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QUARTERLY PROGRESS REPORT

OCTOBER, NOVEMBER, AND DECEMBER, 1952 *tie. 1951*

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FOREST UTILIZATION SERVICE //



*U.S. Forest Service*

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PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION //

R. W. COWLIN, DIRECTOR

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PORTLAND 6, OREGON //

PACIFIC NORTHWEST FOREST AND RANGE EXPERIMENT STATION

FOREST UTILIZATION SERVICE

E. E. MATSON

A. C. KNAUSS

Progress Report October, November, and December 1951

SUMMARY

Even though there has been a softening in the plywood and lumber markets during the quarter, there has been no slackening on the part of industry in its program of setting up a more secure raw material supply. There has been no apparent decrease in prices either for logs or standing timber. Generally, earnings for all wood-using industries have been good during the year. Many companies are interested and anxious to invest some of their earnings in new plants or equipment whereby they can better utilize their raw material. Sawmills and plywood plants have recently entered into contracts with pulp companies for the sale of chips from "mill waste." However, many are interested in setting up some sort of a plant of their own so they can put this material into a product that will give them a greater return.

Fiberboard plants appear to have good possibilities for the utilization of "mill waste." The cost of a board plant is much less than the cost of a pulp mill and board manufacture does not have the water and stream pollution problems encountered in the production of pulp. Also, markets are very good which has created much interest and activity in this field.

Members of the FUS unit have worked with both chambers of commerce and industry, furnishing them information that would be of value in setting up board plants.

During the quarter the Weyerhaeuser Timber Company announced their plans to construct a board plant at Klamath Falls to utilize the defective white fir in the Klamath basin. One plywood company has made application for a certificate of necessity for a board plant which will utilize "waste" material from their present operation.

Defense work during the past three months has been confined, chiefly, to work with the Bureau of Ships. Several boat companies have military contracts for the construction of mine sweepers. These companies have had little experience in the laminating of oak keels and have requested much help from the FUS unit in their problems with glues, assemblies, and curing schedules.

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## Reduction and Recovery of "Logging Waste"

The Westfall Engineering Company of Portland, Oregon have developed a pneumatic-tired yarding unit which is called "The Performer." This piece of equipment is creating considerable interest among loggers in the area. It is designed for the handling of large-size logs. Power is produced by 225 horsepower Cummins diesel motor. It is equipped with a bulldozer and an arch attached to the machine. The machine is mounted on four 21 x 25 inch tires. It can be operated at all speeds from two to thirty miles per hour. Due to its speed it is of particular value in logging timber a considerable distance from roads. The machine is very expensive, costing \$35,850 f.o.b. factory. However, the company claims it will do at least twice as much work as a D-8 Caterpillar equipped with an arch.

Two of these machines are now in use and five are under construction. Matson was invited to watch this machine perform in the lot near the factory and he obtained the picture shown in Fig. 1. Apparently, a machine of this type but of much smaller design would have wide application in the midwest and southern forests. The company is interested in building a smaller model if it appears that there is a large enough market to justify it.

## Scaling and Grading of Logs

A committee consisting of members of the Forest Service, the scaling bureaus of Washington, Oregon and northern California, and members of industry have been organized to work on scaling and grading problems of logs coming from the Douglas-fir region. The immediate problems of this committee are to try to work out one set of scaling and grading rules for the entire Douglas-fir region. At present we have five scaling and grading bureaus each having their own rules. Prior to the time they agree on one set of rules the committee will review any proposed changes of the individual scaling bureaus.

Harland C. Hiatt of the Timber Management Division of the Regional Office is Chairman of this committee. The committee held its first meeting on December 10 and discussed the proposed rules submitted by the Southern Oregon Scaling Bureau for ponderosa and sugar pine logs. The Forest Service has recommended a set of rules similar to the ones that were developed several years ago by the Experiment Station for ponderosa pine.

Matson attended this meeting and explained the work the Forest Products Laboratory and the Station have been doing on log grade studies and lumber grade recovery studies. Members of the committee appeared to be interested in these studies and were anxious to receive copies of the Laboratory's report on the studies made at the six plywood plants.



During the time the log grade studies were being made at the six plywood plants there was some indication that spiral grain might be correlated with long radius of the logs. At the request of the Laboratory we made field checks on this point. Careful measurements were made on twenty-five second-growth trees and twenty-five old-growth Douglas-fir. These data were submitted to the Laboratory and showed that there was little correlation between spiral grain and the degree of change of the long radius of the logs. We, also, found that spiral grain was more serious in old growth than in young growth and that the long radius seldom remains in the same plane throughout the length of the tree. Some additional field checks will be made and it is planned to prepare a report on this project that should be of some assistance in determining the grade of Douglas-fir logs.

#### Lumber and Lumber Industry

Most of the incense cedar growing in southern Oregon is very defective and yields a large percentage of low grade lumber. We feel that this lumber would be suitable for crating lumber for military use and have made such recommendations to local Army Engineer Corps.

#### Reduction of "Sawmill Waste"

Pulp companies still are continuing with their program of obtaining a higher percentage of their raw material from "mill waste." The present price of Douglas-fir chips at the sawmill is approximately \$6.50 per unit. Hemlock chips are much more in demand and the price per unit for this material is in the vicinity of \$20 per unit.

A few more hydraulic barkers are being installed in some of the larger sawmills so that they obtain bark-free "mill waste" that can go directly to the chipper. Many of the smaller mills are interested in this program but do not have sufficient production to warrant the costly installation of a hydraulic barker. There is considerable need for the development of a mechanical log barker that would be within the cost range of sawmills cutting 50- to 100-thousand board feet of lumber per day.

With the present power shortage in this region there has been considerable thought given to the possibility of producing electric power in steam plants, using hogged fuel. At the instigation of Bonneville Power Administration a survey was made of the Roseburg area in Oregon and the Wenatchee area in Washington to determine how much hogged fuel could be obtained within a reasonable hauling distance of these two cities.

#### Seasoning of Lumber

An inquiry was received from the Youngs Bay Lumber Company, Roseburg, Oregon about the handling of kiln dried wide flat grain kiln dried Douglas-fir. This company has an excellent battery of internal fan

kilns and uses particular care in the drying of Douglas-fir finish. They were receiving complaints about the cupping and warping of such lumber after being planed and in storage both in their finish shed and in the retail yards. A visit to their plant revealed that the company, for greater efficiency in handling, had adopted a procedure of tying four pieces of finish into a bundle with twine. Further, they were mixing lengths in the same bundle. It appeared that the lumber which was dried to less than 10-percent moisture content was permitted to reabsorb moisture freely on the uneven ends and on faces where bundles were separated by the thickness of the twine. Particular undesirable effects noted were warping of the board ends, which extended beyond the pile and cupping of the outer boards of each bundle. The suggestion was made that in order to keep dry lumber flat and prevent serious change in shape it was desirable to sort lumber for length for piling and to avoid exposing one face freely to the air while the other was protected. Also, that the bundle-tying system they were using would actually be expected to promote cupping. This company had only recently had a representative in attendance at the dry kiln course in Corvallis and they, therefore, appreciated immediate changes which they would need to make in order to avoid their complaints.

#### Veneer and Plywood

New plywood plants continue to be built and come into production in the Douglas-fir area. Knauss visited a new plywood plant being constructed by the Long-Bell Lumber Company at Gardiner, Oregon, which is being designed and built by George French (formerly on the staff at the Forest Products Laboratory) and is expected to be in operation about January 1, 1952. The Long-Bell Lumber Company have operated a plywood company at Weed, California for many years. This plant produced ponderosa pine plywood before the Douglas-fir region was producing any appreciable amount of plywood and today part of its production is of Douglas-fir shipped from outside the territory.

Expansion of the Douglas-fir plywood industry was summarized recently by O. Harry Schrader, Jr., of the Douglas Fir Plywood Association in an address at the Western Forestry Conference. He stated that "today the Douglas-fir plywood industry is represented by 71 producing factories operating under 61 separate ownerships. An additional 15- to 20-millions are under construction and expected in production before July 1, 1952. Approximately 34 veneer green ends are or have been in production recently, a few owned by operating plywood plants but most by industry. The industry, over-all, employes more than 12,000 people in its manufacturing operations alone and the total annual value of fir plywood produced is in excess of one quarter of a billion dollars. Present annual productive capacity is estimated at 3.1-billion feet, 3/8-inch thickness, which is the customary method of quoting production figures. Production for 1951 is expected to approximate 2.7-billion feet. .... Today the Douglas-fir plywood industry consumes on an annual basis more than one billion feet log scale---perhaps 5 percent of the total nation's timber cut.....

Recognizing that the industries' capacity by mid-1952 will approximate 3.5-billion feet of plywood and that indications are that productive capacity is stabilized around this figure for several years, it may be estimated that the annual log volume demand by the plywood industry, operating near its capacity, will be 1.5-billion feet."

#### Glued and Laminated Products

Knauss made an inspection in October of the glue joints in the Loon Lake bridge. This is a wood-arch bridge in which the arches and posts are made of glued laminated construction, using Douglas-fir pressure treated with Wolman salts. Representatives of Timber Structures (the fabricators), the American Lumber and Treating Company (who furnished preservative treatment), the American Wood Preservers Association, and the West Coast Lumbermen's Association were present as observers during the inspection. Results of the inspection showed that the glue joints were maintaining a satisfactory condition. The wood has not been given any surface protective treatments; such as paint and there is some evidence of weather checking where the wood is exposed directly to sun and rain. The bridge has been in service for a total of four years.

At the Weyerhaeuser Timber Company, Longview, Washington Blomquist, of the Forest Products Laboratory, visited the edge-gluing operation in which narrow strips of clear redcedar are being glued into wide boards for resawing into bevel siding. Resorcinol or acid-catalyzed phenol resin glue is being used and is cured by the application of hot plates. Narrow clear strips of Douglas-fir are being similarly glued into wide boards for use as shelving.

An increasing number of requests are being received for assistance in the gluing of laminated boat parts--both white oak and fir for the construction of navy mine sweepers. Knauss has been called to two ship builders who have contracts for the building of mine sweepers and who are setting up to do their own laminating. He has also been called to two commercial laminators in the navy who have subcontracts for finishing laminated white oak frames for Douglas-fir stems, keels, and other parts for the mine sweepers. John Kuenzel, Bureau of Ships, Washington, D. C. and several other navy personnel were in the region during November and Knauss spent some time with them, calling at the laminating plants and testing laboratories. The Navy is urging the Forest Utilization Service to make themselves available in a major way for consultation in this field during the next few months.

White oak lumber for laminating purposes is being imported from the southern part of the country and Douglas-fir is being obtained in this region. During the past year the revised working stresses applicable to the design with dry glued laminated Douglas-fir for structural timbers have found considerable acceptance on the part of designing engineers, particularly where they have been incorporated into building codes. The use of these higher working stresses has



permitted the laminators to design more economical structures so that laminated construction is rapidly replacing wood construction formerly designed in solid members which necessarily were of green wood. One of the immediate effects of this improved situation is reflected in the following quotation taken from the "Trade Review" of November, issued by "The Timberman:"

#### TIMBER COMPETING SUCCESSFULLY WITH STEEL, SAYS FULBRIGHT

Structural timber construction is now competing successfully with steel as a result of improved engineering, fabricating and erecting techniques. This was reported this week by Ralph H. Fulbright, vice president and general sales manager of Timber Structures, Inc., Portland, when he addressed the Portland Hoo-Hoo Club. Fulbright said that improvement in many techniques made in the past few years has resulted in timber construction competing with steel even though the price of lumber has increased five times since 1940 as against an increase in the price of steel of two times in the same period. In 1940, he stated, his firm bought select structural Douglas fir lumber for \$24.

Fulbright said that lumbermen should realize that, pound for pound, lumber is stronger than steel. Wood, he said, is the only structural material which can withstand successfully a 100 percent impact overload.

Regarding the progress made by Timber Structures, Inc., Fulbright said that the company in October has shipped 142 carloads of fabricated structural lumber items; thus far this year the firm has shipped an average of 96 carloads each month. At the same time, Timber Structures, Inc. has received a monthly average of 100 carloads this year. In 1951 up to November 15, he said, the firm has shipped 19,000 roof trusses. If these trusses were placed end to end they would stretch away for 750,000 feet.

Inquiry was received from one of the laminators regarding the potential use of Western hemlock in gluing structural wood members. Although the strength of Western hemlock is below that of Douglas-fir, which in western woods has been used almost exclusively for structural purposes, the relatively higher grade obtainable in Western hemlock and the increasing supply of this species has developed an interest in its potential supply for laminating purposes.

R. F. Blomquist of the Forest Products Laboratory visited in the region in November and, accompanied by Knauss, visited Douglas-fir plywood plants and glue manufacturing companies.

#### Utilization of Western Hardwoods

The Associated Plywood Mill, Inc. have recently acquired timber holdings in southwestern Oregon on which is located a rather extensive

stand of tanoak. The plywood company is experimenting with the conversion of tanoak into plywood and has invited the cooperation of the Oregon Forest Products Laboratory and the Forest Utilization Service. They recently rotary cut several logs--some hot and some cold--at their Willamina Plywood plant and have also had some tanoak flitches sliced into veneer at the Olympic Manufacturing Company at Gresham, Oregon. They are producing samples of plywood from this veneer and will explore potential markets for the material. The logs which were cut into veneer were of high quality compared to the tanoak logs the FUS has seen previously and, when heated in accordance with the conclusions reached by Laboratory tests at Madison several years ago, produced a high quality veneer.

One of the reasons alder lumber has not been given wider use is because it is considered--all the way from the stump through the sawmill--as an inferior species. The poorest type of small sawmill usually cuts the lumber and it is badly manufactured. This lumber is ordinarily not graded and the main incentive for the sawmill man is to cut the largest quantity rather than the best quality. Before this lumber can receive more favorable consideration by the furniture manufacturers, who are now the chief users of this lumber, it should be properly graded so there will be some sound basis for the buying and selling.

The furniture manufacturers in the Los Angeles area have had difficulty in obtaining suitable alder from mills in this region. One lumber broker, Slattery Hardwood Company, who has been furnishing material for the Los Angeles plants, has decided to build his own sawmill. This mill will be located at Raymond, Washington and will produce at the beginning about 15,000 board feet of lumber per day. This is a small mill for the Douglas-fir region, however, it is larger than most alder mills and, no doubt, will produce better manufactured lumber than is ordinarily available.

The Station and Oregon Forest Products Laboratory have given considerable thought to the problems of grading both the logs and the lumber. The Oregon Forest Products Laboratory has recently started a project on both hardwood lumber and log grades. Immediate plans are to try to set up log grades for alder, using the grades developed by the Forest Products Laboratory for eastern and southern hardwoods as a base. The mill tests will be made and these rules will be adjusted to meet local conditions. If these rules work out satisfactorily for alder, a similar procedure will be followed for other local hardwoods.

The FUS unit has worked with the Oregon Forest Products Laboratory on the utilization of western dogwood and madrone. With the present shortage of material for making shuttle blocks we felt that these two species might have possibilities. In our last quarterly report we requested other FUS units contact us if they knew of companies that might be interested in trying these western species. Englerth of the Southeastern Station notified us that the Steel Heddle Manufacturing Company of Greenville, South Carolina were interested. We contacted the company and proposed that we send them a half cord of



each species to be collected by members of the Oregon Forest Products Laboratory.

### Wood Preservation

The Forest Products Laboratory included Cascade west side locations in setting up field service records on treated poles in R.E.A. utility lines. Kulp and Hegge were in the Oregon area in October and inspected and set up a unit near Portland (Mt. Hood) area and in Roseburg. The units included full-length pressure treated Douglas-fir poles which had been in service from one to two years. Fig. 2. shows details of the inspection which included a record of the pole size and class, history of installation, increment boring to determine depth of penetration of preservatives, inspection of wood condition at ground level, and data on the soil type. It is anticipated that inspection of the line will be made at intervals of several years. These units are part of the nation-wide service record project in which the Forest Products Laboratory is cooperating with the R.E.A.

A representative of Boliden Mining Company, Stockholm, Sweden visited the Pacific Northwest recently, interested in promoting a new type of salt for wood preservation purposes. The preserving agents are calcium and zinc arsenate which in final form in the wood are claimed to be nonvolatile and non-leaching in water. The claim is made that the process operates at normal temperature without any requirement for heat. The process is represented as having been used in Sweden since 1936. We do not know whether any American companies have arranged for distribution rights in this country.

### Wood Hydrolysis

During the first part of the quarter the wood hydrolysis plant at Springfield again started production on a small scale. The Hudson Bros. have obtained complete control of the plant and intend to produce alcohol. Matson visited the plant in October. At that time they were making a wood-sugar solution from one percolator. It was their intention to first fill up all storage space with this solution and then employ the small crew on the production of alcohol. It is intended that they will gradually increase the size of the crew and as fast as possible will bring the plant up to full production.

### Pulp and Paper

There still is considerable interest in the expansion of the pulp capacity in the region. During the quarter the FUS unit made reports for N.P.A. on tax amortization certificates submitted by two pulp companies. One of these was for an entire new plant that would utilize "waste" from several sawmills.

## Fiberboard Manufacture

Interest continues high in the production of fiberboard from unutilized material at sawmills and plywood plants. During the quarter one new plant started producing board, a plywood plant made application for certificate of necessity to construct a board plant to utilize "waste" from their plywood production, and the Weyerhaeuser Timber Company reported their plans to construct a board mill at Klamath Falls.

White fir in the Klamath basin is very defective and of little value for lumber and, consequently, is poorly utilized. The Weyerhaeuser Company have made exhaustive tests and find this species gives them a superior board over Douglas-fir. Rot in the white fir does not hamper much except that it gives a darker color in the board. The company plans to log all the defective white fir and bring in material that is as much as 75 percent cull. A hydraulic barker is being installed at the Weyerhaeuser plant and logs of all species will be barked before going to the sawmill. "Mill waste" from other species can be utilized for board but this material is needed for fuel for the boiler plant.

At Weyerhaeuser's Snoqualmie Falls plant there is under construction a "Silvacel" plant that will produce wood fiber products. The defiberizing process at the plant will be identical to that used in the board plant at Klamath Falls. The wood fiber material has many uses for such products as molding compounds, fiber for oil-well-drilling muds, and manufacture of roofing felts. In addition, Weyerhaeuser Timber Company and a local battery separator plant have worked for the past three years on development of a molded battery separator. Although the process is still in the pilot plant stage, results of the work are sufficiently convincing for the separator company to announce that plans are going forward for the commercial production of two million battery separators from fiber per day. This volume would be sufficient to practically replace the present production of wooden battery separators.

The new plant at Snoqualmie Falls will utilize bark-free material from the sawmill. The hydraulic barker has recently been installed on the mill pond and all logs will be barked before going to the headrig.

## Silvicultural Relations

During Ben Paul's visit to the region this summer he and members of the FUS unit met with Mr. H. W. Eades of the Canadian Forest Products Laboratory to discuss problems the Canadian lumbermen are having with compression wood in hemlock shipped to remanufacturers in this country. At that time it was recommended that samples of the problem material be shipped to the Forest Products Laboratory and that someone from the Canadian Forest Products Laboratory go to Madison to clear up any differences that might exist in Canada and here on the identification and seriousness of compression wood. We have been notified that samples have been sent to Madison and that the Laboratory has invited representatives of the Canadian Forest Products Laboratory to meet with them sometime this winter at the Madison Laboratory.

This Station and the Oregon Forest Products Laboratory have a joint project to study the properties of second-growth Port Orford cedar. The supply of old-growth timber now used for battery separators is very limited and tests were needed to see if second-growth material would be suitable. A number of separators from young timber were made and shipped to Globe Union, Inc. to be given tests. Preliminary tests show this second-growth material to be equal or superior to the old-growth Douglas-fir separators now used by the company.

Cooperation with Other Federal and State Agencies, with Industry, and with Technical Organizations in all Phases of Wood Utilization

Director Cowlin spent a week at the Forest Products Laboratory early in the quarter. He discussed work underway at the Laboratory--particularly, that of interest to the wood-using industry of the Pacific Northwest.

Matson attended two meetings of the Oregon Forest Products Laboratory Advisory Committee. The chief subject under discussion at these meetings was setting up a policy for licensing patents developed by the Laboratory. At present no policy has been set up and there is considerable pressure by five companies to obtain licensing contracts for the Kurth bark-extraction process. A sample contract was drawn up and presented to the Oregon State Board of Forestry who have jurisdiction over these contracts.

The Kurth patent was the first one obtained by the Oregon Forest Products Laboratory and it covers the production of wax, tannins, and other extractives from bark.

Matson attended a field trip with the Washington County Planning Commission. This trip covered the same route taken by the committee in 1939 when they were trying to determine a policy for lands that did not appear to be suitable for agriculture. At that time they recommended that these lands be used for the growing of timber, which, no doubt, was a wise decision. Several woodlots and small timber holdings were visited and problems of growth and utilization of the young timber were discussed.

We continue to get requests from N.P.A. for reports on wood-using companies that are expanding or building new plants. During the quarter this region reported on eight applications. This makes a total of fifty-three applications for the year--valued at approximately 144-million dollars.

The Pacific Northwest Section of the Forest Products Research Society held its fall meeting at Longview, Washington on November 14. Matson and Knauss attended. The program of the meeting centered largely on the subject of hardboards, emphasizing the need for developing economical standards to control and stabilize the properties of products as they will be put on the market.



The following foreigners visited members of the FUS unit and discussed problems of forest utilization during the quarter:

Raymond-Christian Antoine	Belgium
Jos. A. G. Fourage	Belgium
Viejo Ismari Heiskanen	Finland
Tollef Ruden	Vollebekk, Norway
H. H. H. Heilberg	Vollebekk, Norway
John Svensson	Norway

Some of these men were escorted to various wood manufacturing plants in the region.

Matson met twice with Ralph DeMoisy, Director of the Washington Institute of Forest Products to better correlate projects of both agencies.

Writing and Reviewing Articles on Wood Utilization, Giving Talks, Arranging Meetings, etc.

During the quarter Matson completed the lumber grade recovery studies made at the Kogap mill at Medford and the Cape Arago mill at Coos Bay. Rough draft copies of this report have been sent to all cooperating agencies for their review and comments. These two reports show that grades of lumber recovered in the Medford and Cape Arago areas is poorer than average for the Douglas-fir region.

Knauss arranged for the program of the West Coast Dry Kiln Club at the St. Paul and Tacoma Lumber Company, Tacoma, Washington on November 3. This company has recently installed a battery of Moore internal overhead-fan dry kilns and has gone to extra effort to provide a kiln roof with high degree of insulation against heat loss. This company is installing a hydraulic barker at its sawmill in order that its "mill waste" (slabs, edgings) may be suitable for chipping for the pulp market. This improved utilization at the plant will leave less wood fiber for fuel and more attention is being paid to minimize the steam requirements of the dry kilns. The company is conducting tests on the amount of steam required to operate the dry kilns and sometime next year plans to make available to the dry kiln club the results of its steam studies.

An old battery of internal fan kilns (wood construction), which has reached the end of its structural usefulness, is being dismantled and replaced by a tile concrete construction and it will also be provided with a high insulated roof. This company is increasing its dry kiln capacity and is quite extensively drying common grades as well as clears. One of the speakers at the meeting was a representative of the Stetson-Ross Company who spoke on planing mill layouts suitable for machining kiln dried Douglas-fir lumber.

A representative of the Laucks Laboratories, Inc., Seattle, Washington spoke briefly on the use of the "Moisture Sentry." He described the instrument as being in use in two plants in the Pacific Northwest, one in Los Angeles, and one in West Virginia. An installation is being planned in the planing mill of J. Neils Lumber Co., Klickitat, Washington in the near future.

Matson and Knauss of the FUS unit and Bates of the Regional Office reviewed Fobes' paper on "Wood Lost in Bucking." This paper shows the amount of material wasted by improper bucking of logs at the six plywood plants where the Laboratory made the veneer recovery studies. This report is being written at the request of the Washington Institute of Forest Products.

The report on the amount of "mill waste" that would be available for further manufacture in the Lakeview area of Oregon was completed. This report has been submitted to interested parties for review and comments.



Fig. 1.--"Performer" yarding unit, showing bulldozer.



Fig. 2.--"Performer" yarding unit with attached arch.