1956

Pulpwood production and use in Louisiana

Ralph W. Hayes

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Pulpwood Production and Use in Louisiana

by Ralph W. Hayes

Agricultural Experiment Station
Charles W. Upp, Director

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and
Agricultural and Mechanical College
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# Acknowledgement

The author wishes to acknowledge the cooperation of the members of the faculty of the School of Forestry, and the members of the State Forester's local staff who assisted in the planning and development of this project.
Pulpwood Production and Use in Louisiana

RALPH W. HAYES, Forester*

Introduction

The decreasing output of pine lumber in Louisiana in recent years, accompanied by the increase in production of pulpwood from both softwood and hardwood, presents a problem in future forest policy which justifies this study.

In 1954, over twice as much pine was used as pulpwood as was cut into lumber. The percentage of the total pulpwood production coming from hardwood species has increased tenfold in the last eight years.

About 6 per cent of the pulpwood cut in the 38 states which produced pulpwood in 1954 came from the forests of Louisiana. Over 11 per cent of the workers in all manufacturing establishments in the state were employed in the pulpwood and paper industries. This production and employment has developed in less than 40 years, as the first pulpwood was cut in Louisiana in 1917.

Several new paper-producing companies have recently indicated an interest in establishing mills in Louisiana and have made some investigations regarding possible location and raw material supply. One of the plants presently operating in the state recently announced they were considering establishing a second plant and were investigating possible locations.

The anticipated increasing demand for pulpwood in the nation in the next 20 years will no doubt be concentrated in the South. Because of Louisiana's present rank in pulpwood production and the potential supply, the state should, and will be expected to, develop its pulpwood resources to supply at least its share of the South's raw material.

This study gives a brief history of the development of the pulp and paper industry in the state, the present status, and future possibilities. It is hoped that the information included will be of interest and value to forest managers in state work and private industry and be of some help in developing forest policies for future management practices for the forest lands of the state.

History of Pulpwood Production in Louisiana

The first commercial pulpwood produced in Louisiana was cut on the lands of the Great Southern Lumber Company of Bogalusa in 1917. This pulpwood was converted into paper by the new paper mill of the

*The pictures in this publication are Louisiana Forestry Photos.

The farsighted officials of the Great Southern Lumber Company, one of the largest sawmills in the world, realizing their sawtimber supply would be exhausted in some 20 years and that a new crop of sawlogs could not be grown in that time, decided to construct the pulp mill to provide a means of using some of their ordinary sawmill waste, and to provide a method of using smaller trees to be grown on their cut-over lands. The Bogalusa Paper Company operated successfully under these conditions until the sawmill cut out in 1938.

The Bogalusa Paper Company mill, and a large portion of the land owned by the Great Southern Lumber Company, were taken over by the Gaylord Container Corporation with headquarters at St. Louis, Missouri, when the lumber company cut out. The mill has been enlarged, additional types of production developed, and remanufacturing plants added. The corporation acquired considerable additional land acreage and has carried on extensive forest planting. The mill has been in continuous operation since 1918. In 1955, a merger of the Gaylord Container Corporation and Crown-Zellerbach Corporation of San Francisco took place, and the mill is now being operated as the Gaylord Division of the Crown-Zellerbach Corporation.

Following the completion and successful early operation of this first Louisiana mill, and realizing the extensive areas of young pine timber naturally established after the cutting of the original stand and the timber growing potential in many parts of the state, other companies constructed paper mills within the next ten years.

The second such plant was that of the International Paper Company at Bastrop, established in 1921. It is still owned and operated by the original company.

In 1924 the Brown Paper Company, Inc., built a mill at West Monroe. This plant was continuously operated by the original company until 1955, when it was acquired by the Olin-Mathieson Chemical Corporation. It is being operated as a part of the activities of this corporation.

The fourth mill to be built in the state was the second International Paper Company plant at Bastrop built in 1925. Both Bastrop mills have been continuously operated by the original company since they were established. The two Bastrop mills and their production are reported together in most reports of the industry.

The fifth mill in the state developed from an experimental plant built by the Industrial Lumber Company of Elizabeth in 1921 to manufacture paper from pulp processed from stumps left after logging. This operation never developed successfully, and was changed to a round wood mill in 1926, and was acquired by the Calcasieu Sulfate Paper
Company. In 1946, the name was changed to Calcasieu Paper Company, Inc. Plant production was increased to its present capacity in 1950. It has been in continuous operation since 1926.

In 1928 the sixth paper mill in the state was completed at Hodge, built by the Southern Advance Bag and Paper Company. It was continuously operated by the original company until early in 1955, when it was sold to Robert Gair Company, Inc., and is now known as the Southern Advance Division of that company.

The International Paper Company constructed its third mill in the state in 1938 at Springhill. It is one of the two largest in the state and has been operated continuously by the International Paper Company since its completion. This was the last large mill built in Louisiana, making a total of seven.

There are two other small pulp mills in the state making specialized paper products. They are: Bird & Son, Inc., of Shreveport, with a rated capacity of 60 tons of semi-chemical pulp in 24 hours, and the Flintkote Company of New Orleans, with a rated capacity of 60 tons of miscellaneous pulp in 24 hours. Neither of these two companies owns or operates any forest land. Bird & Son report all their pulpwood is purchased from Jones Timber Company of Shreveport, and Flintkote purchases its raw material from various pulpwood vendors.

Current Pulp Production in Louisiana Mills

Most of the pulp produced in the South and in Louisiana is manufactured by the sulfate process and marketed as kraft paper or manufactured into bags, boxes, etc. for the trades.

The sulfate process of pulp production, in addition to caustic soda (NaOH), uses some sodium sulfide (Na₂S) and small amounts of other relatively inactive compounds such as sodium carbonate and sodium sulfite in the cooking liquor. Southern yellow pines provide the majority of wood used by this process. The pulp usually produced is known as “kraft” pulp, is brownish in color, and is used for the manufacture of wrapping paper, bags, and other container products where strength is important. It can be bleached, but the process is expensive and although some southern plants bleach their product, the practice is not common at the present time.

The semi-chemical process of pulp production is extensively used in pulping hardwoods. Increased yields are secured by regulating the cooking procedure, i.e., temperature, concentration of chemicals, and time of cooking, so as to prevent the solution of some of the cellulose and lignin. Following a mild cooking, the chips can be broken into pulp by mechanical means. By this means, yields can be considerably increased. The principal use is for the production of corrugated board. This process offers excellent opportunities for an increase in the utilization of the South’s low-grade hardwoods.
Groundwood, or mechanical pulp, is produced by forcing peeled wood laterally against a revolving grindstone, reducing the wood to a fibrous mass which is screened and thickened and converted into pulp products. The yield of groundwood pulp is high, often as much as 90 per cent of the dry weight of the wood. It has low strength and is used largely in cheaper grades of paper and in boards, and as an absorbent for explosives in dynamite.

The processes used and the rated capacity of the Louisiana mills are shown in the following table.\(^1\)

<table>
<thead>
<tr>
<th>Name</th>
<th>Mill location</th>
<th>24-hour pulp capacity (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gaylord Division of Crown-Zellerbach Corp.</td>
<td>Bogalusa</td>
<td>1040 135</td>
</tr>
<tr>
<td>International Paper Co.</td>
<td>Bastrop</td>
<td>540 525 60</td>
</tr>
<tr>
<td>Brown Paper Mills Division of Olin-Mathieson Chemical Corporation</td>
<td>West Monroe</td>
<td>550</td>
</tr>
<tr>
<td>Southern Advance Division of Robert Gair Company, Inc.</td>
<td>Hodge</td>
<td>325</td>
</tr>
<tr>
<td>International Paper Company</td>
<td>Springhill</td>
<td>1560</td>
</tr>
<tr>
<td>Calcasieu Paper Company</td>
<td>Elizabeth</td>
<td>200</td>
</tr>
<tr>
<td>Bird &amp; Son, Inc.</td>
<td>Shreveport</td>
<td>60</td>
</tr>
<tr>
<td>Flintkote Company</td>
<td>New Orleans</td>
<td>60</td>
</tr>
</tbody>
</table>

This shows total pulp producing capacity of the mills in Louisiana, on a 24-hour day basis, as 5,055 tons, consisting of 4,215 tons of sulfate pulp, 720 tons of semi-chemical pulp, 60 tons of groundwood pulp, and 60 tons of miscellaneous pulp.

**Economic Importance of the Pulp Industry in Louisiana**

Louisiana's rank in the industry, as of 1954, is shown by the following statements.\(^2\)

In the capacity for production of sulfate pulp, Louisiana ranked third in the South and the nation, exceeded only by Georgia and Florida in the order given.

The total rated capacity of the sulfate pulp mills in the 11 southern states in 1954 was 32,842 tons per day. Louisiana had about 15.5 per cent of this total producing capacity.

The total national sulfate pulp production capacity was 61,798 tons daily. Louisiana had 8.18 per cent of this capacity from all such mills in the 33 states where pulp is produced.

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Two common methods of cutting pulpwood. A power saw is being used in the bottom photo. Cutting is being done by hand labor in the top picture.
Considering all pulp mills in the nation and including all types of pulp produced, Louisiana ranks fourth as a state in total production capacity, exceeded only by Washington, Georgia, and Florida in the order given.

Returns from a questionnaire sent to the pulpwood producers and paper mills of the state indicate approximately the following raw material costs, production costs, and economic importance of the industry to the state.

The cut of pine pulpwood in the state in 1954 was about 1,260,000 cords. Based on available figures, the approximate cost of producing this pulpwood and delivering it to the mills was about $18.15 per cord. This cost included payment for stumpage or credit allowed for cutting from company-owned lands, cutting, woods hauling to concentration point, freight, insurance, constructors' fees—in fact the cost of rough pulpwood ready for processing. Hardwood pulpwood costs were figured the same as for pine, except for the difference in stumpage cost. Hardwood pulpwood stumpage was estimated at an average of $1.00 per cord, while pine stumpage was estimated at $3.25 per cord, so the delivered cost of hardwood pulpwood was about $15.90 per cord. The hardwood pulpwood cut in 1954 was approximately 240,000 cords. These costs total $26,685,000, an amount largely paid to labor for pulpwood production.

The annual cost of operation of the paper producing plants in the state is roughly estimated at $60,000,000. State and local taxes, including tax on timber land paid in 1954, are estimated at $6,000,000. Thus, an estimated $92,685,000 was spent in the state by this industry in 1954. Incidental items not considered would indicate the operating pulpwood and paper industry to be at least a hundred million dollar industry.

The employment by the plants is estimated at from 12,000 to 13,000 persons, with some 4,000 more classified as employed in wood procurement, or a total of 16,000 to 17,000 employees. This would indicate a total of from 64,000 to 68,000 persons depending on the over-all payroll of the industry.

This estimate does not take into consideration the value of the forest land in the state owned by the pulp mills. The forest area owned or leased by the pulp mills of the state is approximately 2,000,000 acres. The value of these lands depends on many things and cannot be definitely stated. It is estimated that these lands are worth at least $50,000,000 on the basis of future production. The value of the plants is unknown, but taking the forest land, the plants, and annual expenses for raw material and operation into account, the pulp and paper industry of the state represents about a $250,000,000 industry. This would be one of the largest industries in the state, if not actually the largest.
Comparison of Pulpwood and Lumber Production in Louisiana

In 1954 the Louisiana Forestry Commission reported 308,500,000 board feet of pine logs were cut in the state for lumber production under the regular severance tax law. In addition, 46,500,000 board feet of timber was cut from timber conservation contract lands. Estimating that, because of the character and location of the contract lands, three-fourths of this was pine and one-fourth hardwood, the total cut of pine for lumber was approximately 343,000,000 board feet. In the manufacture of lumber from trees as they grow in the forest, one cubic foot of solid wood will produce from five to eight board feet of lumber. Thus on the basis of 6.5 as a factor for converting board feet to cubic feet, this pine lumber cut represented approximately 53,000,000 cubic feet of live standing pine timber.

The 1954 pulpwood cut in the state, as reported by the Louisiana Forestry Commission, was approximately 1,500,000 cords. United States Forest Survey Release No. 76 reported about the same cut. About 84 per cent of this pulpwood was pine, the other 16 per cent hardwood. This indicates a total of 1,260,000 cords of pine pulpwood and 240,000 cords of hardwood pulpwood.

The solid wood (cubic foot) content of a cord of pulpwood varies somewhat, depending on such factors as the size of sticks, roughness, bark thickness, length, etc. For the purpose of comparison, we will assume the

![Graph](image_url)

**Figure 1.**—Lumber and pulpwood production in Louisiana, in cubic feet, 1943 to 1954. (From Louisiana Forestry Commission releases, using conversion factors in report.)
average cord contains approximately 90 cubic feet of solid wood. Multiplying the 1,260,000 cords of pine pulpwood produced by 90, we get the total of 113,400,000 cubic feet of pine timber converted to pulpwood in 1954. Comparing this volume to the 53,000,000 cubic feet of pine cut into lumber, we see that more than twice as much pine from Louisiana's forests was used for pulpwood in 1954 as was used for lumber.

If we make the same comparisons for hardwood lumber and pulpwood produced in 1954, we find the following facts: Approximately 475,000,000 board feet of timber was cut and converted into lumber. On the basis of the same conversion factor used above, this would be about 73,000,000 cubic feet. The 240,000 cords of pulpwood would equal approximately 21,600,000 cubic feet. This shows that more than three times as much hardwood timber was used for lumber as for pulpwood. The trend toward increased use of Louisiana's timber for pulpwood has been developing for some time, culminating for the time being at least, in the relationship shown above for 1954.

Figure 1 shows the relation between lumber and pulpwood production in Louisiana for specified years.

**Species and Sizes of Timber Cut for Pulpwood**

Because of its wide distribution in Louisiana, loblolly pine is the softwood most extensively used for pulpwood production, although all of the southern pines are used when they are found naturally or have been established by reforestation. All southern pines generally produce good quality pulp by the extensively used sulfate process.

The 16 per cent of the state's pulpwood production derived from hardwoods in 1954 came largely from the species of gum found extensively in the state: sweet gum, tupelo gum, and black gum. These woods, together with cottonwood, willow, soft maple, yellow poplar, and sweet bay, are known as soft-textured hardwoods, all of which are quite acceptable for pulpwood where found. The hard-textured hardwoods such as the oaks, hickories, elm, ash, birch, etc. are not as extensively used at the present time, but research and experimental work are extending the use of hardwoods for pulpwood, so that most of the species found in the state are used to some extent. The future of our hardwoods for pulp production depends on many factors, but it is almost certain that their use for this purpose will increase.

**Importance of Hardwoods for Pulpwood**

The trend toward more hardwood pulpwood production in the state has been definite and positive. In 1946, only about 1.5 per cent of the pulpwood cut in Louisiana was from hardwoods, the percentage increasing to 16 per cent in 1954. This trend, which was gradual and regular, will probably continue, as the potential additional raw material for increasing pulpwood needs, especially for the next few years, is greater than in pine. If this rate of increase continues for the next five
years, 25 per cent of the pulpwood produced in the state will be from hardwoods.

A large percentage of the pulpwood produced in the state comes from trees 6 inches to 15 inches in diameter breast high, or 4½ feet above ground level. Some 5-inch trees may be cut in thinning a young stand to improve spacing and reduce competition, but trees this small are not usually considered economically desirable for pulpwood production. Trees up to 20 inches in diameter, occasionally larger, are sometimes cut for pulpwood, and the bolts split before they go to the chipper. The cutting policy in reference to size depends on several factors, such as ownership, age of the stand, density, and quality of site. If the land is owned by the operating company, they may be interested primarily in supplying their plant, if possible, from their own lands and may be ready to cut trees up to 20 inches in diameter to do it, rather than sell the larger trees to a sawmill for lumber production and buy pulpwood in smaller-sized trees from other land owners.

**Improvements in Pulpwood Utilization**

There are three sources of pulpwood supply: (1) standing timber, the chief source at the present time; (2) tops, broken logs, or other woods waste; and (3) chippable sawmill waste.
Equipment used in debarking saw logs so that slabs and edgings can be salvaged for manufacture of pulp. This is a rather recent development that is growing in importance in the state's pulp industry.

As previously stated, the main source of pulpwood in most localities today is found in standing trees cut into round pulpwood bolts. The industry as a whole, and in cooperation with sawmills and other timber using industries, is continuously searching for ways of more completely utilizing the wood produced on the forest land acreage harvested each year. The residue left in the woods after the harvesting of such primary products as sawlogs, poles, piling, and crossties is a potential source of additional pulpwood.

Several different types of small, portable barkers and chippers are being developed which can be taken to the woods where they can be used to produce usable chips from the above type of woods residue without hauling it to the mill. Several types of chip conveyors have been produced for use with this machinery, in addition to railroad cars, that may be used for hauling chips from the producing unit in the woods to the mill. This type of pulp chip production is not extensively used in Louisiana today but will be used to a greater extent in the future.

Chippable sawmill waste has the greatest potentiality for increasing the production of raw material for paper manufacture. It is being worked up in two ways.
During the past few years several different machines have been developed for removing the bark from sawlogs before milling, making it possible to use the slabs and edgings from these debarked logs to produce chips for making pulp. Such bark-free slabs and edgings can be sold to pulpmills or put through chippers where produced and the chips sold to pulpmills. This system has been extensively used in the West in recent years where sawmill waste is greater than in the South. One un-

Debarked log emerging from debarker. Slabs and edgings from this log will go to chipper. Chips will be used in manufacture of pulp.
designated papermill in the Pacific Northwest reportedly manufactured 250 tons of pulp a day from chips produced from other plants' milling residue. Chips from such residue materials in the West alone are producing the equivalent of 1,000,000 cords of pulpwood annually.

Log barking equipment was not used in the sawmills of Louisiana to any appreciable extent until very recently. The lastest available information gives the pine chip production at the sawmills having log barking equipment as 2,800,000 pounds per week. This publication also gives the conversion factor to change the weight to cord equivalent as 5,000 pounds. This would give a production of 560 cords per week, or 29,120 cords per year, from only five sawmills. It is almost certain that several other mills will install log peeling machinery, and the chip production from this source should reach 100,000 cords or more per year in the next few years.

The potential chippable waste problem was the subject of a study made by the Southern Forest Experiment Station in 1950. In this study Mr. Carpenter found that the average chippable waste resulting from the sawing of 1,000 board feet of lumber was equal to about one-half cord of pulpwood. Complete utilization of chippable waste at sawmills will never be realized because the small sawmills could not afford, nor would they be justified in attempting to use, the necessary equipment. But the larger mills are justified, from both the financial and utilization standpoint, in installing debarking equipment.

A possible solution to the slab and edgings waste at the small, portable and semi-portable sawmills is the development of different types of slab debarkers which have been used with varying degrees of success in the North and West, and have been introduced and used to a limited extent in the Southeast and South. This type of debarking equipment can be used at the pulp mill where slabs could be secured from sawmills within a reasonable hauling distance, taken to the pulp mill, bark removed, and put through the regular chippers at the mill. Any slabs thus available and used would reduce the round wood requirement of the mill. This type of chip production is in use at some mills now and no doubt will increase in the future.

This use of chips from these sawmill wastes, and no doubt chips from present woods waste, can do one of two things, and probably both. First, it would definitely reduce the amount of round wood required for the pulpmills of the state. Second, if fully developed, together with improved stocking and increased production of round wood from the state's

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*Notes:

forest acreage, it would provide raw material for additional pulpmills in the state.

**Conservation Practices of Pulp Companies**

Pulp companies practice good forestry on their own lands, marking the timber to be cut and conserving a definite portion of the stand for future growth, seed production, and later cutting. Technical foresters are used to supervise, and in some cases, actually do the marking work.

This same type of good cutting practice, or conservation, is practiced where pulpwood is purchased from private owners if the owner will allow his timber to be cut in this way. In some instances, a land owner may demand that his area be clear cut, planning to use it for pasture or farming. In every instance the pulp company would probably prefer to cut properly so that they may have the opportunity of returning in five or ten years for another cut.

This type of work is under the direction of technical foresters, commonly known as conservation foresters. They have been a very definite help to private land owners and, by improving the forest practice on these lands, have built up the prestige of the pulp companies with these owners. Their job is largely one of public relations and has really paid off in service and public good will.

**Potential Pulpwood Production in Louisiana**

Pulpwood production in Louisiana has fluctuated with the general business cycles since 1917, but the trend has been upward, particularly since 1949, as shown in previous graphs. In each of the years 1951 to 1954 inclusive more than one million cords were produced, and the same trend is expected to continue in the future. The Stanford Report\(^6\) predicts a gradual but continuous increase in pulpwood requirements from the South and the nation in the twenty-three years, 1952-1975. This increase in the national use of softwood is predicted to be about 33 1/3 per cent, while the increased use in the South is figured to be about 50 per cent. The change in the use of hardwood for pulp presents a more startling picture. For the nation, the use of hardwoods for pulpwood is predicted to increase about 210 per cent, while in the South the increase is predicted to be nearly 300 per cent. Because Louisiana is one of the chief pulpwood producing states of the South, we certainly should develop our production to meet the expected need, and, if we hope for more pulpmills, produce much more than these increased percentages indicate.

Another very important source of additional raw material for pulpwood as well as sawlogs on the lands of the state classified as commercial

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forest land could be realized through improvement of stocking, thus growing more trees per acre.

Just about one-half of our 16,000,000 acres of commercial forest land is classified as well stocked. Forest Survey Release No. 75 considered stocking as "the extent to which growing space is effectively utilized by present or potential growing stock trees of commercial species." For well stocked stands, 70 per cent or more of the growing space was utilized, an average of 85 per cent. About one-fourth of the area is classified as medium stocked, ranging from 40 to 69 per cent of full stocking, or an average of 55 per cent. Just over one-eighth of the area is classified as poorly stocked, ranging from 10 to 39 per cent, or an average of 25 per cent. A little less than one-eighth of the area is classified as non-stocked, or under 10 per cent stocked, an average of 5 per cent. These figures definitely prove that we are not growing nearly the possible volume of wood that could be grown in the state.

Forest Survey Release No. 75 divided the state into five regions for study and report purposes. These regions are shown on the outline map of the state (Figure 2 on Page 17).

The rate of growth of our forests varies on different soils, but studies of well stocked natural stands and planted areas show a growth of from 50 to 100 cubic feet per acre per year. If we use the minimum growing figure, and consider an average of 30 years desirable to grow trees from seedlings to desirable size for use, this would give us growing stock volume of 1,500 cubic feet per acre. On this basis, the future productivity of our forest lands is impressive.

In the Southeast region the average growing stock per acre on 1,257,300 acres of commercial softwood type lands in 608 cubic feet, or a total of 764,500,000 cubic feet. If the growing stock were increased to 1,500 cubic feet per acre, the total volume would be about two and one-half times the present amount, or 1,911,000,000 cubic feet, an increase of 1,146,500,000 cubic feet. The present hardwood volume per acre is about 800 cubic feet on 745,500 acres, or total of about 600,010,000 cubic feet. Increasing this to 1,500 cubic feet per acre would mean about 1,118,250,000 cubic feet, an increase of 518,250,000 cubic feet. This would make a total increase in growing stock for the region of 1,664,500,000 cubic feet.

In the Southwest region we find an average of only 400 cubic feet of growing stock per acre on its 3,525,300 acres of softwood type forest, or a total of about 1,400,000,000 cubic feet. If the growing stock were increased to 1,500 cubic feet per acre, total volume would amount to 4,550,000,000 cubic feet, an increase of 3,150,000,000 cubic feet. This region has an average of 1,120 cubic feet of hardwood per acre on about 1,350,000 acres of hardwood type, or a total of 1,512,000,000 cubic feet.

Increasing the growing stock of hardwood to 1,500 cubic feet per acre would bring the total up to about 2,050,000,000 cubic feet, or an increase of 538,000,000 cubic feet. The total growing stock increase for the region would be an astounding 3,700,000,000 cubic feet.

In the Northwest region, we find an average of nearly 600 cubic feet per acre on 2,785,400 acres of softwood type forest, or a total of about 1,600,000,000 cubic feet. If increased to 1,500 cubic feet per acre, this volume would be about 4,000,000,000 cubic feet, an increase of 2,400,000,000 cubic feet. Here again the hardwood volume is large, about 1,100 cubic feet per acre on 1,384,400 acres of hardwood type land, a total of about 1,524,000,000 cubic feet. Increasing this to 1,500 cubic feet per acre would bring the total to about 2,060,000,000 cubic feet, an increase of 530,000,000 cubic feet, or a total increase for the region of nearly 3,000,000,000 cubic feet.
In the North Delta region, there are about 600 cubic feet per acre on 168,300 acres of softwood type area, or a total of 108,800,000 cubic feet. If the volume on this area were increased to 1,500 cubic feet per acre, the softwood type area would have a volume of 272,000,000 cubic feet, an increase of 163,200,000 cubic feet. The hardwood type area is large, 2,003,000 acres, and has a growing stock volume of 850 cubic feet per acre, a total of 1,702,100,000 cubic feet. Increasing the volume to 1,500 cubic feet per acre would result in a volume of 3,004,100,000 cubic
feet, or an increase of 1,302,000,000 cubic feet. This would be an increase of growing stock in the region of about 1,465,200,000 cubic feet.

The South Delta region shows an unusual condition, in that the softwood type area of 97,700 acres now has a growing stock volume of 4,600 cubic feet per acre. This volume is mostly sawtimber-sized pine. The total volume is about 439,200,000 cubic feet, and of course is much greater than 1,500 cubic feet per acre, and no increase in volume should be expected. The hardwood type area is 2,721,900 acres and the average growing stock volume is about 900 cubic feet per acre, a total of about 2,466,100,000 cubic feet. Increasing this to 1,500 cubic feet per acre would produce about 4,110,100,000 cubic feet, an increase of 1,644,000,000 cubic feet for the region, all in hardwood.

These calculations show a present growing stock volume in the state, both softwood and hardwood, of over 12 billion cubic feet. This volume is supporting our present sawmill and pulpwood operations and producing a surplus above use. Increasing the growing stock as suggested above would allow for continuously increasing use as increased volume was developed by natural regeneration, direct seeding, or planting of nursery stock and would provide a growing stock volume of over 23 billion cubic feet at the end of a 30-year period. This volume of growing stock should be maintained or increased, when once reached, by cutting only the annual growth. The annual growth for the state given in Survey Release No. 75, as a result of careful on-the-ground study and measurements, was 716 million cubic feet. This growth was based on 12,114,000,000 cubic feet of growing stock and amounts to about 6 per cent volume increase per year.

The future growth rate should be at least equal to the present rate. The possible future growing stock has been figured to be 23,000,000,000 cubic feet. Using our present growth rate of 6 per cent on this growing stock gives an annual growth of 1,380,000,000 cubic feet, or almost twice as much as at present. This growth would be available for lumber, pulpwood, and other forest products production.

As we build up our growing stock and annual growth, additional opportunities for use must be considered. Improvement and refinement in the lumber manufacturing methods, together with better merchandising of the product, are desirable. As the production of lumber in the West decreases as the cutting of virgin timber progresses, more southern pine should be needed for lumber. These conditions could justify two or three times the volume of standing timber for lumber and allied products production as was used in 1954. This could mean more sawmills or similar plants or greater production from those now found in the state. This could require one-fourth or more of the additional available volume.

Probably most of the additional volume beyond that required for additional sawmill needs will be used for the production of paper and
Scene at one of Louisiana's pulp mills. Pulpwood from the stacks is thrown onto the conveyor shown in center foreground which carries it to the mill.

paper products or be developed into wood fiber production. Many people think there will be much greater use of wood fiber in the future than at present, and such use should be provided for. There would be sufficient volume by the end of the development period for several new plants of this nature, possibly six to eight 500- to 1,000-ton plants. It would not be necessary to wait to the end of the period to establish all of them; they could be built as the available timber supply increased.
Provisions should be made to use both pine and hardwood, either in separate plants or in combination plants.

We are all interested in the financial feasibility of growing pulpwood as a crop. About 15,200,000 acres of state forest land are in private ownership, with about 3,200,000 acres in farm forest classification, leaving 12,000,000 acres in private non-farm ownership. Probably about one-half of this acreage needs some degree of planting or natural increase in stocking, and all of it needs protection. What is the incentive to develop these lands as property used for growth of forest products? What is the probable cost and possible returns from such development? Let's assume some figures (as nearly those that are applicable today as possible) and work out the problem, using a per-acre basis to eliminate the use of large figures.

Let's assume that much of this area has been owned by the present owners for several years or recently changed owners by mergers or consolidation. Some of it has been held and taxes paid to retain mineral rights, with little or no income. Present land market values vary widely, depending on several factors. For the purpose of this calculation, we will assume a land market value of $20 per acre and a going rate of interest of 4 per cent for long time, reasonably safe loans which we will apply as compound interest over the time necessary to carry a planted stand to harvest age, here considered to be 30 years. The interest on this land value at 4 per cent for 30 years would be $44.87.

Complete planting or seeding will cost approximately $10 per acre. It should, and probably will, be less as improved planting techniques are developed. Complete planting at this cost, again carried at 4 per cent interest for 30 years, would amount to $32.43. Partial planting would be proportionately less.

Taxes and protection must be provided for. These two items will amount to about 20 cents per acre per year. This cost at the end of 30 years will amount to $11.22.

Some supervision should be considered, and an average cost of 10 cents per acre per year seems reasonable. This carried for 30 years would accumulate to $5.60. The total cost, at 4 per cent compound interest, would amount to $94.12. Of this amount, $75.12 would represent interest on land value and production costs, leaving an actual cash cost of only $19 per acre for the production of a 30-year-old stand of timber.

A thinning should be possible in a fully stocked stand at 20 years of age, yielding about 4 cords of pulpwood per acre, worth $16.00. This would reduce the cash cost of the crop at 30 years of age to $3.00 per acre.

Our final crop at 30 years of age should be approximately 25 cords of pulpwood, worth an estimated $4.00 per cord, a total of at least $100, an income over actual cash cost of about $97 per acre in 30 years.
This calculation indicates the economic feasibility of growing timber on presently non-productive forest lands and putting Louisiana back into its proper place in the nation's timber production.

Summary and Conclusions

The pulpwood and pulp products industry is one of the most important in the state and is destined for increasing importance in the future.

Hardwood will be increasingly important in pulpwood production in Louisiana in the future. In 1946 only 1.5 per cent of the state's pulpwood output was from hardwood. In eight years, this increased to 16 per cent and probably will increase to 25 per cent or more in the next five years, and to a larger per cent in the years to come.

The commercial forest area of the state is capable of producing at least twice as much timber volume as at present if increased protection is provided and present understocked and non-stocked areas are brought into production by natural reseeding in some cases and by planting of nursery stock or direct seeding in others.

Additional pulp mills are definitely possible and desirable. With a growth in 1954 of twice the cut, and expected progressive increase in growing stock in the future, some expansion is possible in the next five years, with greater development to follow.

The use of chips from slabs and edgings from debarked logs at sawmills will be a definite and important contribution to pulp production in the future, and will reduce the round wood requirement.

Woods waste will be increasingly utilized through the use of movable debarking and chipping equipment in the production of chips for paper making, again reducing the round wood requirement of the pulp mills.

Utilization and conservation practices by the present pulp mills are improving continuously, and this improvement will continue.

The possibility and soundness of a policy of clear cutting a stand when it reaches pulpwood size and planting to produce the next crop deserves careful consideration by small land owners, possibly even by the large owners.

Forest Survey Release No. 75 indicates the need for timber stand improvement work on a large acreage of pine sites in the state, and also the removal of cull and undesirable hardwoods on hardwood sites. Species of hardwood which have not been used for pulpwood in the past are now being used in increasing amounts and it is possible that some of the desirable removal could be done at little or no cost if these trees were used for pulpwod.

In early lumbering days, Louisiana was one of the most important producing states in the nation. The concept of the use of forest raw material has undergone a change, as have the economic conditions in the
state. The combination of lumber and pulpwood production offers an opportunity for integrated use of the products of our forests which will make it possible and profitable for Louisiana to develop her forest lands and again become one of the outstanding forestry states of the nation.