	.159
12			.143	.206	.127	.148	.174	.186	.137	.158
14			.142	.183	.176	.149	.177	.197	.136	.158
16			.141	.181	.190	.148	.182	.196	.135	.159
18			.140	.179		.147	.147	.113	.135	.159
20			.138	.177		.147	.193	.086	.134	.157
22			.216	.175		.147	.147			
24			.134	.173		.147	.147			
26			.133	.170		.146				
28				.168		.145				
30				.166						
32										
34										

Table 22. Volume increment in per cent of volume for softwoods and hardwoods

Diameter at breast height	Beaver Creek		Clifford		Corpus		Nueces Canyon		Reading Ridge	
	Soft-woods	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods	Soft-woods	Hard-woods
Inches	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent	per cent
8	4.0	4.2	4.3	5.5	4.1	4.3	6.4	6.0	4.0	4.5
10	3.2	3.4	3.4	4.3	3.6	3.4	4.8	4.9	3.3	3.6
12	2.7	2.8	2.8	3.5	3.2	2.9	3.7	4.0	2.4	3.0
14	2.3	2.4	2.4	3.0	2.9	2.4	3.2	3.1	2.2	2.6
16	2.0	2.1	2.0	2.5	2.7	2.1	2.8	2.9	1.9	2.3
18	1.8	1.9	1.8	2.2		1.9	2.5	2.4	1.7	2.0
20	1.6	1.7	1.6	2.1		1.7	2.3	2.0	1.5	1.8
22	1.5	1.5	1.4	1.8		1.5	2.2			
24	1.4	1.4	1.3	1.7		1.4	2.0			
26	1.3	1.3	1.2	1.5		1.3				
28	1.2	1.2		1.4		1.2				
30	1.1	1.1		1.3						
32	1.0	1.0				1.1				
34	1.0	1.0								

Table 23. Annual volume increment per acre and in per cent of volume. Potential 7 inches in diameter and over.

Work		Volume increment per acre	Percentage volume increment			Total
			Small timber	Medium timber	Large timber	
		cu. ft.	per cent	per cent	per cent	
Turner Brook	Softwood	12.7				
	Hardwood	20.0				
	Total	32.7	3.5	2.1	1.4	3.1
Milford	Softwood	4.8				
	Hardwood	42.5				
	Total	46.3	4.4	2.3	1.6	3.4
Penn	Softwood	6.1				
	Hardwood	48.0				
	Total	54.1	3.7	2.7	1.6	3.4
Monroe Branch	Softwood	14.9				
	Hardwood	32.8				
	Total	47.7	5.2	2.3	1.4	4.6
Dowling Tract	Softwood	2.6				
	Hardwood	37.1				
	Total	39.7	2.0	2.3		2.4

methods used in all these calculations are described in Bulletin 433 of the Pennsylvania Agricultural Experiment Station.

When comparing the volume increment per acre obtained for the various blocks, it must be kept in mind that these calculated values are affected by sampling errors which may amount to about 1 - 2 cubic feet (standard error). The increments obtained for the Gifford and Evans Furnace blocks must be considered significantly higher than those obtained for the other blocks. We should not conclude, however, that these two blocks as a whole are of a better quality than the others. In the case of the Gifford Block, only the portions containing merchantable timber were measured. The average increment of about 40 cubic feet per acre characterizes the present productive capacity of the cutover areas sufficiently well for immediate practical purposes. This increment is low, but by building up the growing stock and by proper silvicultural treatment it is quite possible that the future yield increment of the forest may be increased to twice the present amount. This, however, will only be obtained after a period of 40 to 60 years of sound and conservative management of the forest.

PART I REF

MANAGEMENT

1. Management policy and administration

The general policy to be followed in the management and administration of the College Experimental Forest is clearly outlined in Section 5 of the lease between the United States of America and The Pennsylvania State College (See Appendix). Under (a) Forestry, it is stated that the forest shall be managed on a sustained yield basis. A planting program shall be established and the College shall provide adequate forest protection. Similarly, the management of (b) Wildlife shall be such as to maintain the lands in a productive condition from the standpoint of game. Under (c) Recreation, it is indicated that the College shall develop recreational facilities for the use and benefit of the general public. Nothing is said concerning the use of the area for grazing; however, it will be the policy of the College to allow no grazing of domestic livestock on forested or planted areas. The provisions made in the present management plan are in full accordance with the general policy set forth by the United States Government.

The ultimate goal of sustained yield management is to attain an adequate and balanced growing stock, capable of producing a regular annual or periodic yield of high quality timber. In order to gradually build up the present growing stock, which in all blocks of the forest is far below normal, it is necessary that only a portion of the current growth be cut from the forest annually or periodically. All cuttings to be made in the near future will, in one way or another, have the character of improvement cuttings. The small financial returns, if any, can be

expected from this type of cutting. Timely efficient organization of all logging operations and through a careful survey of market possibilities, the highest attainable returns should be sought. In order to take advantage of favorable market conditions an increase of the annual cut in certain years to above normal may be justified. The accumulation of timber will call for a temporary increase of the annual cutting budget. Smaller cuttings than average will be made in years of unfavorable price levels.

The more intensive operations to be carried out during the first period of management shall be concentrated on the better areas of the forest, where the investment of labor and capital promises the relatively highest future returns. In view of the variable forest conditions within the College Experimental Forest this policy calls for the application of management practices of various degrees of intensity. The subdivision of the forest into 7 separate blocks has been undertaken for just this reason. Each of the blocks represents basically a more or less independent continual yield unit. Each block will be treated and improved in accordance with the economic possibilities obtained in its present condition. This, in turn, will allow for a practical demonstration of various forms of management. It will also make it possible to distribute the future revisions of the present plans of regulation for the different blocks over a period of several years.

The reforestation of the open areas and abandoned farm lands may be considered as a counterpart to the gradual building up of improvement of the present growing stock. Areas exposed to severe erosion will be put at the top of the planting program. Otherwise, the better sites

will be reforested first. No attempt will be made to reforest the open fields in the neighborhood of the Engineering Camp except the parts which are subject to severe erosion. Certain open areas like the Tuttlerabaugh Farm in the Gifford Block and others which present a favorable habitat for wildlife will be left in their present condition.

With regard to improvements to be made in the immediate future, priority will be given to works necessary for a more efficient protection of the forest from fire. The first major project to be carried out will be the construction of a road along Stevens Creek, leading from the bridge on State Highway 245 (Ferguson Road). Obviously this project cannot be undertaken at the present time. For the duration of the war road construction will be limited to logging roads and truck trails, necessary for normal woods operations. Additional fire breaks will be constructed as rapidly as possible.

The research work which will be carried out on the Experimental Forest is not expected to interfere with the general management of the area based on sound silvicultural principles. Cuttings made on an experimental basis will have to be included in the regular felling record, where the trees cut are recorded by 2-inch diameter classes. Experimental cuttings should not be of a destructive nature, except as confined to small areas. The integration of research work and of normal practical forest management represents a challenging task. Recent experience gained in the management of the College Farm Woodlands has already shown that such an integration of research and management on one and the same area is entirely feasible.

The College Experimental Forest will be used as a laboratory

for instruction of students enrolled in the Department of Forestry at the College. A large part of the regular summer camp activities of the school will be located on the area. Subsequent revisions of the management plan by blocks, silvicultural markings, plantings, certain cuttings and forest fire protection may be carried out by graduate students and other students scheduling special forestry courses.

2. Silviculture & Treatment

a) Silvicultural systems. Most of the cuttings to be made during the coming 10 or 15 years will be of the character of improvement cuttings. The chief aim of operation is to be of minor importance to specify a silvicultural system to be followed. There are, however, a number of over-mature stands on the area, and the handling of these stands will definitely depend on a coarse silvicultural system as outlined in the method of regeneration. The several forest types which can clearly be differentiated on the area will call for somewhat different methods of silvicultural management. Research or demonstration projects to be conducted will probably be concerned to some extent with the application of various silvicultural systems. It is contemplated that demonstration markings and cuttings to illustrate the various silvicultural systems of some extent of natural regeneration will be made as previous stands land themselves to such treatment. It may be possible that such cuttings might be made for demonstration purposes with little regard to the silvicultural characteristics of the stand. However, such demonstrations will be confined to relatively small areas and the yield derived from the cuttings must be within the allowable cut as determined for a block or a whole. For these reasons it is not advisable to set up too definite a policy concerning the silvicultural system or systems

to be applied in the forest. The following general principles will be followed in future operations which do not serve special demonstration purposes.

With the exception of some Virginia pine stands and some younger stands of upland oak, the growing stock on the greater part of the forest is of a more or less uneven-aged structure. In few cases is an actual segregation of age classes possible. The entire forest is, therefore, best considered as uneven-aged and no attempts will be made to subdivide the area into age classes nor to secure an even distribution of such age classes by area. In view of the extensive plantations made in recent years it would be difficult indeed to obtain in reasonable time such a distribution.

Stands of different average ages or ages will also blend into one other in the future and sharp boundaries clearly discernible today will disappear. A flexible silvicultural system capable of conforming to end of maintaining such conditions may best be defined as some form of a single-tree or group single-tree system. In areas with a high proportion of tolerant species, such as hemlock, regeneration in single small groups will create stands of the type of the group selection forest. In areas stocked with intolerant species, such as Virginia pine and oak, such as yellow poplar, the forest will have to remain more or less even-aged. A burst regeneration in both areas will be established in groups of varying sizes as determined by the light requirement of the species. While tolerant species may be reproduced in small groups and under considerable shade, the intolerant species can be regenerated naturally or artificially on larger areas of at least 1/5 to 1/2 acre. All initial regeneration cuttings should, whenever possible, be started

on natural little of brush cutting, but is to say, along ridge tops or slopes between two parallel roads. This will allow the felled trees to be skidded without damaging the established reproduction and it will ensure a larger "point in space" in the cutting of the harvest timber. The center of reproduction will gradually be established, initially if the young growth is made up of tolerant species, more slowly if it consists of intermediate or tolerant species. White pine and especially hemlock may be introduced in comparatively small groups.

b) Thinning, climbing, improvement cutting and weeding. Since most of the existing stands have received silvicultural treatment, it is difficult to distinguish between thinning, climbing and improvement cuttings. As already pointed out, most of the cuttings to be made in the near future will be of the ch nature of improvement cuttings. Diseased and poor, formed trees as well as wolf trees will be removed first. Sound, poorly formed trees, not of merchantable size, will be removed only if they are interfering with the development of future crop trees. In general, thinning will be of the nature of high thinning. From groups averaging from 5 to 10 trees each, the best formed future crop tree is selected, then, the main competitors of these are marked for cutting. Suppressed trees which are noted will be left as ground cover and also because intermediate trees will be left as reserves. In all these cuttings the valuable hardwoods and softwoods will be favored against the less valuable species.

Following a major or a minor cutting in a stand of improvement, the crop trees of valuable softwoods, especially of white pine, will be pruned. A pruning up to 17 feet above the ground will in general be carried out in the, more liberal these, operations. The first pruning will

be made when a tree can be pruned to a height of 9 feet. The second pruning will be carried up to a height of 17 feet. This will yield a clear bolt of 16 feet. Prunings up to 17 and 19 feet will, in the near future, be made only in exceptional cases. All prunings are to be made with pruning saws.

c) Planting. The reforestation of the open areas, begun by the Forestry Department between 1934 and 1936, will be continued. In these plantings (apart from the experimental work undertaken in the field) softwoods will be used predominantly. The use of promising species appears to be justified. Work in accordance with this plan will be carried out in the best sites. Norway spruce will be planted only on the best sites. The plantings will be made in pure blocks or groups of varying size. Smaller areas within blocks of softwoods will be planted with suitable hardwoods, such as red oak, white oak, sugar maple, black walnut and ash. The hardwoods used in gullies black locust will be planted in groups or singly. When planted singly they are expected to be crowded out by the surrounding softwoods after having served the purpose of consolidating and improving the soil. It may be necessary to cut the locust back after a time to prevent overtopping of the softwoods.

In general, either wide spacing will be applied in these plantings. For red pine a spacing of 8 - 8 feet appears to be the most suitable. White pine and Norway spruce will be planted from 6 to 7 feet apart. Hardwoods should not be planted in spacings wider than 6 by 6 feet. For the most part the planting stock will be secured from State nurseries and transplant stock of pine and spruce will be used (2 - 2 stock). Some additional stock for distinctive tree plantings will be obtained from private nurseries.

Concerning the lay-out of cost in plantations, the recommendations made in the chapter on wildlife should be duly considered.

No definite planting program has been set up at the present time.

2. Protection

a) Fire. Damage from forest fires has been slight for many years. In 1940 a fire destroyed about three acres of young plantations. The lack of serious fires may be ascribed to the vigilance of the land owners and to the proximity of the Ramey Mountain Fire Tower. Fires occurring within the area of the Experimental Forest may also be detected from the Log Mountain and the Greenwood Mountain. The Department of Forest and Waters which is operating Grove Fire Lookouts has made a memorandum of the agreement with The Pennsylvania State College for cooperative fire protection of the Experimental Forest. A copy of this agreement dated April 1, 1942 is found in the appendix. According to this agreement [illegible] the Experimental Forest in the same category as other protected land in Huntingdon County. The superintendent of the forest (or resident officer) employed by the College is responsible for all phases of fire protection and prevention. He will act as fire boss on fires within the boundary of the forest. The local warden crew established by the State will constitute the first line of attack on fires on or near the area. The College will maintain [illegible] men employed part time or full time, and the necessary tools for a fire crew. Fires are to be reported by the lookout man to the resident officer and also to the Huntingdon Town Hall office.

In accordance with this agreement, the Department of Forestry of the Pennsylvania State College has established a detailed fire plan

which is in the files of the Department. The local fire warden and the resident officer in Stone Valley are responsible for the execution of this plan.

b) Insects. The great variety of species on the Experimental Forest has so far prevented any great epidemics caused by insects. The white pine weevil is perhaps the most common of the injurious forest tree insects within the area. As far as possible all weevil leaders found in the various plantations must be collected annually and destroyed.

The locust borer is doing considerable damage in some of the larger stands of this species, as along the road leading to the forestry camp. No other measures except the gradual removal of infested trees need be proposed at the present time.

Bark beetles attack in large numbers the fallen or dead trees of Virginia pine and other conifers. They have, so far, not caused any appreciable damage to living trees. The practice known as "trap-peeling" should be carefully watched since none of the native insects might possibly develop to such numbers as to become a danger to the remaining trees of a stand in which a cutting of pulpwood has been made.

c) Diseases. As mentioned before, the chestnut blight has profoundly affected the composition of the stands in Stone Valley. Chestnut, which was a major species on the rocky ridges of Stone Valley and on the neighboring mountains, has very nearly disappeared and it is questionable if it can ever become established again. A number of living sprouts and small trees are still to be found on the area.

Various species of fungi causing cankers or galls are common throughout the forest. The removal of all infected trees represents one of the most important measures to be undertaken in future improvement cuttings.

The best protective measure against bark beetle attack will be of a preventive nature. By keeping the stands in a healthy condition, by the prevention of fires and of mechanical injuries to the butts of trees, the development of many fungi will be greatly reduced.

4. Regulation

a) The object of regulation. It may be said that a forest is under sustained yield management if the actual volume gradually approaches a normal volume, capable of producing an annual or periodic yield. As economic and other conditions change, the most desirable normal volume to be established in a forest will vary also. It is extremely important, however, for the forest manager to have the approximate goal which he wishes to approach through systematic and scientific methods of forest management. For an even-aged forest the normal growing stock is determined indirectly by adopting a certain rotation for the management. For an uneven-aged forest the normal volume per acre must be obtained directly by estimating the desired volume which can be maintained indefinitely, if not more than the annual increment is removed from the forest. The normal volume should show a balanced number of trees by diameter classes. In order to characterize the normal growing stock of an uneven-aged forest properly, it is sufficient for practical purposes to give the volume per acre and the percentage distribution of this volume over three inch diameter groups for all species combined. For a regular structure of part of the stands of the College Experimental Forest and a forest type it obviously requires more to consider it as an uneven-aged forest.

After an appraisal of the desired normal volume is made, the yield for the annual period of management is determined in such a way as to make the actual volume gradually approach normality. In the case of the College Experimental Forest, only a portion of the current possible

increment can be removed from the forest, since the actual volume is far below the normal volume.

The final task of forest regulation is to distribute this anticipated cut over the various compartments of the forest, that is to say, to establish a cutting plan. While it is often desirable to determine beforehand in which year a certain compartment will be cut over, planned or otherwise treated, this is not absolutely necessary. The question of the most appropriate sequence of cutting may be decided from year to year. In case of the Mont Valley Forest as an experimental area and the forest manager accordingly a matter is advisable to follow the second plan, leaving it up to the silviculturist to determine from year to year which stands and compartments are in need of immediate attention. However, any cut made must always cover the entire area of a compartment.

Even for a well-kept forest, normality in structure can only be attained within longer units. Each block of the Ontario Experimental Forest will technically be considered as a combined yield unit and the future yield will, therefore, be determined separately for each block. Also due to certain differences in site quality, each block will ultimately require a separate appraisal of its normal growing stock. At the present time, it is sufficient to appraise the desired normal volume per acre for the forest as a whole. Each time the management plan is revised, the normal volume as previously determined is subject to a reappraisal which will be based partly on the experience gained in the past. These successive approximations of normality represent an intuitive process that is never brought to a definite conclusion.

b) The normal volume. An appraisal of the normal volume of an uneven-aged forest must be based on the structure of uneven-aged forests

showing a more or less balanced distribution of number of trees by diameter classes. In this county there is no managed forest of the type encountered in Stone Valley to give an indication of the desired structure. However, a few remnants of virgin upland oak forests have recently been studied (Meyer, 1943) and the structure of these stands may be taken as a guide for determining the desired volume distribution of our forests. Furthermore, the structure of virgin beech-birch-maple-hemlock forests of northern Pennsylvania, of which a detailed study has been made (Meyer and Stevenson, 1943), will furnish still another basis from which to judge what may be attained on the better sites occupied by the mixed oak-beech-hardwood type. To obtain a results comparable with the calculated actual volume of some of the compartments of the College Experimental Forest, the volume of trees at six inches has been used using the same local volume table as used in the management plan. The original detailed tables of the virgin forests are given in the publication referred to above. In Table 24 the total volume of trees 7 inches in diameter and over and the percentage distribution of this volume over three diameter groups are given. The volume of the virgin forests is compared with that of certain relatively well stocked compartments of the Experimental Forest. The lower portions of the compartments of the Stover Creek Block are within the mixed oak-beech-hardwood type, but the upper parts extend into the upland oak type. The entire compartment of the Leading Ridge Block is entirely of the upland oak type.

It is apparent at once that the actual volume, even of the better and mature fully stocked compartments of the forest, is far below the volume per acre encountered in a virgin forest of the upland oak type, and it falls short even more when compared with the volume of a virgin

Table 24. Volume per acre of virgin forests compared with the volume in certain compartments of the Experimental Forest.

Forest type or compartment	Volume per acre	Distribution of volume		
		Small timber	Medium timber	Large timber
	cu. ft.	per cent	per cent	per cent
Virgin upland oak forest				
Stand 1_p 21.0 acres	1230	39	52	9
2_p 20.0 acres	2010	41	49	10
3_p 16.6 acres	2340	29	57	14
Virgin beech-birch-maple-hemlock forest				
Theoretical type A	2770	29	39	32
B	2650	33	30	37
C	2040	37	36	27
D	2460	27	34	39
College Experimental Forest				
Flower Brook Block:				
Compartment 7_p 42.0 acres	1570	49	43	8
11_c 7.0 acres	1460	61	35	4
12_p 43.7 acres	1360	68	26	6
Bowlby Brook Block:				
Compartment 2_p 165.4 acres	1020	72	28	

All volumes are computed with the local cubic foot volume table applied in the management plan.

beech-birch-hemlock forest. The figures given in Table 24 are for structural types with a relatively small volume per acre which will most likely represent what might be maintained in a managed forest. In a virgin forest large amounts of heavy timber are accumulated, leaving only a limited space for the small and intermediate trees. The managed forest of the selection or group uniform type, on the better sites are left to grow into large sizes and a greater part of the available growing space is taken up by trees of small and intermediate diameters, many of which will be harvested before reaching the age of natural mortality. The contributed more volume for the following Hypothetical Forest must, therefore, be recognized below the volume found in a virgin forest of similar type. Taking into consideration the relative importance of the various forest types of the area, it seems safe to assume that the desired normal volume on the forested land should ultimately lie between 7500 and 8500 cubic feet per acre, the volume being obtained with the local volume table used in this management plan. The lower volume would be found on upland oak sites while a higher volume per acre can be obtained on the bottomlands, supporting the mixed northern hardwood type. The probable distribution of this volume by diameter groups may be estimated to be as follows:

for a volume of 7500 cu. ft. per acre	small timber 7-11 inches	45%
	medium timber 12-23 inches	50%
	large timber 24 inches and over	10%
for a volume of 8500 cu. ft. per acre	small timber 7-11 inches	35%
	medium timber 12-23 inches	45%
	large timber 24 inches and over	20%

In the future the most desirable normal volume will vary somewhat for the different blocks of the forest. For the present time, however, it will be sufficient to set as the goal of most local yield per acre for

all blocks of the forest a volume of 3000 cubic feet per acre with a distribution by diameter groups as given above.

c) Cutting cycle and period of management. It has already been stated that future revisions of this management plan may be undertaken separately for each block of the area, at least in so far as such a revision is concerned with the determination of the periodic yield to be derived from the area. The present management plan shall be valid for a period of 10 years, that is to say for the years 1941-42 to 1951-52. The fiscal year shall cover the period from July 1 until June 30 of the next year. The first periodic yield will, therefore, be calculated for a period of 10 years. If the plan of regulation for a certain block is not immediately revised after this period, the same average annual cut will be allowed for the coming years until the first revision is made.

The operation plan outlined within this periodic yield shall be secured by cutting over every compartment of each block so that after ten years the cut would return to the first area cut over during the present management period, or if the periodic yield should be removed from a number of selected compartments only. In the first alternative a cutting cycle of 10 years will be applied to the forest, in the case of the second alternative a cutting cycle longer than 10 years. The application of a short cutting cycle regulation is intensive form of silvicultural management. It is quite clear that the various blocks of the Experimental Forest do not lend themselves to the same intensity of management. It is likely, therefore, that in certain blocks the periodic yield will be derived from a few compartments only, where the present condition of the stands make heavier cuts necessary, or where a return of the cut after a period of 10 years does not appear feasible. It would be

difficult to anticipate all the possibilities, but this will hardly be necessary. In setting up the cutting plan for the various blocks of the forest, the periodic yield will be distributed over the entire area of each block, anticipating, however, for certain compartments the removal of dead and diseased timber only. It remains to be seen whether more minor cuttings can be carried out in such case or not. The fact that each compartment which has been cruised in detail in the cutting plan may at least be taken as a reminder that it should be looked over, if only for the purpose of taking the necessary protective measures. The degree of intensity of management applied in the various blocks will, therefore, be brought out by a relatively uneven or a relatively even distribution of the periodic yield over the area of a block.

d) Determination of periodic yield for 10 years 1941-1942 to 1951 - 1952.

The growing volume on the cruised area of the forest is only little more than half the desired normal volume of 2000 cubic feet per acre. This is the case in every block of the forest. It is, therefore, imperative that only a portion of the current annual growth be cut. On the other hand, most stands are badly in need of thinnings or improvement cuttings. The allowable cut should, therefore, be large enough to permit these important silvicultural operations. On the basis of a number of smaller cuttings already made and on the basis of the experience gained in recent years from the College Farm Woodlands, it should be possible to carry out the necessary cuttings if 2/3 to 3/4 of the current periodic growth is removed. The allowable cut on the areas cruised for trees 7 inches in diameter and over has been determined on this basis. The figures for each block have been rounded off to the nearest 500 cubic feet. The proposed cut for each block is summarized in Table 25.

Table 25. Proposed yield in cubic feet for next 10 years (1941-42 to 1951-52). Limit 7 inches in diameter and over.

Block	Total yield for 10 years	Yield per acre
	cu. ft.	cu. ft.
Silver Creek	125,000	31
Gilford	30,000	36
Cape	70,000	28
Mecca Terrace	110,000	33
Rowley Ridge	40,000	24
	380,000	

For the entire period of management according to plan the total yield proposed for the several areas of each block should not be exceeded. In the cutting plan, given in Table 26, the total yield of each block has been distributed over the various compartments. These estimates cannot be considered as binding. Silvicultural necessities and other reasons may make it necessary to increase or to reduce the cut in some of the compartments. These increases or decreases should, however, be made to compensate in other parts of the area of an entire block. Within one or two years, however, they should in general not be more than about 50% of the estimated yield.

In addition to the yield to be derived from material 7 inches in diameter and over, a considerable amount of timber below that diameter limit will be cut and sold for fuelwood, fence posts, etc. For the cruised areas this additional yield may be estimated to amount to about

Table 26. Cutting plan for 10 year period of management 1941-42 to 1951-52.

Block and Compartment	Area	Allowable cut in trees 7 inches and over		Compartments to be cleared or otherwise treated and area	
		total	per acre		
	acres	cu.ft.	cu.ft.		
Beaver Creek:					
1 a	5.5	2000	360	1b	31.4 acres
2 a	4.4	2000	450	2b	36.5 "
				3b	40.2 "
4 a	60.2	19000	310	4b	5.5 "
				5	70.2 "
7	41.7	10000	420	6a	5.3 "
				b	20.7 "
				8	40.5 "
				9	23.3 "
				10	24.2 "
11a	7?.2	?000	?10	11b	5.4 "
				c	3.3 "
12	49.7	10000	200	13	16.5 "
14 a	54.4	12000	220	14b	.4 "
16	62.0	18000	290	15	32.9 "
17 a	24.1	3000	80	18	22.7 "
17 b	6.8	5000	570	19b	15.0 "
19 a	24.9	3000	120	c	4.3 "
Milford:					
1 a	17.3	1000	70	1b	6.3 "
				a	12.0 "
				2b	13.6 "
				a	20.4 "
				d	23.1 "
				e	1.8 "
				6a	5.1 "

Table 26. Cutting plan for 10 year period of management 1941-42 to 1951-52 continued.

Block and Compartment	Area	Allowable cut in trees 7 inches and over		Compartments to be cleared or otherwise treated and area	
		total	per acre		
	acres	cu.ft.	cu.ft.		
Gilford (continued)					
5 a	10.2	6000	590	3 b	6.1 acres
				c	2.4 "
				d	1.8 "
				4 a	20.6 "
				5 a	10.2 "
				b	1.2 "
8 a	2.7	2500	930	7 a	7.4 "
c	20.7	5700	270	b	24.2 "
				c b	10.8 "
				c	10.2 "
				6 c	3.5 "
9 a	20.8	6700	340	9 f	1.6 "
d	7.8	2300	300	10 b	5.8 "
e	5.5	4000	770	d	20.6 "
10 a	1.6	700	440	11 a	3.8 "
Corpe					
				3 b	13.8 "
				4 a	13.6 "
				b	4.2 "
				c	6.5 "
				5 b	6.7 "
				c	20.2 "
				6 b	1.2 "
				c	5.2 "
				d	0.2 "
				e	3.8 "
8	52.5	17000	320	7 b	33.2 "
9	22.6	13000	580		
10	20.8	7000	340		
11 a	18.6	4000	210		
12 a	7.1	3000	420		
14	96.4	13000	130	13	30.1 "
15	22.8	4000			
17 a	21.7	7000	320	16 a	2.9 "
18 a	9.0	3000	330	g	21.1 "
				17 b	4.4 "
				d	3.4 "

Table 26. Cutting plan for 10 year period of management 1941-42 to 1951-52 continued.

Block and Compartment	Area	Allowable cut in trees 7 inches and over total	Allowable cut in trees 7 inches and over per acre	Compartments to be cleaned or otherwise treated and their area
	acres	cu.ft.	cu.ft.	
Monroe Furnace				
2 a	7.0	1500	210	1 a 9.3 acres 2 b 13.6 " c 4.2 " e 6.8 "
3 a,b	51.0	10000	200	
4	45.2	14000	310	
5 a	26.0	10000	500	5 d 13.6 "
6 c	20.1	6000	300	6 a 4.5 " 6 d 1.6 "
8	18.7	2300	130	
9 a	4.7	2000	430	
b	23.0	8000	350	
10 a	19.2	8000	420	
b	14.4	5000	350	
11 a,b,c	45.7	21000	460	
12 a,b,c	38.8	13000	340	12 f 11.0 "
13 a	44.3	6000	140	
Leading Ridge				
2 a	185.4	45000	240	1 58.4 " 2 b 3.1 "
Kanawha	—	No cuttings, thinnings or cleanings anticipated in these blocks in the next 10 years.		
Chute Hill				

150,000 cubic feet. None of this material will be left in the woods. A great part of it will be in the form of dead timber which will be cut only if economically justified. Another yield of about 150,000 cubic feet may be derived from the areas which have not been cruised. Again a large part of this material may not be utilised. The necessary thinnings and improvement cuttings will call, however, for the removal or cut of about that amount of wood. If these two estimated volumes are added to the proposed yield to be derived in material 7 inches and over on the cruised areas, the total yield for the next 5 management period may amount to about

600,000 cubic feet.

The amount of volume to be cut on the areas not yet cruised and in trees below the lower diameter limit of measurement will be left entirely to the silvicultural judgment of the manager. The above estimates have been made merely to give an idea of how much material of this kind may be expected.

c) The cutting plan. For the gradual improvement of the forest it is important that every compartment and stand of the area will be cut over or at least looked after within the next ten years. In many of the poorer compartments it may not be feasible to undertake operations of any kind, but for the sake of protection measures, they should nevertheless be checked. This is best done at the same time as a neighbouring compartment with better stocking is being cut over. In the cutting plan the compartments which have not been cruised have been arranged, therefore, to certain other compartments, in order to indicate that such group should be treated in the same year. The cutting in the cruised compartment represents the major operations, the thinnings and improvement

cutting, the minor operation. At the time when these minor cuttings are made, the equipment along the main operation is carried out should be looked over again for the eventual removal of trees damaged through felling or skidding, and for the execution of other necessary improvements or salvage cuttings.

3. Markets and utilization

The economic objectives of timber management will be to secure the fullest utilization of the land possible, and in so doing secure a reasonable return on the investment of capital and labor. A type of integrated utilization represents the goal of management. This applies not only to the production of all kinds of timber products for which a market may be found, but also to the use of the area for wildlife production and for recreation. One stand will furnish various kinds of forest products. Fuelwood, paperwood and mine props will be obtained from thinnings and improvement cuttings; lumber from principal cuttings made in the heavier timber.

At the present time good markets are available for fuelwood, mine props and especially for paperwood. The proximity of the paper mill at Tyrone will probably at all times allow the selling of any quantity of pulpwood that can be produced. Reasonable profits from these operations may be expected so long as the price of pulpwood remains at a reasonable level. Fuelwood can be sold in State College, in Huntingdon and to local users. Fair small profits from fuelwood operations cannot be expected, at least not in normal times. The market for fuelwood, especially fireplace wood could, however, be built up to such a possible, because it will make it possible to operate at little or no cost the necessary improvement cuttings in younger stands.

So far it has not been possible to establish a settled story market for sawlogs. It is questionable if acceptable prices can be obtained for saw logs sold on the stumpage or transported to a nearby sawmill. The sale of stumpage to a jobber can be made only if men are found who are willing to cut in accordance to the requirements of good woods practice. At the present time it does not seem easy to find men who would be willing to accept a rigid contract. It may, therefore, be necessary that the College will set up its own small sawmill and to establish a market for rough lumber, railroad ties and other half finished products.

6. Roads and Improvements.

Projects for roads and other improvements will be established at the time when construction work of this kind becomes necessary and possible to carry out. Since the low amount of standing timber in the forest does not permit heavy cuttings and large scale operations, it is not justified to invest a large amount of capital in roads and bridges at the present time. Only work necessary to carry out the contemplated improvement and salvage cuttings will be undertaken. The establishment of single truck trails will be sufficient for most of the immediate operations. These truck trails should,nevertheless, be carefully planned, so that in time they may be built out into roads capable of carrying a heavier traffic as may be anticipated for future operations.

At present it is out of the question to engage in improvement work of any scale. It is undoubtedly the best policy to postpone important projects such as the improvement and relocation of the existing better road until after the war or until such time when construction work of this kind will be welcome for the relief of unemployment. An exception to this policy must be made with regard to the construction of

disturbed especially along the boundary of the property and to some extent along ridges and along encroachment lanes.

7. Wildlife management.

Wildlife management can be integrated with the general forestry practices on the Pine Valley area very easily without detriment to the main management objectives on the tract. The area is at present producing a good crop of wildlife. The annual harvests of cottontails, cottontails, ruffed grouse, and woodcock are substantially small. Public hunting in accordance with the State game laws should be permitted in the future as has been the case in the past.

Practically all forestry operations such as cuttings and plantings alter the environment for wildlife. Some species, perhaps additional may be built with regard to the cost of total future plantings. In certain areas, such open, no plantings should be made. This refers in the first place to the swampy area of the Milford Block where natural plant succession should be allowed to take its course. Other smaller woodcock spots along fence rows should also be left open, as they provide brooding and mating grounds for birds, such as woodcock.

It is in the interest of wildlife to plant many of the old fields as soon as possible to prevent solid blocks of Virginia pine from becoming established. In all plantings as many clean as possible are to be left along field borders. Where large blocks of conifer plantings would separate existing stands of hardwoods, a connecting link of hardwood planting will be established. Existing clumps of shrubs and hardwoods are not to be cut.

Silver Creek, which is the main stream running through the area, should be studied for possible fish management plans. Its present scenic value, and its value for land animals can be enhanced through proper and generally conservative cutting practices along its banks.

f. Recreation

The Experimental Forest is open to the public for recreational activities such as hunting, fishing, hiking and camping. The proximity of the State Park of Thipple Rock precludes the necessity of constructing at the present time camp sites or buildings for public recreation. It is hardly in the interest of the College to promote recreational activities which may lead to an increase in the number of forest fires or to other detriments to the forest. On the other hand, no measures will be taken to discourage the use of the area for public recreation.

PART IV.

RECORDS AND REVISION

A detailed cost and income record of all operations carried out on the experimental forest will be kept. For that purpose a double entry bookkeeping system is used which at the same time contains a similar record for the College Farm Woodlands.

A felling record is being kept in which the diameters of all trees carried having a diameter at breast height of 7 inches and over are recorded by species and compartments separately for hardwoods and softwoods.

Annual reports on all activities will be made.

The present management plan is retroactive to July 1, 1942 and is valid for a period of 10 years. It will be revised after June 30, 1952. Type revisions may be carried out separately for each block of the forest.

L E A S E

Between

THE UNITED STATES OF AMERICA

and

THE PENNSYLVANIA STATE COLLEGE

THIS LEASE, made and entered into between the UNITED STATES OF AMERICA acting by and through the Secretary of Agriculture, pursuant to Title III of the Bankhead-Jones Farm Tenant Act (hereinafter referred to as the United States), and the PENNSYLVANIA STATE COLLEGE, (hereinafter referred to as the College).

WITNESSETH:

The parties hereto, for themselves and their respective successors and assigns, do hereby mutually covenant and agree as follows:

1. The United States hereby leases to the College and the College hires from the United States, upon the terms and conditions hereinafter set forth, those portions of the real property acquired or to be acquired by the United States in connection with the Pennsylvania Land Project, Land, as may be described in the exhibits hereinafter referred to, together with all improvements which are located thereon (hereinafter referred to as the property) subject, however, to all easements, rights-of-way, licenses, leases, and outstanding interests in, upon, across or through said property which have heretofore been granted or reserved by the United States or its predecessors in title, but excepting and reserving unto the United States of America:

(a) All rights to the oil, gas, coal and other minerals or mineral ores whatsoever upon, in or under said property, together with the usual mining rights, powers and privileges, including the right of access to and use of such parts of the surface of the premises as may be necessary for mining and saving said minerals. The College, however, shall have the right to use stone, gravel, and similar substances from said property, provided such materials are used for construction purposes upon or in connection with said property, or, with the written consent of the United States, on other nearby lands under the jurisdiction of the College. In the event the United States determines that the exercise of said mining rights would be inconsistent with the purposes referred to in Section 5 below, it agrees not to exercise such rights during the term of this lease without the written consent of the College. In the event the College or the United States determines that the use of stone, gravel, and similar materials by the College for construction purposes, or the exercise of any mining rights acquired by the College pursuant to Section 6 below, or in any other manner, would be inconsistent with the purposes referred to in Section 5 below, the College agrees not to exercise such rights, or to permit third persons to exercise such rights during the term of this lease without the written consent of the United States.

(b) The right, but not the duty, to prosecute developmental work on the property until June 30, 1942, and to do any and all things which it deems necessary or desirable in connection therewith. However, any such developments shall be approved by the College before being initiated.

The property already acquired by the United States in connection with said project which is to be made subject to the terms and conditions of this lease is described in Exhibit A, and the property to be acquired by the United States in connection with said project which is to be made subject to the terms and conditions of this lease is described in Exhibit B, such exhibits being attached hereto and expressly made a part hereof. The property described in Exhibit B, or any part thereof, shall become subject to all the terms and conditions of this lease when title thereto has vested in the United States, but not before such time. The United States shall notify the College in writing when the title to any of the property described in Exhibit B has vested in the United States.

2. Those items of equipment which the United States leases to the property after commencing its developmental program, as provided in Section 1 above, shall be available to the College for use in the administration of the property in accordance with the terms of this lease. (Each item of equipment shall be listed in Exhibit C which shall be attached hereto and made a part hereof at the time the United States completes its developmental program as provided in Section 1 above.) When such equipment, through normal usage or through accidental breakage, shall have become unserviceable, the College shall report on appropriate statement of the facts to the United States, which shall then provide for its disposition. Attached to the annual report rendered to the United States, in accordance with Section 9 below, shall be an inventory of the equipment and a statement of its condition.

3. The term of this lease shall be ninety-five (95) years beginning with the 17th day of May, 1940, and ending on the 17th day of May, 2035.

4. (a) Subject to the provisions of subsection (b) of this section the College shall pay to the United States in Washington, D. C., as rental for the full term of this lease, the sum of One Dollar ($1.00), payable on or before the eighth day after the execution of this lease on behalf of the United States.

(b) At any time the annual income and revenue derived from the property exceeds the annual cost to the College of operating the property, the College is hereby authorized, to the extent of the excess income and revenue available, to use on account thereof to that which has been expended on the property from College funds during the preceding years covered by this lease. These funds may be used by the College in the same manner as any other College funds.

If at any time the United States should determine from the information contained in the reports referred to in Section 9, below, or otherwise, that the total income and revenue received by the College from the use and operation of said property exceeds the total cost to the College

of operating the property, the United States may request a conference to determine (1) the rental to be paid during the remainder of the term of this lease, (2) the use to be paid by the College, out of the net revenue received from the property, to counties or other local governmental subdivisions of the State, and (3) the use to be made of such excess income or revenue which has been accumulated. This redetermination shall be made by mutual agreement and shall not preclude either the United States or the College from requesting subsequent redeterminations if the amount of net revenue from the operation of the property should materially change.

5. The college shall use said property for educational purposes, particularly for field instructions in forestry, civil engineering, geology, geophysics, geography and nature study, and for research in these fields in accordance with the following purposes and management practices:

(a) Forestry:

Forestry practices shall be of such character as to maintain the forest lands in a productive condition; the lands shall be managed to produce sustained or periodic yields of forest products insofar as is compatible with the research or educational use of the area; utilization practices shall be established to prevent waste; management practices shall be applied so as to assure the best growth of desirable species; a planting program coordinated with the educational and wildlife purposes of the area shall be established to provide appropriate forest cover on existing open land, the planting to be carried forward as rapidly as funds permit. The College shall provide adequate forest protection, including a satisfactory system of truck trails, fire breaks and other essential protection improvements, and fire suppression equipment.

(b) Wildlife:

Wildlife management practices shall be of such character as to maintain the lands in a productive condition from the standpoint of wildlife; the lands shall be managed to effectuate a balanced wildlife population; forest management practices shall be so planned as to assure reproduction of desirable species; a planting program coordinated with the educational purposes of the area shall be established to provide appropriate food and cover. In effectuating these purposes adequate provisions shall be made for the control of public hunting and fishing. The United States agrees that in carrying out the provisions of this subsection the College may cooperate with the appropriate department of the Commonwealth of Pennsylvania to assure adequate protection of wildlife on the property.

(c) Recreation:

The College shall operate, maintain and administer any public recreational facilities which may be subsequently developed for the use and benefit of the general public, any fees charged

for such public use to be non-discriminatory as consistent with the public park character of the area. (Any such recreational facilities developed shall be consistent with and subordinate to the educational uses of the area.) Recreational uses may include picnicking, camping, bathing, winter sports and other similar activities.

(d) The College shall use the laboratory, classroom and dormitory facilities located on the property for such educational purposes as the College may determine desirable.

(e) The forestry uses including forestry, recreation and wildlife shall be effectuated in accordance with standard technical practices applicable to the areas involved.

(f) Vacant buildings acquired with the land and not required in the operation of the project and which may be occupied by squatters or may be a source of other hazards are to be removed or demolished. The salvage material or entire buildings may be used or disposed of by the College in effectuating the purposes set forth in the preceding paragraphs of this section. Any of these salvage materials may be used by the College on lands owned or controlled by it in the administrative area of which the lands included in this agreement are a part.

(g) The sale of timber or any other products in excess of $300 in value shall be advertised and sold to the highest bidder. The right to reject any and all bids shall be reserved by the College.

(h) The provisions set forth in this section may be modified from time to time by mutual consent of the United States and the College.

6. The College shall not use or permit, and shall take such measures as may be necessary to prevent, the use or occupancy of said property, or any portion thereof, for any purpose which is inconsistent or incompatible with the purposes set forth in Section 5 above. Nor shall the College accept with the written consent of the United States, sub-lease said property or any portion thereof, or assign any of its rights or obligations under this lease. This provision shall not be construed to apply to such employees of the College as are engaged in the administration of said property during the period they are actually so engaged.

The College shall not, except with the written consent of the United States, authorize or permit third persons, including employees of the College engaged in the administration and management of the project, to erect dwellings on the property, whether such authorization or permission creates any rights in such third persons or not.

7. The College shall give preference to the full or part-time employment of suitable persons residing on said property with the consent of the United States, where the operation, maintenance or administration of said property provides suitable opportunities for such employment. The

College shall, however, have the right to discharge any such persons who prove themselves to be incompetent.

6. The College shall enforce such measures as may now be available under existing State Laws for integrating the use of tax-delinquent and other lands with that of said property, and for acquiring outstanding mineral interests in said property or preventing any exploitation of such outstanding interests that may be inconsistent with the purposes referred to in Section 5 above, and at the earliest possible date the College shall recommend to the Legislature and adequately present to the Legislature the necessity for the passage of such other measures as may be appropriate for this purpose.

9. All income and revenue which the College may receive from the use and operation of said property shall be and is hereby impressed with a trust for the following purposes: during the term of this lease, such income and revenue shall be expended by the College for effectuating the purposes set forth in Section 5 above and for making repairs and replacements on said property as provided in Section 10 below. Any such income and revenue which remains unexpended upon the expiration or termination of this lease shall be expended for making repairs and replacements which the College has undertaken to make under Section 10 hereof, and which have not been made prior to the expiration or termination of this lease. Insofar as such unexpended income and revenue is not needed for the above purposes, or not otherwise used in accordance with Section 4 (b) above, it may be expended, as shall be mutually agreed upon by the College and the United States, for the acquisition by the College of additional lands to block in, round out, or enlarge said property, of additional lands to block in, round out, or enlarge other scenery forest areas already established by and under the jurisdiction of the College, and of lands for the establishment of new conservational areas, for the development of any such lands so mined, or for the development of any lands in conservational areas already under the jurisdiction of the College by virtue of ownership or otherwise.

Not later than the 31st day of July of each year during which this lease is in effect, the College shall furnish the United States with an annual report, in such detail as may be prescribed by the Secretary of Agriculture, showing the income and revenue received from the use of said property, and the disposition made thereof.

10. The College shall assume and defray all costs, charges, expenses, and obligations incident to the use of said property for the purposes provided herein, and shall maintain said property, including equipment left on the project as provided in Section 3 above, in good condition and repair, making all repairs and replacements necessitated by deterioration, damage, use, negligence, or any other cause whatsoever, provided, however, that the College shall be obligated to make repairs and replacements necessitated by defects in the original design, material or construction, or necessitated by the violent forces of nature only to the extent that income and revenue received from the use of the property is available therefor. The College shall not remove any improvements, except in accordance with the provisions of Section 17 below, or alter any major improvements, without the written consent of the United States.

The funds referred to in Section 9 above, and the proceeds of any insurance which the College may secure to indemnify itself against damage or loss of the property, shall be used by the College to discharge its obligations under this section.

In the event the College fails to provide such additional funds as the United States may deem necessary for the purpose of discharging the College's obligations under this section, the United States shall have the right to terminate this lease in accordance with the provisions of Section 15 below.

11. In any publications, except press notices of monetary and local interest, covering the results of the program referred to in Section 5 above, the College shall recognize that such program was conducted on land acquired and developed in connection with the land conservation and land utilization program of the United States Department of Agriculture.

12. The College shall make adequate provision for sanitation and water purification, and shall enforce such other measures as may be necessary for the protection of the public health on the property.

13. The College shall save the United States harmless from any loss, expense, liability, or other obligation of any nature arising out of any accident or occurrence causing injury to any person or property, and due directly or indirectly to the use or occupancy of said property.

14. The College shall submit not later than one year after the date of this lease, and annually thereafter, a general plan of operation and development setting forth the measures to be taken by the College during the ensuing year to effectuate the purposes of this lease. The College shall furnish the United States with such information in regard to its use and management of said property as may be requested from time to time. The College shall also permit at all times any duly authorized representative or representatives of the United States to enter upon and inspect said property.

15. This lease may be terminated by the United States if all or any part of the land involved hereunder is needed by the United States for military or other use of a kind not provided for herein, but such termination shall not be made without the consent of the College, unless the United States has funds available which may be used to reimburse and does reimburse the College for such of the expenditures it has incurred, over and above the income and revenue derived from the property, for the purpose of developing, protecting, and administering the land involved, as are deemed by the United States to have been reasonably necessary for said purpose. In the event the College shall fail, neglect, or refuse to fulfill or perform any of the terms and conditions of this lease, the United States shall have the right to terminate this lease by giving notice addressed to the College that the term of this lease shall cease and determine twelve (12) months subsequent to the date of such notice, and upon the expiration of the twelve (12) months specified in said notice, said term shall cease and determine. However, before any notice of termination is given, a meeting

shall be so posted for discussion between officials of the College and the United States to be held at such a time and place as shall be mutually agreed upon by the College and the United States.

16. Upon the expiration or termination of this lease, the College shall quietly and peaceably remove from said property and surrender possession thereof, and the United States may immediately, or at any time thereafter, reenter and take possession of the property and remove all persons therefrom. The term "reenter" shall not be restricted to its technical legal meaning. The United States may also take any action in law or in equity which it may deem necessary to regain possession of the property or to assure the fulfillment of the purposes of this lease.

17. Upon the expiration of this lease, the College shall have the right to remove only those improvements which have been erected exclusively with funds furnished by the College and which have not been erected in any part with funds derived from income and revenue received from the use of said property; provided, however, that unless such improvements are removed by the College within eighteen (18) months from the date this lease expires or is terminated, title to such improvements shall automatically vest in the United States; and provided further that the United States shall have the option to purchase such improvements upon the expiration or termination of this lease, or within six (6) months thereafter. In the event this option is exercised, the purchase price shall be the fair value of the improvements as of the time of the expiration or termination of this lease.

18. The United States shall have the right, but shall be under no duty, to prosecute or defend, in the name of the United States of America or in the name of the College, any actions or proceedings appropriate or necessary for the protection of the title to, possession of, or any other interest in said property.

19. The invalidity of any provision of this lease, or of any part thereof, shall not affect the validity of the remaining provisions or the rights and obligations of the parties thereunder.

20. The failure of the United States to insist upon the strict performance of any of the terms, covenants, agreements, and conditions herein contained shall not constitute a waiver or relinquishment of the right of the United States to enforce thereafter such terms, covenants, agreements, and conditions, but the same shall continue in full force and effect.

21. Any notice, consent, or other action to be given or done by the United States under this lease shall be valid only if in writing and executed or performed by the Secretary of Agriculture or his duly authorized representative, or in the case of a successor to the rights of the Department of Agriculture hereunder, by the chief administrative officer of such successor or his duly authorized representative. All notices to be given under this lease shall be delivered or forwarded by mail, addressed,

to the case of the delivery to the Secretary, The Pennsylvania State College, State College, Pa., and in the case of the United States to the United States Department of Agriculture, or to its successor hereunder, Washington, D. C.

22. No member of or delegate to Congress or Resident Commissioner shall be admitted to any share or part of this lease or to any benefit to arise therefrom.

23. This lease shall become effective when duly executed by all the persons indicated below:

IN WITNESS WHEREOF, the parties hereto have hereunto subscribed their names as of the dates indicated.

THE UNITED STATES OF AMERICA

Date May 17, 1940

By (H. A. Wallace)
Secretary of Agriculture

THE PENNSYLVANIA STATE COLLEGE

Date (Sample for Secretary)
May 17, 1940

By (E. Davidson Sparks)
President, Board of Trustees

Attest:

Date (E. E. Reisner)
May 17, 1940

By (C. R. Mateer)
Secretary, Board of Trustees

EXHIBIT "A"

LANDS ACQUIRED BY THE UNITED STATES IN CONNECTION WITH THE PENNSYLVANIA LAND PROJECT, PA-21-4, TO BE MADE AVAILABLE TO THE PENNSYLVANIA STATE GAME

File Number	Name of Vendor	Tract Number	Acres	Deed Recorded: Date	Volume	Page
602	Henry G. Bolin	8	196.78	11/24/36	87	65
603	Elmer L. Smith and Ella M. Smith	9, a	109.00	7/ 2/37	87	30
604	Henry G. Bond and Ida S. Bond	11	186.41	12/16/36	87	49
606	Norman L. Bradley, Charlotte Bradley and Amanda Bradley	17	120	6/ 2/37	87	93
609	Ray T. Bosler	3	275.300	2/11/38	87	513
615	Henry Breidenbaugh & Mabelle Breidenbaugh	15	191.11	3/31/37	87	259
620	William Jackson Miller, et al	a	1.00	11/24/36	87	66
621	William Jackson Miller, et al	4a	22.9763	3/31/37	87	372
622	George Henderson & Bessie E. Henderson	14	222.765	4/24/38	87	164
624	John Fitzgerald	20	74.52	3/30/38	87	573
625	Carl A. Lightner & Catherine Lightner	1	200	11/24/36	87	62
627	Jackson T. Poole & Ethel Poole	6	344.875	12/12/36	87	85
628	Warren J. Port & Marie Port	29	117	6/29/37	87	16
630	Lydia A. Thorn & Harry E. Thorn	30	42.911	4/24/38	87	170
1698	Monroe Furnace Banking & Fishing Club	45, a	313.0264	7/16/38	87	278
1700	Porter D. Lightner	3a	38.4648	6/17/38	87	322
1704	William T. Illig & Margaret V. Illig	21	113.456	6/29/37	87	19
1707	Porter D. Lightner	3b	276.3153	6/17/38	87	322
1713	Myrtle Batchelder & Susan L. Batchelder	7c	32.7250	12/29/37	87	393
1715	Lydia A. Thorn and Harry E. Thorn	30a	67.233	4/24/38	87	170
1721	Eleanor M. Lightner and Miles Lightner	40	150.287	4/ 6/38	87	103
			2939.7			

SCHEDULE "B"

LANDS TO BE MERGED BY THE SECOND PART TO CONSTITUTE THE NEW PENNSYLVANIA LEE ROAD, LAID OUT AND TO BE KNOWN AS THE WARREN TO THE PENNSYLVANIA STATE COLLEGE

Plan Number	Name of Parties	Book Number	Approximate Acres
624	Linda Gilford & Also O. Gilford	3	107
633	J. L. Hetherington & Anna Hetherington	36b	3.975
634	L. F. Shaw and Mrs. A. L. Shaw	31	111.0777
640	Elizabeth Hollis Bechtel & Edward C. Bechtel	37 a)	743.55
650	Elizabeth Hollis Bechtel & Edward C. Bechtel	37	
651	Lewis J. Tyle	4	106.7775
691	J. L. Hetherington & Anna Hetherington	28	573
1710	Frank Hetherington et al	15	165.000
1734	Helen Kelp	75	1.77
1819	Lydia Hamm	33b	45.0000
1820	Jason Tuttle	37	67.00
			1326.2

Supplement to EXHIBIT "B" - Copy of Letter.

[illegible]
[illegible]
Soil Conservation Service

Washington, D. C.
November 20, 1940

Mr. C. E. Ketchler,
Treasurer, Pennsylvania State College,
State College, Pennsylvania.

Dear Mr. Ketchler:

This is to advise you that title to the following tracts of land which were included on Exhibit B of the lease agreement, effective July 17, 1940, between the United States and the Pennsylvania State College covering certain portions of the Pennsylvania Land Project, La-Pa-4, has now vested in the United States:

File No.	Name of Vendor	Tract No.	Date	Deed Recorded R. Volume	Page
614	Edwin Gifford et ux Alice G. Gifford	29		Law Case	No. 1
633	J. E. Butterebaugh and Anna Butterebaugh	26b		Law Case	No. 3
634	E. E. Evans and Geo. E. E. Evans	52		Law Case	No. 16
640	Elizabeth Mellie Pinchliff and Edward C. Pinchliff	57a		Law Case	No. 4204
641	Elizabeth Mellie Pinchliff and Edward C. Pinchliff	57		Law Case	No. 4204
668	David J. Kyle	4		Law Case	No. 29
691	J. E. Butterebaugh and Anna Butterebaugh	26		Law Case	No. 3
1712	Frank Butterebaugh et al	15	7-16-39	U-7	503-502
1734	Reuben Kuhy	75		Law Case	No. 4295
1819	Lydia Evans	50b	3-4-40	U-7	300
1833	Jesse White	37	6-19-39	U-7	505

The tracts of land referred to above now become subject to the terms and conditions of the lease, as provided in Section 1 thereof.

Sincerely yours,

/s/ Wm. C. Crest,
Chief, Land Management Division.

AREA TABLE - Thorer Creek Block

Compartment	Stand	Open-partially stocked			Plantations	Woodlands		Misc.	Total
		Open	Naturally Stocked	Planted		Natural	Old Field		
1	a					5.5			62.1
	b					31.4			
	c	20.2		5.0					
2	a					5.9	31.3		36.3
	b	9.7							
3	a					4.4			44.6
	b					34.2	6.0		
4	a					42.8	13.4		57.2
	b				5.0				
5						62.2	11.0		73.2
6	a					5.5			41.6
	b						22.7		
	c	9.6		4.0					
7						33.3	8.0		41.3
8			5.4			25.1	12.0		42.5
9						33.3			33.3
10						24.2			24.2
11	a					70.2			78.9
	b						5.4		
	c					3.3			
12						45.6	4.1		49.7
13		3.0				2.0	11.3		16.5
14		2.4				51.4	3.0		56.8
15						16.9	17.0		33.9
16						61.3			62.8
17	a					24.1			32.9
	b						8.8		
18						11.7	17.0		28.7
19	a					23.9	1.0		44.4
	b						15.0		
	c				4.5				
Total		43.9	5.4	9.0	9.5	527.1	176.2		871.1

AREA TABLE - Gilford Block

Compartment	Stand	Open-partially stocked			Plantations	Woodlands		Misc.	Total
		Open	Naturally Stocked	Planted		Natural	Old Field		
1	a					14.5			35.0
	b						8.3		
	c				12.8				
2	a		3.3						85.4
	b						12.8		
	c					36.4			
	d				29.1				
	e						1.8		
3	a	43.1							58.2
	b					6.1			
	c					2.4			
	d						3.8		
	Nursery							0.5	
4	a					23.6			60.6
	b	24.0	10.0	3.0					
5	a					10.2			85.4
	b						1.8		
	c	72.0	3.3						
6	a					5.1			63.0
	b	55.4							
	c					3.3			
7	a						7.4		36.1
	b					24.2			
	c	4.5							
8	a					3.7			61.3
	b						10.0		
	c					20.7			
	d	33.0	4.0						
	e						10.2		
9	a					20.0			70.3
	b				4.0				
	c	5.5		5.0					
	d					7.8			
	e					5.5			
	f						1.6		
	g	21.4							
10	a					1.6			44.0
	b		3.0				5.8		
	g	4.0				29.6			
11	a					3.3			49.0
	b	40.3	5.2						
Total		306.4	26.3	8.0	45.3	220.7	63.9	0.5	672.1

AREA TABLE - Inaps Block

Compartment	Stand	Operationally stocked: Open Naturally Stocked	Open Naturally Planted	Plantations	Coniferous: Natural Old Field	Coniferous: Old Field	Misc.	Total
1		75.3						75.3
2	a	2.3						53.8
	b				13.8			
	c	37.5						
3		29.8	29.8					59.6
4	a					13.6		24.3
	b				4.2			
	c					6.5		
5	a			20.5				57.7
	b				5.7			
	c					30.2		
6	a	37.7	14.2					73.9
	e				1.9			
	c				5.8			
	d					8.9		
	e					3.8		
	Tea around Forestry Building						3.4	
7	a	28.7						98.9
	b					35.2		
	c	1.8						
8	a				41.1	6.1		53.5
	b					6.3		
9					39.8			39.8
10					15.0	5.8		20.8
11	a				13.6			34.0
	b	11.0	6.1					
12	a				7.1			33.7
	b	26.6						
13					30.1			30.1
14					36.6			36.6
15					32.8			22.8
16	a				22.0	7.0		74.9
	b	1.3						
	c					31.1		
	d	5.0	18.5					
17	a				23.7	2.0		31.5
	b				4.4			
	c	2.0						
	d				3.4			
18	a				9.3			46.2
	b	9.0	37.9					
Total		261.2	94.8	20.8	321.5	146.5	2.4	847.2

AREA TABLE - Monroe Furnace Area

Compartment	Stand	Open-partially stocked		Plantations	Woodlands		Misc.	Total
		Open	Naturally Planted Stocked		Natural old Field			
1	a					9.3		42.8
	b	33.2						
	Power Line						0.3	
2	a				7.0			118.1
	b					13.6		
	c				4.2			
	d		71.5					
	e				6.8			
	f		15.0					
3	a				34.4			51.0
	b					16.6		
4					45.2			45.2
5	a				26.0			53.6
	b	5.0						
	c		9.0					
	d					13.6		
6	a					4.5		67.8
	b		3.0					
	c				30.1			
	d				1.5			
	e			38.4				
	Cemetery						0.2	
7		10.0		24.4				34.4
8					18.7			18.7
9	a					4.7		29.7
	b				25.0			
10	a				19.3			33.6
	b					14.4		
11	a					6.0		45.7
	b				35.1			
	c					4.6		
12	a				3.2			38.8
	b					3.3		
	c				19.3			
	d	.7						
	e	3.0						
	f				11.0			
13	a				44.3			45.9
	b	1.6						
Total		53.5	98.5	24.4	38.4	220.4	90.6	0.5	625.3

AREA TABLE - Leading Ridge Block

Compartment	Stand	Open-partially stocked		Woodlands		Misc.	Total
		Open Naturally Stocked	Planted	Plantations	Natural Old Field		
1				58.4			58.4
2	a				185.4		213.0
	b				3.1		
	c			26.5			
	Power Line					4.5	4.5
Total				84.9	188.4	3.1	4.5	277.9

AREA TABLE - Masseyburg Block

Compartment	Stand	Open-partially stocked			Plantations	Woodlands		Misc.	Total
		Open	Naturally Stocked	Planted		Natural	Old Field		
1		83.0		12.5					95.5
2	a					3.2			88.2
	b	80.7		4.3					
3		4.4			90.0				94.4
4		19.2			57.4				76.6
5		8.8			53.8				62.6
6	a					10.2	23.8		62.9
	b	28.9							
7	a					6.4	9.7		99.5
	b	8.3			75.1				
8	a						6.4		135.5
	b	14.0	13.5		101.6				
9		102.0							102.0
10	a					3.8	3.8		136.4
	b	128.8							
	Power Line							13.0	13.0
Total		478.1	13.5	16.8	377.9	23.6	43.7	13.0	966.6

AREA TABLE - Snake Hill Block

Compartment	Stand	Open-partially stocked		Plantations	Woodlands		Misc.	Total
		Open Naturally Stocked	Planted		Natural	Old Field		
1	a				45.0	2.0		115.5
	b	27.5	36.5					
	c	14.3						
2	a				8.7			89.2
	b	80.5						
3	a				9.6			111.1
	b				8.1			
	c				4.4			
	d	99.0						
Total		317.5	36.5		69.8	2.0		315.8

STAND AND STOCK TABLE

Block: I Compartment: 1a Area: 5.5 acres Date: January 1942

Species	Diameter at breast height, inches 8	10	12	14	16	18	20	22	24	26	28	30	Total
White pine	63	77	61	34	12	2							249
Virginia pine	42	27	6	2									77
Table Mt. pine													
Pitch pine	1	1											2
Hemlock													
Total softwoods	106	105	67	36	12	2							328
White oak	3		1										4
Chestnut oak	1												1
Black oak	14	12	6										32
Red oak	27	9	2										38
Scarlet oak	4	1											5
Hickory													
Red maple	1												1
Sugar maple	4												4
Yellow poplar													
Ash													
Elm	2												2
Birch													
Basswood													
Cucumber													
Black gum													
Beech													
Cherry	1												1
Black locust	2												2
Aspen	1												1
Black walnut	6												6
Ironwood	1												1
Total hardwoods	67	22	9										98
TOTAL	173	127	76	38	12	2							426

Total volume, cu.ft.										
	8"	1364		14"	1033		22"		Total:	6173
	10"	1676		16"	469		24"			
	12"	1528		18"	103		26"		Per acre:	1122
		4568		20"			28"			
		74%			1605		30"			
					26%					

STAND AND STOCK TABLE

Block: 1 Compartment: 4a Area: 6 .2 acres Date: [illegible]ptember, 1941

Species	Diameter at breast height, inches 8	10	12	14	16	18	20	22	24	26	28	30	32	Total
White pine	305	266	199	132	68	33	11	2		1		1		1071
Virginia pine	456	160	50	6										672
Table Mt. pine	6	8	5	2	1									22
Pitch pine	26	21	7	2	1									57
Hemlock	340	154	101	57	25	10	1	1	2		1			592
Total softwoods	1096	609	362	199	95	43	12	3	2	1	1	1		3414
White oak	110	44	28	13	9	11	3	1	1	2	1			223
Chestnut oak	335	198	123	65	21	2	2							746
Black oak	29	24	18	5	5		1				1			83
Red oak	317	145	53	31	20	9	7					1	1	584
Scarlet oak	11		1			1		1						14
Hickory	159	87	38	20	13	3								320
Red maple	56	33	19	12	11	10	5	1						147
Sugar maple	60	17	17	4	3	4	3	1	1	1	2			113
Yellow poplar	1	5	5	12	2									25
Ash	13	12	1	3										29
Elm	13	12	11	13	6	1	2	3	1					61
Birch	73	31	20	10	2		1	1						138
Basswood	21	10	15	8	4			1						59
Cucumber	6	11	4	1										22
Black gum	1		1											2
Beech	11	7	10	5	6	2	2							43
Cherry	12	1												13
Black locust	1													1
Aspen	19	7	4	2										32
Black walnut	33	13	11	6	4	4	5							75
Ironwood	27	4												31
Butternut	20	14	4	2										40
Hawthorn	1		1											2
Sassafras	1													1
Dogwood	1													1
Total hardwoods	1331	674	364	211	106	47	32	8	3	3	4	1	1	2805
TOTAL	2427	1283	726	410	201	90	44	11	5	4	5	2	1	6219

Total volume, cu.ft.	8"	10,137	14"	11,499	22"	896	Total:	81,013
	10"	16,936	16"	7,853	24"	498		
	12"	13,001	18"	4,615	26"	479	Per acre:	1,302
		51,074	20"	2,975	28"	711		
		63%		36,826	30"	334		
				35%	32"	184		
						3113		
						4%		

STAND AND STOCK TABLE

Block: 1 Compartment: 7 Area: 11.3 acres Date: September, 1941

Species	Diameter at breast height, inches 8	10	12	14	16	18	20	22	24	26	28	30	34	Total
White pine	150	74	43	16	17	18	11	4	2	3				347
Virginia pine	23	4	3	2										32
Table Mt. pine														
Pitch pine	4		1											5
Hemlock	347	218	151	84	53	32	8	2	2					897
Total softwoods	533	296	198	102	70	50	19	6	4	3				1281
White oak	61	49	35	26	14	4	3	1						193
Chestnut oak	115	137	113	69	33	6	3	1	1	1				478
Black oak	11	10	11	1	6	1								40
Red oak	44	48	32	34	33	16	6	4	3	1	2	2	3	221
Scarlet oak														
Hickory	133	58	36	32	14	6		1						277
Red maple	23	4	4	2	3	1								36
Sugar maple	67	36	24	13	15	7	2	6	3	1				173
Yellow poplar	24	21	4	1		1								51
Ash	30	8	6	5	3				1					53
Elm	75	35	20	12	6	5	1	2						157
Birch	7	1	1	2	3		1							14
Basswood	40	10	2	6	1	1								60
Cucumber	5	6	2	3	1									13
Black gum	2	2	1	1		1	1							8
Beech	17	20	23	22	20	10	6	1	1	1				121
Cherry			1											1
Black locust														
Aspen	2	3	1											6
Black walnut	30	27	20	10	6	1	4	1						117
Butternut	12	3	2	1	2									19
Swamp white oak	41	33	22	9			1			1				107
Total hardwoods	747	500	359	249	159	60	28	17	8	3	2	2	3	2147
TOTAL	1280	796	557	351	229	110	47	23	12	3	2	2	3	3428

Total volume, cu.ft.	8"	10093	14"	10074	22"	1874	Total:	64790	
	10"	10507	16"	8908	24"	1196		1,869	
	12"	11401	18"	5641	26"	959	Per acre:		
		32001	20"	3074	28"	284			
		49%		27697	30"	334			
				43%	34"	445			
						5092			
						8%			

STAND AND STOCK TABLE

Block: I Compartment: 11a Area: 70.2 acres Date: September 1941

Species	Diameter at breast height, inches 8	10	12	14	16	18	20	22	24	26	28	30	Total
White pine	155	99	59	19	8	9	3	3	4				359
Virginia pine	8	1	1										10
Table Mt. pine													
Pitch pine													
Hemlock	502	201	78	14	9	3	3						800
Total softwoods	665	301	138	33	17	12	5	3	4				1173
White oak	305	195	163	102	44	11	7	3	1	1			832
Chestnut oak	606	377	266	119	41	7	3	4	1	1			1425
Black oak	37	41	20	15	9	3							135
Red oak	139	160	108	72	36	11	9	2	1	3		1	592
Scarlet oak	154	109	63	43	15								404
Hickory	115	57	33	20	80	10	6	1	1				235
Red maple	237	154	79	57	53	26	13	3	3	1	1		615
Sugar maple	40	26	13	13	3	6	1						102
Yellow poplar	2	3	1	4	2								11
Ash	50	40	23	16	7	5	1	1					143
Elm			3	2									6
Birch	22	15	6	1	3								49
Basswood	1	3	4										8
Cucumber	7	11	7	5	4								34
Black gum	34	27	19	17	10	4	2						111
Beech	102	91	68	33	21	9	5	1	1				345
Cherry	6												6
Black locust													
Aspen	13	23	13	4	1		1						60
Black walnut	2	1											3
Ironwood	1												1
Dogwood	1												1
Sassafras	2												2
Total hardwoods	1934	1317	903	523	367	92	49	15	8	6	1	1	5116
TOTAL	2599	1618	1041	556	384	104	54	18	12	6	1	1	6294

Total volume, cu.ft.										
8"	30,493	14"	15,957	22"	1467	Total:	103,302
10"	31,350	16"	11,096	24"	1136		
12"	20,933	18"	5,333	26"	719	Per acre:	1450
		20"	3,598	28"	143		
	82,783			30"	167		
	61%		35,918				
			35%		3031		
					4%		

STAND AND STOCK TABLE

Block: [illegible] Compartment: 13 Area: [illegible] acres Date: September 1941

Species	Diameter at breast height, inches 8	10	12	14	16	18	20	22	24	26	28	30	Total
White pine	273	150	129	71	52	31	8	5	3				730
Virginia pine	252	101	43	10	2								408
Table Mt. pine	48	36	27	16	1								128
Pitch pine	33	29	13	4	4								83
Hemlock	565	357	131	59	11	16	2	1	1				1143
Red Cedar	1												1
Total softwoods	1172	681	343	160	70	47	10	6	4				2493
White oak	166	94	36	30	19	11	5	6		3		1	370
Chestnut oak		1	1										2
Black oak	5	5	3	2									15
Red oak	60	35	15	13	4	3	3	1	1	1			115
Scarlet oak	1	1		1									3
Hickory	69	37	12	3		3	2	1			1		118
Red maple	110	77	50	42	13	8	7	4	3	1			314
Sugar maple	21	13	4	2	2	2	1	1		3	1		48
Yellow poplar	8	3	4										15
Ash	53	37	13	10	3	1	3		1	3			117
Elm	43	15	10	11	3	1	1	2		1			85
Birch	41	12	2										55
Basswood	40	13	12	6	1	1	2	2					77
Cucumber	15	5	7	8	3	1							39
Black gum	13	14	5	2	2								35
Beech	90	54	54	30	14	4	3	2					219
Cherry	25	3	2	1									31
Black locust													
Aspen	17	12	4		1								34
Black walnut	29	13	4	2	5								50
Ironwood	6	1											7
Butternut	4	2											6
Willow					1								1
Juneberry	1												1
Apple		1		1									2
Total hardwoods	771	414	263	164	69	35	27	19	5	9	2	1	1775
TOTAL	1943	1095	603	324	139	82	37	25	9	9	2	1	4268

Total volume, cu.ft.

8"	15,381	14"	9309	22"	2038	Total:		67,720
10"	14,404	16"	5431	24"	807			
12"	11,135	18"	4305	26"	1079	Per acre:		1,363
	41,900	20"	2430	28"	284			
	62%		21,355	30"	167			
			32%		4465			
					6%			

STAND AND STOCK TABLE

Block: 1 Compartment: 14a Area: 54.4 acres Date: September 1941

Species	Diameter at breast height, inches 8	10	12	14	16	18	20	22	24	26	28	30	3334	Total
White pine	199	130	86	19	7	1	3						1	463
Virginia pine	81	43	30	7	1									162
Table Mt. pine							1							1
Pitch pine	15	11	4	4	1	1								36
Hemlock	509	376	169	65	35	17	6							1076
Total softwoods	804	668	397	95	44	19	10						1	1738
White oak	33	11	14	7	3	1	1	1			1		1	72
Chestnut oak	390	309	217	136	55	19	2					1		1139
Black oak	38	13	13	11	3	1								80
Red oak	103	56	30	32	22	17	7	2	4	1	1			283
Scarlet oak	140	62	34	16	9	6	4							277
Hickory	32	20	7	8	1	3								65
Red maple	68	35	9	13	3	3	1							129
Sugar maple	6	4			1		1							12
Yellow poplar	7	3	3	3	4									25
Ash			2											2
Elm	13	4	5	2	1	1								27
Birch	30	16	7	8	3	2	1							67
Basswood	4	2	5											11
Cucumber	3	1			1	1								5
Black gum				1	1		1							3
Beech	3	4		2	1									10
Cherry	24	3	3											30
Black locust														
Aspen	10	4												14
Black walnut	20	5	6	1	1									33
Ironwood	3	3												6
Dogwood	1													1
Total hardwoods	928	564	378	334	169	74	28	3	4	1	2	1	1	2291
TOTAL	1732	1232	669	329	153	73	28	3	4	1	2	1	2	4029

Total volume, cu.ft.	8"	13657	14"	9442	22"	241	Total:	63411
	10"	13622	16"	5978	24"	399		
	12"	13452	18"	3743	26"	120	Per acre:	1166
		40731	20"	1831	28"	284		
		64%		20934	30"	194		
				33%	34"	445		
						1686		
						3%		

STAND AND STOCK TABLE

Block: I Compartment: 16 Area: 62.8 acres Date: September 1941

Species	Diameter at breast height, inches 8	10	12	14	16	18	20	22	24	26	28	30	Total
White pine	26	14	6	2									48
Virginia pine	1	2											3
Table Mt. pine													
Pitch pine	1	1	1										3
Hemlock	595	353	113	32	17	5							1014
Total softwoods	623	370	119	34	17	5							1068
White oak	339	272	238	139	33	13	4	3	1		1		1041
Chestnut oak	716	355	340	141	33	15	4		1	2		1	1603
Black oak	52	37	43	16	4	3							155
Red oak	63	66	79	54	23	10	3			3			340
Scarlet oak	44	34	32	9		1							120
Hickory	83	36	17	10	7	4	3	2					162
Red maple	170	97	64	41	22	12	3			1	1		411
Sugar maple	23	11	12	5	3	1	1	1					57
Yellow poplar	6	6	2	2		1							17
Ash	30	9	6	13	1	4	3						66
Elm	4				2								6
Birch	29	23	8	7	3	3							73
Basswood	9	3	2	5		1							20
Cucumber	9	7	6	8	3	1							35
Black gum	16	22	20	10	6	3							84
Beech	32	15	13	5	4	2							71
Cherry	4	2	1										7
Black locust													
Aspen	2	2											4
Black walnut	1												1
Ironwood	4												4
Butternut	5	3	3										11
Juneberry	2												2
Sassafras		1											1
Sycamore				1									1
Total hardwoods	1663	1121	680	474	143	66	30	5	2	6	2	1	4193
TOTAL	2286	1491	1009	508	160	71	30	5	2	6	2	1	5541

Total volume, cu.ft.	8″	13025	14″	14580	22″	403	Total:	83,552
	10″	19601	16″	6351	24″	199		
	12″	20209	18″	3841	26″	719	Per acre:	1362
		57835	20″	1308	28″	284		
		69%		25780	30″	167		
				30%		1777		
						2%		

STAND AND STOCK TABLE

Block: 1 Compartment: 17a Area: 21.1 acres Date: January, 1942

Species	Diameter at breast height, inches 8	10	12	14	16	18	20	22	24	26	28	30	Total
White pine	52	15	7	2	1								76
Virginia pine	36	17	8	2	1								64
Table Mt. pine													
Pitch pine	15	10	6	3									34
Hemlock	32	14		4			2						50
Total softwoods	132	56	21	11	2		2						224
White oak	166	29	9	7	2	2							214
Chestnut oak	289	78	32	12	8	9	2	2					422
Black oak	95	26	7	1									129
Red oak	10	9	2	1									22
Scarlet oak	244	62	9										315
Hickory	4	1	2										7
Red maple	6	1	1										8
Sugar maple	1					1							2
Yellow poplar	1	1											2
Ash	3	2	1	4									10
Elm	4	2											6
Birch	3	1											4
Basswood	5			1									6
Cucumber	1												1
Black gum	1				1			1					3
Beech	1		1										2
Cherry													
Black locust													
Aspen	28	4	1										33
Black walnut		1											1
Butternut	1												1
Sycamore	3	1	1	1			1	1					8
Total hardwoods	866	217	56	27	11	12	3	4					1196
TOTAL	998	273	77	38	13	12	5	4					1420

Total volume, cu.ft.									
	8"	7869	14"	1091	22"	326	Total:	15688
	10"	3604	16"	508	24"			
	12"	1548	18"	615	26"		Per acre:	659
			20"	327	28"			
		13021			30"			
		82%		2541				
				16%		326		
						2%		

STAND AND STOCK TABLE

Block: 1 Compartment: 17b Area: 8.8 acres Date: January, 1942

Species	Diameter at breast height, inches 8	10	12	14	16	18	20	22	24	26	28	30	Total
White pine	2												2
Virginia pine	671	223	29	1									924
Table Mt. pine	3	5	1										9
Pitch pine	32	14	7	1	1								55
Hemlock	2												
Total softwoods	710	242	37	2	1								992
White oak	10	2	1										13
Chestnut oak	7	2											9
Black oak	3	5	1										9
Red oak	4	3	2										9
Scarlet oak	7		1										8
Hickory	6	1											7
Red maple	1												1
Sugar maple													
Yellow poplar													
Ash													
Elm													
Birch													
Basswood													
Cucumber													
Black gum													
Beech													
Cherry													
Black locust													
Aspen	1												1
Black walnut													
Total hardwoods	39	13	5										57
TOTAL	749	255	42	2	1								1049

Total volume, cu.ft.

8"	5806	14"	57	22"	Total:	10213
10"	3366	16"	39	24"		
12"	845	18"		26"	Per acre:	1161
	10,117	20"		28"		
	99%		96	30"		
			1%			

STAND AND STOCK TABLE

Block: 1 Compartment: 19a Area: 23.9 acres Date: September, 1941

Species	Diameter at breast height, inches 8	10	12	14	16	18	20	22	24	26	28	30	Total
White pine	21	7											28
Virginia pine	144	78	25	3	1								251
Table Mt. pine		1											1
Pitch pine	4	3	2										8
Hemlock	1				1								2
Total softwoods	170	89	27	3	2								290
White oak	260	51	5	3		1							320
Chestnut oak	191	24	2										217
Black oak	71	30	4										105
Red oak	8	2	1										11
Scarlet oak	494	140	31	2		1	1						659
Hickory	10	3											13
Red maple	8	5	3										16
Sugar maple													
Yellow poplar		1											1
Ash	1												1
Elm	1												1
Birch													
Basswood													
Cucumber													
Black gum	1						2						3
Beech													
Cherry	1												1
Black locust	30	6											36
Aspen													
Black walnut													
Total hardwoods	1076	262	36	5		2	3						1384
TOTAL	1246	350	63	8	2	2	3						1674

Total volume, cu.ft.									
	8"	9825	14"	230	22"		Total:	16319
	10"	4620	16"	78	24"			
	12"	1267	18"	103	26"		Per acre:	683
			20"	196	28"			
		15712		607	30"			
		96%		4%				

STAND AND STOCK TABLE

Block: II Compartment: 1a Area: 14.5 acres Date: January, 1942

Species	Diameter at breast height, inches 8	10	12	14	16	18	20	22	24	26	28	30	Total
White pine	2	1											3
Virginia pine													
Table Mt. pine													
Pitch pine													
Hemlock													
Total softwoods	2	1											3
White oak	83	14	4	1	1								103
Chestnut oak	320	32	5										357
Black oak	149	42	6	2		1							200
Red oak													
Scarlet oak	153	25	1										179
Hickory	2		1										3
Red maple													
Sugar maple													
Yellow poplar													
Ash													
Elm													
Birch													
Basswood													
Cucumber													
Black gum													
Beech													
Cherry	2	1											3
Black locust													
Aspen													
Black walnut	2		1										3
Total hardwoods	710	115	13	3	1	1							843
TOTAL	712	116	13	3	1	1							851

Total volume, cu.ft.

8"	5614		14"	86		22"	Total:	7,603
10"	1531		16"	39		24"		
12"	362		18"	51		26"	Per acre:	530
	7507		20"			28"		
	98%			176		30"		
				2%				

STAND AND STOCK TABLE

Block: [illegible] Compartment: 5a Area: [illegible] acres Date: March, 1942

Species	Diameter at breast height, inches 8	10	12	14	16	18	20	22	24	26	28	30	Total
White pine	6	2	4	1	2								15
Virginia pine	6	5	4										15
Table Mt. pine													
Pitch pine													
Hemlock	1	1	1										3
Total softwoods	13	8	9	1	2								33
White oak	14	9	12	9	11	3	15	4	3	4	3	2	89
Chestnut oak	43	49	51	43	38	33	25	9	8	3	3	1	306
Black oak	23	21	10	7	1	1	1						71
Red oak	5	3		3	3	1							15
Scarlet oak	3	1	1		2	2							8
Hickory	30	22	13	18	9	5	1	1					99
Red maple	1												1
Sugar maple	3	2											5
Yellow poplar													
Ash	6	2	1										9
Elm													
Birch													
Basswood													
Cucumber													
Black gum	1						1						2
Beech													
Cherry	1												1
Black locust													
Aspen													
Black walnut	4	3	1	2									10
Total hardwoods	132	112	97	83	64	45	43	14	11	7	6	3	616
TOTAL	145	120	106	83	66	45	43	14	11	7	6	3	649

Total volume, cu.ft.	8"	1,143	14"	2,382	22"	1,141	Total:	12,368
	10"	1,584	16"	2,579	24"	1,096		
	12"	2,131	18"	2,308	26"	839	Per acre:	1,000
		4,858	20"	2,812	28"	853		
		25%		10,081	30"	500		
				52%		4,429		
						23%		

STAND AND STOCK TABLE

Block: II Compartment: 0a Area: 3.7 acres Date: January, 1942

Species	Diameter at breast height, inches 8	10	12	14	16	18	20	22	24	26	28	30	Total
White pine	17	20	15	13	15	4	2	1					87
Virginia pine	3	6	7	1									17
Table Mt. pine													
Pitch pine		2											2
Hemlock													
Total softwoods	20	28	22	19	19	4	2	1					106
White oak	8	13	6	6	2	1							33
Chestnut oak	39	26	13	8	10	4	2						101
Black oak	10	15	16	16	10	7	6	2					82
Red oak		1	1	1			1						4
Scarlet oak	5	5	2	4	6	4							26
Hickory	3	1	1										5
Red maple	5	3	3	2	2		1						16
Sugar maple													
Yellow poplar	9	9	6			1							25
Ash													
Elm													
Birch													
Basswood													
Cucumber													
Black gum													
Beech													
Cherry													
Black locust													
Aspen													
Black walnut				1									1
Sassafras		1											1
Total hardwoods	79	71	47	38	30	17	10	2					294
TOTAL	99	99	69	57	49	21	12	3					400

Total volume, cu.ft.									
	8"	731	14"	1,836	22"	244	Total:	8,780	
	10"	1,307	16"	1,563	24"				
	12"	1,307	18"	1,077	26"		Per acre:	2,373	
		3,475	20"	785	28"				
		39%		5,961	30"				
				68%		244			
						3%			

STAND AND STOCK TABLE

Block: [illegible] Compartment: [illegible] Area: [illegible] acres Date: [illegible]

Species	Diameter at breast height, inches 8	10	12	14	16	18	20	22	24	26	28	30	Total
White pine	63	50	25	8	1								147
Virginia pine	30	16	11	2	1								60
Table Mt. pine													
Pitch pine		2											2
Hemlock		1		2	1								4
Total softwoods	113	69	36	12	3								233
White oak	53	33	20	12	3	7			1	1			130
Chestnut oak	121	109	88	60	27	3	1	1					410
Black oak	65	65	40	23	14	6	6	1					224
Red oak	17	12	5	3	3	1	1						47
Scarlet oak	6	9	5	5	3	3	2						33
Hickory	66	60	29	13	7	3	1						178
Red maple	59	25	20	12	6		1						124
Sugar maple	3	2											5
Yellow poplar	8	3	8	5			1						25
Ash	3	3	2	2									10
Elm													
Birch	1												1
Basswood													
Cucumber													
Black gum	1	2		3		1	1	1					8
Beech													
Cherry	1	1											2
Black locust													
Aspen													
Black walnut	8	3			1	1							13
Total hardwoods	414	335	335	136	63	26	16	3	1	1			1310
TOTAL	527	304	261	148	66	26	16	3	1	1			1443

Total volume, cu.ft.									
8"	4,185	14"	4,248	22"	244	Total:	24,278		
10"	5,201	16"	3,578	24"	130				
12"	5,249	18"	1,334	26"	120	Per acre:	1173		
	14,635	20"	1,047	28"					
	60%		9,207	30"					
			38%		464				
					2%				

STAND AND STOCK TABLE

Block: II Compartment: 9a Area: 20.0 acres Date: January, 1942

Species	Diameter at breast height, inches 8	10	12	14	16	18	20	22	24	26	28	30	Total
White pine	58	51	37	6	3	2	3	1		1			147
Virginia pine	25	30	10										65
Table Mt. pine													
Pitch pine		2			1								3
Hemlock													
Total softwoods	77	83	37	6	4	2	3	1		1			215
White oak	383	179	67	26	13	5	3	1	1		1		583
Chestnut oak	166	108	43	8	8	4							337
Black oak	74	64	55	24	14	2	5		1		1		240
Red oak	60	48	36	8	9	4							144
Scarlet oak	24	36	34	15	0	7	1	1					116
Hickory	13	7	3										23
Red maple	109	68	30	21	3	2		2					235
Sugar maple													
Yellow poplar	4	6	4		1	1							16
Ash	30	9	8	2									39
Elm													
Birch				1									1
Basswood													
Cucumber													
Black gum													
Beech													
Cherry	4	1											5
Black locust													
Aspen													
Black walnut													
Total hardwoods	743	526	350	105	61	25	9	4	2		2		1738
TOTAL	822	609	387	113	65	27	10	5	2	1	2		1953

Total volume, cu.ft.										
8"	6,481	14"	3,248	22"	408	Total:	20,325
10"	6,039	16"	3,540	24"	199		
12"	5,972	18"	1,385	26"	130	Per acre:	1,466
	20,492	20"	654	28"	284		
	70%		7,982	30"			
			27%		1,011		
					3%		

STAND AND STOCK TABLE

Block: 11 Compartment: 9d Area: 7.8 acres Date: February, 1943

Species	Diameter at breast height, inches 8	10	12	14	16	18	20	22	24	26	28	30	Total
White pine	33	40	20	11	7	2	2						115
Virginia pine	39	12	7		1								59
Table Mt. pine													
Pitch pine	1	1	2										4
Hemlock													
Total softwoods	73	53	29	11	8	2	2						178
White oak	27	17	11	3	2	1	1	2					64
Chestnut oak	23	16	10	4	9	1		1	1				64
Black oak	10	6	10	2	3				1				33
Red oak	32	20	8	8	2								70
Scarlet oak	3	1	1										5
Hickory	11	2	3	1	2	1							20
Red maple	13	9	4	4	2			2					34
Sugar maple													
Yellow poplar	9	11	8	6	1	1							36
Ash	49	8	2	3									62
Elm													
Birch													
Basswood													
Cucumber													
Black gum	1	2	1	1	1	1	3						10
Beech													
Cherry													
Black locust													
Aspen	2												2
Black walnut													
Total hardwoods	179	92	58	33	22	5	4	5	2				400
TOTAL	252	145	87	44	30	7	6	5	2				578

Total volume, cu.ft.										
	8"	1,987	14"	1,263	22"	408	Total:	9,443
	10"	1,914	16"	1,172	24"	199		
	12"	1,749	18"	359	26"		Per acre:	1,211
		5,650	20"	392	28"			
		60%		3,186	30"			
				34%				
						607		
						6%		

STAND AND STOCK TABLE

Block: II Compartment: 9 e Area: 5.5 acres Date: February, 1942

Species	Diameter at breast height, inches 8	10	12	14	16	18	20	22	24	26	28	30	Total
White pine	9	7	10	3	4	4	3	1		1			41
Virginia pine	3			1	1								4
Table Mt. pine													
Pitch pine													
Hemlock	2		2										4
Total softwoods	13	7	12	4	5	4	3	1		1			49
White oak	9	8	3	3	4	2	5	2	1	1	1	1	39
Chestnut oak	31	25	23	14	14	13	14	13	9	6	5	4	175
Black oak	11	15	12	15	6		1						60
Red oak	3	5	3	2		1							15
Scarlet oak		1			1								2
Hickory		3	1		2								6
Red maple	10	5		1									16
Sugar maple													
Yellow poplar	3	3	1	1			1						9
Ash	1			1									3
Elm													
Birch				1									1
Basswood													
Cucumber													
Black gum													
Beech													
Cherry													
Black locust													
Aspen													
Black walnut	1			1									2
Total hardwoods	68	65	41	39	27	21	21	14	10	7	6	5	324
TOTAL	81	72	53	43	32	25	23	15	10	8	6	5	373

Total volume, cu.ft.												
8"	639		14"	1334		22"	1331		Total:	12,789		
10"	950		16"	1350		24"	998					
12"	1066		18"	1302		26"	950		Per acre:	2,325		
	2655		20"	1504		28"	853					
	218			5370		30"	834					
				417			4966					
							382					

STAND AND STOCK TABLE

Block: II Compartment: 10a Area: 1.5 acres Date: February, 1941

Species	Diameter at breast height, inches 8	10	12	14	16	18	20	22	24	26	28	30	Total
White pine	13	3	3	1									20
Virginia pine	4	1	1										6
Table Mt. pine	1												1
Pitch pine	1		3										5
Hemlock													
Total softwoods	19	3	5	3									30
White oak			1									1	2
Chestnut oak	11	15	14	9	5	1			1				57
Black oak	3	3	4	3	6				1				25
Red oak				1	1								2
Scarlet oak				1									1
Hickory	2	2											4
Red maple	3	3											6
Sugar maple													
Yellow poplar													
Ash													
Elm													
Birch													
Basswood													
Cucumber													
Black gum													
Beech													
Cherry		1											1
Black locust													
Aspen													
Black walnut													
Total hardwoods	24	25	19	14	12	1			2			1	98
TOTAL	43	28	24	17	12	1			2			1	128

Total volume, cu.ft.	8"	339		14"	488		22"		Total:	2,566
	10"	370		16"	469		24"	199		
	12"	483		18"	51		26"		Per acre:	1,604
				20"			28"			
		1192					30"	167		
		47%			1008					
					39%			366		
								14%		

SPECIAL DESCRIPTION

Block: I Compartment: 1 Area: [illegible] acres Date: [illegible]

	Stand A	Stand B	Stand C
Area, acres	9.5	30.4	23.2
Type of cruise	10%	none	none
Number of trees per acre	77		
Softwoods	60		
Hardwoods	17		
Total volume, cu.ft.	(17)		
7 - 13"	74?		
13 - 21"	26?		
21" and over			
Volume per acre, cu.ft.	1122		

Description of stands:

Stand A - [illegible] natural woodland composed of white and Virginia pine with some scattered hardwoods. Stand density heavily reduced as result of Comm's thinning, probably in 1929-1931.

Stand B - Small, rural natural woodland recently cut except for some scattering. Virginia pine stand on south and east also, hardwoods on remaining portion of stand.

Stand C - Open field, partially planted in 1929 on both sides of creek.

Remarks and recommendations:

Stand A in need of improvement cutting.

SPECIAL DESCRIPTION

Block: I Compartment: 2 Area: 36.3 acres Date: January 1949

	Stand a	Stand b
Area, acres	36.6	0.7
Type of cruise	none	none
Number of trees per acre		
Softwoods		
Hardwoods		
Total volume, cu.ft.		
7 - 13"		
13 - 21"		
21" and over		
Volume per acre, cu.ft.		

Description of stands:

Stand a - Mainly Virginia pine with hardwoods in scattered groups. Natural and old field woodland.
Stand b - 0.7 ac. field with corn trees along creek.

Remarks and recommendations:

Thin Virginia pine stands for pulpwood.

SPECIAL DESCRIPTION

Block: I Compartment: 3 Area: 47.6 acres Date: January 1942

	Stand a	Stand b
Area, acres	4.4	43.2
Type of cruise	1:05	none
Number of trees per acre	102	
Softwoods	57	
Hardwoods	45	
Total volume, cu.ft.	6654	
7 - 13"	661	
13 - 21"	393	
21" and over	43	
Volume per acre, cu.ft.	1499	

Description of stands:

Stand a - Cultivated & farm woodland. Pine stand along ridge adjacent to Stand b -- mixed with hardwoods on northeastern slope.
Stand b - Unmanaged old field woodlands. Between roads, young mixed oak and chestnut oak with patch of Virginia pine.
Stand c - Recently cut over. Unmanaged natural woodland.

Remarks and recommendations:

Improvement cutting in Stand a. Thin Virginia pine in Stand b.

SPECIAL DESCRIPTION

Block: 1 Compartment: 4 Area: 67.3 acres Date: September 1942

	Stand a	Stand b
Area, acres	60.3	7.0
Type of cruise	100%	
Number of trees per acre	64	
Softwoods	19	
Hardwoods	45	
Total volume, cu.ft.	61,032	
7 - 13"	69%	
13 - 21"	32%	
21" and over	4%	
Volume per acre, cu.ft.	1012	

Description of stands:

Stand a - Cutaway old field and natural woodland of mixed hardwoods with some pine and hemlock.
Stand b - Plantations of Virginia and jack pine.

Remarks and recommendations:

Improvement cutting of Stand a.

SPECIAL DESCRIPTION

Block: I Compartment: 5 Area: 77.2 acres Date:

Area, acres

Type of cruise

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

Predominant natural cut old field woodland of mixed cedar and deciduous oak with other hardwoods in evidence. Stand mainly not merchantable except for small section along stream.

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: I Compartment: 6 Area: 41.8 acres Date:

	Stand a	Stand b	Stand c
Area, acres	3.5	22.7	13.6
Type of cruise			
Number of trees per acre			
Softwoods			
Hardwoods			
Total volume, cu.ft.			
7 - 13"			
13 - 21"			
21" and over			
Volume per acre, cu.ft.			

Description of stands:

Stand a - Typical natural seedling of mixed oak in narrow rocky stony ridge

Stand b - Overlapped old field seedling of Virginia pine, some openings only recently seeded in.

Stand c - Old fields partial & planted, on dry to moist areas.

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: I Compartment: 7 Area: 41.3 acres Date: September 1941

Area, acres	41.3
Type of cruise	100%
Number of trees per acre	63
Softwoods	32
Hardwoods	53
Total volume, cu.ft.	4,070
7 - 13"	42%
13 - 21"	43%
21" and over	6%
Volume per acre, cu.ft.	1000

Description of stands:

Timber heavy stand of mixed oak, other hardwoods, hemlock and white pine along edge, slope and in lower part bottom. Some evidence of lower portion of stand.

Remarks and recommendations:

Selective cutting.

SPECIAL DESCRIPTION

Block: [illegible] Compartment: [illegible] Area: [illegible] acres Date:

Area, acres

Type of cruise

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

[illegible]

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: 2 Compartment: 9 Area: 33.3 acres Date:

Area, acres

Type of cruise

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

Natural woodland. Overmature oak type on hilly clay soil other species in minor. Small amount of white pine on protection forest.

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: I Compartment: 20 Area: 0.3 acres Date:

Area, acres

Type of cruise

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

Natural woodland. Protection forest of exposed site.

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: I Compartment: 11 Area: 70.0 acres Date: September 1942

	Stand a	Stand b	Stand c
Area, acres	70.3	5.4	3.3
Type of cruise	100%	none	none
Number of trees per acre	90		
Softwoods	17		
Hardwoods	73		
Total volume, cu.ft.	100,300		
7 - 13"	61%		
13 - 21"	35%		
21" and over	4%		
Volume per acre, cu.ft.	1430		

Description of stands:

Stand a - Principal mixed hardwoods in lower portion with considerable amount of hemlock and white pine. Mixed oak and chestnut only on east and southern portions.
Stand b - Virginia pine. Not cruised
Stand c - Like Stand a but not cruised

Remarks and recommendations:

Selective cutting in Stand a. Clearing in Pt of b.

SPECIAL DESCRIPTION

Block: I Compartment: 12 Area: 40.7 acres Date: September 1941

Area, acres	40.7
Type of cruise	100%
Number of trees per acre	86
Softwoods	36%
Hardwoods	64%
Total volume, cu.ft.	43,700
7 - 13"	60%
13 - 21"	32%
21" and over	7%
Volume per acre, cu.ft.	1060

Description of stands:

Mixed hardwoods with large amount of hemlock and white pine. Small area of old field plan in southeast corner of A compartment (not kept separately in inventory).

Remarks and recommendations:

Cut selectively. Light cuttings are reported along road and Beaver Creek because of scenic value of this area.

SPECIAL DESCRIPTION

Block: I Compartment: 20 Area: 16.0 acres Date: September 1942

Area, acres

Type of cruise

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

Thirty old field pine & mostly stocked. In Virginia [illegible] pine. The rest of young mix pine on [illegible] along River Creek.

Remarks and recommendations:

Thinning pine stands

SPECIAL DESCRIPTION

Block: I Compartment: 14 Area: 36.8 acres Date: September 1941

	Stand a	Stand b
Area, acres	34.4	2.4
Type of cruise	100%	
Number of trees per acre	74	
Softwoods	32	
Hardwoods	42	
Total volume, cu.ft.	87,411	
7 - 13"	64%	
13 - 21"	33%	
21" and over	3%	
Volume per acre, cu.ft.	1266	

Description of stands:

The larger part of Stand a is located on a steep ridge with northwestern exposure and contains a high proportion of hemlock. Some groups of hemlocks have been partially drought killed and are now understocked. Near the ridge top on the east and north side, chestnut oak predominates. Stand b is an open glade.

Remarks and recommendations:

Thin hemlock at rate as well as other portion of Stand a. Plant openings with white pine.

SPECIAL DESCRIPTION

Block: [illegible] Compartment: [illegible] Area: [illegible] acres Date: [illegible]

Area, acres

Type of cruise

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

[illegible]

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: I Compartment: 25 Area: 60.8 acres Date: September 1943

Area, acres	60.8
Type of cruise	100%
Number of trees per acre	80
Softwoods	27
Hardwoods	73
Total volume, cu.ft.	85,270
7 - 13"	60%
13 - 21"	30%
21" and over	10%
Volume per acre, cu.ft.	1362

Description of stands:

Mid-aged mixed hardwood type in lower portion of compartment with considerable amount of hemlock. In upper portion, chestnut oak and mixed oaks predominate. Some openings in canopy here in west corner.

Remarks and recommendations:

Light selective cutting

SPECIAL DESCRIPTION

Block: I Compartment: 17 Area: [illegible] acres Date: January 1942

	Stand a	Stand b
Area, acres	24.1	8.8
Type of cruise	100%	100%
Number of trees per acre	59	119
Softwoods	9	113
Hardwoods	50	6
Total volume, cu.ft.	15,[illegible]66	10,[illegible]23
7 - 13"	60%	9%
13 - 21"	16%	1%
21" and over	2%	
Volume per acre, cu.ft.	699	1162

Description of stands:

Stand a - Chiefly mixed upland oak with some white pine and scrub hardwoods.
Stand b - Old field woodland of Virginia pine with a secondary growth of white pine and some hardwoods.

Remarks and recommendations:

This mixed oak at 24 yrs and Virginia pine stand selectively.

SPECIAL DESCRIPTION

Block: [illegible] Compartment: [illegible] Area: [illegible] acres Date: [illegible]

Area, acres

Type of cruise

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

[illegible]

Remarks and recommendations:

[illegible]

SPECIAL DESCRIPTION

Block: I Compartment: 19 Area: 44.4 acres Date: September 1941

	Stand a	Stand b	Stand c
Area, acres	24.0	15.0	4.9
Type of cruise	100%		
Number of trees per acre	50		
Softwoods	9		
Hardwoods	41		
Total volume, cu.ft.	16,329		
7 - 13"	958		
13 - 21"	45		
21" and over	---		
Volume per acre, cu.ft.	681		

Description of stands:

Stand a - Natural woodland, cutover. Young oak with Virginia pine in certain portion.
Stand b - Old field woodland. Young Virginia pine.
Stand c - Plantation of red pine.

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: II Compartment: 1 Area: 30.0 acres Date: January, 1942

	Stand a	Stand b	Stand c
Area, acres	14.5	6.3	10.2
Type of cruise	100%	none	none
Number of trees per acre	90		
Softwoods	90		
Hardwoods			
Total volume, cu.ft.	7680		
7 - 13"	96		
13 - 21"	2		
21" and over			
Volume per acre, cu.ft.	530		

Description of stands:

Stand a - Old; cut-over. Very mixed oak
Stand b - Old field pine
Stand c - Mixed conifer-hardwood

Remarks and recommendations:

This oak is old, clear old field pine and hardwood.

SPECIAL DESCRIPTION

Block: II Compartment: 2 Area: 89.4 acres Date: 1942

	Stand a	Stand b	Stand c	Stand d	Stand e
Area, acres	3.3	12.8	38.4	29.1	1.8
Type of cruise	none	none	none	none	none
Number of trees per acre					
Softwoods					
Hardwoods					
Total volume, cu.ft.					
7 - 13"					
13 - 21"					
21" and over					
Volume per acre, cu.ft.					

Description of stands:

Old field, also in western portion, plantation west of stream and cut over oak-pine on slope south of stream.

Stand a - Open, partially wooded
Stand b - Virginia pine
Stand c - Natural woodland
Stand d - Plantation
Stand e - Roadland

Remarks and recommendations:

Thin Virginia pine and clear plantation.

SPECIAL DESCRIPTION

Block: II Compartment: 3 Area: 58.7 acres Date: 1963

	Stand a	Stand b	Stand c	Stand d	Stand e
Area, acres	45.4	6.2	2.4	3.0	0.3
Type of cruise	none	none	none	none	none

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

Open fields partially shaded with narrow strip of woodland along northwest and southeast boundaries. Virginia pine stand in northern corner of compartment.

Stand a - Open field
Stand b - Woodland
Stand c - Woodland
Stand d - Woodland and old field
Stand e - Nursery

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: [illegible] Compartment: 4 Area: [illegible] acres Date: [illegible]

	Stand a	Stand b
Area, acres	[illegible]	[illegible]
Type of cruise	none	none
Number of trees per acre		
Softwoods		
Hardwoods		
Total volume, cu.ft.		
7 - 13"		
13 - 21"		
21" and over		
Volume per acre, cu.ft.		

Description of stands:

Stand a - [illegible]

Stand b - [illegible]

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: II Compartment: 5 Area: 61.4 acres Date: March 1940

	Stand a	Stand b	Stand c
Area, acres	10.2	2.2	73.0
Type of cruise	100%		
Number of trees per acre	64		
Softwoods	3		
Hardwoods	61		
Total volume, cu.ft.	19,368		
7 - 13"	65%		
13 - 21"	31%		
21" and over	4%		
Volume per acre, cu.ft.	189		

Description of stands:

Stand a - Quiltpond. Mature mixed oak and chestnut oak.
Stand b - Virginia pine
Stand c - Open and scrub, in parts stocked with Virginia pine.

Remarks and recommendations:

Selective cut in Stand c, remove defective material.

SPECIAL DESCRIPTION

Block: II Compartment: 6 Area: 66.0 acres Date: 1942

	Stand a	Stand b	Stand c
Area, acres	5.1	56.4	3.5
Type of cruise	none	none	none
Number of trees per acre			
Softwoods			
Hardwoods			
Total volume, cu.ft.			
7 - 13"			
13 - 21"			
21" and over			
Volume per acre, cu.ft.			

Description of stands:

Stand a = Young hardwoods
Stand b = Old field and swamp
Stand c = Pasture type soil and white pine stand.

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: II Compartment: 7 Area: 34.1 acres Date: 1942

	Stand a	Stand b	Stand c
Area, acres	7.4	24.2	2.5
Type of cruise	none	none	none
Number of trees per acre			
Softwoods			
Hardwoods			
Total volume, cu.ft.			
7 - 13"			
13 - 21"			
21" and over			
Volume per acre, cu.ft.			

Description of stands:

Stand a - Young Hardwood pine stand
Stand b - Cut-over oak stand
Stand c - Old field woodland

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: II Compartment: 6 Area: 81.4 acres Date: January 1942

	Stand a	Stand b	Stand c	Stand d	Stand e
Area, acres	3.7	10.0	31.7	27.0	10.2
Type of cruise	100%	none	100%	none	none
Number of trees per acre	138		70		
Softwoods	20		11		
Hardwoods	79		59		
Total volume, cu.ft.	8780		24,375		
7 - 13"	20%		60%		
13 - 21"	50%		30%		
21" and over	3%		2%		
Volume per acre, cu.ft.	2373		1173		

Description of stands:

The old-growth stands Stand a and c are mixed oak with some white pine. Stand b is of Virginia pine. Stand d is old field partially stocked with white and Virginia pine. Stand e is scattered groups of white pine.

Remarks and recommendations:

Cut hardwoods selectively, thin Virginia pine and white pine stands, prune crop trees.

SPECIAL DESCRIPTION

Block: II Compartment: 9 Area: 73.8 acres Date: January 1942

	Stand a	Stand b	Stand c	Stand d	Stand e	Stand f	Stand g
Area, acres	29.0	4.0	10.5	7.8	5.5	1.6	21.4
Type of cruise	100%	none	none	100%	100%	none	none
Number of trees per acre	96			74	68		
Softwoods	11			23	9		
Hardwoods	87			51	59		
Total volume, cu.ft.	29,334			9449	13,709		
7 - 13"	33%			60%	21%		
13 - 21"	27%			34%	41%		
21" and over	3%			6%	38%		
Volume per acre, cu.ft.	1466			1211	2329		

Description of stands:

Stand a - Old growth. Mixed oak, young to medium age on good site.
Stand b - Red pine plantation.
Stand c - Open, partially planted with mixed softwood and hardwoods.
Stand d - Cut-over. Mixed oak with more oak, scrub poplar and other bottom-land hardwoods.
Stand e - Cut-over. Over mature stand of chestnut oak.
Stand f - Old field pine
Stand g - Open field

Remarks and recommendations:

Thin Stands a and d, remove Stand c.

SPECIAL DESCRIPTION

Block: II Compartment: 1[illegible] Area: 4[illegible] acres Date: February 1942

	Stand a	Stand b	Stand c	Stand d
Area, acres	2.6	5.8	7.0	29.6
Type of cruise	100%	none	none	none
Number of trees per acre	80			
Softwoods	18			
Hardwoods	62			
Total volume, cu.ft.	2566			
7 - 13"	47%			
13 - 21"	22%			
21" and over	31%			
Volume per acre, cu.ft.	1602			

Description of stands:

Stand a = Cutover. Small stand of mixed oak
Stand b = Virginia pine
Stand c = Old field partially eroded
Stand d = Large mixed hardwoods with scrubby cedar trees

Remarks and recommendations:

In Stand d [illegible] overstory of hardwoods and pine

SPECIAL DESCRIPTION

Block: II Compartment: 11 Area: 49.0 acres Date: 1942

	Stand a	Stand b
Area, acres	3.8	45.2
Type of cruise	none	none
Number of trees per acre		
Softwoods		
Hardwoods		
Total volume, cu.ft.		
7 - 13"		
13 - 21"		
21" and over		
Volume per acre, cu.ft.		

Description of stands:

Stand a -- Small cut stand with some slash.
Stand b -- Open Scrub, resulting in 40 Scrub pine occupying the major portion of the Compartment.

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: III Compartment: 1 Area: 7[illegible].3 acres Date: August 1942

Area, acres

Type of cruise

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

Open area around Taylorsville Camp.

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: III Compartment: 2 Area: 52.6 acres Date: 1942

	Stand a	Stand b	Stand c
Area, acres	3.3	19.8	27.5
Type of cruise	none	none	none
Number of trees per acre			
Softwoods			
Hardwoods			
Total volume, cu.ft.			
7 - 13"			
13 - 21"			
21" and over			
Volume per acre, cu.ft.			

Description of stands:

Stand a - Open area on flat between main road and stream
Stand b - Heavily stocked white pine with some oak
Stand c - Open area to east

Remarks and recommendations:

Improvement cutting in Stand b accompanied by soil scarification test with disk or harrow to break up sod and induce regeneration

SPECIAL DESCRIPTION

Block: III Compartment: 3 Area: 23.5 acres Date: 1941

Area, acres

Type of cruise

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

Partially planted to conifers and locust

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: III Compartment: 4 Area: 24.3 acres Date: 1940

	Stand a	Stand b	Stand c
Area, acres	13.6	4.2	6.5
Type of cruise	none	none	none
Number of trees per acre			
Softwoods			
Hardwoods			
Total volume, cu.ft.			
7 - 13"			
13 - 21"			
21" and over			
Volume per acre, cu.ft.			

Description of stands:

Stand a - Cutover. A mixed stand of old field pine; well stocked with about 30 percent white pine

Stand b - Small stand of young oak with some large white pine

Stand c - Young, old field pine

Remarks and recommendations:

Improvement cutting in Stand a favoring white pine. Salvage cutting of white pine in Stand b. Is soon ripening to Forestry Camp by inbergl mixed portion of Stand c.

SPECIAL DESCRIPTION

Block: III Compartment: 3 Area: 57.7 acres Date: 1943

	Stand a	Stand b	Stand c
Area, acres	20.8	6.7	30.2
Type of cruise	none	none	none
Number of trees per acre			
Softwoods			
Hardwoods			
Total volume, cu.ft.			
7 - 13"			
13 - 21"			
21" and over			
Volume per acre, cu.ft.			

Description of stands:

Stand a - Plantation of red pine and Norway spruce
Stand b - Young hard wood stand
Stand c - Native aged old field pine

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: III Compartment: 6 Area: 20.0 acres Date: 1941

	Stand a	Stand b	Stand c	Stand d	Stand e	Area around Forestry Bldg.
Area, acres	21.0	1.0	5.0	8.0	3.0	2.4
Type of cruise	none	none	none	none	none	none

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

This Cut-over is to be developed as an arboretum. A portion of the open land (Stand a) has been planted in 1938 to mixed conifers, while Stands b and c represent mature mixed hardwoods and d, old field pine. Stand e is a locust grove. The improved area around the forestry camp has an acreage of 2.4 acres approximately.

Remarks and recommendations:

Develop arboretum and cut locust stand selectively.

SPECIAL DESCRIPTION

Block: III Compartment: 7 Area: 56.9 acres Date: 1940

	Stand a	Stand b	Stand c
Area, acres	20.7	33.2	1.0
Type of cruise	none	none	none
Number of trees per acre			
Softwoods			
Hardwoods			
Total volume, cu.ft.			
7 - 13"			
13 - 21"			
21" and over			
Volume per acre, cu.ft.			

Description of stands:

A large portion of Stand b is composed of almost pure white pine part of which was thinned in 1939. Stands a and c are open fields. The immediate area around the Mineral Industry Camp has been segregated on the map. An agreement provides that a larger area (16 acres) may be used and improved by the School of Mineral Industry.

Remarks and recommendations:

Complete thinnings and pruning in Stand b.

SPECIAL DESCRIPTION

Block: III Compartment: 6 Area: 53.5 acres Date: August 1942

	Stand a	Stand b
Area, acres	47.3	6.2
Type of cruise	strip	
Number of trees per acre	84	
Softwoods	37	
Hardwoods	47	
Total volume, cu.ft.	60,600 ± 4600	
7 - 13"	78%	
13 - 21"	22%	
21" and over	---	
Volume per acre, cu.ft.	1100 ± 90	

Description of stands:

All cull; creek. Very varied topography in this Compartment ranging for a variety of site conditions and stands. Natural woodlands of the mixed hardwoods type occupy the large hollow running from east to west, with chestnut oak and mixed oak on the ridges, an old field pine stand, largely white pine, is located on the west side near the Mineral Industry Camp. Another old field pine stand lies on the ridge to the north.

Remarks and recommendations:

Give improvement cutting in old field pine stands. Salvage cutting in mixed hardwoods at head of hollow.

SPECIAL DESCRIPTION

Block: III Compartment: 9 Area: 39.6 acres Date: August 1944

Area, acres	39.6
Type of cruise	strip
Number of trees per acre	83
Softwoods	6
Hardwoods	77
Total volume, cu.ft.	19,800 ± 2000
7 - 13"	671
13 - 21"	2[illegible]
21" and over	6[illegible]
Volume per acre, cu.ft.	450 ± 250

Description of stands:

Continued. Mature aged chestnut oak with pitch pine on the ridge and mixed oak on the flat to the north. Removal of chestnut from the stand on the ridge has resulted in understocking.

Remarks and recommendations:

Note in movement cutting in mixed oak on flat.

SPECIAL DESCRIPTION

Block: [illegible] Compartment: [illegible] Area: [illegible] acres Date: [illegible]

Area, acres	[illegible]
Type of cruise	[illegible]
Number of trees per acre	[illegible]
Softwoods	[illegible]
Hardwoods	[illegible]
Total volume, cu.ft.	[illegible]
7 - 13"	[illegible]
13 - 21"	[illegible]
21" and over	[illegible]
Volume per acre, cu.ft.	[illegible]

Description of stands:

[illegible]

Remarks and recommendations:

[illegible]

SPECIAL DESCRIPTION

Block: III Compartment: 11 Area: 34.0 acres Date: August 194[illegible]

	Stand a	Stand b
Area, acres	18.6	15.4
Type of cruise	strip	none
Number of trees per acre	75	
Softwoods	—	
Hardwoods	75	
Total volume, cu.ft.	16,000 ± 1200	
7 - 13"	95%	
13 - 21"	5%	
21" and over	—	
Volume per acre, cu.ft.	860 ± 60	

Description of stands:

Stand a - Oak/pine. Chestnut oak and mixed oak.
Stand b - Open area with a partially planted section to the northeast. The plantings were made in 1939, mixed hardwoods and conifers.

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: III Compartment: 12 Area: 33.7 acres Date: August 1942

	Stand a	Stand b
Area, acres	7.1	26.6
Type of cruise	strip	none
Number of trees per acre		
Softwoods	3	
Hardwoods	71	
Total volume, cu.ft.	9600 ± 1200	
7 - 13"	261	
13 - 21"	113	
21" and over	33	
Volume per acre, cu.ft.	1350 ± 200	

Description of stands:

Stand a - Hilltop soil. Chestnut oak on ridge, mainly aged
Stand b - Slope soil to northeast, connecting to cool in to
Virginia pine

Remarks and recommendations:

Thin improvement and selective cutting in small group of mixed oak
in south section of cal: at rd.

SPECIAL DESCRIPTION

Block: III Compartment: 19 Area: 30.1 acres Date: 1949

Area, acres

Type of cruise

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

Young mixed hardwoods with some hemlock in bottom, along and north of Turner Creek. Small area cut over within past 10 years. Central portion was burned with resultant site deterioration and seeding in of aspen. Poor seed reproduction, especially of tulip poplar, near stream.

Remarks and recommendations:

Clearings in portions of the compartment.

SPECIAL DESCRIPTION

Block: III Compartment: 14 Area: 56.6 acres Date: August 1941

Area, acres	56.6
Type of cruise	strip
Number of trees per acre	85
Softwoods	22
Hardwoods	63
Total volume, cu.ft.	52,600 ± 4500
7 - 13"	900
13 - 21"	103
21" and over	—
Volume per acre, cu.ft.	930 ± 80

Description of stands:

California. Stands of chestnut oak type on steep slopes with both northern and southern exposures. Belts of mixed hardwoods in hollows with some hemlock. Low stocking on the steep slopes.

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: XII Compartment: 15 Area: [illegible] acres Date: August 1942

Area, acres	20.0
Type of cruise	strip
Number of trees per acre	78
Softwoods	15
Hardwoods	63
Total volume, cu.ft.	14,000 ± 2800
7 - 13"	100%
13 - 21"	—
21" and over	—
Volume per acre, cu.ft.	770 ± 120

Description of stands:

Cutover. Small woodland. Chestnut oak type on northern slope, poorly stocked. Narrow belt of mixed hardwoods and hemlock along stream on northern side.

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: III Compartment: 25 Area: 74.9 acres Date: 1945

	Stand a	Stand b	Stand c	Stand d
Area, acres	20.0	2.0	21.4	23.5
Type of cruise	none	none	none	none

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

Stand a - Mixed old field woodland. Medium aged chestnut oak type with some mixed oak on ridge and slopes.
Stand b - Open fields
Stand c - Old field white pine with some Virginia and table mountain pine
Stand d - Oak over oak with scattered defective older trees left. Along the bottom there is a partial stand of old field pine with some hardwoods.

Remarks and recommendations:

Make improvement cutting in Stand a and d. Thin out pine Stand c.

SPECIAL DESCRIPTION

Block: III Compartment: 17 Area: 32.5 acres Date: August 1942

	Stand a	Stand b	Stand c	Stand d
Area, acres	21.7	4.4	3.0	3.4
Type of cruise	strip	none	none	none
Number of trees per acre	100			
Softwoods	8			
Hardwoods	92			
Total volume, cu.ft.	25,000 ± 1000			
7 - 13"	88%			
13 - 21"	12%			
21" and over	--			
Volume per acre, cu.ft.	1150 ± 80			

Description of stands:

Stand a - Cold creek. Uniform aged chestnut oak and mixed oak with some mixed hardwoods on lower slopes. Small area of Virginia pine on northeast side of stand.

Stand b - On northern portion of Compartment there is a small stand of poorly stocked young chestnut oak on south slope.

Stand c - Open field

Stand d - Composed of partially stocked mixed hardwoods with some white pine.

Remarks and recommendations:

Improvement cutting in Stand a.

SPECIAL DESCRIPTION

Block: III Compartment: 16 Area: 46.2 acres Date: August 1940

	Stand a	Stand b
Area, acres	9.3	36.9
Type of cruise	strip	none
Number of trees per acre	62	
Softwoods	3	
Hardwoods	59	
Total volume, cu.ft.		
7 - 13"		
13 - 21"		
21" and over		
Volume per acre, cu.ft.		

Description of stands:

Stand a - Cutover natural woodland. Hardwood to medium aged mixed hardwoods with some oak. Stand poorly stocked in some portions.

Stand b - Open and partially stocked. Planted to mixed conifers and small amount of hard maple.

Remarks and recommendations:

Improvement work in Stand a to remove poor quality trees.

SPECIAL DESCRIPTION

Block: IV Compartment: 1 Area: 45.6 acres Date: May - June 1941

	Stand a	Stand b	Power Line
Area, acres	9.1	33.2	0.3
Type of cruise			
Number of trees per acre			
Softwoods			
Hardwoods			
Total volume, cu.ft.			
7 - 13"			
13 - 21"			
21" and over			
Volume per acre, cu.ft.			

Description of stands:

Stand a - Old field woodland. Virginia pine stand with strips of mixed hardwoods on the west and east.
Stand b - Open fields.

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: 17 Compartment: 2 Area: 119.1 acres Date: May - June 1942

	Stand a	Stand b	Stand c	Stand d	Stand e	Stand f
Area, acres	7.0	13.6	4.2	72.3	6.2	15.0
Type of cruise	line plot	none	none	none	none	none
Number of trees per acre	50					
Softwoods	34					
Hardwoods	16					
Total volume, cu.ft.	4500 ± 1500					
7 - 13"	75%					
13 - 21"	25%					
21" and over	—					
Volume per acre, cu.ft.	640 ± 210					

Description of stands:

Stand a - A mixed oak stand.
Stand b - Old field. Virginia and white pine.
Stand c - Young chestnut oak stand. Large open area in center, now seeding in to old field pine, with open area in south.
Stand d - Open, partially stocked.
Stand e - Small mixed oak stand of saline age.
Stand f - Open area partially stocked with inferior species.

Remarks and recommendations:

Improvement cuttings in Stand a. Cultural work in Stand b.

SPECIAL DESCRIPTION

Block: IV Compartment: 3 Area: 51.0 acres Date: May - June 1940

	Stand a	Stand b
Area, acres	34.4	16.6
Type of cruise	Line plot	
Number of trees per acre	45	
Softwoods	25	
Hardwoods	20	
Total volume, cu.ft.	21,100 ± 1200	
7 - 13"	81%	
13 - 21"	19%	
21" and over	—	
Volume per acre, cu.ft.	620 ± 20	

Description of stands:

Stand a - Natural woodland. Mixed oak stand, partly cut over and another portion thinned by CCA crews.
Stand b - Old field pine with large percentage of white pine, partially thinned - good reproduction coming in.

Remarks and recommendations:

Complete thinning in Stand a. Improvement cutting in Stand b.

SPECIAL DESCRIPTION

Block: IV Compartment: 4 Area: 45.2 acres Date: May - June 1940

Area, acres	45.2
Type of cruise	line plot
Number of trees per acre	70
Softwoods	36
Hardwoods	34
Total volume, cu.ft.	4[illegible],700 ± 6800
7 - 13"	87%
13 - 21"	13%
21" and over	—
Volume per acre, cu.ft.	900 ± 150

Description of stands:

Mixed oak on the northern portion, mostly thinned by CCC crews, with some old field pine; mixed hardwoods with old field pine along Turner Creek to south.

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: IV Compartment: 3 Area: 32.6 acres Date: May - June 1942

	Stand a	Stand b	Stand c	Stand d
Area, acres	26.0	5.0	9.0	13.6
Type of cruise	line plot	none	none	none
Number of trees per acre	94			
Softwoods	53			
Hardwoods	41			
Total volume, cu.ft.	26,700 ± 970			
7 - 13"	661			
13 - 21"	241			
21" and over	—			
Volume per acre, cu.ft.	1420 ± 370			

Description of stands:

Stand a - Natural woodland. Timber cut to the north and mixed hardwoods in the bottom land.
Stand b - Old field
Stand c - Open, partially stocked
Stand d - Young old field pine, mainly Virginia pine.

Remarks and recommendations:

Improvement cutting in Stand a. Thinnings in Stand d.

SPECIAL DESCRIPTION

Block: IV Compartment: 6 Area: 67.8 acres Date: May - June 1942

	Stand a	Stand b	Stand c	Stand d	Stand e	Cemetery
Area, acres	4.8	3.0	30.1	1.6	28.4	0.2
Type of cruise	none	none	Line plot	none	none	none
Number of trees per acre			73			
Softwoods			6			
Hardwoods			67			
Total volume, cu.ft.			17,700±4700			
7 - 13"			911			
13 - 21"			91			
21" and over			—			
Volume per acre, cu.ft.			880±230			

Description of stands:

Stand a - Virginia pine stand about 35 years old.
Stand b - Control in old field to the east.
Stand c - Bulk of [illegible] and composed of a mixed oak stand along the ridge.
Stand d - A small clear cut area coming up to oak sprouts.
Stand e - Plantations, established in 1939 and 1941, the along southern slope.

Remarks and recommendations:

Salvage cutting in Stand c.

SPECIAL DESCRIPTION

Block: IV Compartment: 7 Area: 34.4 acres Date: May and June 1942

Area, acres

Type of cruise

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

Portion to north planted to conifers. Old border hardwood [illegible] to southeast portion.

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: IV Compartment: 8 Area: 16.7 acres Date: May - June 1940

Area, acres	16.7
Type of cruise	line plot
Number of trees per acre	50
Softwoods	—
Hardwoods	50
Total volume, cu.ft.	5800 ± 2900
7 - 13"	1335
13 - 21"	—
21" and over	—
Volume per acre, cu.ft.	470 ± 150

Description of stands:

Natural conditions. Trying to restore my old mixed oak and chestnut soil.

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: IV Compartment: 9 Area: 70.7 acres Date: May - June 1940

	Stand a	Stand b
Area, acres	4.7	25.0
Type of cruise	line plot	line plot
Number of trees per acre	130	63
Softwoods	130	1
Hardwoods	—	62
Total volume, cu.ft.	750 ± 100	23,100 ± 4000
7 - 13"	950	600
13 - 21"	50	24
21" and over	—	—
Volume per acre, cu.ft.	160 ± 400	900 ± 160

Description of stands:

Stand a - Virginia and white pine, medium age
Stand b - Mixed hardwoods in the bottom in central portion and mixed oak and chestnut oak on slope in southern section

Remarks and recommendations:

Improvement cutting in Stand a and Stand b.

SPECIAL DESCRIPTION

Block: IV Compartment: 10 Area: 23.6 acres Date: May - June 1940

	Stand a	Stand b
Area, acres	10.2	14.4
Type of cruise	line plot	line plot
Number of trees per acre	96	93
Softwoods	19	60
Hardwoods	83	33
Total volume, cu.ft.	23,400 ± 2600	19,200 ± 2900
7 - 13"	60%	68%
13 - 21"	18%	32%
21" and over	—	—
Volume per acre, cu.ft.	1300 ± 150	1600 ± 200

Description of stands:

Stand a - Mixed oak merging into mixed hardwoods with some hemlock in the bottoms

Stand b - Old field pine, young to medium aged, with large percentage of white pine

Remarks and recommendations:

Improvement cutting in oak and mixed hardwoods. Thinnings and seed tree cutting in reforest openings in old field pine (Stand b).

SPECIAL DESCRIPTION

Block: IV Compartment: 11 Area: 41.7 acres Date: May - June 1942

	Stand a	Stand b	Stand c
Area, acres	6.0	29.1	6.6
Type of cruise		line plot	
Number of trees per acre		202	
Softwoods		16	
Hardwoods		86	
Total volume, cu.ft.		57,900 ± 7400	
7 - 13"		83%	
13 - 21"		15%	
21" and over		4%	
Volume per acre, cu.ft.		1300 ± 160	

Description of stands:

Stand a - Young to medium aged old field pine.
Stand b - A mixed woodland composed of mixed oak except along Turner Creek where there exists a thin strip of mixed hardwoods and hemlock.
Stand c - Old field pine, similar to Stand a.

Remarks and recommendations:

Thinnings in Stands a and c. Improvement cuttings in Stand b.

SPECIAL DESCRIPTION

Block: IV Compartment: 12 Area: 30.6 acres Date: May - June 1942

	Stand a	Stand b	Stand c	Stand d	Stand e	Stand f
Area, acres	2.6	3.1	12.0	0.7	2.0	11.0
Type of cruise		line plot		none	none	none
Number of trees per acre		94				
Softwoods		51				
Hardwoods		43				
Total volume, cu.ft.		24,700 ± 15,100				
7 - 13"		66%				
13 - 21"		20%				
21" and over		13%				
Volume per acre, cu.ft.		1300 ± 600				

Description of stands:

Stand a - Mixed oak and mixed hardwoods in narrow ravine slope below Petersburg road

Stand b - Old field pine of low stocking on small hill

Stand c - Mixed oak stand with some mixed hardwoods along Beaver Creek

Stand d - Open field

Stand e - Open field

Stand f - An open stand of mixed hardwoods, partly pooled in on the old site of the Dumas Iron Furnace.

Remarks and recommendations:

For aesthetic purposes along the road, areas d and e should be planted and Stand e possibly developed for a picnic area. The area around the old Dumas furnace in Stand f should be cleared out and the old furnace restored and regarded as a historical monument. Some large hardwoods may be removed in a salvage cutting in Stand c.

SPECIAL DESCRIPTION

Block: IV Compartment: 13 Area: 45.7 acres Date: May - June 1942

	Stand a	Stand b
Area, acres	44.3	1.4
Type of cruise	line plot	none
Number of trees per acre	54	
Softwoods	3	
Hardwoods	51	
Total volume, cu.ft.	24,120 ± 7100	
7 - 13"	92%	
13 - 21"	8%	
21" and over	—	
Volume per acre, cu.ft.	540 ± 160	

Description of stands:

Mixed oak and chestnut oak, mainly young, with a few mixed hardwoods along Petersburg road on eastern side (Stand a)

Remarks and recommendations:

Stand b for aesthetic reasons on crossroad and opposite old Hanna Furnace.

SPECIAL DESCRIPTION

Block: V Compartment: 1 Area: 58.4 acres Date: August 2042

Area, acres

Type of cruise

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

Reservation (1997)

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: V Compartment: 2 Area: 215.0 acres Date: August 1942

	Stand a	Stand b	Stand c
Area, acres	183.4	3.1	28.5
Type of cruise	strip	none	none
Number of trees per acre	76		
Softwoods	6		
Hardwoods	70		
Total volume, cu.ft.	180,700 ± 30,000		
7 - 13"	72%		
13 - 21"	28%		
21" and over	—		
Volume per acre, cu.ft.	1000 ± 160		

Description of stands:

Stand a - Chiporal. Natural overlay, upland oak with some pitch pine and of dead chestnut snags.
Stand b - Old field pine
Stand c - Plantation (1932)

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: VI Compartment: 1 Area: 9.5 acres Date: 1941-1942

Area, acres

Type of cruise

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

Open Glade

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: VI Compartment: 2 Area: 90.2 acres Date: 1941-1942

	Stand a	Stand b
Area, acres	5.2	85.0
Type of cruise		
Number of trees per acre		
Softwoods		
Hardwoods		
Total volume, cu.ft.		
7 - 13"		
13 - 21"		
21" and over		
Volume per acre, cu.ft.		

Description of stands:

Open fields and natural woodlands

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: VI Compartment: 3 Area: 24.4 acres Date: 1941-2010

Area, acres

Type of cruise

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

Plantations

Remarks and recommendations:

-

SPECIAL DESCRIPTION

Block: VI Compartment: 6 Area: 76.6 acres Date: 1942-1943

Area, acres

Type of cruise

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: [illegible] Compartment: [illegible] Area: [illegible] acres Date: [illegible]

Area, acres

Type of cruise

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

[illegible]

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: [illegible] Compartment: 6 Area: [illegible] acres Date: [illegible]

	Stand A	Stand B
Area, acres	34.0	28.0
Type of cruise		
Number of trees per acre		
Softwoods		
Hardwoods		
Total volume, cu.ft.		
7 - 13"		
13 - 21"		
21" and over		
Volume per acre, cu.ft.		

Description of stands:

Old field [illegible] and natural [illegible].

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: VI Compartment: 7 Area: [illegible] acres Date: [illegible]

	Stand a	Stand b
Area, acres	16.1	03.4
Type of cruise		
Number of trees per acre		
Softwoods		
Hardwoods		
Total volume, cu.ft.		
7 - 13"		
13 - 21"		
21" and over		
Volume per acre, cu.ft.		

Description of stands:

[illegible]

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: VI Compartment: 8 Area: 133.9 acres Date: 1931-1932

	Stand a	Stand b
Area, acres	6.4	127.5
Type of cruise		
Number of trees per acre		
Softwoods		
Hardwoods		
Total volume, cu.ft.		
7 - 13"		
13 - 21"		
21" and over		
Volume per acre, cu.ft.		

Description of stands:

Stand a - old field woodland
Stand b - open and partially stocked, (burned), naturally stocked and open fields

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: VI Compartment: 9 Area: 100.0 acres Date: 1941-1942

Area, acres

Type of cruise

Number of trees per acre

Softwoods
Hardwoods

Total volume, cu.ft.

7 - 13"
13 - 21"
21" and over

Volume per acre, cu.ft.

Description of stands:

Open fields

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: VI Compartment: 10 Area: 176.4 acres Date: 1941-1942

	Stand a	Stand b	Power Line
Area, acres	7.6	176.8	12.0
Type of cruise			
Number of trees per acre			
Softwoods			
Hardwoods			
Total volume, cu.ft.			
7 - 13"			
13 - 21"			
21" and over			
Volume per acre, cu.ft.			

Description of stands:

Stand a - natural and old field hardwoods
Stand b - open fields and natural woodland

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: VII Compartment: 1 Area: 115.3 acres Date: 1938-1940

	Stand a	Stand b	Stand c
Area, acres	47.0	54.0	14.3
Type of cruise			
Number of trees per acre			
Softwoods			
Hardwoods			
Total volume, cu.ft.			
7 - 13"			
13 - 21"			
21" and over			
Volume per acre, cu.ft.			

Description of stands:

Stand a - Natural and old field woodland
Stand b - Open, partially shaded land
Stand c - Open

Stand a is medium aged mixed oak with a little hemlock on north side and small patch of old field pine to southwest. Stand b was partially planted in 1938-1939.

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: VII Compartment: 2 Area: 68.2 acres Date: 1941-1942

	Stand a	Stand b
Area, acres	8.7	60.5
Type of cruise		
Number of trees per acre		
Softwoods		
Hardwoods		
Total volume, cu.ft.		
7 - 13"		
13 - 21"		
21" and over		
Volume per acre, cu.ft.		

Description of stands:

Stand a - Mixed hardwoods with some hemlock

Remarks and recommendations:

SPECIAL DESCRIPTION

Block: VII Compartment: 3 Area: 111.1 acres Date: 1941-194[illegible]

	Stand a	Stand b	Stand c	Stand d
Area, acres	9.6	2.1	4.4	95.0
Type of cruise				
Number of trees per acre				
Softwoods				
Hardwoods				
Total volume, cu.ft.				
7 - 13"				
13 - 21"				
21" and over				
Volume per acre, cu.ft.				

Description of stands:

Stand a - Natural woodland of mixed hardwoods, young to medium aged.
Stand b - Natural woodland - mainly mixed oak, cut over within 7 - 8 years.
Stand c - Natural woodland of mixed oak and pine.
Stand d - O on fields

Remarks and recommendations:

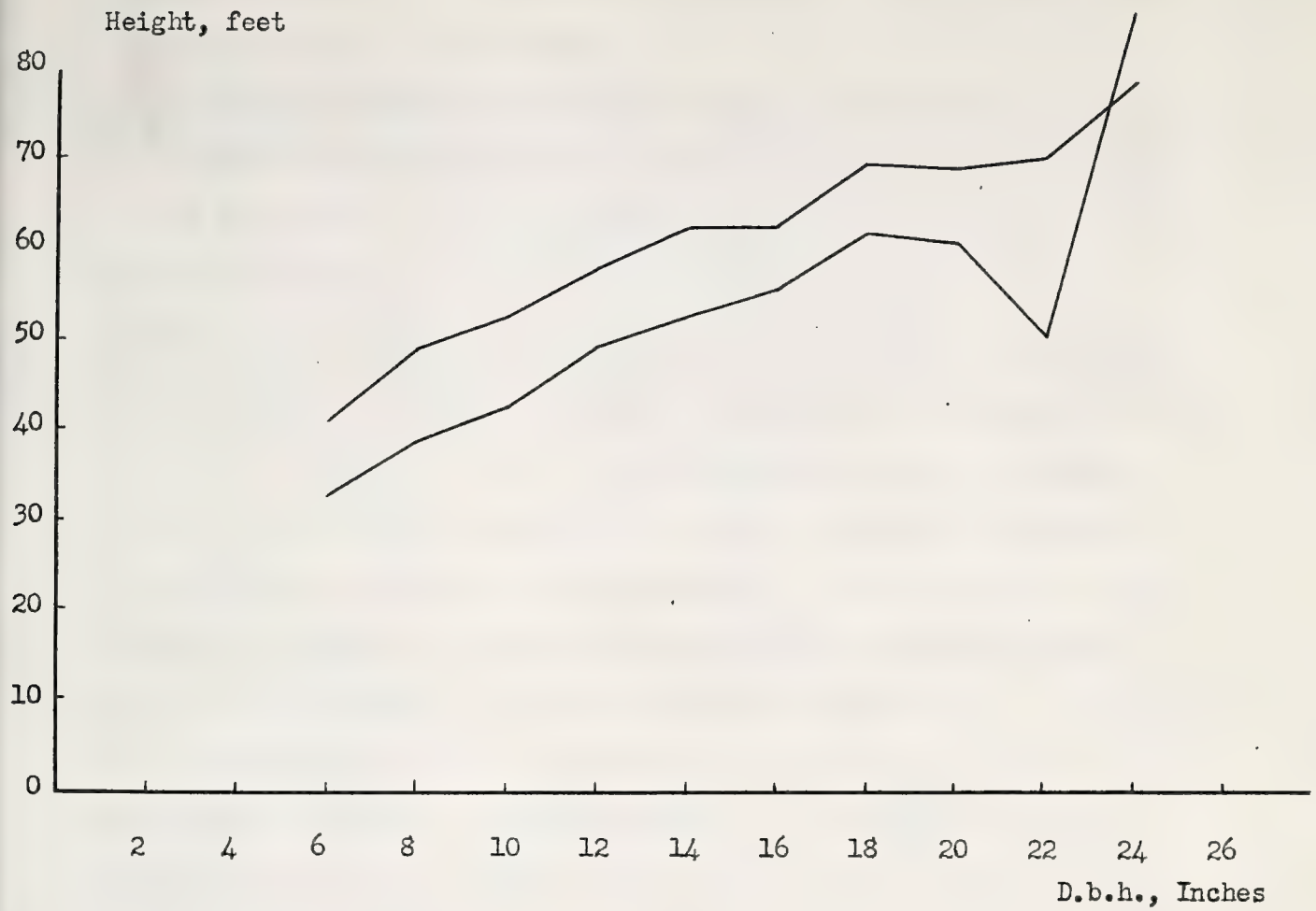
TABLE OF MULTIPLE CUBIC FOOT VOLUMES

Diameter at breast height inches		0	1	2	3	4	5	6	7	8	9	10
	0		8	16	24	32	39	47	55	63	71	
	10	79	87	95	103	110	118	126	134	142	150	
	20	158	166	173	181	189	197	205	213	221	229	
	30	237	244	252	260	268	276	284	292	300	308	
8	40	315	323	331	339	347	355	363	371	378	386	
	50	394	402	410	418	426	434	442	449	457	465	
	60	473	481	489	497	505	513	520	528	536	544	
	70	552	560	568	576	583	591	599	607	615	623	
	80	631	639	647	654	662	670	678	686	694	702	
	90	710	718	725	733	741	749	757	765	773	781	789
	0		13	26	40	53	66	79	92	106	119	
	10	132	145	158	172	185	198	211	224	238	251	
	20	264	277	290	304	317	330	343	356	370	383	
	30	396	409	422	436	449	462	475	488	502	515	
10	40	528	541	554	568	581	594	607	620	634	647	
	50	660	673	686	700	713	726	739	752	766	779	
	60	792	805	818	832	845	858	871	884	898	911	
	70	924	937	950	964	977	990	1003	1016	1030	1043	
	80	1056	1069	1082	1096	1109	1122	1135	1148	1162	1175	
	90	1188	1201	1214	1228	1241	1254	1267	1280	1294	1307	1320
	0		20	40	60	80	101	121	141	161	181	
	10	201	221	241	261	282	302	322	342	362	382	
	20	402	422	442	462	483	503	523	543	563	583	
	30	603	623	643	664	684	704	724	744	764	784	
12	40	804	824	845	865	885	905	925	945	965	985	
	50	1005	1026	1046	1066	1086	1106	1126	1146	1166	1186	
	60	1206	1227	1247	1267	1287	1307	1327	1347	1367	1387	
	70	1408	1428	1448	1468	1488	1508	1528	1548	1568	1589	
	80	1609	1629	1649	1669	1689	1709	1729	1749	1770	1790	
	90	1810	1830	1850	1870	1890	1910	1930	1950	1971	1991	2011
	0		29	57	86	115	144	172	201	230	258	
	10	287	316	344	373	402	430	459	488	517	545	
	20	574	603	631	660	689	718	746	775	804	832	
	30	861	890	918	947	976	1004	1033	1062	1091	1119	
14	40	1148	1177	1205	1234	1263	1292	1320	1349	1378	1406	
	50	1435	1464	1492	1521	1550	1578	1607	1636	1665	1693	
	60	1722	1751	1779	1808	1837	1866	1894	1923	1952	1980	
	70	2009	2038	2066	2095	2124	2152	2181	2210	2239	2267	
	80	2296	2325	2353	2382	2411	2440	2468	2497	2526	2554	
	90	2583	2612	2640	2669	2698	2726	2755	2784	2813	2841	2870
	0		39	78	117	156	195	234	273	313	352	
	10	391	430	469	508	547	586	625	664	703	742	
	20	781	820	860	899	938	977	1016	1055	1094	1133	
	30	1172	1211	1250	1289	1328	1367	1407	1446	1485	1524	
16	40	1563	1602	1641	1680	1719	1758	1797	1836	1875	1914	
	50	1954	1993	2032	2071	2110	2149	2188	2227	2266	2305	
	60	2344	2383	2422	2461	2500	2540	2579	2618	2657	2696	
	70	2735	2774	2813	2852	2891	2930	2969	3008	3047	3087	
	80	3126	3165	3204	3243	3282	3321	3360	3399	3438	3477	
	90	3516	3555	3594	3634	3673	3712	3751	3790	3829	3868	3907

Height measurements and construction of local cubic foot volume tables

In 1940, during their practice in summer camp in Stone Valley, students secured a large number of heights for different species. These measurements were made, for the most part, on the Clover Creek Block, although a few were obtained on the Camp Block near the Forestry Building. The graphical representation of the calculated average heights by diameter classes revealed no conclusive difference between the various species of hardwoods or between the various species of softwoods. As there were no significant differences between the species within each group, the data of all softwoods and of all hardwoods respectively were combined and the average heights by diameter classes again calculated. These new averages for the Clover Creek Block were compared with the average heights in the Camp, Stone Furnace, and Loading Ridge Blocks. The measurements made in these other blocks had been segregated on the basis of softwoods and hardwoods only. These basic data are summarized in the following two tables for future reference and comparisons.

A graphical comparison of the data obtained from the various blocks revealed no significant difference between the heights of softwoods. The heights of the hardwoods measured by students on the Clover Creek Block and in the neighborhood of the Forestry Building appeared somewhat lower than those of the other blocks. No significant difference was found between the heights of the trees in the Camp, the Stone Furnace, and the Loading Ridge Blocks. The average heights for all blocks combined of softwoods and hardwoods are graphically represented in Fig. A. For



Total tree heights represented in terms of diameter at breast height.

diameter of 6 up to 20 inches the hardwoods are, on the average, about 10 feet higher than the softwoods.

Using the cubic foot volume tables of J. A. Aughenbaugh of the Department of Forest and Waters, the average volume per tree corresponding to the calculated average height of softwoods or hardwoods was determined for various species of oak and maple as well as for pine and hemlock. These volumes were plotted on logarithmic paper and straight lines, one for each species of softwoods and one for each species of hardwoods, was fitted to the data. The differences between corresponding volumes of the various species of hardwoods and softwoods respectively were small and in most cases not significant. The average volume of the hardwoods, however, was found to be somewhat larger than the average volume of the softwoods. This difference was approximately 10 per cent in the 4 inch diameter classes and 6 per cent in the upper. Giving the hardwood volumes a somewhat higher weight than to the softwood volumes, an intermediate line, representing average volume per tree for all species combined, was finally drawn. The equation of this line which has already been given in the main text is as follows:

$$\log V = -1.1662 + 2.3008 \cdot \log D.$$

With the help of this equation gradually differing volumes per tree were calculated for the different diameter classes.

The fact that no significant differences in height were found between the various blocks does not imply that there do not exist considerable differences in site quality within each block or even within compartments.

Height measurements, softwoods

Diameter at breast height	B l o c k				
	Chevor*) Creek	Cargo	Ramroo Furnace	Loading Ridge	Total
	Sum of heights in feet Number of measurements Average height per tree				
6	3407 102 33.4		780 26 30.0		4196 128 32.8
8	4134 109 37.9	897 19 45.1	1569 41 38.3	544 14 38.9	7104 183 38.8
10	2737 67 41.1	978 21 46.6	1973 31 44.3	630 15 42.0	5738 134 42.8
12	2197 64 49.1	1141 22 49.6	986 20 49.3	542 11 49.3	5706 116 49.2
14	970 19 51.1	604 11 54.9	261 5 52.2	308 7 55.4	2143 42 51.0
16	811 15 54.1	504 9 56.0	229 4 57.3	186 3 62.0	1730 31 55.8
18	319 5 63.8	122 2 61.0	56 1 56.0		497 8 62.1
20	110 2 55.0	122 2 61.5		65 1 65.0	306 5 61.2
22	92 2 46.0	61 1 61.0			153 3 51.0
24			87 1 87.0		87 1 87.0

*) Including some trees measured near Forestry Building on Cargo Block.

Height measurements, hardwoods

Diameter at breast height	Block				
	Shaver*) Creek	Camps	Monroe Furnace	Bowling Ridge	Total
	Sum of heights in feet Number of measurements Average height per tree				
6	3218 69 38.8		1730 38 45.5		4948 121 40.9
8	5710 126 45.4	1030 21 49.1	6600 127 52.0	841 16 52.5	14193 290 48.9
10	7670 126 48.9	907 17 53.4	3406 61 57.3	892 15 59.5	12967 209 52.5
12	4131 74 55.8	720 12 59.2	1413 22 64.2	882 15 58.8	7136 123 58.0
14	2445 [illegible] 58.6	834 12 67.8	900 12 75.0	1124 16 62.4	5773 92 62.8
16	1397 23 60.7	754 12 63.7	276 3 68.3	934 14 64.6	3361 52 62.7
18	420 7 61.4	586 8 73.3	265 2 82.5	497 7 [illegible]	1678 24 69.9
20	368 5 72.6	215 3 71.7		181 3 60.3	764 11 69.5
22	366 5 73.2	80 1 80.0		47 1 47.0	493 7 [illegible]
24	130 2 65.0	256 3 [illegible]	68 1 68.0		476 6 79.3

*) Including some trees measured near Forestry Building on Camps Block.