

90
T786
1943

PRACTICAL FORESTRY
IN
NEW JERSEY

DEPARTMENT OF
CONSERVATION AND DEVELOPMENT



New Jersey State Library

974.90
T786
1943



BOARD OF CONSERVATION AND DEVELOPMENT
STATE HOUSE ANNEX, TRENTON, N. J.

GEN. H. L. MOELLER, <i>President</i>	Millburn
ARTHUR J. COLLINS, JR.	Moorestown
WILLIAM C. COPE	Glen Ridge
HARRY L. DERBY	Montclair
MARTIN J. HOGENCAMP	Paterson
W. STEWART HOLLINGSHEAD	Riverton
CHARLES A. MEYER	Andover
OWEN WINSTON	Gladstone, P. O. Mendham

CHARLES P. WILBER

Director and Chief of the Division of Forests and Parks

MEREDITH E. JOHNSON

Chief of the Division of Geology and Topography

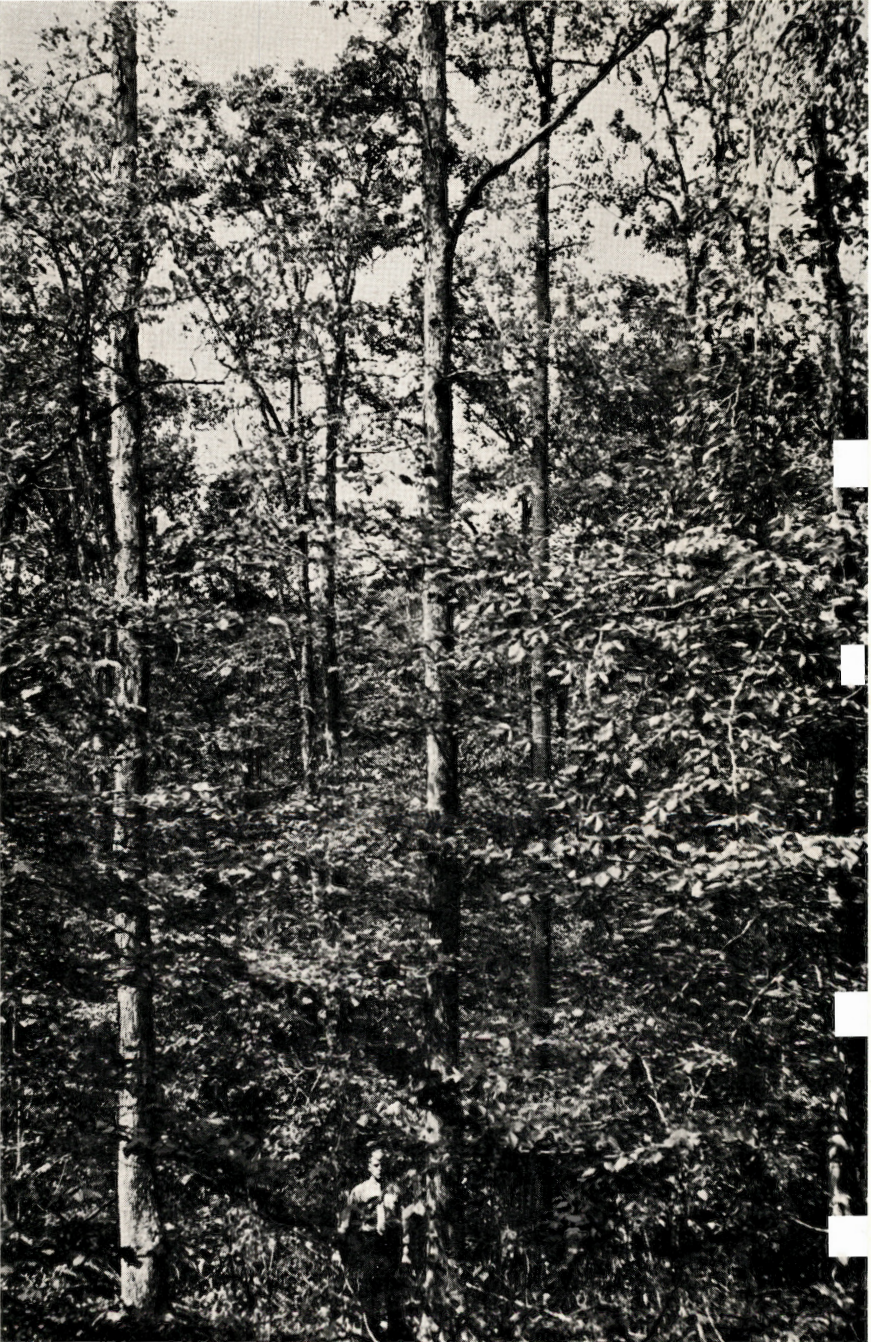


Fig. 1. Typical private forest following a cutting made under direction of the Department of Conservation and Development. This tract will produce another cut in 20-25 years, and is growing timber at the rate of \$2.50 per acre per year.

STATE OF NEW JERSEY
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
DIVISION OF FORESTS AND PARKS

PRACTICAL FORESTRY
IN NEW JERSEY

By E. B. MOORE
Assistant Forester



TRENTON, NEW JERSEY

Foreword

By CHARLES P. WILBER

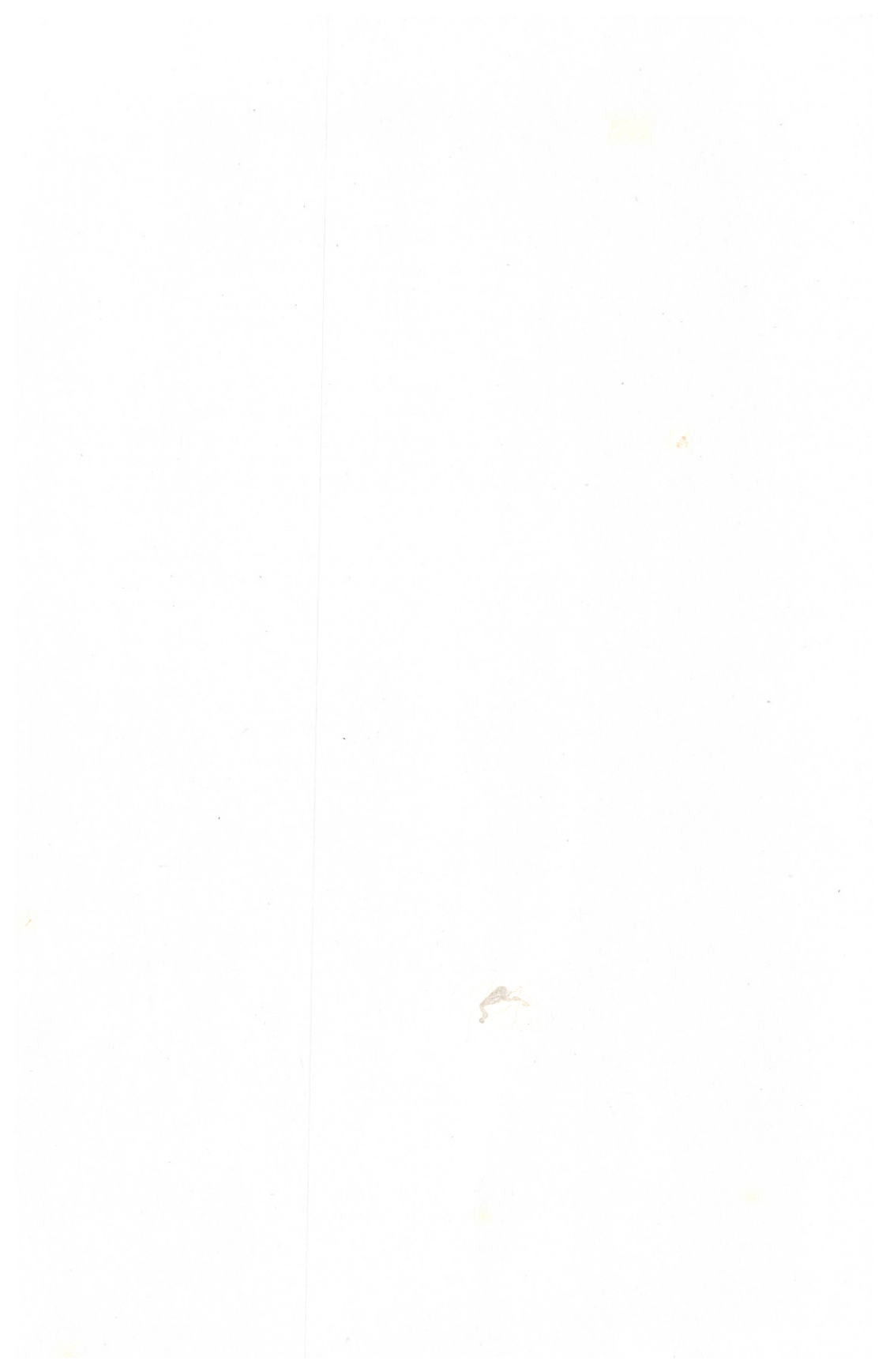
Director and Chief of Division of Forests and Parks

The great bulk of New Jersey woodland is now and from the early days has been in private ownership. Unquestionably a considerable area of this land must eventually be taken over by the public to provide for various public needs such as recreation, wildlife conservation, watershed protection, etc., and for the reclamation and protection of great areas which cannot be profitably handled by the private owner.

However, a substantial proportion should and undoubtedly will remain in private hands. Such woodlands, with few exceptions, can justify their continuance as woods to the owner, if they are maintained as profitable crop land. Like any other crop land they will pay profits only in proportion to the care and intelligence with which the timber crop is handled.

The State has long felt the responsibility for stimulating adequate production, harvesting and marketing methods on farm land. It is believed that it owes the same obligation to its timber crop. It is realized that timber crop rotation, with its long period, presents features more puzzling to the owner than many shorter rotation crops. It is certain that as a "natural resource" timber has not been looked upon as a crop in the past. But as a crop timber does have an essential place in our present and future economy, and is already paying owners who handle it as such.

The forester can be of use to woodland owners and it is the purpose of this bulletin to point out and to encourage the use of the services which the State makes available in this field.



PRACTICAL FORESTRY IN NEW JERSEY*

By E. B. MOORE

Assistant Forester

INTRODUCTION

What are the opportunities and incentives for the practise of forestry in New Jersey? How can timber land owners and foresters contribute to the national war effort? What returns can be expected from well-managed woodlands? These are some of the questions which have been brought sharply into focus by the war and which the Department of Conservation and Development is answering by practical help to land owners in the details of woods management.

It has long been recognized that the use of improper methods prevents obtaining adequate returns from woodland, and that the great bulk of such land in New Jersey is improperly handled. In this state timber is usually cut because of some immediate financial need, or because a lumber operator makes an offer to buy it. There is an almost total absence of long range planning by the owners, in spite of the fact that timber-growing is a long-time affair, and that managed woods will net from two to four times as much annually as those which are handled in the current haphazard manner. Specific cases presented later on will give striking details of such transactions.

The war is bringing home to all of us the grim necessity of organizing our resources and efforts along more efficient lines, and by insisting on better practises in their woodland owners can contribute both to the war effort and to the stability of the post-war period. Faced with the gravest national crisis in our history should we continue complacently in the use of wasteful and destructive methods?

GROWTH AND INCOME FROM FOREST LAND

This bulletin deals with the hardwood forests of Northern New Jersey and the lower Delaware Valley, and excludes the Pine Region of South Jersey which has a totally different set of problems. The portions of the state to be considered here contain about 740,000 acres of forest land of which it is estimated that approximately 330,000 acres are sufficiently productive and accessible to offer an excellent opportunity for the practise of forestry under present conditions. The remainder includes swamps, ridge tops and lands in suburban development. Oak is the predominant species, with trees reaching 25 to 30-inches in diameter and 110-feet in height on the best sites at 125 to 150 years. Yellow poplar, hickory, birch, gum and maple are also present.

* Part of the material contained in this bulletin appeared in the Journal of Forestry for May, 1942, under the title "Developing Private Forestry in New Jersey".



Fig. 2. Hardwood forest in the lower Delaware Valley with an average stand of 22,000 board feet per acre. The oak at the right is 34-inches in diameter at breast height and 110-feet tall. Stands of this quality will return upwards of \$3.00 per acre per year.

Due to the lack of management it is estimated that the forests on these 330,000 acres are growing at an average rate of about 80 board feet per acre per year. Under the usual methods of selling timber this is equivalent to an annual return to the owner of 56 cents per acre. By the use of sound forestry practise—both in cutting and marketing—this average growth rate can be increased to 150 board feet and the financial returns to at least \$2.00 per acre per year.

PROBLEMS FACING THE PRIVATE OWNER

For the forest owner the handling of woodland presents serious difficulties. It is usually impracticable for him to employ a forester, and yet without detailed technical guidance he is at a tremendous disadvantage in even so primary a matter as the sale of merchantable trees—let alone the application of correct management practises. Thus for example, when tendered the small offers usually made for standing timber, most owners become convinced that if this is all the money their woods are worth, forestry does not pay. In addition the unsightly wreckage resulting from the usual logging job leaves many with an aversion to all cutting operations. This situation is unfortunate, for it can be clearly shown that by the use of practicable techniques not only may the net financial yields from woodland be increased, but at the same time the areas can be left in excellent shape for future growth and permanent production.

Most private holdings in the sections of New Jersey under discussion may be grouped under two main headings: (1) commercial farms, and (2) country estates. The average farm in this section contains approximately ten acres of woodland. While excellent timber is to be found on some of them, the greater

number show an over-abundance of trees in the small diameter classes, reflecting the owners' practise of selling timber as soon as it has reached the lower limits of merchantability, generally from 10 to 12-inches on the stump.

The woodlots on the country estates on the other hand are larger in area and generally in better condition. Here the owners use the woodlands for hunting or riding, or for aesthetic purposes, and allow the trees to grow into larger sizes.

METHODS OF BUYING TIMBER

In New Jersey timber is usually bought on the stump by lumbermen who cut the trees and haul the logs to their mills. In these transactions any of the following methods may be used:

- (1) The entire woodlot may be bought for a lump sum. This method is preferred by most buyers if an appreciable amount of timber is involved.
- (2) Selected trees may be bought at so much apiece. This method is often used in buying piling, or where a few choice trees are wanted.
- (3) All trees over a set diameter on the stump may be bought by the ton, or, by the board foot.

From the owner's standpoint the first method is the least desirable, since the buyer must estimate both the volume of timber and the percentage of defect present, and his offer will thus include a considerable margin of protection against error. The last two methods afford more fair and satisfactory bases



Fig. 3. Young stand in North Jersey following a light selection cutting made under state direction. Original stand contained 2800 board feet of saw timber and 18 tons of poles per acre. Approximately 600 board feet of logs and 11 tons of poles per acre were cut, yielding a net return of \$17.30 per acre.

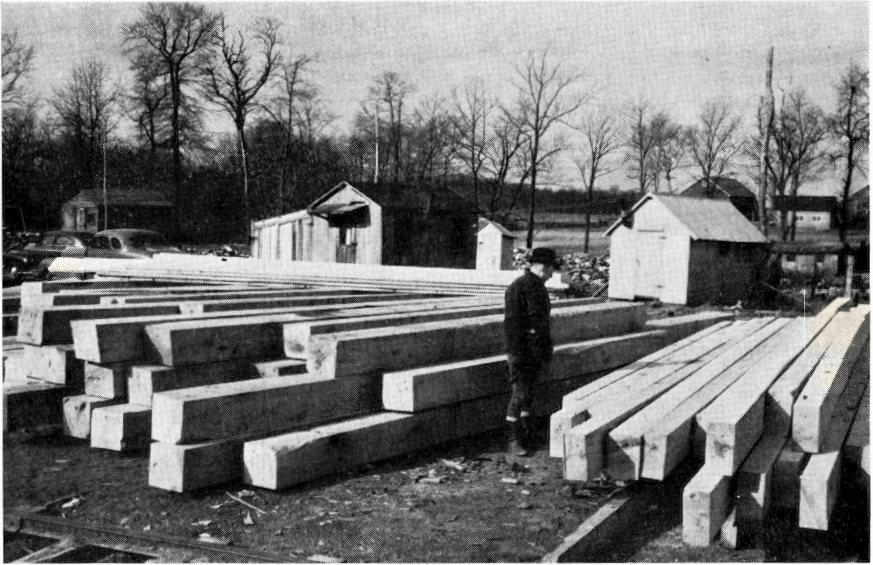


Fig. 4. Oak timbers for the construction of ships and barges are an important product of New Jersey sawmills.

under most circumstances. In sales by the board foot, the Doyle log rule is used with the diameters measured at the middle of the log inside bark.

After buying the timber on a property the operator generally cuts the trees as orders are received and delivers the sawed lumber or other products in green condition, thereby avoiding the need for storage and seasoning.

While some farmers cut their own logs and have them custom-sawn for home use, there is relatively little sale of logs by land owners to the regular mills. This is due both to the uncertainty of such supplies and to the large demand for long lengths requiring heavy equipment and special skills in handling.

MARKETS

In New Jersey the combination of mechanical transportation and good roads has tended to eliminate the portable sawmill and establish the semi-permanent mill operated by electricity. Crawler-type tractors are used for skidding and loading logs and truck hauls of as much as 70 or 80 miles are made from woods to mill. Logs are frequently handled in long lengths, i. e. from 20 to 45 feet, although shorter ones are also used.

Much of the oak of saw timber size is cut into plank or flitch for barge, ship or bridge construction. Some goes into railroad ties and stock for heavy machine frames. The poorer quality material is sawed into dunnage wood for wedging car and ship cargoes, or into lumber for shoring and rough temporary construction. Yellow poplar and sweet gum logs are often cut into veneer for the manufacture of baskets. Trees that are sufficiently tall and straight are used in the round for piling. Furnace poles and brands for purifying molten ore at the copper smelters offer an outlet for less-desirable trees which could

be utilized to real silvicultural advantage under a well-organized system of management. The zinc mines in northern New Jersey and the anthracite fields in Pennsylvania take a small amount of prop timber and lagging. There is a fair demand for seasoned oak and hickory for fuel in the metropolitan suburbs.

The war has greatly increased the cutting of forest products in New Jersey, and many land owners who have allowed no lumbering in their woods for years, now feel impelled to let their timber go to meet the needs of war industries. In doing so, however, all too many are defeating their purpose by failing to insist on the use of proper methods of cutting and the avoidance of waste



Fig. 5. An 18-inch oak ruined by careless felling. This waste could have been avoided by making a proper undercut or by "jumping" the tree. Work of this kind does not occur on state-supervised jobs.

and needless destruction. America is facing a most threatening future,—a future in which we may painfully ration the resources we squander today. Under these conditions it is highly desirable that unnecessary waste be eliminated while assuring ourselves of a sustained flow of material for the nation's war needs. This can be done so far as timber production in New Jersey is concerned without decreasing the total output.

WASTAGE UNDER CURRENT METHODS

Under the current unregulated methods of cutting timber much needless destruction and wastage occurs. Figure 5, illustrating this point, was taken of a logging operation in Central Jersey in February 1942, showing how high grade timber is ruined by careless cutting. Figure 6 illustrates another common type of destruction. Here thrifty young trees which would have produced merchantable material twenty years hence, have been ruined. Obviously this sort of thing is not helping to win either the war or the peace.



Fig. 6. Destruction resulting from unregulated cutting. Note the breakage of trees too small to be merchantable now, but which would have yielded timber in 20 years.

The cutting of thrifty young oak and tulip trees for furnace poles is another wasteful practise. The copper smelters do not require the best grades of timber, and can utilize the less valuable hardwoods, even with some defects, provided that the trees are in green condition. A sound young oak or tulip will bring about 50 cents on the stump, as a furnace pole, while if allowed to grow for twenty years it may easily be worth \$3.00 for piling.

Today much merchantable timber in the tops of trees is left on the ground to rot. (Figure 7). In most cases this is due to the practise of cutting logs for certain specific products, and when these requirements are met the rest of the tree is left where it lies,—particularly if large limbs are present. Much of the material lost in this way could be utilized for dunnage wood, furnace poles or brands, and thereby avoid the cutting of other trees for these purposes. It should be emphasized again that the use of sound forestry practises would not lessen the volume produced for war purposes, but would provide more efficient methods of cutting and utilization, and adequate protection for the future crop.

WHAT NEW JERSEY IS DOING TO ENCOURAGE PRIVATE FORESTRY

Successful forest management calls for technical training, practical experience and a knowledge of markets and methods of sale. Obviously few land owners in New Jersey are equipped for such work. To meet this situation the Department of Conservation and Development provides technical guidance in handling forest land to residents of the state. The objective is not only to assist the owner in handling his woods and obtaining the full value of his timber crop, but also to establish actual demonstrations of well-managed tracts on which the financial and silvicultural advantages of good forestry practise can be clearly shown. Such exhibits will serve as nuclei around which forestry co-operatives can ultimately be formed.



Fig. 7. Seventy board feet wasted. One dollar's worth of sound lumber in the top of this tulip tree was left to rot because only the choice butt log was wanted. Waste of this sort is common on unregulated cutting operations. Under proper management another 10-feet of length would have been utilized.

The type of assistance provided begins with a brief reconnaissance of the property by a state forester, and a discussion of its possibilities with the owner. If the owner agrees to manage his woods along the lines recommended by the Department, an estimate is made of the volume of timber. In allotting the amount to cut the condition of the stand and its rate of growth are given consideration, and a balance is then struck between the silvicultural needs and practical logging requirements. Ordinarily the cut is limited to removal of 30-40 percent of the board foot volume, but in some cases the proportion of overmature trees is such that more has to be removed.

At this point it would be well to point out that the responsibility for good management practises rest with the land owner and not with the timber buyer. In the vast majority of cases the owners show a keen interest in the permanent welfare of their land and welcome state guidance in handling it properly. There are, unfortunately, occasional individuals who think only in terms of the immediate present and of the greatest profit that can be wrung from the land now, regardless of the consequences. Sustained yield and stabilized re-

Fig. 8. This stand in North Jersey is managed under direction of the Department of Conservation and Development. View taken before cutting.



Fig. 9. The same stand after a group-selection cutting which netted the owner \$60 per acre on the stump. Similar cuts can be made at 20-25 year intervals on a permanent basis.



turns do not interest them. In the minds of such people, America apparently has no future.

MARKING THE TREES TO BE CUT

Under state guidance the cutting cycle for saw timber is usually set at 20-25 years. This means that the amount to be taken is such that the growth on the remainder will permit another cut of equal volume to be made 20-25 years hence. It is recognized that a cycle of this length is not the ideal one for New Jersey, however, it lays a foundation on which better practises can ultimately be established, and gradually as both owners and lumbermen become accustomed to organized methods, the cycle may be shortened and the volume removed at any one time reduced.

The rotation age at which individual trees are cut, is usually set at 75-100 years for chestnut oak, 100-125 years for the black oak group, and 150-200 years for white oak. Investigations have shown that in most stands mortality and decay are apt to increase appreciably after these ages.



Fig. 10. Cutting furnace poles from heavy limbs represents good utilization. The owner netted \$1.00 per ton for this material on the stump. It takes about four of these poles to weigh one ton.



Fig. 11. Brands are cut from branches or broken portions of the trunk and are used in the copper smelters. This material netted the owner 50c per ton on the stump.

In marking the trees to be cut a crew of 2 or 3 men is furnished by the owner, and a state forester points out and measures the trees to be taken. These are blazed on opposite faces of the trunk at breast height, and once on the stump, and the letters NJ are stamped on the latter blaze.

APPRAISALS AND ADVERTISING OF MARKED TIMBER

The volume of the marked trees is computed and the owner furnished with an Appraisal Sheet showing this amount and its approximate value. Prospectus Sheets describing the marked timber are then mailed to all the lumber operators, together with a map showing the acreage and boundaries of the woodlot and how it may be reached. Inspection by interested parties is invited. Examples of these sheets are shown on pages 28 and 29.

SELLING THE TIMBER

Even with the information outlined above at their disposal, most owners are still ill-prepared to handle the details of a timber sale. Experience shows that without further help they are certain to have trouble in connection with the cutting operations or payments. Skilled assistance is necessary, and to meet this need the Department has made arrangements with several competent and reliable persons not on the state staff to act as timber agents for the owners on a commission basis.

The specific duties of a timber agent consists in showing prospective buyers over the ground, receiving bids, drawing up the sales agreements, accepting the bonds posted by the buyer for satisfactory execution of the work, scaling the



Fig. 12. Logs are scaled for diameter at their middle point inside bark. Here the buyer and the timber agent are checking each other's measurements.



Fig. 13. Excellent stand in Central Jersey containing good distribution of diameter classes. Under proper management this tract would have supported a cutting at 20-year intervals, and yielded a periodic return of \$3.00 per acre per year. Against state advice this stand was sold for a lump sum equivalent to \$5.30 per thousand board feet.



Fig. 14. Same stand as Figure 13 after unrestricted commercial logging. Another cut can possibly be made in 100 years. This type of management will yield a net return of about \$0.95 per acre per year.



Fig. 15. Stand in Central Jersey marked for partial cutting by Department of Conservation and Development. This timber was sold for \$14.00 per M. for saw logs and 90c per ton for furnace poles.



Fig. 16. Same stand as Figure 15 after completion of logging. Note that tops are being worked up into cordwood. This sale netted the owner \$50.00 per acre on the stump. Subsequent cuttings can be made at 25-year intervals, returning a periodic annual yield of \$2.25 per acre.

logs, collecting the money and checking up on the cutting operations. Before the logs are loaded on the trucks they are scaled by the timber agent and the buyer together, (Figure 12), their volume is then computed and payment is made before they are removed. Furnace poles are weighed on registered scales and payment made on the basis of weight slips.

TIMBER SALE AGREEMENTS

Written contracts are always used on timber sales and a cash bond is required of the buyer to guarantee faithful performance of the agreement. The cutting of unmarked trees is heavily penalized, and the operator is also required to cut and remove at penal prices, unmarked trees which have been so damaged by the logging operations as to render their recovery doubtful if left standing. To further protect the owner the purchaser is required to produce satisfactory proof that he carries adequate personal liability, property damage insurance, and workmen's compensation while working on the lands of the seller. A sample timber sale contract is shown at the end of this bulletin.

SLASH DISPOSAL

The disposal of the tops of the trees and other debris resulting from the logging is handled as a separate operation, since most lumbermen do not engage in this phase of the work. As mentioned above there is a fair market for seasoned fuelwood in certain parts of the state, and under most conditions the slash can be worked up and sold in this form. Two methods are used in doing this; (1) Choppers are engaged by the owner at so much per cord. This wood is held until it is seasoned, then sold at the woods-edge. (2) The slash is sold by the cord, or for a lump sum as it lies.

The amount of brush left after the cordwood operation has been completed is negligible and is scattered and allowed to decay on the ground. This is desirable from the standpoint of soil nutrition, since most of the essential elements taken up by the tree are stored in the leaves and smaller branches.

ENSURING REPRODUCTION OF THE STAND

The proper harvesting of timber is a most important step in forest management, but the establishment of satisfactory reproduction is of equal importance. In partial cuttings such as those made under state direction, it is necessary that oak and tulip seedlings dominate the openings resulting from the removal of merchantable trees, in order to assure the future productivity of the stand. Ordinarily some of these seedlings are already on the ground at the time of cutting, but unless given assistance are likely to be overtopped and killed by small undesirable trees and shrubs which will never develop into merchantable material. A small amount of labor directed at lopping-back this competing vegetation overcomes this situation.

Supplementary work of this type is handled by the Timber Agents on a per-acre basis, and one such "cleaning" operation should always be made from 3 to 5 years after the logging. The costs involved are moderate, and represent the "plowing-back" of a small percentage of the profits to ensure full, sustained production.



Fig. 17. Stand in North Jersey after completion of cutting operations under state supervision. Note low stumps and small amount of brush left behind. This brush will disintegrate rapidly and the opening will soon fill up with reproduction.

BENEFITS OF THE PROGRAM

At present the Department of Conservation and Development furnishes forestry assistance to owners without charge because of the emergency character of the work, and also because the program is still in the educational stages. Ultimately a reasonable fee will probably be charged.

It should be pointed out that while the owners of woodland are the immediate beneficiaries of this type of service the timber operators also stand to gain in the long run. For with the assurance that conservative cuttings can be made without destroying their woods many owners who now refuse to sell timber at all will be willing to have their lands managed under state supervision. Another factor bearing upon this same point is that of increased growth under forest management. According to the best available information the total consumption of hardwood lumber in New Jersey from 1920-40 averaged 70 million board feet per year, of which the greater part was imported from outside the state. Under the present disorganized methods of handling woodland the current *available* hardwood growth is estimated at about 26 million board feet per year. Under management this volume could readily be increased to at least 50 million feet annually. With New Jersey's good roads and favorable location this volume would enable the timber operators of the state to supply a much larger share of the domestic consumption than they do at present, and to operate under the stabilizing influence of sustained yield.



Fig. 18. Loading oak logs on a private forest in North Jersey which is managed with state cooperation. These logs came from trees approximately 100-years of age, and each scaled more than 1000 board feet.

CASE HISTORIES

The following case histories present data on the type of work being done. All were completed before December 1941, and so do not reflect the rise in price levels due to the war.

CASE NO. 1: A 65-acre tract in North Jersey. Merchantable stand before cutting 6000 board feet per acre. Age 101-120 years. Considerable number of trees dying. Sixty percent of volume marked in trees over 15-inches in diameter. Lump sum bids ranged from \$1500.00 to \$2500.00; log scale bids from \$12.00 to \$14.00 per M. Sale made at \$14.00 per M. for sawlogs and \$1.00 per ton for furnace poles. Net receipts from this logging job were \$3935.00 or nearly \$1400.00 more than the top lump sum offer. The slash was worked up by the owner and sold at a net profit amounting to about \$2.00 per acre. A previous cutting on this property 24 years ago netted \$3842.00, indicating that under the same type of management the woodland can return approximately \$2.50 per acre per year on a permanent basis.

CASE NO. 2: A 40-acre tract in the lower Delaware Valley. Stand before cutting 22,000 board feet per acre. Maximum diameter 42-inches. Age classes present 121-140 years and 201-220 years. Stand over-mature with considerable mortality. About fifty percent of volume marked, mostly in black oaks over 18-inches and white oaks over 20-inches. Lump sum bids ranged from \$2000 (*for everything before marking*) to \$2500.00 for the marked trees. Sale made at \$14.00 per M. for saw logs and \$1.00 per ton for poles. Net receipts from this logging job were \$4735.00, or \$2235.00 *more* than the top lump sum offer. The slash has been sold as it lies, and will net approximately \$600.00 more. Another cut can be made in about 20 years. Under the same type of management this woodland will yield a net return of more than \$3.00 per acre per year.

CASE NO. 3: A rocky 15-acre tract in North Jersey. Stand before cutting 7500 board feet per acre. Age classes present 101-120 years and 161-180 years. Considerable number of trees dying. About 60 percent of volume marked, mostly in chestnut oak over 15-inches. Lump sum bids ranged from \$200.00 to \$250.00 (*for everything before marking*). Sale made for \$12.00 per M. and \$.90 per ton. Receipts \$971.00 with a good stand left for future growth. Another cut can be made in about 25 years. Under the same type of management this tract will yield a net return of about \$2.50 per acre per year.

IN CONTRAST to the above, the following two cases are submitted to show the losses which can be incurred by incorrect handling of woodland.

CASE NO. 4: An 18-acre tract in Central Jersey. Stand before cutting 17,000 board feet per acre. Age classes present, 141-160 and 221-240 years. Against the Department's advice the owner elected to sell *everything* without restrictions, so no trees were marked. Lump sum bids ranged from \$1000.00 to \$1650.00. One log scale bid of \$12.00 per M. for the black oaks and \$15.00 per M. for the white oaks was received. (The cruise showed 104,000 board feet of black and 138,000 board feet of white oak). Again disregard the state's advice the sale was made for the lump sum of \$1650.00 which for the total stand represented a rate of \$5.30 per M. Had the log scale bid been accepted, the owner would have netted \$3318.00 for the oak alone. In this case \$1668 was sacrificed by poor management and in addition the woods were



Fig. 19. Stand of oak and pine in Central Jersey containing 12,000 board feet per acre. This tract was marked for cutting by state foresters and sold at \$10.00 per M. on the stump.

completely devastated. Another cut cannot be made here in less than 100 years. Under *the same type* of handling in the future this tract will yield a net return of about \$0.95 per acre per year.

CASE NO. 5: A 150-acre tract in eastern New Jersey. Stand before cutting 6000 board feet per acre (estimated). Age classes present 101-120 and 141-160 years. Without contacting the state the owner sold all oak that was merchantable for saw logs or piling at \$5.00 per M. No check was made on the operator's scaling. After approximately 500,000 board feet had been removed the owner stopped operations because payments were far in arrears. In this vicinity poorer timber was being sold at the same time under state marking at \$14.00 per M. The owner sacrificed at least \$4500.00 in this independent transaction. *Under the same type* of handling in the future this tract will yield a net return of about \$0.53 per acre per year.



Fig. 20. The same stand after completion of the logging which removed about 50 percent of the volume, netting the owner \$61.00 per acre on the stump. Another cut can be made in 25 years. Note the tops have been worked up into cordwood and the brush left to decay.

CONCLUSIONS

For many years the methods of handling woodland in New Jersey have been characterized by a complete absence of plan or organized management. Cuttings have been made without any consideration for permanent productivity. The results have been meager returns for the owners and a needless waste of timber resources.

The war emergency has led to a heavy increase in cutting and accentuated the waste and destruction. Many owners who have hesitated to have their woods cut over in the usual manner, now feel that they should sell because of the need for timber in war industries. Under sound forest management the volume cut for war purposes need not be reduced, but more efficient methods of cutting and utilization should be introduced.

The Department of Conservation and Development provides technical guidance for owners who are interested in handling their woods along these lines, and interested persons should write to Trenton for assistance. Actual cases handled through the Department over the last four years show a strikingly higher rate of return as a result of the use of proper methods.

Under regulated cutting practices the forests of New Jersey can be developed into permanently productive assets and the grim realities of today demand that such potentialities be fully utilized and not heedlessly wasted.



Fig. 21. Yellow poplar or tulip tree occurs on moist ground throughout the northern and central parts of New Jersey. These logs were cut on a state-supervised job near Plainfield, and sold for from \$12.00 to \$13.00 a piece.



Fig. 22. White oak log containing 835 board feet. At the lump sum for which the woodlot was sold this log was worth \$4.42 on the stump. If the owner had followed state advice and sold by scale instead, this log would have brought \$12.52 on the stump.



Fig. 23. Loading a black oak log containing 1480 board feet in North Jersey. At \$14.00 per M. this tree netted the owner \$20.72 on the stump. It was 97 years old and shows the type of timber that can be regularly grown on good sites under forest management.

SAMPLE OF APPRAISAL SHEET

(Furnished to land owner)

Number of Trees Marked For Sale on the Property of Mr. H. H. Smith near
Burlington, New Jersey.

Trees ABOVE the heavily-ruled line should be sold by the ton, or by the individual tree.

Trees BELOW the heavily-ruled line should be sold by the Doyle log rule.

Diameter at Breast Height	Black Oaks	White Oaks	Hickory	Bilstead	Maple	Others	TOTAL
inches							
6 - 10	130	36	11		9	2	188
11 - 14	123	10	1		7	1	142
15 - 19	87	4		2	2	1	96
20 - 24	53	3	1	3	1		61
25 - 29	13				1		14
30 - 34	5						5
TOTAL	411	53	13	5	20	4	506

ABOVE Line

Tons	37	9	2	5	1	54
------	----	---	---	-------	---	---	----

Appraised Value

\$1.00 per ton, or 27c per tree

Value ABOVE Line

\$54.00

BELOW Line

Bd. Ft.	43,000	1,500	250	1,200	800	46,750
---------	--------	-------	-----	-------	-----	-------	--------

Appraised Value per M.

\$12.00	\$12.00	\$12.00	\$10.00	\$8.00		
---------	---------	---------	---------	--------	--	--

Value

<u>BELOW</u> Line	\$516.00	\$18.00	\$3.00	\$12.00	\$6.00		\$555.00
-------------------	----------	---------	--------	---------	--------	--	----------

Total Appraised Value of All Marked Trees if Sold by Scale.....\$609.00

SAMPLE OF PROSPECTUS SHEET OF
STANDING TIMBER FOR SALE NEAR BURLINGTON, N. J.

(Sent to timber buyers)

Timber standing on the property of Mr. H. H. Smith at Green Hill Farm located about $3\frac{1}{4}$ miles east of Burlington, New Jersey, is for sale. The woodlot covers about 30 acres, and its exact location is shown on the accompanying map.

A total of 506 trees have been marked for cutting and are for sale. Of these, the 199 trees shown ABOVE the heavily-ruled line will yield about 54 tons of poles, and may be bought by the ton, or by the individual tree. The 307 trees shown BELOW the heavily-ruled line will yield about 47,000 board feet, and may be bought by the Doyle log rule.

Number of Trees Marked for Cutting

Diameter at Breast Height	Black Oaks	White Oaks	Hickory	Bilstead	Maple	Others	TOTAL
inches							
6 - 10	130	36	11		9	2	188
11 - 14	123	10	1		7	1	142
15 - 19	87	4		2	2	1	96
20 - 24	53	3	1	3	1		61
25 - 29	13				1		14
30 - 34	5						5
TOTAL	411	53	13	5	20	4	506

All trees that are for sale are plainly marked with a blaze on opposite sides of the trunk at breast height, and again on the stump. The letters NJ are distinctly stamped on the stump blaze.

Inspection is invited. Apply to Mr. John Wood of Bordentown, New Jersey. Phone—Bordentown 123. In order to ensure contacting Mr. John Wood, it is suggested that appointments be made by letter or phone.

SAMPLE TIMBER SALE CONTRACT

THIS AGREEMENT entered into this . . . 14th . . . day of July, 1940, between . . . JOHN DOE . . . of MOUNT HOLLY, NEW JERSEY, hereinafter called the Owner, party of the first part, and . . . ROBERT ROE . . . of . . . BURLINGTON, NEW JERSEY, hereinafter called the Purchaser, party of the second part;

WHEREAS, the said Owner is the owner of a tract of land situated in . . . BRIDGEBORO . . . Township, . . . BURLINGTON . . . County, New Jersey, the exact boundaries and location of which is shown on the attached map; and

WHEREAS, the Owner desires to sell a portion of the timber standing or lying upon the above tract, without impairing the productivity of the woodland.

NOW, THEREFORE, this agreement WITNESSETH:

Article I. That the said Owner for and in consideration of certain sums of money to be paid as hereinafter provided, agrees to allow the Purchaser to enter upon the above described tract for the purpose of cutting and removing therefrom such timber as is included in the terms of this contract.

Article II. All work will be done under the direction and supervision of the Owner's Timber Agent, who will be in full charge of the work at all times. His directions and instructions shall be followed and carried out in detail.

Article III. The Purchaser agrees to cut and remove the said timber in strict accordance with the following conditions.

1. Unless extension of time is granted, all timber shall be cut, paid for and removed before July 1, 1941.
2. To cut only marked trees, by which is understood only such trees as are blazed on opposite sides of the trunk at about breast height, and also in addition have a blaze on the stump on which the letters N.J. are stamped.
3. To cut all trees which are marked as described above. No exceptions are to be made except as may later be agreed upon between the Purchaser and the Timber Agent.

Article IV. The Purchaser further agrees to avoid unnecessary injury to trees which are not permitted to be cut, when felling, working up the trees or hauling out any or all of the timber or wood, by being careful to throw each tree so that it will not fall against, into, or upon trees which are not permitted to be cut; to use existing roads as far as practicable, only locating new roads through young growth when absolutely necessary, and as directed by the Timber Agent.

Article V. It is mutually understood and agreed upon that the scaling of all logs shall be done with labor supplied by the Purchaser and in the presence of the Timber Agent, and shall be based upon the peeled diameter of the logs at a point midway between the ends as measured. The Doyle log rule shall be used in computing all board foot volumes.

Article VI. The Purchaser agrees to pay the Owner or the Timber Agent the proper amounts of money for all logs cut and before their removal from the tract in accordance with the following schedule:

- (1) For timber measured in accordance with the Doyle rule, at the rate of Fifteen and 00/100 (\$15.00) Dollars per thousand board feet.

(2) For furnace poles at the rate of One and 00/100 (\$1.00) Dollar per ton.

(3) For brands at the rate of Fifty (\$0.50) Cents per ton.

Article VII. 1. The Purchaser agrees to pay to the Owner as damage and penalty for each tree that is cut in violation of the terms of this contract, a stumpage price of \$30.00 per thousand board feet by the Doyle log rule. In computing the volume in board feet of a tree so cut, it is mutually understood and agreed upon that the average diameter of the stump inside bark shall be taken as the diameter of the log cut from the tree, and that the length of such a log shall be taken as 60 feet.

2. The Purchaser further agrees to cut down, remove and pay for at a stumpage price of \$20.00 per thousand board feet, Doyle log rule, upon direction of the Timber Agent, any unmarked tree so severely damaged as a result of the logging operations as to be valueless if allowed to remain standing, the volume to be computed in the same manner as is specified in Article V.

Article VIII. It is mutually understood and agreed by and between the parties hereto as follows:

(1) No saw timber shall be removed from the property of the Owner until said saw timber has been scaled by the Timber Agent, stamped by him and paid for in full.

(2) Payment for timber sold by weight shall be based on weighslips obtained by the Purchaser from a certified weigher at the time of weighing.

(3) The Purchaser shall exercise all reasonable precaution against the origin or spread of fire in the property, and shall use his entire force to extinguish any fire found on the same.

(4) The Owner or his authorized agent shall make inspections of the cutting operations from time to time, and may order their complete cessation if they are found to be violating the terms of this agreement.

Article IX. The Purchaser shall carry Public Liability Insurance with minimum limits of \$25,000.00 and \$50,000.00; Property Damage Insurance with minimum limits of \$5,000.00; and Workmen's Compensation Insurance. These insurance policies to remain in effect at all times until the final completion of the work. The Purchaser shall submit and file with the Owner proper evidence covering the force of these Insurance Policies.

Article X. (1) In case of dispute between the parties of the first and second parts in reference to matters relating to the faithful performance of the provisions of this contract, such matters shall be referred to three arbitrators, one to be selected by each party to this agreement, and the third member to be chosen by the first two selected; and the decision of the majority of such arbitrators shall be final, with respect either to the acts to be done or the compensation to be paid.

(2) This agreement is non-assignable, and a cash deposit of Three Hundred and 00/100 (\$300.00) Dollars shall be given by the Purchaser to the Owner as a guarantee for the faithful performance of this contract, upon signing of the same. It is understood and agreed upon that said deposit shall not be applied to payment for stumpage until such time as this agreement shall have been satisfactorily completed.

IN WITNESS WHEREOF the parties hereto have hereunto set their hands and seals this . . . 14th . . . day of . . . July, 1940.

Witnesses:

JOHN SMITH
ROBERT JONES

JOHN DOE, *Owner.*
ROBERT ROE, *Purchaser.*





Scott Printing Company
Jersey City, N. J.