

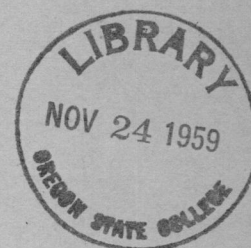
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Thesis

ECONOMIC FACTORS AFFECTING STUMPAGE PRICES
WITH SPECIAL REFERENCE TO NORTHWEST STUMPAGE

by

Charles W. Fox



SCHOOL OF FORESTRY
OREGON STATE COLLEGE
CORVALLIS, OREGON

OREGON STATE COLLEGE

School of Forestry

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HISTORICAL BACKGROUND OF NORTHWEST LUMBER INDUSTRY

The first national attention the Pacific Northwest received was far from conducive to the development of the lumber industry or, in fact, any industry. This early attitude of the majority of the people of the United States was well expressed by Daniel Webster in his famous "Prairie Dog Speech" when he said, "I would not vote one cent from the public treasury to bring the Pacific Northwest one inch nearer to Boston." This attitude was taken due to the reports that had sifted out of the West telling of great stands of timber. In that period in the development of this nation, trees were considered an impediment in the way of agricultural development which was supreme in the minds of all. Of what value, then, was this vast area of forests? It could not be turned into agricultural uses without first removing the huge trees. However, despite the cutting tongue of satire used by Webster and others in respect to the acquiring of the Oregon country, there was one man, Marcus Whitman, who had that sterling quality of foresight which makes for leaders and conquerors of new fields. Marcus Whitman rode horseback from Oregon to Washington, D.C., in 1843, garbed in the buckskin of the woodsman, suffering hardships and dangers, to carry the story of the great Northwest to the seat of government where he persisted in his efforts until in 1846 he was awarded by the passage by Congress of the "Oregon Law."

Long before the recognition of this vast wilderness by the Federal Government there were settlers sifting into the Northwest from the sea via the Columbia River and Puget Sound. One of the earliest of these settlements was Fort Walla Walla, which was established at Point Vancouver on the Columbia River in 1818. Shortly after the establishing of this settlement, the first sawmill west of the Mississippi was built by Dr. John McLoughlin, who was sent to the Columbia River by the Hudson Bay Company. This was the birth of the lumber industry in the Northwest.

The first settlement in the Puget Sound area, which President Jackson almost relinquished to Great Britain, was Tumwater, established in 1837 on what is now the present site of Olympia. The following year a sawmill was built and operated by the water power secured from the Tumwater Falls. The products of these first sawmills were used in construction of nearby residences for the almost continual stream of immigrants.

In the year 1849 the first cargo of lumber was shipped from Puget Sound to San Francisco in the brig "Orbit." This marked the beginning of coastwise trade. The development of this trade was augmented by the discovery of gold in California which brought thousands of immigrants across the mountains from the East or around the Horn, lured on by the lure of gold. However, just as the wagon trains to Oregon divided, some going south for gold,

others remaining, so did those coming around the Horn by boats divide, some remaining, others sailing on up the coast to the Northwest. These arrivals by sailing vessels began settling on the tide flats of the present city of Seattle. It was on this site that Henry Yesler built the first steam sawmill on the Puget Sound. The same year Nicholas Deline, a Swede, settled on Commencement Bay and on the present site of Tacoma and built a water power mill which engendered the rivalry between these two cities which still exists today.

From the "Oregon Spectator" issued on February 22, 1849, the following prices of lumber are revealed. Before gold was discovered in California, lumber sold at \$30.00 per thousand at the mill. In November, 1849, the increased demand from California had forced prices up to \$80.00 per thousand; by March of the following year to \$100.00; and by December of the same year, after the rush had subsided and stocks had accumulated at unloading ports, the price receded to \$80.00 per thousand; and by midsummer of 1851 had receded to \$10.00 of pre-gold prices. This shows the first indication of the ups and downs of the lumber market in the Pacific Northwest which seems to have been and is its inheritance ever since.

When Dr. John McLoughlin built the first sawmill for the Hudson Bay Company he also generated the exporting of lumber from the Pacific Northwest. Company ships arrived

each year from London with supplies and loaded cargoes of lumber for the Sandwich Islands. The first of such cargoes was loaded on the Columbia River in 1833. In connection with this first cargo occurred an interesting thing. When the clerk asked John McLoughlin whether he should use the term "fir" in making out the manifest, Mr. McLoughlin answered, "No, they do not know fir, but they do know pine, so call it 'Oregon Pine'." This was the origin of the term Oregon Pine which has stood the evolution of our nomenclature until recent years.

In 1864 occurred the act which is responsible for the present condition of the lumber industry as well as being the cause of its nature of development. This act was the signing by President Lincoln of the land grant to the Northern Pacific, which marked an era of unequalled development in the Pacific Northwest. The results of this grant along with following grants to the Southern Pacific, and paternalistic land laws, the most important of which was the "Timber and Stone Act of 1879," and the Lien Land laws of 1897, were of two different natures, one a concentration in timber ownership coupled with erratic speculation in timber lands; the other the opening of new markets for Northwest timber besides that by water routes up and down the coast and foreign markets.

Concentration of ownership resulted in the following conditions which took place in the late 19th and

early 20th centuries, and reached its peak in 1907 and 1910. In the Northwest twenty owners of five billion feet or more each controlled, all told, four hundred thirty-six billion; one hundred thirty-one owners of one billion feet or more controlled six hundred sixty-four billion feet, and three hundred thirteen owners of two hundred fifty million feet or more held together seven hundred fifty-seven billion feet. About one-third of the private timber in the Northwest was held by eight holders. The three largest of these holders up until the recent decision of the supreme court in regard to "O & C Grants" were the Southern Pacific Railroad Company with a holding of one hundred five billion feet, The Weyerhaeuser Timber Company with a holding of ninety-six billion feet, and the Northern Pacific Railroad Company with a holding of thirty-six billion feet. Eighty per cent of the Weyerhaeuser timber was bought from the Northern Pacific Company at extremely low rates. For example, in 1900 the Weyerhaeuser Company bought a block of 900,000 acres from the Northern Pacific Company for \$6.00 per acre.

The twenty years prior to 1908 and particularly from 1900 to 1908 was the heyday of timber in the Pacific Northwest. During this period there was a rush of entrymen to the public lands, not to settle them, but to acquire salable claims. Millions of acres were patented from the Government. The agents of eastern investors were busy

blocking up holdings. Trading was active and many men made fortunes by buying and selling stumpage. This all resulted in 23.5% of the timber being controlled in the Pacific Northwest by the above mentioned three corporations or one-half of all the privately owned timber being controlled by thirty-eight holders.

Perhaps the most conspicuous aid to the development of the Northwest lumber market after the completion of the Northern Pacific was the establishing of a forty-cent freight rate by Hill, owner of these lines, from the Pacific Northwest to the "Twin Cities". This rate was based on actual cost of returning empty cars from the Northwest. If lumber had not been returned, the railroad company would have had to draw empty cars East. This "key" rate in combination with a ten-cent rate from the "Twin Cities" to Chicago, coupled with a thirty-cent rate from Chicago made a seventy-cent rate to the Atlantic sea coast. By this rate the first entrance was made into coast-to-coast rate structure and the national identity established for the Northwest. Evidence of the influence this forty-cent rate had on the industry is revealed by the records of 1910 which establish Washington first in lumber production and Oregon fourth. But with the view of additional markets in sight came the realization that the Pacific Northwest could not compete with the Eastern producers located nearer the centers of population because of freight rates, which

up to 1920 advanced as follows: in 1907 the rate was increased five cents from the "Twin Cities" east; in 1918 occurred the railroad administrations, additional five cents advance; followed in 1920 by the Interstate Commerce Commission's decision handed down in the "Ex Parte '76" to increase Chicago rates one-third, advancing the Chicago rate eighty cents. During the period immediately following the last big advance in freight rates, the outlook of the lumber industry for this section of the country was across a sea of troubles with no sail of rescue in sight. After eighteen years of struggle for a market, during which time the Eastern frontier wavered first at the Missouri River, then the Mississippi, with Chicago a goal, at first seemingly impossible of realization, but gradually responding, Pacific Coast products, new and untried in the markets beyond; every eastern thrust contested strongly by the southern pine competition, through the disparity brought about in freight rate advances and finally a complete defeat in the struggle. The Atlantic Coast up to the last big raise in freight rates had responded to the upper grades of lumber from the Northwest despite competition but the last raise destroyed that market. However, in 1921 a slight deflation was obtained in freight rates. The Chicago rate was reduced to seventy-two cents and the New York rate to ninety cents.

The Panama Canal did not reveal its value in the Pacific Northwest lumber industry until 1920 when the

increased railroad rates to eastern markets forced a disclosure of its value. In 1920 fifty million feet moved via the Panaman Canal. The following year two hundred million feet and at present there is over a billion feet passing eastward through the Panama Canal.

About this time there developed another factor which prevented the lumber industry in the Northwest from going to pieces. That was the increasing demand again from California due to the astounding rise of the city of Los Angeles. California had consumed approximately one billion feet annually up to 1920. In 1922 over two billion feet was shipped to California just one hundred years after the first redwoods had been cut opposite the Presidio on San Francisco Bay and towed in rafts to that settlement for the building of homes. A striking example of the rapid development of the Pacific Coast.

The export trade developed rapidly from the Hudson Bay Company exports until in the last thirty years Oregon and Washington have shipped by water in the domestic and foreign trade in excess of forty billion feet of lumber. The trade lanes include London, Liverpool, Australia, Hawaiian Islands, India, South Africa, South Seal Islands, the West Coast of South America, China, and Japan.

One of the outstanding movements in the Pacific Northwest was the establishing of the Douglas Fir Exploitation and Export Company in 1916. In the beginning none but

saltwater mills entered the institution but in seven years of its existence the membership grew to include one hundred eight mills. Today any mill within one hundred miles of a Pacific Northwest Port can export lumber through this organization. The result of this company was to establish export prices and provide markets for export lumber.

To the geographical handicap of the Pacific Northwest lumber industry was added in 1917 the eight-hour day which caused an increase in production costs of twenty cents. Likewise, there occurred about this time a reduction in per capita consumption in the United States from 512 to 312 board feet annually.

In 1920 was started the West Coast Forest Product Bureau sponsored by lumbermen of this district. The purpose of this bureau was market extension. In connection with this it carried on a survey of the properties of the western woods, which resulted very favorably in about every instance. Hemlock, for example, thought to have no value, was found to be a valuable wood and as a result commands its place as an important timber tree of the United States and the title of "Cypress of the West."

II. CHARACTERISTICS OF NORTHWEST LUMBER INDUSTRY AS COMPARED TO OTHER LUMBERING REGIONS.

Quite generally in other lumber regions the lumber manufacturer owns and logs his own stumpage; all intermediate functions from stump to car being done by one organization. In the Pacific Northwest this condition is not generally the case because as stated before, in the early development of the country there was attracted the speculator who foresaw large profits in the rise in value of the vast forests of this region and who did not wish to log or manufacture.

In the State of Oregon and Washington west of the Cascades there are 30,000 owners of stumpage and but 699 loggers and 1535 sawmills. Likewise, there are many so-called commercial loggers who have no manufacturing affiliations. In fact, between 40% and 45% of lumber manufactured in Oregon and Washington is from the commercial log. From this is seen that there are a large number of sawmills who neither own timber nor engage in logging activities.

III. STUMPAGE IN GENERAL

The word "stumpage" is a term used to express all kinds of timber standing in the tree, but it covers at the same time so many different kinds and qualities of wood that it is impossible to give a definite fixed value to the word. In general it means standing timber. In order to discuss the subject "Economic Factors Affecting Stumpage Prices" it is necessary to combine with it many other features and conditions that directly or remotely have heretofore or will in the future affect the value of stumpage.

Conditions affecting stumpage price is somewhat different from those affecting the price of lumber. Stumpage is held as a permanent investment or a reserve asset, while lumber is a commodity that is immediately and constantly affected by the law of supply and demand.

The great bulk of the timber acquired by patentees from the government and the first purchasers of state and railroad grant lands was obtained for from three to twenty-five cents per thousand board feet. With the development of lumbering, the construction of railroads, expanding markets and the influence of eastern conceptions of timber values, the rise in stumpage was very rapid. During the eighties the prevailing price of stumpage in Washington was not over fifteen cents per thousand feet. Between 1898 and 1908 prices trebled. A stand of eight million feet was bought in 1891 for \$800.00 or for 10 cents

per thousand feet. In 1909 the same tract was sold for \$18,500 or for \$2.31 per thousand feet. As late as 1903 a stand of 472 million feet was purchased at 12.9 cents per thousand. In 1907 fifty-nine cents per thousand was offered for the entire tract.

High prices for stumpage have followed civilization and the development of other resources--not preceded them. The pioneer stumpage buyer, who had foresight enough to open the trail to new and unexplored regions was the one to secure for himself and his followers the benefit of minimum stumpage, and the development of the lumber industry has followed his wake, as the exhausted supply in one locality changed the base of operation to a more undeveloped territory. Such conditions do not exist today to any extent for practically the entire timber area of the United States has been reached by rail or water transportation, thus making available the stumpage of almost every locality and more generally creating uniform values and at the same time equalizing the price to a greater extent than ever before. This condition has cheapened stumpage. The stumpage from which the lumber produced today is cut is cheaper in value than the stumpage from which lumber was cut forty years ago. Then the lumber producing area was largely confined to the white pine territory, where stumpage was selling at from \$4.00 to \$7.00 per thousand, while now the average price for stumpage will not exceed \$4.00 per thous-

and, although it will vary in price according to quality, locality, scarcity and availability for shipment from fifty cents to \$20.00 per thousand.

CONCENTRATION OF TIMBER HOLDING AND STUMPAGE PRICES

Concentration in the west is due to unwise public land legislation according to the report of the Bureau of Corporations. Regardless of what might be the cause of concentration, it exists and in so doing affects the price of stumpage in an upward direction.

The question has been raised by Compton in his book entitled "The Organization of the Lumber Industry," What Determines the Prices of Standing Timber in all Lumber Manufacturing Regions of the United States? He answers this by saying, "Ultimately the anticipated prices of the lumber to be cut from the stumpage. This price in turn has been objectively limited by the competition of lumber from other sources." "Prices" as first used may be assumed to mean current market prices. The anticipated prices may be assumed to mean market value of stumpage anticipated for future supply by the owners of timber, which discounted to the present, determines, under the qualifications of financial ability to withhold from current manufacture, their subjective timber prices. These prices are not market prices and have not been influenced in the least but by timber from other sources, except as the

owners forecast of the future is limited by present competition. The market value of timber is determined on the seller's side by the subjective value of all the timber owners which in turn are affected by two principal considerations, (1) a forecast of the future market by an analysis of the probable subjective valuations of future timber owners and lumber consumers, (2) financial ability to withhold the timber from the consuming market.

Scarcity of supply, however caused, whether by man's withholding or by nature's lack of proper supply or by destructive ways is of the same general character, namely, an insufficient available amount to supply all wants regardless of money and without prices; and it exerts an upward pressure on market prices. Any timber that, converted into lumber under existing conditions and marketed at current prices, would pay manufacturing and selling expenses, and competitive profits, is physically available and a part of the total effective supply, and exerts an influence on price by affecting the subjective valuations of buyers and sellers of timber. Any timber which is not thus immediately available but which through physical growth or changed conditions of manufacturing, distribution or market, may become available, forms a part of the potential supply and as such affects market price through its influence on the subjective valuations of owners and speculative buyers of timber.

The withholding of any available timber from the mill restricts the amount of lumber offered at a given price, tending to increase the current price of lumber and so affecting upward the subjective valuations of all available timber. It is an influence working in the same general direction as destruction of timber by fire only in this case the timber's existence, even though withheld, makes subjective valuations of the owners of other timber lower than they would be if the timber were destroyed.

The statement which is often made that as long as enough timber is on the market to meet the demand, the concentration with resultant withholding does not affect the price of stumpage, is fallacious. Price is the resultant of total demand expressed by a scale of the subjective valuations of all demanders, and total supply expressed by a scale of subjective valuations of all suppliers. Concentration of itself, however great, does not cause higher stumpage prices. It is only as it affects withholdings that it becomes a price determining factor. So long as the subjective valuations of the owners of such concentrated interests rests on the hypothesis of a free market in the future, the influence thus exerted on present prices will be no different from, nor greater than that exerted by many small holders whose holdings in the aggregate are equal in amount, whose financial ability is proportionately as great, and whose subjective valuations are similarly based.

But, when, as is likely to be the case at once, concentration increases the subjective valuations of the owners of such interest, as well as those of others to an amount equal to the present worth of near-future monopoly prices, present market prices will be increased. Then concentration becomes not only a potential factor in future monopoly prices, but an actual factor towards present higher prices.*

TRANSPORTATION AND STUMPAGE PRICES

One of the outstanding and most important factors determining the price of stumpage is the cost of hauling the logs to the mill and the cost of carrying the lumber from the mill to the market. To illustrate, take two such unlike soft woods as second growth white pine and virgin redwood. The percentages of grades obtained from each would be as follows:

<u>Grades of Lumber</u>	<u>Redwood</u>	<u>Pine</u>
Wide clear lumber	15	0
Shop lumber	20	5
Common lumber	25	10
Box boards lumber	40	85

Nevertheless, the average sale value for both at the mill has been about \$30.00 per thousand for the log run,

*Extract from "Determinants of lumber prices". American Economic Review. Vol. VII. By George Stevens.

with redwood averaging not more than 20% higher than the pine. In the same way the logging costs did not vary greatly. Before the war \$3.00 per thousand would have covered all costs from stump to mill pond in either case. Milling has been slightly higher in the case of redwood because some of it was planed but \$10.00 was a safe figure for the total cost of the finished lumber in California or New England. Consequently, there would remain a margin of \$20.00--sale value \$30.00 less cost of \$10.00--to cover freight charges and stumpage price. In the case of redwood even pre-war freight charges took fully three-quarters of this margin of \$20.00 while one-quarter was ample amount to cover freight charges on white pine. Hence the stumpage price of redwood has never been over \$5.00 per thousand while that of second growth white pine has already gone over \$10.00 per thousand in the case of accessible tracts.

Distance from market determines stumpage prices more effectively than does use or value of the wood. This is demonstrated by the above example and can be demonstrated to a more striking degree in the case of the valuable hardwoods of the tropic. Bringing fancy prices at the wholesale markets in the form of boards or hewn logs, the trees themselves are worth less than \$1.00 a thousand in the woods.

Another way transportation rates affect stumpage prices is as follows: suppose that lumber rates should be lowered generally and relatively alike all over the country.

The immediate effect would be an increase in manufacturing profits which in turn would cause an influx of capital into the industry or an enlargement of old firms to take advantage of this increased profit, an increase in output, and an enlarged demand for stumpage. This greater demand for stumpage would raise the value of stumpage and an increase in stumpage value would cause a competition for the lumber market with a decline in lumber prices. The margin of decline in rates appearing first as a manufacturer's profit would tend to be divided between lumber buyers in lower lumber prices and timber sellers in higher stumpage prices. If the elasticity of the buyers' demand for lumber were very high and that of the sellers' of supplying stumpage (which would be equivalent to his demand for returns on his stumpage) were low, this margin might go almost wholly to the stumpage seller in higher prices for stumpage. For example, assume these conditions: \$2.00 per thousand the price of stumpage; \$10.00 per thousand the manufacturer's sale price of lumber at destination, at which there is a demand of one thousand board feet; \$.25 per thousand reduction in rates. Then under high elasticity of demand for lumber and low elasticity of supply of stumpage a reduction of \$.05 per thousand might increase the demand for lumber by a thousand to call forth the requisite stumpage for which an increase in the price of stumpage of \$.20 per thousand might be required.

COMPETITION WITH OTHER REGIONS AND STUMPAGE PRICES.

Current prices of timber, for utilization in current lumber manufacturing cannot rise above a price that will enable the lumber so produced to compete in the common markets with lumber that has been manufactured in regions where timber is not so high. Current prices, in any region of stumpage for current use, are therefore limited by the prices of stumpage in every other competing region. As long, therefore, as West Coast manufacturers have continued to produce fir lumber and have continued to compete in mid-western markets with southern pine, the price of fir timber has not risen beyond a point imposed as a maximum by the competition of other species.

There remains, however, below this maximum price, a range of possible prices for fir standing timber. In the Pacific Northwest the demand for timber for speculative holding has tended to hold fir stumpage prices to the maximum. No amount of speculative demand can, however, be said to have raised stumpage prices above such maximum. For if this had been true, it is obvious that the manufacture of fir lumber for sale in competitive markets would have ceased since by hypothesis, fir would have been unable to compete with southern and northern pine. Hence the demand for fir timber for current manufacture would have almost ceased. This is, however, contrary to known facts.

SUBSTITUTIONS AND STUMPAGE PRICES

It is evident that iron, steel, and concrete construction are rapidly taking the place of lumber for many purposes and properly so, but this does not mean cheaper lumber or corresponding cheaper stumpage as might be expected, for if the supply is regulated to the demand as it ultimately must be, such will not be the case. The cost of iron and steel will increase as time goes on. Available iron ore does not exist in unlimited quantities. There are more thousand board feet of stumpage in sight than there are tons of high grade ore, so the rocks and clay seem to be the only unlimited supply of building material from which we draw.

In Germany where fireproof construction is obligatory for all kinds of building and where reforestation is practiced to a greater extent perhaps than in any other country, they have stumpage prices in the woods that would make our timber owners happy. The average cost of stumpage in Germany is as follows:

Shortleaf pine	\$23.00 per thousand
Spruce	\$25.00 per thousand
Beach	\$26.00 per thousand
Oak	\$80.00 per thousand

To these stumpage prices must be added the cost of logging and transportation and manufacture, showing that substitution of fireproof materials for wood does not

cheapen the price of lumber or reforested stumpage, let alone natural grown stumpage.

There are many other substitutes for wood beside constructional material but due to the continual reduction of available supply of virgin timber, there is no reason to believe that the price of lumber will drop from its normal and consequently stumpage prices go down. It is more reasonable to believe that the opposite condition will occur.

UTILIZATION OF BY-PRODUCTS

It has not been until the last few years that the closer utilization of our timber has been given any thought and there is still a vast amount of waste. In most logging camps fully 25% of the tree is wasted. Lumbermen have been slow to change their methods from simply sawing wood to the larger plan of combining by-products with their operation. It was not so very long ago that kerosene was the chief product of petroleum while today it is only one of the many products from the raw material. A comparatively short time ago cotton seed was considered a waste product and not even considered a good fertilizer. Today it is one of the valuable food products for man and beast. Thus combination of sawmills with by-products plants will, if given a part of the thought and attention now devoted to lumber alone, proportionately increase the value of stumpage by converting into a valuable product the portions

of the tree that are wasted in the woods or destroyed at expense in the sawmill. This thoughtless wasting has taken place because of the low price of stumpage to draw from in the new sections of the country; but now the end of the timber domain has been reached, the circle from New England to New York State, then to Michigan, Wisconsin and Minnesota, the southern states, then over the mountains to the last great stand in the Northwest, has been made. If a study and practice of the most efficient methods of utilization is installed in the Northwest, an added profit can be had in the remaining standing timber, equal if not greater than that obtained in the past.

TIMBER LAND TAXATION AND STUMPAGE PRICES

Taxation as now practiced in the Northwest has had and will have, unless altered, a pertinent bearing on stumpage values. As taxes are now assessed against timberlands, they become a part of the stumpage cost and are so treated by the owner and charged with compound interest annually added. Therefore, if one holds a tract of timber for twenty years, he adds twenty years' taxes and nineteen years' compound interest to the original stumpage price which the consumer eventually pays. This factor becomes more serious when it is realized that during the last fifteen years taxes on timber lands in the West have increased from 100% to 500%.

TRADE AND ASSOCIATION ACTIVITIES ON STUMPAGE

As far as lumber prices are concerned, trade associations have had little effect upon raising or lowering stumpage prices although claims are made to the contrary. The West Coast manufacturers have claimed in the past, in 1904 for example, that they made \$10,000,000.00 more by organization than if in a disorganized state. This was obtained at a cost of \$23,000.00. However, statistics show that in 1904 despite the activities of the association, fir prices declined 26.4 per cent.

It cannot be entirely assumed, however, from such data that trade associations do not affect lumber prices and consequently timber prices for if it were not for such trade activities as the West Coast Forest Products Bureau, western hemlock would still be considered of little value and consequently have practically no stumpage value as it did before the activities of this bureau brought out its value and consequently a rapid rise in the value of western hemlock stumpage. From this fact can be seen that research may play an important role in controlling the stumpage prices of timber. It might be quite permissible to assume that continued research and closer utilization may raise materially the value of such stumpage as lodgepole pine, and white fir stumpage or even fir and pine stumpage.

REFORESTATION ON STUMPAGE PRICES

No matter how soon reforestation is taken up in the Pacific Northwest it will take from 300 to 2000 years to obtain the present growth of fir, cedar, pine and redwood. Sixty years is the minimum length of time to grow any of these species for lumber. To plant and cultivate a forest for this period with accumulating taxes and interest on investment will cost from \$15 to \$20 per thousand board feet stumpage and the yield will be chiefly a coarse-grained lumber. When sixty years is gone beyond for harvesting the crop it becomes practically an economic impossibility. No matter how soon we begin, or to what extent we replant, the original old growth forests now remaining contain the only large sized high-grade timber that will be available for ages to come. Extravagant waste may continue until the lumbermen themselves, as there is some indication at present, or the public in general, realize these facts and regulate production accordingly, but cheap stumpage cannot be produced by any known process of planting. It is sane to say, therefore, that reforestation means higher stumpage values and the closer the Pacific Northwest gets to a period of reforestation the higher will be stumpage prices.

CONCLUSIONS

For the last one hundred years stumpage prices have been increasing the world over. In some places, namely, Germany, and other European countries, they have

remained constant for some time due to the fact that the maximum amount which stumpage will bring has been reached in those countries. This maximum amount is the cost of producing stumpage. Already in parts of the United States this maximum price for stumpage has been reached as statistics show. Accessible hardwood cordwood in the East brings \$6.00 per thousand and it is estimated that it costs \$6.00 per thousand to produce twenty-five year old cordwood. White-pine box board is selling for \$8.00 per thousand and costs as much to reproduce. So far the supply of large virgin timber has been great enough to supply the demand for high grade lumber at much less than it will cost to grow. Or, in other words, our stumpage prices for cordwood and the lower grades of lumber have already gone about as high as they will in the older settled parts of the country. Therefore, in predicting the future of stumpage prices in the Northwest it is correct to assume that stumpage prices will increase until the great virgin stands have been removed when they will be represented by the cost of reproducing sixty-year-old stock and when this stabilized condition is reached they will remain practically constant, varying only as necessary to meet changes in labor and equipment essential to reproducing forests.

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