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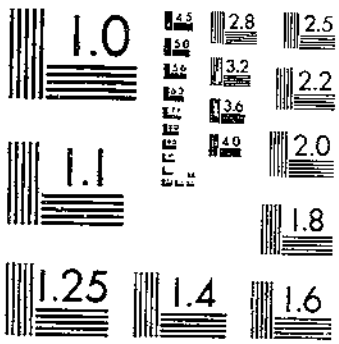

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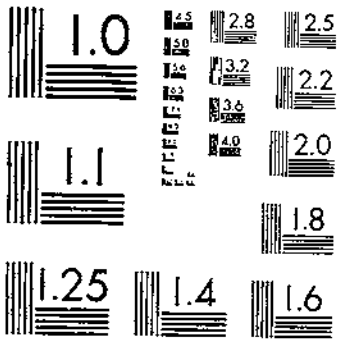

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TECHNICAL BULLETIN No. 626 JULY 1938

STUMPAGE PRICES OF PRIVATELY OWNED TIMBER IN THE UNITED STATES

By

HENRY B. STEER

Senior Forest Economist
Division of Forest Economics
Forest Service

UNITED STATES DEPARTMENT OF AGRICULTURE, WASHINGTON, D. C.

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CONTENTS

INTRODUCTION

PURPOSE OF THE INVESTIGATION

A record of the prices which have been actually paid for privately owned standing timber, properly compiled and analyzed for a number of years, forms an important index in measuring the stability and intrinsic value of forests as financial investments. Relative prices, or the relation of stumpage prices to prices of other commodities, are of equal importance with the absolute prices at which standing timber

[1] Received for publication November 20, 1937.

[2] The material presented in this bulletin was offered to the Graduate Board of American University, Washington, D. C., in partial fulfillment of the requirements for the degree of Doctor of Philosophy.

has been sold. The price paid for standing timber is an important element in the production cost of lumber and other wood products. For this reason stumpage-price data are of interest and value to wood-producing and wood-using industries. They are essential to other forest economic investigations and influence the formulation and development of national, State, and private forest programs and land-use planning.

The purpose of this investigation was threefold: (1) To compile and classify all available records of prices paid for privately owned standing timber; (2) to develop price trends for the more important commercial species in the largest timber-producing regions; and (3) to compare the price trends developed with those of other basic products of the soil and with the record of general commodity prices.

The use of land for the production of crops of timber differs in a material way from that for the production of common agricultural crops, in that forestry is relatively a long-time proposition. No one can forecast economic conditions half a century in advance any more correctly than he can predict the future political situation. Nevertheless, the record of past stumpage prices and of their relative stability as compared with prices of other basic raw materials and commodities is the best indication of the relative position of future stumpage prices. With the record of past prices carefully classified and compiled as a basis, it is possible that future price trends may be predicted in a general way.

Although stumpage prices, present and expected, are undoubtedly the best index of the attractiveness of forests as a financial investment and exercise a tremendous influence upon the private ownership of forest land and policies of management, the tangible asset represented by the value of timber crops is often considerably less than other assets resulting from the wise use of this resource. Many forest areas are of less importance for their capacity to produce timber crops than for their functions in stream-flow and erosion control, recreation, and game protection. Stumpage prices are undoubtedly the best index of the attractiveness of forests as financial investments, and exercise a tremendous influence upon the private ownership of forest land and policies of management.

EXTENT AND IMPORTANCE OF FORESTS IN THE UNITED STATES

It may be well to give a general idea of (1) the amount of forest land in the United States, (2) the importance of forests in the national economy, (3) the industries dependent on forests, and (4) the necessity for the proper utilization of forest land. It has been estimated that some 820 million acres in the United States were originally in forests. A recent carefully prepared estimate (*53*)[1] gives the total present forest area of the United States as 615 million acres, of which 495 million acres are classified as capable of producing timber of commercial quantity and quality under present or reasonably conceivable future conditions. The total land area of the continental United States (excluding Alaska) is divided by major economic uses as follows:

[1] Italic numbers in parentheses refer to the Bibliography, p. 166.

Classes of land	Million acres
Forest land:	
Commercial	495
Noncommercial	120
Total	615
Cropland in farms	413
Pasture and range:	
In farms	379
Not in farms	317
Total	696
Farmsteads, roads, urban, waste, etc	179
Total land area	1,903

Of the 495 million acres of commercial forest land, it has been estimated that about 130 million acres are in farm woodlands. Recent economic developments reveal the esixtence of large areas of submarginal farm-crop and grazing land which are best adapted to the growth of timber. The indication is that the area of forest land given should be increased by several million acres and the area of farm land correspondingly decreased.

The importance of timber as a farm product is not commonly realized. In the 12 Southern States, for example, forest products brought more than $82,000,000 in cash income to farmers in 1930, ranking second among farm income producers in Alabama, Mississippi, and Arkansas, and third in Georgia, North Carolina, South Carolina, and Tennessee. For the 12 States combined, forest products ranked fourth as a source of cash income, the order being cotton, tobacco, potatoes, and forest crops. Nor is this the whole story. The value of forest products to the farmer is measured only in part by the money received when some of them are sold directly. All the wood the farmer uses for fencing, farm building, and for special purposes such as the curing of tobacco, or for fuel, is a contribution to the expenses of running the farm (*51*) or to the support of his household.

In 1929, approximately 1,500,000 persons were afforded full-time employment or its equivalent in forest work. The forest industries had a predepression capital value, including forests, estimated at $10,000,000,000, and gross products prior to 1929 averaged $2,000,000,000 per year. The above data do not include the merchandising of forest products and services to forest-products industries. Neither do they include industries dependent upon forest water, forest ranges, forest wildlife and recreation, and minor products and services. For all of these, large additional values could be added (*53*).

Although the production of timber is the most tangible benefit of forests in that the value of wood products may be easily measured in monetary terms, it should not be assumed that the practice of forestry consists solely of the production of timber crops or rates as a successful or unsuccessful venture according to whether or not timber crops can be produced at a profit. It is true that forest products occupy a very important place in industry and in our national life. Nevertheless, even in the case of forests maintained primarily for the production of raw wood, the money realized from the sale of the standing timber is not nearly so important in the economic life of communities

as are the wages paid labor in producing, harvesting, and manufacturing the timber. The wood-using industries and pay rolls are community assets also in that they keep on the tax rolls the forest property itself, the industrial plants dependent on forest raw materials, and the homes and property of those engaged in the industry.

SOURCES OF DATA AND METHOD OF COMPILING

The stumpage-price data presented in this bulletin for the period subsequent to 1900 refer exclusively to privately owned timber, do not include sales of national forest, Indian Service, or State timber, and have been obtained from a variety of sources. The most important of these data were obtained through a cooperative agreement between the Forest Service of the Department of Agriculture and the Bureau of the Census of the Department of Commerce, whereby Forest Service forms for the reporting of sales and purchases of standing timber and logs are mailed annually by the Bureau of the Census to all lumber-manufacturing plants in connection with the census of manufactures. This agreement has been in effect since 1923, in which year two report forms were mailed, one covering the year 1923 and the other the period 1900 to 1922, inclusive, with the request that the form for the longer period be filled out as completely as records would permit.

Other sources include voluminous records of sales of standing timber obtained from the files of the Bureau of Internal Revenue;[4] unpublished reports of the Forest Service, particularly the results of individual investigations in the South and the far West and the results of unpublished special country-wide investigations;[5] data published in decennial reports of the Bureau of the Census (1890–1920); unpublished reports of investigations conducted by regional offices of the Forest Service; published and unpublished reports of individual and private investigations; data collected by the Chicago office of the Forest Service, which was maintained for a few years prior to the World War; and finally from every other source having anything to do with stumpage and log prices which could be located in libraries or in Forest Service records.

Sales of stumpage have been classified into two main groups as follows: (1) Individual sales, which include sales of only one or of several species where each was sold at an individual price; and (2) flat-rate sales, in which two or more species were grouped together and sold for a lump sum or at a uniform rate per thousand feet. In compiling flat-rate sales no accounting has been made of the different species involved, since the price paid for each could not be definitely or satisfactorily determined. Flat-rate and individual sales have been combined, however, into national and regional averages for softwoods, hardwoods, and all species. These total averages indicate the average selling price of all species of standing timber in the country as a whole and in the several regions.

Although it has been necessary to make certain combinations of data by hand, in the main they were coded by use of a numerical code, punched on cards, and tabulated by tabulating-machine operators. The major sorts in the tabulations have been for species and type of

[4] Handled in such a manner that the identity of reporting concerns was not disclosed.

[5] PIERSON, A. H. STUMPAGE VALUES IN 1907. U. S. Forest Serv. Rept. 191 pp. 1908. Unpublished. SMITH, F. H. STUMPAGE VALUES IN 1912. U. S. Forest Serv. Rept. 1913. Unpublished.

sale, growth (virgin, second, or mixed), State, region, and the entire country.

Average prices have been computed from the total quantity and value data given on the machine tabulations; and tables, graphs, and charts have been prepared from the computations.

The stumpage-price data presented are based, for the period 1900–1934, on well over 50,000 transactions involving nearly 500 billion feet of timber which was sold for a total of nearly 1½ billion dollars. The proper classification and accurate compilation of this large mass of material were made more difficult because of the great variety of common names used by cooperators and also because of the necessity of carefully examining each report for completeness, consistency, and accuracy. Every possible means has been used for checking the original reports and the accuracy of compilation, tabulations, charts, and graphs.

NATURE AND DIFFICULTIES OF THE PROBLEM

STUMPAGE PRICES

Definitions

The term "stumpage" is most commonly used to designate a quantity of standing timber, but is frequently used also with reference to a quantity of timber that has been cut. "Jones owns 600 million feet of stumpage." "Smith logged over 4 million feet of stumpage last winter." It is also commonly used to express the price paid for standing timber. "How much stumpage is Brown paying?" Its most common use in this latter connection, however, is with the words "price" and "value."

As used in this bulletin, stumpage price may be defined as the monetary consideration for which the ownership of standing timber changed hands. All are weighted-average prices; that is, they have been weighted by the quantities involved.

In the big majority of timber sales of which a record has been obtained, both land and timber were sold. In the present study no deduction for the value of the land has been made from the price paid for land and timber, but all of the purchase price has been credited to the timber. This has been done for two reasons. In the first place, it is a matter of common knowledge that most privately owned cut-over land, in the condition in which it has usually been left after logging, has not been regarded as an asset but as a liability, and has not been considered worth the taxes. This estimate is borne out by studies by the regional forest experiment stations of the extent of tax delinquency, abandonment, and reversion to public ownership of cut-over forest land in the South, in the Lake region, and in the Pacific Northwest (*53*).[6] The examination of available records, the personal experience of the writer, and the judgment of many men having a first-hand knowledge of past timber sales all clearly indicate that, in the principal forest regions at least, forest land as such has not been considered as having any value. Only in a few exceptional cases was any real value attached to the

[6] CRAIG, R. B. THE EXTENT OF TAX DEFAULT IN THE GULF STATES IN 1934. U. S. Forest Serv., South. Forest Expt. Sta. Occas. Papers 40, 21 pp., illus. 1935. [Multigraphed.]
WILSON, S. A. FACTS BEARING UPON INSTABILITY OF FOREST LAND OWNERSHIP IN WESTERN OREGON. Pacific Northwest Forest Expt. Sta. 77 pp. 1934. [Mimeographed.]
——— FACTS BEARING UPON INSTABILITY OF FOREST LAND OWNERSHIP IN WESTERN WASHINGTON. Pacific Northwest Forest Expt. Sta. 76 pp. 1934. [Mimeographed.]

land in original sales of land and timber; and only in New England and to a limited extent in the Central and Southern Pine regions has timber alone been commonly sold, the original owner retaining the land.

In the second place, although information concerning the value of the land was requested from reporting concerns and individuals and a figure obtained in a large number of instances, the use of the land values as reported and their deduction from the total purchase price would have resulted in inaccuracies. Many purchasers reported the land as having no value at all. Where values were given they were purely arbitrary estimates based on the judgment of the person making the report and not on actual sales of the land itself. These estimates naturally varied for similar tracts in the same locality.

It should perhaps be stated that an examination of reports for recent years indicates that the practice of selling all or a part of the timber and retaining the land is increasing, although not to any great extent. There is, however, a trend in this direction.

USUAL METHOD OF DETERMINATION

The price paid for standing timber depends primarily on the quantity available in relation to the existing demand. Theoretically it is determined by a number of factors and conditions, among which are the species, quality, size, and density of the timber; the quantity sold and whether for immediate or future cutting; the amount of other timber available and the competitive demand; the kind of product to be manufactured from it; the location with respect to manufacturing plants, transportation facilities, and markets; the cost of exploitation as determined by local conditions of topography and surface, labor, cost of equipment, and supplies, etc.; the form of sale (lump sum, flat rate per thousand feet, specific rate for different kinds of timber, etc.); the terms of sale, including provisions as to time and rate of payment, method of cutting, requirements as to fire protection, brush disposal, and utilization, and provisions regarding taxes; and finally the desire of the purchaser to buy and the seller to sell, and the knowledge of values on the part of each. From a practical standpoint, particularly so far as the individual owner is concerned, the demand for the timber or the amount of competition between purchasers, the knowledge of values on the part of both purchaser and seller, and the degree of necessity for selling, are the most important factors determining stumpage prices.

If an individual or company owning a body of timber of ample size and of sufficiently favorable location is adequately financed so that the timber can be held, a relatively independent position can be taken with regard to selling. A sawmill can be erected and the timber logged and manufactured if desired, or prospective purchasers can be dealt with independently. Under these circumstances the owners can refuse to sell for a price less than that which they believe they can realize by conducting their own logging and milling operations. The price set is apt to have a pretty definite relationship to the anticipated margin between the price of lumber and the cost of manufacturing and selling it. An excellent example of this type of ownership is afforded by the Weyerhaeuser holdings in the Pacific Northwest.

The owner of a small tract of timber is in an entirely different position. If the size of his holding is not large enough to warrant the building of a mill, he must sell his timber to realize anything from it. If this timber is relatively accessible so that several concerns can log it and there will be competition, he can, if he has business sagacity and is familiar with values, obtain a reasonably fair price. If, on the other hand, his timber is relatively inaccessible, or if it is located in a region where a single large company owns the surrounding timber, or if his timber is situated so that only one concern can log it economically, he is at the mercy of this one concern. Under such circumstances the small owner can either sell his timber at such a price as the one buyer in his locality thinks it expedient to pay, or he can keep it. The building of good roads and the development of the motortruck and tractor logging have changed this situation somewhat in some regions. It has become increasingly more practical for the small owner to log his own timber and market the logs rather than to sell his timber on the stump for someone else to log. The development of truck and tractor logging, through increasing the number of possible buyers for his products, has given the small owner, especially the farmer, the opportunity to get at least wages for logging the timber, in addition to the stumpage price.

One of the favorable characteristics of timber as a crop, which operates in favor of all timberland owners regardless of the size of their holdings, is that standing timber does not deteriorate rapidly nor do the uses of wood change greatly within a few years. The more common agricultural crops must usually be harvested and sold promptly upon maturity, but merchantable standing timber may, from a physical standpoint, be held uncut without serious deterioration for a decade or even more. If abnormal forced sales (a necessity that must be faced by holders of all forms of property) are left out of consideration, standing timber need not necessarily be sold during periods of economic depression when market conditions are generally unfavorable.

There has been a considerable falling off in the total quantity of stumpage reported sold in recent years although methods of obtaining sales data have been the same. In 1929 a total of 15,703,564 thousand feet of standing timber was reported sold. In 1930, 1931, 1932, 1933, and 1934 the volumes of standing timber reported sold were 46.20, 20.89, 11.76, 24.59, and 26.64 percent, respectively, of the 1929 volume. Probably there were as many owners of stumpage who desired to sell their timber in recent years as during the late 1920's but declined to do so in view of the low prices offered. As prices increase over the low level of 1931–33, it seems reasonable to expect that the volume of sales will also increase.

DIFFERENTIATION OF PRICE FROM VALUE

In the few articles, published and unpublished, that have been written on the subject of stumpage prices or stumpage values, no clear-cut line of demarcation has been drawn between these two terms. "Stumpage price" as used herein is the monetary consideration for which the ownership of standing timber changed hands.

The term "stumpage value" is not so easily defined. From a commercial viewpoint, standing timber cannot be said to have a positive stumpage value until the lumber or other products manufactured from it can be sold for more than the cost of manufacturing and selling the products. The commercial value of standing timber, in other words, depends upon the anticipation of profits to be made through manufacturing it, and is identical with price.

Price, however, simply designates the exchange value of a commodity or service in terms of money. It is not always possible to express all values in terms of money, for such expression can only be based upon a single conception of value—that is, value in exchange. No forester would agree that the evaluation of forests or of standing timber by a method predicated solely upon their value in exchange would be adequate, or would accurately express their full worth to individuals, to communities, or to the Nation. Such an expression would result in giving only the commercial value, and it is well established that forests have important uses—hence are of value—for purposes other than commercial exploitation.

A more adequate definition of stumpage value is the worth of the timber for certain specific uses, and such value cannot always be accurately expressed in dollars and cents. Standing timber is of value for the protection of watersheds and for retarding erosion, for ameliorating the extremes of climate and the effect of storms (shelterbelts), the shelter of game and livestock, and recreational and aesthetic purposes, as well as for the production of lumber and other commercial forest products. This bulletin is concerned solely with the value of standing timber for the production of commercial forest products. The theoretical market value of standing timber is the residue left when the total cost of manufacturing and marketing the forest products fabricated therefrom plus a reasonable margin of profit is subtracted from the total price received from the sale of the manufactured forest products. This is also called the "realization" stumpage value. National-forest stumpage is appraised on this basis. Thus stumpage realization values, theoretically at least, fluctuate up or down directly as does the selling price of the product and inversely as the costs of logging, manufacturing, and merchandising. Competition, however, has upset many an appraised price. The margin between the total cost of manufacturing and distributing forest products and the price received for them determine a limit beyond which the commercial value of standing timber cannot go, and beyond which stumpage prices cannot remain permanently.

The relationship between the fair market stumpage value of many tracts of timber and the price for which they have been sold has, during the period covered by this investigation, been so slight as to be practically negligible. Standing timber may be and frequently has been sold, as a result of keen competition or speculation, or because of particularly favorable location, for more than its anticipated or actual realization value. This has occurred not only with privately owned timber, but occasionally in sales of Government timber. On the other hand, where competition is entirely absent, stumpage prices, at least of privately owned timber, have often been only a fraction of the realization value. Stumpage value and stumpage price come closest to parity where the parties to the transaction are both lumbermen

in a position to exploit the timber or where the owner is financially able to hold the timber until he obtains what he considers a fair price.

Commercial stumpage value has on occasion been defined as the value fixed by the ruling, or current, market price. This, however, is fallacious. No definite ruling or current stumpage value can be established for standing timber because of the greatly diversified physical conditions affecting its exploitation and the great variation in the intrinsic value of the different species, and, indeed, between the same species in different localities. It very frequently happens, however, that a current market price is established by timber buyers for a species or for several species in a given region or locality, which is not determined by the realization value and has no definite relation thereto.

The value of standing timber as appraised by the owner and by the prospective purchaser, and as distinct from what is implied in the term "stumpage value," may be very different. It is always the right of an individual to appraise or evaluate his own property regardless of any intent to sell. The owner's appraisal of his stumpage may be based on his actual investment plus carrying charges, on what he believes current conditions justify, or on what he believes he can get. The purchaser's appraisal, on the other hand, may be governed by the fact that he has all the timber he needs or by the need for additional stumpage to prolong the life of his operations. In any event, such appraisals are estimates, and as such are subject to and greatly influenced by the mental attitude of both purchaser or seller. Actual prices have been determined to some extent by the economic conditions obtaining at the time the timber was sold, but to a very much greater degree by the opinions which the parties to the transaction had with regard to the future. That this "by-guess-and-by-God" method of price determination has been as common as it is fallacious is well known. Stumpage prices should be determined by a careful consideration of returns and costs to the purchaser, and the total cost of the timber to the seller, equitably adjusted in the best interests of both.

In some cases, notably in some sales of national-forest timber, the stumpage price actually paid is the same as the computed or anticipated realization value. Competent forest valuation engineers can make a reasonably accurate estimate of the probable realization value of a body of timber. This calls for a thorough knowledge of average logging, milling, and selling costs and the adjustment of these average costs to fit the conditions under which a given body of timber must be exploited, as well as familiarity with the timber itself, particularly with the grades of lumber or other products that the timber will produce. The computed or realization stumpage value of a tract of timber arrived at before the timber is exploited is at best an approximation and is subject to revision after actual costs and sales are known. It is not possible to determine accurately the realization stumpage value of standing timber until after it has been logged and milled and the lumber or other products sold. Saw-milling has become fairly well standardized and costs can be estimated with a reasonable degree of accuracy for different types of sawmills. This is not so true of logging operations. Even if the type of logging technique and machinery best suited to a particular body of timber can be agreed upon, costs vary greatly in actual practice, for the output depends in large measure upon the ability, initiative, and drive of those directing and supervising the operation. In addition, such factors as prolonged periods of

unfavorable weather, floods, or other "acts of God" are important factors in causing a variation in the efficiency of logging operations.

Stumpage prices in the long run cannot be higher than the actual realization value. If they are higher, they adversely affect the purchaser; if lower they adversely affect the owner and grower of stumpage. Factitiously high stumpage prices may in part be passed on to the consumer, but not ad infinitum. This phase of the price structure is discussed later (pp. 17–21).

The commercial value of standing timber must in the last analysis be derived from the price received for manufactured forest products. Commercial value has in many instances in the past had little to do with the price at which virgin timber has been sold, because of the abundant supply. Although an owner of large tracts of virgin timber may occasionally be forced to liquidate under such price conditions as will enable him merely to break even, it is obvious that such operations or conditions cannot continue indefinitely. Value in use will govern and determine stumpage prices to an ever-increasing extent in the future, as the supply of virgin timber becomes less plentiful and as methods of logging, manufacturing, and distribution become standardized. No other criterion is possible.

METHODS OF SELLING TIMBER

Methods of selling timber vary greatly not only as between regions but in the same region, and have changed considerably in the period covered by this investigation. As a matter of broad principle, it can be stated that methods of selling privately owned timber have become more accurate as timber has increased in value. The principal tendency has been to estimate more carefully the volume of timber to be sold, and no longer to depend upon the rough guesses that sufficed when timber was plentiful and cheap.

Common methods of selling timber may be divided into two major groups: (1) Sales based on the estimated quantity of standing timber (or on a fixed price per acre, which amounts to the same thing); and (2) sales based on the amount of forest products actually obtained from the timber sold. Early timber sales were almost invariably made under the first plan. Sales of Forest Service timber are usually made under the second plan, which has also been adopted in recent years by some private corporations and individuals.

Sales of timber made on an estimated quantity may in turn be divided into two major types, depending on whether the timber only is sold or whether the sale includes both land and timber. The various subtypes of sales in these two major classes are the same for both and include sales made at a fixed price per acre, or at a fixed price per tree or per unit of measurement. The same rate may apply uniformly to all species, or different rates may be specified for different species. The most common practice in the past has been to sell standing timber for a flat rate by the lot, boundary, or tract for a lump sum. This practice is still common in sparsely settled and less accessible districts, but elsewhere the number of individual sales in which different prices are specified for the several species is constantly increasing. In sales of this character an attempt is made to take into consideration the different realization values of the several species.

The majority of sales of privately owned timber made in the past have been outright transfers of land and timber with no restrictions concerning the extent or method of cutting other than as provided by State laws. The usual practice has been to cut everything that had a sale value. In contrast to this, in sales of timber only, where the land is kept by the original owner, some form of cutting limitation is usually specified. The owner, for example, may sell only trees above a certain diameter and reserve the remainder to form a nucleus for subsequent cuttings. Sales of timber on agricultural land which the original owner intends to put into cultivation when cleared have been frequently made. In sales of this type, it would naturally be to the advantage of the owner to have the purchaser remove the maximum quantity of timber, thereby reducing the amount of clearing and burning to be done after the merchantable timber has been removed.

In certain parts of the country, more particularly in the Northwest, the practice of selling privately owned timber at fixed rates per unit of product (usually logs) is growing. The usual procedure is to stipulate fixed rates per thousand feet log scale, cord, shake, pole, or other unit of measurement, as shall be determined when the timber is cut. This is standard Forest Service practice. Sales of Forest Service timber on the estimate are made only in cases where the costs of administration under the usual method would be prohibitive, and are exceptional.

Another method introduced within recent years, and which has been successfully applied, is to sell standing timber for a percentage of the selling price of logs produced. This has been done, for example, in the Douglas fir region, particularly in the Puget Sound section of Washington where there is a recognized log-scaling and grading bureau. The stumpage price of Douglas fir, for instance, may be 30 percent of the selling price of peelers and No. 1 logs; 20 percent of the selling price of No. 2 logs; 10 percent of No. 3 logs; and 5 percent of cull logs.

DIFFICULTY IN DETERMINING UNIT PRICES OVER LONG PERIODS OF TIME

Because of the variation in methods of selling timber and the changing degree of accuracy of quantitative timber estimating during the period covered by this investigation, the average stumpage prices per thousand feet of timber as given herein are not as accurate as if the unit of measurement had been standard throughout the period. More or less continuous changes in the standards of merchantability of standing timber in the last 40 years have resulted in corresponding changes in the accuracy of quantitative estimates. Timber of small size and of the so-called inferior species, which as recently as 15 years ago would not have been considered merchantable, nor included in the timber estimate, nor logged, is now classed as merchantable and is estimated, sold, and logged.

Take, for example, a tract of timber of 1,000 acres containing a variety of species in an accessible part of the South. In 1900 the estimate of the volume of timber on this tract would probably have included only those portions of the more important species yielding high-grade lumber. In other words, not only would some species not have been considered at all, but only the best part of the more valuable species would have been included in the estimate and would have been

logged. If, however, the tract was not sold in 1900 but was offered for sale again in 1910, prospective buyers would find a larger quantity of timber than they did in 1900 in addition to growth increment, because some species would probably then be considered worth logging which were considered worthless in 1900, and a larger portion of the more valuable species would be taken. The relationship between 1920 and 1910, and 1930 and 1920, would be similar to that for 1910 and 1900. The increase in the total value of the timber on this hypothetical tract, as well as the total value of each species, would therefore be greater than the increase in the price per thousand feet would indicate.

Inferior hardwoods in the Northeast, aspen and jack pine in the Lakes region, hemlock in Pennsylvania, and certain hardwoods in the South and Appalachians (particularly gum and some varieties of oak) were at one time considered worthless weed trees. Many millions of feet of the finest quality of virgin hemlock in Pennsylvania were cut down, the bark removed for use in the tanning industry, and the logs left to rot in the woods. As, however, logging progressed, and timber became more valuable as it became less plentiful, the once worthless hemlock (from the standpoint of value for the production of lumber) was sold at prices as high as $10 a thousand feet on the stump. Forest industrial communities in the Lake region, which relatively a very few years ago used only the finest kind of white pine logs for raw material, are now dependent on jack pine and aspen, which were recently considered worthless.

Although these examples are probably outstanding, essentially similar price increases have occurred in the so-called inferior species in regions where supplies of virgin timber of the more valuable species are no longer plentiful, and inferior species which once were disregarded or given away have been included in the estimate.

It is also true that standards of merchantability have varied to a considerable extent with economic conditions. Western hemlock in the Douglas fir region of the Pacific Northwest offers a good example. Only the best part of the larger hemlock trees was ordinarily removed in the usual logging operation prior to the World War. Thus the price per thousand feet of hemlock as obtained from actual and reported stumpage sales during this period was based on only a relatively small portion of the best trees. During the World War and for a period of a few years thereafter, hemlock lumber, timbers, and logs could be sold at prices not only permitting the much closer utilization of hemlock where it occurred in mixed stands but making logging and milling operations in pure stands of hemlock profitable. This change in economic conditions resulted not only in an increased unit price of hemlock stumpage, but also in a larger total revenue from a given tract because of the larger volume of hemlock that could be economically removed. In other words, whereas in a given locality in the period before the war a thousand feet of hemlock timber at, say, $1 would represent enough stumpage to produce a thousand feet of the highest grade logs, a few years after the war it would represent only a thousand feet of woods-run logs of much lower average quality. This swing of the price pendulum has been followed by two more. The price of hemlock products greatly decreased after the early 1920's, with the result that it was again financially possible to remove only the best hemlock timber. But the recent development of the pulp

and paper industry in the Pacific Northwest has swung the pendulum the other way once more and made it possible to exploit stands of hemlock that have no realization value for lumber manufacture.

It can be seen that the story of stumpage price changes is not completely told by merely recording them. The unit of measurement, in the sense that it includes the same quality of timber, has not remained constant, but has varied with economic conditions, with the volume of timber available, and with changing standards of utilization. One effect of these conditions has been to decrease the actual price differentials during the period studied—the increases shown were actually greater, and the decreases actually less, for timber of the same quality.

DIFFERENCE BETWEEN PRICE RECORDS OF STANDING TIMBER, LOGS, LUMBER, AND OTHER BASIC RAW MATERIALS

In interpreting the data presented, it should also be remembered that although there are probably some instances where the same tract of timber has changed hands two or more times before being cut, it is not possible to base average yearly stumpage prices on sales of the same stands of timber. Not only have all the more important factors influencing stumpage prices varied and changed considerably in the past, as has been pointed out, but prices have been materially affected by the increasing inaccessibility and poorer quality of available timber, even though of the same species.

Units of measurement and standards of grade and quality have been much more constant and uniform with regard to other basic raw materials than has been the case with standing timber. If the fertility of the soil is not abused, agricultural crops of reasonably similar quality can be raised continuously on a given tract of land. Although the yearly price record of these products is not based on the same goods from year to year, it is based on goods which are identical to all intents and purposes, especially with regard to standards of quality and quantity, which have remained relatively constant. A record of the price of a given grade of an agricultural crop, or of oil, coal, or cement since 1900 is based on a more uniform qualitative and quantitative measure of the commodity than is a similar record of any species of timber.

The price record of standing timber is much less complete and accurate, generally speaking, than are the records of log and lumber prices, unsatisfactory though these may be in some respects. Many more variables enter into the determination of the price paid for standing timber than is the case with logs f. o. b. the mill, and this is bound to be reflected in trends of average prices in spite of the fact that log markets are for the most part unorganized and scattered. Logs are more easily graded and classified as to worth and value than is standing timber, and speculation does not enter into the picture to so great an extent. Standing timber may be bought as an investment or for speculative purposes in anticipation of higher prices in the future. Logs are generally purchased for immediate use, in fact they must be manufactured within a reasonable period or they will deteriorate.

Log prices are determined to a greater extent by current economic conditions, more particularly by the price of and demand for lumber and other manufactured forest products. The conditions under which

logs are sold are much more uniform than is the case with standing timber. Log prices vary with kind and quality, along with several other factors such as the competitive field existing and the distance to manufacturing plants. Despite considerable variation in method and accuracy of scaling [7] logs, it is certainly easier to determine the board-foot content and grade of logs than to estimate the volume and quality of standing timber.

Stumpage prices are also less dependable than lumber prices. Frequent changes in the specifications of the common grades of lumber have occurred, and very few long-time price records of specific grades by species have been kept. Such records as are in existence, however, are based on the same quantitative unit of measurement from year to year, and the qualitative standards also have been more nearly constant than has been true in the case of standing timber.

FACTORS INFLUENCING STUMPAGE PRICES

THE RELATIVE IMPORTANCE OF PHYSICAL FACTORS

The most common factors which, theoretically at least, influence the stumpage price of specific tracts of timber have been enumerated (pp. 6–7). These factors may be grouped into three classifications: Physical, economic, and personal. The physical includes such factors as the density and quality of the timber itself, and the location, size, and topography of the timber tract. The economic includes conditions of supply and demand, competition, necessity for sale or purchase, costs of production, the price level of forest products and general economic conditions as well as those of wood-producing and using industries. The personal includes the knowledge of values on the part of both parties to the transaction and their mental attitudes, particularly with regard to the conditions which they believe will obtain in the future.

It is not possible to measure all of these factors statistically. It is possible, however, to measure mathematically some of the more important physical factors which are generally supposed to influence the price of standing timber to a marked degree. An effort has been made to determine the effects of some of these factors on stumpage prices by the use of up-to-date statistical methods. The first of these studies was made of sales in the Douglas fir region of Washington because it was assumed that there would be more uniformity in stumpage prices during any given year in a region having a large supply of virgin timber.

One hundred and twenty-three reports of sales of stumpage involving over 2 billion feet of timber in western Washington were made the subject of a multiple correlation problem to determine by statistical methods the effect of four independent variables on the price received (the dependent variable), these four factors being generally considered as among the most important elements influencing the price paid for standing timber. They were the distance, in miles, of the timber from a sawmill; the area of the tract, in acres; the density of the timber or the amount of standing timber, in thousands of board feet per acre; and the desirability of the timber as evidenced by the percentage of inferior species. Hemlock and white fir were considered

[7] The measurement of logs to determine the amount of lumber or other product that can be manufactured therefrom.

undesirable and Douglas fir, Sitka spruce, red cedar, and white pine were considered desirable. The year 1929 was chosen rather than a later year because it was felt that there would have been a minimum of forced sales during that year.

It was found that the four factors explained only 16 percent of the variation in stumpage price, leaving 84 percent to be explained by other factors of equal or greater importance which cannot be studied statistically.

From a rather intimate knowledge of stumpage prices in western Washington during the 10 years directly preceding 1930, it is estimated that these four factors comprise, roughly speaking, considerably less than one-half of all those directly influencing stumpage prices in this locality. The 16 percent of variation in price does not necessarily therefore represent unsatisfactory results.

The regression of X_2[8] (distance) was plus which seems to indicate that price increases as the distance from a sawmill increases, up to a certain point when the curve flattens out. This result may be partially accounted for by the fact that practically all of the good-quality virgin timber standing near sawmills has been sold. The poorer quality timber that remains will not sell for as much as will the less accessible stands of higher quality, for the better quality will more than offset the higher cost of transportation. Timber located at an extreme distance from existing sawmills does not move, for no one will buy it.

Although the regression coefficient of X_3 (area) was plus, which seems to indicate that price increases with the size of the timber tract sold, an early dropping off in price for the tracts of greater acreage was clearly indicated. This is due, to some extent at least, to the amount of money required to handle a large body of timber with resultant high carrying charges and lower stumpage prices.

The regression coefficient of X_4 (stand per acre) was also plus, indicating that the price increases as the volume per acre increases. As the stand per acre increases to 50 M feet, the increase in price is very rapid, but above that point the influence of stand per acre upon price becomes less marked. There is more difference between the prices paid for timber averaging 25 and 50 M feet to the acre than between those for timber averaging 50 and 75 M feet to the acre.

The independent variable X_5 (percentage of inferior species) showed more promise than any of the other three. Its regression coefficient was minus, showing that as the percentage of inferior species increased, the price decreased.

The results of this study, while disappointing because of the low correlation coefficient, are nevertheless interesting. In view of the many factors influencing stumpage prices and because it was possible to measure and analyze only four of them, it is felt that the results were not altogether negative. On the contrary, the study clearly indicates that the four physical factors analyzed did not influence the price of standing timber in western Washington in 1929 nearly as much as would generally be supposed, and that the economic and personal factors must rather explain the variance in stumpage prices. Some of the more important of these will be briefly examined.

[8] The regression coefficient expresses the effect of one independent variable on the dependent variable, the other independent variables being held constant.

(1) The competitive field may vary with each tract and certainly does vary considerably throughout the statistical universe. This single factor that cannot be accurately measured may affect the price of standing timber to a considerably greater extent than any other one or combination of several factors.

(2) Reported prices paid in sales of timber are frequently inaccurate. Privately owned timber is generally sold on a cruise purporting to give the number of thousand feet, log scale, standing on the tract in question. There may be, and frequently is, a vast difference between the cruise of any given tract of timber and the actual scale of the timber removed in logging. The owner of a tract of timber may believe he has 1 million feet and offer it at $3 a thousand, or a total of $3,000. A prospective purchaser may have the area carefully cruised by men in whose ability and judgment he has every confidence and who are familiar with the standards of utilization followed in the logging operations of the prospective purchaser. Such a cruise may show 1½ million feet of timber, but the tract is bought on the basis of the owner's cruise of 1 million feet, and the transaction is so reported. The purchaser is actually paying $2 per thousand instead of the $3 reported. There is no way to allow for this factor the only thing that can be done is to use the price and quantity reported.

(3) General economic conditions may have made some forced sales necessary. There may also have been some cases where purchases of strategically situated tracts of timber were necessary because of railroad location or other important reasons. The effect of these forced sales or necessary purchases on prices may in some instances be of greater importance than the factors studied, yet allowance cannot be made for them with the basic data available. As has been mentioned, however, it is believed that a minimum number of forced sales were made during 1929 in view of the general economic situation during that year.

(4) The knowledge of values or lack of it on the part of purchaser or seller exerts a tremendous influence on prices. Lumbermen, like other good business men, buy as cheaply as they can, and many tracts of timber have been bought at a very low figure from original owners who were not aware of the value of their holdings. Allowance for this very important factor cannot be made.

With the results and limitations of the first study in mind, six similar studies were made of 1930 stumpage-price data in Washington, using the same variables as in the first problem, namely, the distance of the timber from a sawmill, the area of the tract, the density of the timber, and the desirability as evidenced by the percentage of inferior species. These studies were undertaken with a view to determining whether the same results would be obtained if the size of the region were reduced and if one or two limitations in the type of data studied were made.

The results of these studies were similar in a general way to those of the first. Some relationship between the independent and dependent variables was indicated, but not to so great an extent as would commonly be expected. Three studies similar to the seven mentioned above were made of sales of second-growth yellow pine timber in the North Carolina Pine region. Inasmuch as pine timber only was involved the independent variables considered were size of the tract in acres, distance from a sawmill, and density of the timber.

The particulars of these nine supplemental studies are given in table 1.

TABLE 1. *Particulars of 9 statistical studies of sales data and the percent of variation accounted for by the variables studied*

Study No.	Year	Location	Timber	Sales	Volume	Variables	Price variation accounted for
				Number	*Million ft. b. m.*		*Pct.*
1	1930	Puget Sound	Virgin stand	67	1,349.1	$X_2X_3X_4X_5$	24
2	1930	Southwest Washington	do	30	536.5	do	25
3	1930	East Washington	do	51	61.3	do	12
4	1930	West Washington	Second-growth Douglas fir.	38	62.6	do	10
5	1930	do	Virgin stand	58	1,762.0	do	[1] 49
6	1930	Southwest Washington.	Best-quality virgin stand.	30	535.7	do	23
7	1929	Virginia, North Carolina, South Carolina.	Second-growth yellow pine.	102	108.6	$X_2X_3X_4$	[2] 21
8	1934	do	do	159	45.5	do	[2] 21
9	1929	North Carolina	do	51	33.8	do	13

[1] In study No. 5 both parties to each transaction were large sawmilling and logging concerns.
[2] In studies Nos. 7 and 8, of the 21 percent of variation accounted for 20 and 20.6 percent, respectively, were attributable to stand per acre alone.

One of the most significant results shown in table 1 is the 49-percent variation accounted for in study No. 5 where each party to the transaction was a large sawmilling or logging concern and both seller and buyer were in every case free from the factor of unequal knowledge of value. In studies Nos. 7 and 8, about 20 percent of the variation in price was accounted for by the single variable of stand per acre, and in study No. 9, distance accounted for 13 percent of the variation in price.

It appears, then, that stumpage prices are not influenced by physical conditions, such as the accessibility, the density, the composition of the timber, and the size of the area sold, to as great an extent as they are by economic and other conditions and factors which cannot be statistically measured. Beyond these immediate physical and economic conditions, which have, it is true, an important bearing on the price of individual bodies of timber, are a multitude of complex economic conditions not only influencing the stumpage price of specific blocks of timber, but vitally affecting the general level of stumpage prices, both regionally and nationally. These can best be evaluated by a consideration of their gradual development in importance and complexity.

GRADUAL DEVELOPMENT OF THE ECONOMIC FACTORS

Since colonial days, there has been a marked change in the attitude toward forests of both the general public and the lumber industry. The forests with which this country was very generously endowed by nature were once regarded as inexhaustible and were considered a liability rather than an asset in many sections of the country. The clearing of land for agriculture meant in innumerable instances the cutting and burning of heavy stands of timber. The earliest concern

felt for timber was occasioned by the need of adequate supplies for shipbuilding, and laws were enacted to save live oak in the South for ship timbers and white pine for spars in New England. By and large, however, standing timber was not considered as having any appreciable value because of the supposedly limitless supply.

Yet, at the same time, this country had great need of timber from the beginning, not only in the actual building up of the early settlements and local industries, particularly shipbuilding, but for exporting to foreign countries. As our own domestic needs increased, the lumber industry spread from Maine, where it had originally started on a commercial basis, to New York, to Pennsylvania, and down the Atlantic seaboard. As demand increased, prices rose, and the area of timber that could be profitably exploited constantly increased. As supplies of virgin timber in these regions became depleted, the scene of large logging and milling operations shifted to the Lakes region, where cutting started in the late 1840's. Stumpage prices were still low, because of the abundance of the supply. Government timberlands were to be had in Michigan as late as 1866 at $1.25 to $2.50 per acre (*57, pp. 24–28, 175–218*). With the mechanical improvements in the technique of sawmilling, particularly the great increase in the size and capacity of the mills, a policy among operating companies of purchasing or acquiring large blocks of timberland, not operable at the time of purchase but to be held in reserve for future cutting, was adopted. This policy has been followed successively in the Lakes region, the South, and the West.

By 1880 the lumber industry in the Lakes region was in its heyday and the output was rapidly approaching its maximum. Many lumbering communities were facing local depletion and stumpage prices rose. In the Southern States, however, according to a report on the lumber industry made in 1913 (*57*), pine stumpage in almost unlimited quantities could be had from the Federal Government at $1.25 per acre, or about 10 cents per M feet, and from the State governments for 25 to 75 cents per acre. The shipment of southern lumber in small quantities to the central and northern regions had commenced, but the great volume of readily accessible timber in the South kept stumpage prices there at a low level. During the following 10 years, the cut in the Lakes region passed its maximum, stumpage prices in that region rose rapidly, and in the South the production of lumber for export to other regions became a common practice. Many Lakes region lumbermen built up timber reserves in the South by extensive purchases of timberland during the 80's and 90's. By 1900 the Lakes region was eliminated as a controlling factor in the national lumber-production situation.

The South furnished the bulk of the lumber cut from 1890 until 1920. From 1900 on, stumpage prices in the South rose very rapidly. Increased demand and increased prices not only made the exploitation of large bodies of timber in the South profitable, but made possible the utilization of species which had been considered of no value, in the South as well as in other parts of the East. Eastern hemlock and some northern hardwoods in the Lakes region and the Northeast may be cited as examples.

In the Pacific Northwest, stumpage values had already taken definite form, and there was a considerable amount of speculation and buying up of large bodies of timber for future operations by eastern

and southern companies. One of the principal means of acquiring timberlands from the Government aside from railroad land grants was under the provisions of the homestead and timber and stone laws. Under the terms of the timber and stone law the minimum price was fixed at $2.50 per acre.

As recently as 1902 to 1904 large quantities of timber in Washington which till then were owned by the United States were being absorbed by timber speculators. A similar condition obtained in Oregon and California (*27*, *57*).

The shift to the far West of lumber production from virgin timber in the 1920's was the last possible within the boundaries of the United States. The realization of this, coupled with the reduction in the supply of standing timber in the older lumber-producing regions, had the effect of encouraging speculative buying and high prices. One of the principal reasons for the very great increase in the stumpage price of virgin timber between 1900 and 1907 in the Northwest was the idea that the country was dependent upon wood and would have to continue to use it in large quantities. It was widely assumed, both during this period and for many years thereafter, that the value of stumpage is influenced in some mysterious way by the amount of the owner's investment with interest compounded annually. The general attitude is indicated by the following statements made during the early years of the century:

> . . . stumpage values have at intervals come to a standstill temporarily, but the tendency has been steadily upward and no advance has ever been lost. There has been no retrogression except on the manufactured product. This has been uniformly and invariably true; depressions in the lumber market have at times lessened transactions in timber lands, but no decline from fixed valuations has ever been recorded. Frederick Weyerhaeuser once remarked to me that the only times he ever lost money on timber land were the times when he didn't buy (*18*).
>
> There is probably no one commodity that has varied so much in value during the past fifty years as stumpage, although, if we trace its history back that far, we will find that the variation has always been upward, never downward (*27*).
>
> If one holds a tract of timber for twenty years, he adds twenty years' taxes and nineteen years' compound interest to the stumpage costs, which the consumer must pay when he buys the lumber; for the consumer eventually pays the bill, whether it is a free trade product or a high tariff importation (*27*).

This opinion continued to be held, by operators at least, until the middle 1920's. For example, an editorial in the April 1, 1922, issue of the West Coast Lumberman (*1*) stated:

> Western stumpage today is a splendid investment. The risks which were so great in the years gone by are no longer present. The fire hazard has been reduced to a minimum through various protective measures. Railroads and highways now make timber in most parts of the Northwest reasonably accessible. Investors can make no mistake in buying western timber.

Compton (*17*) stated in May 1925:

> A few years ago, in addressing the Southern Pine Association, I stated the opinion, based on an analysis of the industry's development since 1900, that by 1930 original Southern pine timber would be worth $20; Douglas fir between $8 and $10, and within 10 years thereafter, between $16 and $18; and Southern hardwoods between $17 and $19. The facts so far have only confirmed that opinion.

The previous statement referred to was as follows (*16*):

> Douglas fir stumpage in 1890 regularly sold for perhaps a few cents a thousand feet. In 1900 it was about 50 cents; ten years later, $2; today from $3 to $5. In 1930 Douglas fir will, on the average, be between $8 to $10; and within ten years thereafter, between $16 and $18.

In other words, lumber, since the early days of the industry, had always been in great demand and steadily used for building and other purposes, and those engaged in the industry assumed that the American public would have to continue to buy lumber regardless of price. As the scene of large operations moved continually farther from the region of greatest consumption, increasing transportation and other costs were to be handed on to the consumer.

Thus stumpage prices in the Pacific Northwest advanced greatly between 1900 and 1907, and, largely because of the speculative reasoning outlined above, did not follow the same gradual trend up to the actual depletion of supplies as in the South and the Lakes regions. During this period stumpage prices in the older producing regions also advanced very rapidly, owing to the decreasing supply, the heavy demand, and the same speculative reasoning which applied to western timber.

The one big factor which upset the results anticipated was the competition of other materials with lumber, as the use of substitutes for wood in construction and for other purposes became more common. Such substitution reduced consumption of wood and tended to limit price increases. Substitution of low-grade lumber for high-grade lumber and of products of one species for another also tended to relieve pressure upon the better quality of timber, and to make it increasingly difficult for the West Coast operator producing high-grade lumber to dispose of his product at prices which would return the cost of production plus a reasonable margin of profit. It has been found that the price level does affect the quantity of lumber consumed, and that the consumer will seek substitutes or get along with a lower grade of material when lumber prices get too high. The per-capita consumption of lumber has greatly decreased during the past 30 years, owing in no small measure to the concentration of an increasing percentage of our population in cities, where the type of building most commonly constructed called for a smaller volume of lumber in relation to other building materials. The fact that in the early 1900's great bodies of virgin timber in the far West were sold at speculative prices, which had little if any relation to the immediate realization value of the timber but were based on the assumptions stated above, has had no little effect on stumpage prices in other regions of the country in recent years.

The opening of the Panama Canal made it possible for West Coast operators to ship lumber to the Atlantic seaboard at low rates. Holders of large bodies of western stumpage were faced with large carrying charges which forced them to liquidate at least a part of their holdings. This has resulted in the flooding of eastern markets with western low-grade lumber at prices with which eastern producers could not compete. The fact that western operators were losing money in many instances did not change the effects of this situation, one result of which was the lowering of stumpage prices of eastern low-grade lumber.

The advance in stumpage prices which took place subsequent to 1900 came to an abrupt end as a result of the depression of 1907. Speculative buying ceased and the volume of timber changing hands became very small. Stumpage prices dropped somewhat or remained constant until 1913. From about that time until the United States entered the World War the lumber industry remained in a depressed

condition. Then, in the era of economic prosperity during and immediately following the World War, stumpage prices of all species broke upward sharply in keeping with other prices and in direct reaction to the unbalanced relation of supply and demand. The South reached and passed its maximum cut during this period, and western production jumped into the lead.

Disregarding the temporary break of 1920, stumpage prices on the whole continued to increase until the middle 1920's, when a decrease set in that continued through 1932. The break did not, however, occur at the same time in all regions nor for all species within a region.

Considerable variation in the general trend is noted when regions and individual species, especially hardwoods, are considered separately. The price levels of both hardwood stumpage and logs have been more nearly maintained with relation to the 1923 levels than have those of softwoods. The general uses of softwoods and hardwoods and the consideration of supply versus demand offer a reasonable and plausible explanation. Softwoods are mainly used for building purposes and in general construction. Eastern softwoods have been thrown into direct competition with the remaining huge reservoir of western virgin softwoods, and a decline in prices, due in part at least to overproduction in the West and in part to the reduction in building and general construction activities, has been inevitable. Hardwoods, on the other hand, are in much greater demand for the manufacture of furniture, interior woodwork, and other wood-using industries manufacturing specialized wood products than they are for building and structural purposes. Having no vast supply of hardwoods in the West to fall back on, this demand has been met principally from the eastern, southern, and central stocks of hardwood timber, which are certainly not increasing.

From the above-outlined consideration of physical and economic factors influencing stumpage prices, it is evident that practice and theory have been widely divergent. From a theoretical standpoint stumpage prices should be governed by the realization value of the timber, which depends on physical and economic conditions. In actual practice, however—excluding the relatively few transactions where both parties know values and are in a position to obtain them—stumpage prices have been determined to a greater extent by personal factors such as the necessity for selling, the knowledge of values, and the attitude of both seller and buyer toward future economic conditions. Beyond these, also, certain conditions and philosophies peculiar to the lumber industry have had a marked effect upon the level of stumpage prices.

ADEQUACY OF PRICE DATA

Before proceeding with the development and discussion of price records and trends, it may be helpful to examine briefly the price data to be presented from the standpoints of adequacy and representativeness as well as the extent to which common methods of selling standing timber and logs limit the accuracy of price records and the development of price trends for individual species.

It is obviously impossible to obtain a report of every sale of standing timber made. The authenticity of the prices that have been compiled depends primarily on whether or not reports of enough sales

have been obtained to give an adequate and representative sample of the total transactions consummated.

Table 2 gives the stand of privately owned timber (as of 1930) in the several forest regions of the country (*53, p. 185*), and the quantity of standing timber reported sold in the same regions during the periods 1923–34, and 1900–1934.

Table 3 shows the stand of privately owned timber (as of 1930) in the eastern forest regions of the country (*53, p. 185*), the lumber production of the same regions for the period 1923–34, and the quantity of logs reported sold by regions during the periods 1923–34 and 1900–1934.

TABLE 2.—*Stand of privately owned saw timber in 1930, and quantity reported sold, 1923–34 and 1900–1934, by regions*

Region	Privately owned saw timber, 1930 [1]		Saw timber reported sold			
			1923–34		1900–1934	
	Million ft. b. m.	*Pct.*	*Million ft. b. m.*	*Pct.*	*Million ft. b. m.*	*Pct.*
New England	55,493	6	2,689	2	6,898	4
Middle Atlantic	25,831	3	759	1	1,253	[2]
Lakes	32,733	3	7,516	5	28,186	15
Central	31,066	3	3,306	2	7,467	4
Southeast	195,117	20	28,661	18	122,089	67
Pacific coast	593,902	60	109,378	70	336,002	62
North Rocky Mountain	41,731	4	3,904	2	18,410	10
South Rocky Mountain	9,516	1	164	[2]	164	[2]
Total	988,289	100	156,499	100	190,499	100

[1] (*53, p. 185.*)
[2] Less than 0.5 percent.

TABLE 3.—*Stand of privately owned saw timber in 1930, lumber production, 1923–34, and quantity of logs reported sold in the eastern United States, 1900–1934, by regions*

Region	Privately owned saw timber, eastern United States [1]		Lumber production 1923–34		Logs reported sold			
					1923–34		1900–1934	
	Million ft. b. m.	*Pct.*	*Million ft. b. m.*	*Pct.*	*Million ft. b. m.*	*Pct.*	*Million ft. b. m.*	*Pct.*
Northeastern	81,224	24	12,940	7	1,391	10	1,344	10
Lakes	32,733	9	17,909	9	3,129	24	3,325	23
Central	34,066	10	17,920	10	1,551	12	1,740	12
Southeastern	195,117	57	141,091	74	7,105	54	8,146	55
Total	343,140	100	189,860	100	13,176	100	14,764	100

[1] (*53, p. 185.*)

The 156 billion feet of privately owned standing timber reported sold during the 12-year period 1923–34 (table 2), was distributed regionally very closely in accordance with the estimated remaining stands of saw timber as of 1930. In the East, with an estimated 35 percent of the total stand, 28 percent of the sales were reported. That New England, with 6 percent of the country's saw timber, is reported as selling but 2 percent of the total volume during this period may indicate that more tree capital is being conserved there, may show that timber there is not changing hands because it is

largely owned by operators, may be due to the lack of complete reports of timber bought by pulp concerns and woodenware manufacturers, or may reflect the fact that lumber production in New England has fallen off to a considerable extent in recent years.

The same ratio of stand to timber reported sold holds true for the Middle Atlantic region. Here the apparent conservation is probably not entirely voluntary but may be due in part to the effect of the acute competition of imports from other lumber-producing regions and in part to the depletion of timber of saw-timber size.

Similar relationships are disclosed in the Northeastern region, which includes New England, New York, Pennsylvania, Maryland, Delaware, and New Jersey.

A comparison of the regional sales during the two periods 1900–1934 and 1923–34 reveals distinct shifts between regions, of which the most significant are an increase of 8 percent on the Pacific coast and a decrease of 6 percent in the East (from 34 to 28 percent). This was to be expected in view of the shifts in production of lumber, the most important commercial product manufactured from standing timber during the total period under consideration.

In the Eastern States, the Lakes region reported a much larger percent of log transactions during 1923–34 than of lumber production for the same period (table 3). The importation of logs from other regions in the United States and from Canada for the manufacture of furniture, veneers, and other specialized industries partially explains this, and it is possible that mills in the Lakes region are buying logs from producers within the region and are conserving their remaining supplies of standing timber. Records of log transactions show that logs are shipped long distances to specialized manufacturing establishments in all eastern regions, more particularly in the Central and Lakes regions.

Some foresters have long contended that the timber supply of the South is being cut faster than it is being replaced by growth. This is clearly supported by the figures for the Eastern States, which show that the lumber cut of the South is out of proportion to the amount of available saw timber. One reason for the relatively low percentage of reported log transactions is the fact that the majority of the lumber-producing concerns in the South do their own logging, and therefore the few log markets in this region are scattered and unorganized.

It is believed that the national and regional records of sales of privately owned standing timber are representative and adequate as a basis for estimating usable price trends; and yet an inherent weakness in the stumpage-price data may well be recognized at this point. Sixty-four percent of the 490 billion feet of standing timber reported during the period 1900–1934 was in the form of flat-rate or lump-sum sales, as shown in table 4 and figure 1. It is not practicable nor statistically possible to determine accurately the price paid for individual species in cases where no effort was made (so far as available records of the transaction show) to evaluate the worth of the individual species and to fix the price for each accordingly. In many cases, indeed, no estimate apparently was made of the volume of the several species. Reported sales of the total volume of timber at a lump sum are common. (As, for example, 1 million feet of pine and hardwoods for $3,000, $2,000, or $1,000 in the Southern Pine region, or of hemlock

and hardwoods in the Lakes region, or of pine, hemlock, and hardwoods in New England, or of mixed conifers in the West.)

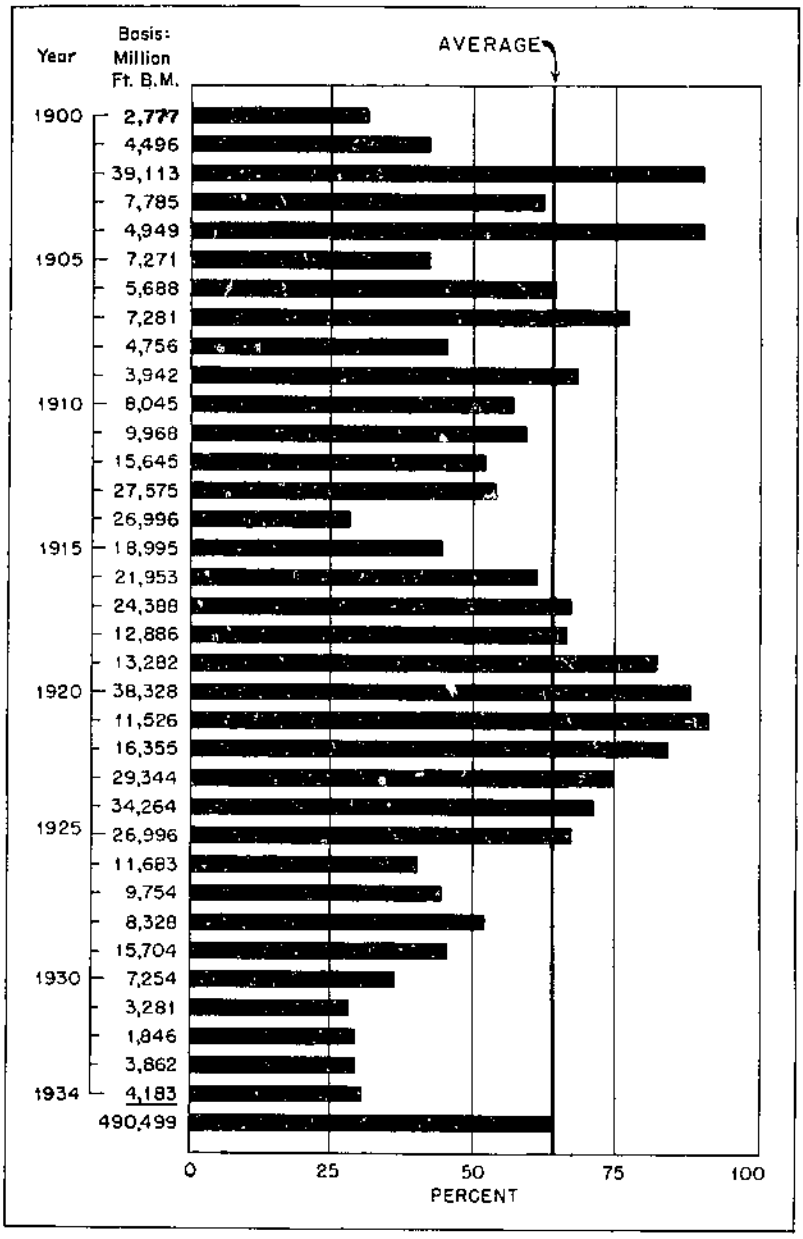

FIGURE 1.--Proportion of privately owned timber reported in flat-rate sales, 1900-1934, all regions.

TABLE 4.—*All sales of privately owned timber and percentage of flat-rate sales, 1900–1934* [1]

Year	All sales	Flat-rate sales		Year	All sales	Flat-rate sales	
	M ft. b. m.	*M ft. b. m.*	*Pct.*		*M ft. b. m.*	*M ft. b. m.*	*Pct.*
1900	2, 776, 582	850, 313	31	1919	13, 282, 321	10, 927, 334	82
1901	4, 495, 844	1, 892, 871	42	1920	38, 327, 787	33, 803, 537	88
1902	39, 113, 394	35, 077, 334	90	1921	11, 525, 923	10, 534, 819	91
1903	7, 785, 377	4, 820, 924	62	1922	16, 354, 508	13, 745, 297	84
1904	4, 948, 809	4, 433, 875	90	1923	20, 344, 413	22, 006, 869	75
1905	7, 271, 175	3, 048, 035	42	1924	34, 264, 197	24, 431, 558	71
1906	5, 687, 793	3, 639, 856	64	1925	26, 996, 432	18, 114, 348	67
1907	7, 280, 783	5, 637, 490	77	1926	11, 683, 118	4, 730, 982	40
1908	4, 755, 623	2, 119, 146	45	1927	9, 754, 125	4, 313, 626	44
1909	3, 942, 032	2, 678, 120	68	1928	8, 327, 617	4, 367, 433	52
1910	8, 045, 010	4, 576, 395	57	1929	15, 703, 564	7, 127, 331	45
1911	9, 908, 490	5, 957, 361	60	1930	7, 254, 438	2, 611, 212	36
1912	15, 645, 312	8, 000, 307	52	1931	3, 280, 528	926, 397	28
1913	27, 575, 370	14, 915, 583	54	1932	1, 846, 101	542, 186	29
1914	26, 996, 240	7, 540, 486	28	1933	3, 861, 796	1, 114, 340	29
1915	18, 995, 463	8, 431, 735	44	1934	4, 182, 778	1, 255, 136	30
1916	21, 952, 496	13, 443, 897	61				
1917	24, 387, 575	16, 381, 037	67	Total	490, 490, 111	312, 545, 461	64
1918	12, 886, 158	8, 448, 475	66				

[1] Basis 490,490,111,000 board feet.

Because of the inadequacy of the data, it is not possible to classify flat-rate or lump-sum sales of standing timber in any other manner than that in which the sales were actually made. Three classifications of flat-rate sales are possible, and have been made: Those containing (1) only softwoods, (2) only hardwoods, and (3) both softwoods and hardwoods. Flat-rate and individual sales have been combined into State and regional averages for softwoods, hardwoods, and all species, for these total averages indicate the average selling price of all species of standing timber in the several States and regions.

Price records of and the trends developed for individual species are based, therefore, on only 36 percent of the total volume of reported sales of standing timber. This in itself accounts for some irregularities in the record which could probably be lessened if the percentage of individual sales were higher. Higher stumpage prices are obtained for both softwoods and hardwoods when sold individually.

It is probably true that more of the higher grade stumpage was sold by species in individual sales and that the poorer grades were more likely to be grouped together and sold collectively. But even where quality of stumpage in both types of sale was comparable, an analysis of the data discloses that flat-rate sales, by and large, were made at lower prices than were individual sales. There is a fundamental principle of merchandising which applies to sales of any raw material or commodity. When all other factors have been given due consideration, the vendor of standing timber will be more apt to receive the true value of his merchandise if he takes a careful inventory of the different kinds of material which he has for sale and markets them as individual parts of a transaction rather than in one lot. Flat-rate sales of stumpage by the Government or by large timber-holding corporations are practically, if not entirely, unknown, and it is becoming more and more common even for farmers to cut their own timber and dispose of the logs to a manufacturing concern at individual prices for the different kinds.

In the graphs of price data which follow, freehand trend curves have been fitted to the graphs of actual prices. Although it is possible that mathematical curves could have been fitted to some of the data, no attempt has been made to do this, because it is not believed that time series of price data such as these have followed in the past or will follow in the future a trend determined by the application of an inflexible mathematical formula. The price change for any one year may become less significant in the development of a long-time trend when data for several subsequent years are available. Thus the trends for 1930–34 as now shown may be changed somewhat when prices up to 1940 have been obtained.

NATIONAL STUMPAGE PRICES

The general trends of stumpage-price data for the country as a whole, divided into four classifications—softwoods, hardwoods, flat-rate mixed, and all sales—are given in figure 2 for the period 1900–1934. Eighty-seven percent of the timber reported sold during the period was softwoods, about 2½ percent hardwoods, and 10½ percent consisted of flat-rate sales of mixed softwoods and hardwoods. The similarity between the records of softwoods and all sales is explained

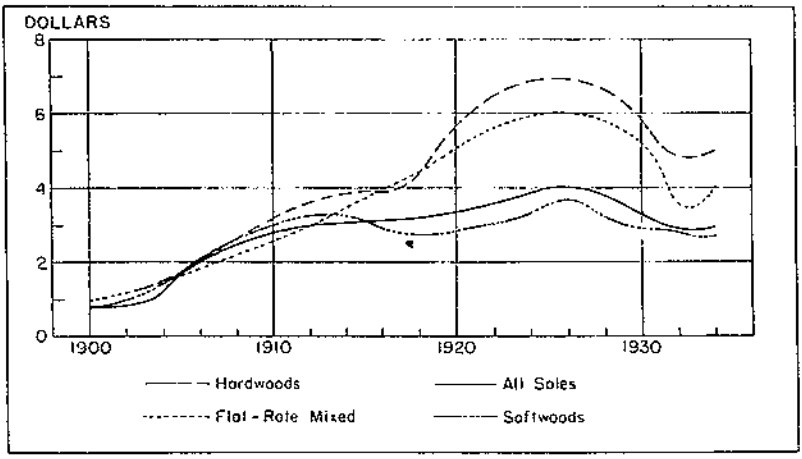

FIGURE 2.—Trends of actual stumpage prices for the United States, 1900–1934. (Basis, in million feet board measure: Hardwoods 11,803, softwoods 426,933, flat-rate mixed 51,763, all sales 490,499.)

by the high percentage of softwoods. The difference between the softwood and hardwood records is striking. Flat-rate mixed sales of both softwoods and hardwoods occur only in the East and the relative position of the price of this class of sale, considerably above the softwoods but somewhat below the hardwoods, is what one would expect in view of the spread between the softwood and hardwood prices.

The most representative and complete stumpage-price data for the country as a whole have been obtained for years subsequent to 1918. Although a considerable body of data is available for previous years, it has been obtained in large measure from investigations of prices in certain regions and for particular species rather than from investigations of prices in the country as a whole. As a result the price record

from 1900 to about 1918 is more representative by regions than for the entire country.

Table 5 presents the actual prices of which trends are shown in Figure 3 together with an adjustment of the prices based on the purchasing power of the dollar.[9] Somewhat different trends are disclosed when actual stumpage prices are adjusted for the purchasing power of the dollar. The most striking difference occurs in the case of hardwood prices where the long-time trend from 1900 to 1934 has been distinctly up.

Index numbers for these price data, given in table 5, have been computed with the period 1910–14 as a base and weighted for the purchasing power of the dollar with the same period as a base. They have been plotted on semilogarithmic paper (fig. 4). A study of these figures clearly indicates that, although actual average stumpage prices in the country as a whole have declined since the late 1920's, the real price in terms of the purchasing power of the dollar has not only been maintained but has shown a distinct increase for the period 1920–34. The importance of this generalization depends upon the extent to which it can be broken down and analyzed and still remain true. The same comparisons will be made by regions and for some of the more important timber species in subsequent sections.

TABLE 5.—*Actual and adjusted*[1] *average annual prices of softwoods, hardwoods, flat-rate mixed, and all sales of stumpage in the United States, 1900–1934*

PRICE IN DOLLARS

Year	Softwoods		Hardwoods		Flat-rate mixed		All sales	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1900	$0.78	$0.95			$1.00	$1.22	$0.79	$0.96
1901	.86	1.06			.86	1.05	.86	1.07
1902			$1.60	$1.74	1.05	1.22		
1903	.93	1.07	1.46	1.68	.92	1.06	.93	1.07
1904	.79	.91			1.95	2.24	.85	.97
1905	1.87	2.13	1.26	1.44	2.25	2.57	1.88	2.14
1906	2.50	2.77	2.68	2.97	1.61	1.79	2.43	2.69
1907	2.33	2.45	2.65	2.78	1.93	2.03	2.32	2.44
1908	2.31	2.52	3.25	3.54	1.89	2.06	2.30	2.50
1909	2.12	2.15	1.94	1.97	1.98	2.01	2.11	2.14
1910	3.13	3.05	3.11	3.03	3.55	3.45	3.17	3.08
1911	3.55	3.75	4.72	4.96	3.64	3.84	3.57	3.77
1912	2.95	2.92	3.89	3.85	2.69	2.67	2.93	2.90
1913	2.85	2.80	3.15	3.09	3.50	3.43	2.94	2.88
1914	4.00	4.02	4.28	4.31	3.01	3.06	3.91	3.93
1915	2.07	2.04	3.57	3.52	2.91	2.87	2.26	2.23
1916	2.39	2.07	3.30	2.72	3.56	2.85	2.78	2.23
1917	2.67	1.56	3.66	2.13	4.17	2.43	2.93	1.71
1918	2.90	1.51	3.13	1.63	4.31	2.25	3.03	1.58
1919	3.18	1.57	6.38	3.15	4.94	2.44	3.79	1.87
1920	2.89	1.28	5.59	2.48	5.47	2.43	3.18	1.41
1921	2.82	1.98	6.36	4.49	4.72	3.31	3.22	2.26
1922	2.85	2.02	7.04	4.98	5.89	4.17	3.11	2.20
1923	3.68	2.51	6.21	4.23	5.95	4.05	4.08	2.78
1924	3.32	2.32	5.83	4.07	5.79	4.04	3.56	2.48
1925	3.51	2.32	6.30	4.17	5.96	3.95	3.79	2.51
1926	3.65	2.50	5.96	4.08	5.39	3.69	4.13	2.83
1927	4.31	3.00	6.75	4.85	5.23	3.76	4.70	3.37
1928	3.18	2.25	7.58	5.37	5.84	4.13	3.60	2.61
1929	3.10	2.29	7.20	5.18	6.47	4.65	3.64	2.62
1930	2.03	2.32	5.84	4.63	5.28	4.19	3.27	2.59
1931	2.81	2.60	4.63	4.34	4.68	4.39	3.13	2.94
1932	2.70	2.85	4.60	4.90	3.01	3.18	2.88	3.04
1933	2.33	2.42	5.13	5.34	3.68	3.83	2.57	2.67
1934	2.66	2.43	5.06	4.63	3.95	3.61	2.97	2.63

[1] On basis of purchasing power of the dollar as determined by the Bureau of Labor Statistics.

[9] The purchasing power of the dollar as determined by the Bureau of Labor Statistics, U. S. Department of Labor, is the reciprocal of the all-commodity index, which is based on the price level of a large number of commodities weighted according to importance

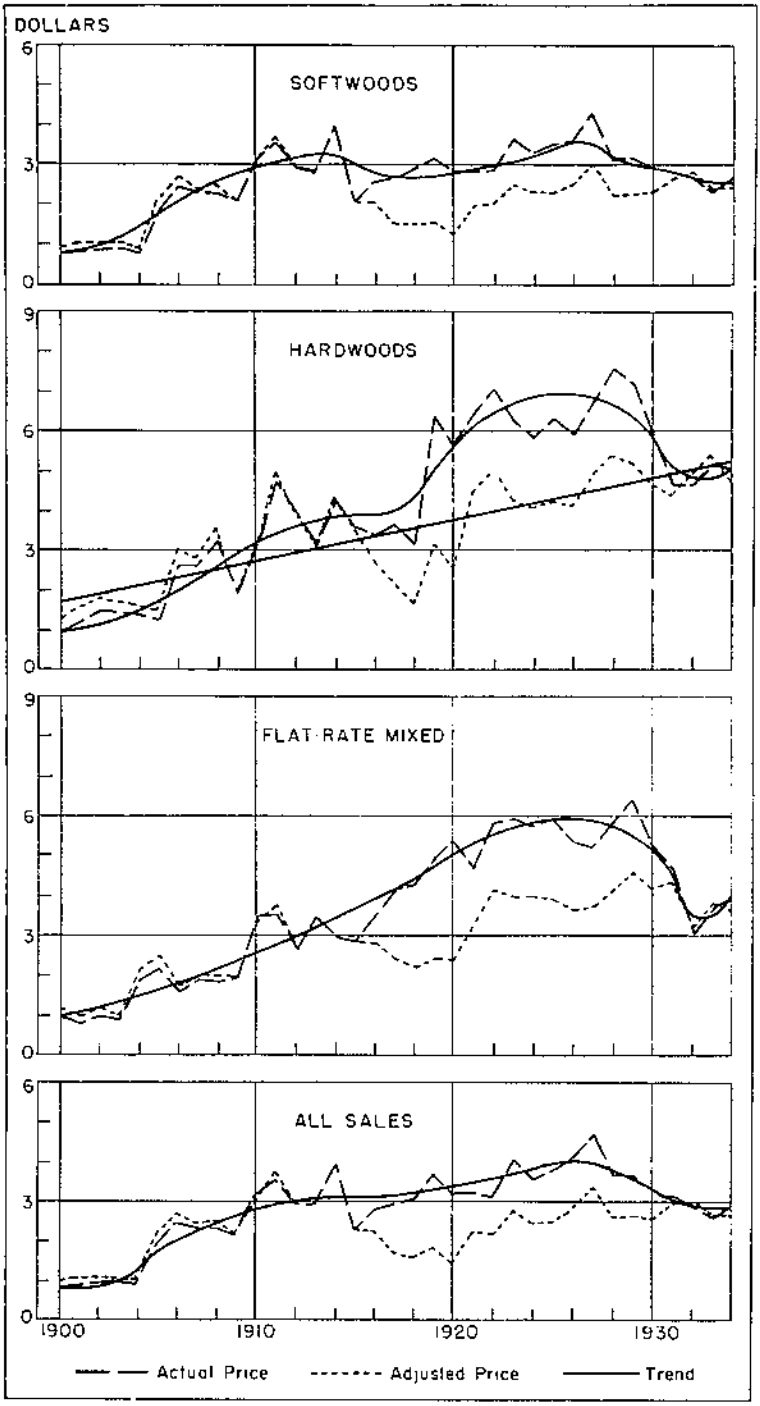

FIGURE 3.—Actual and adjusted average annual stumpage prices for the United States in the four principal classifications, with indicated trends, 1900–1934. (Basis, as in figure 2.)

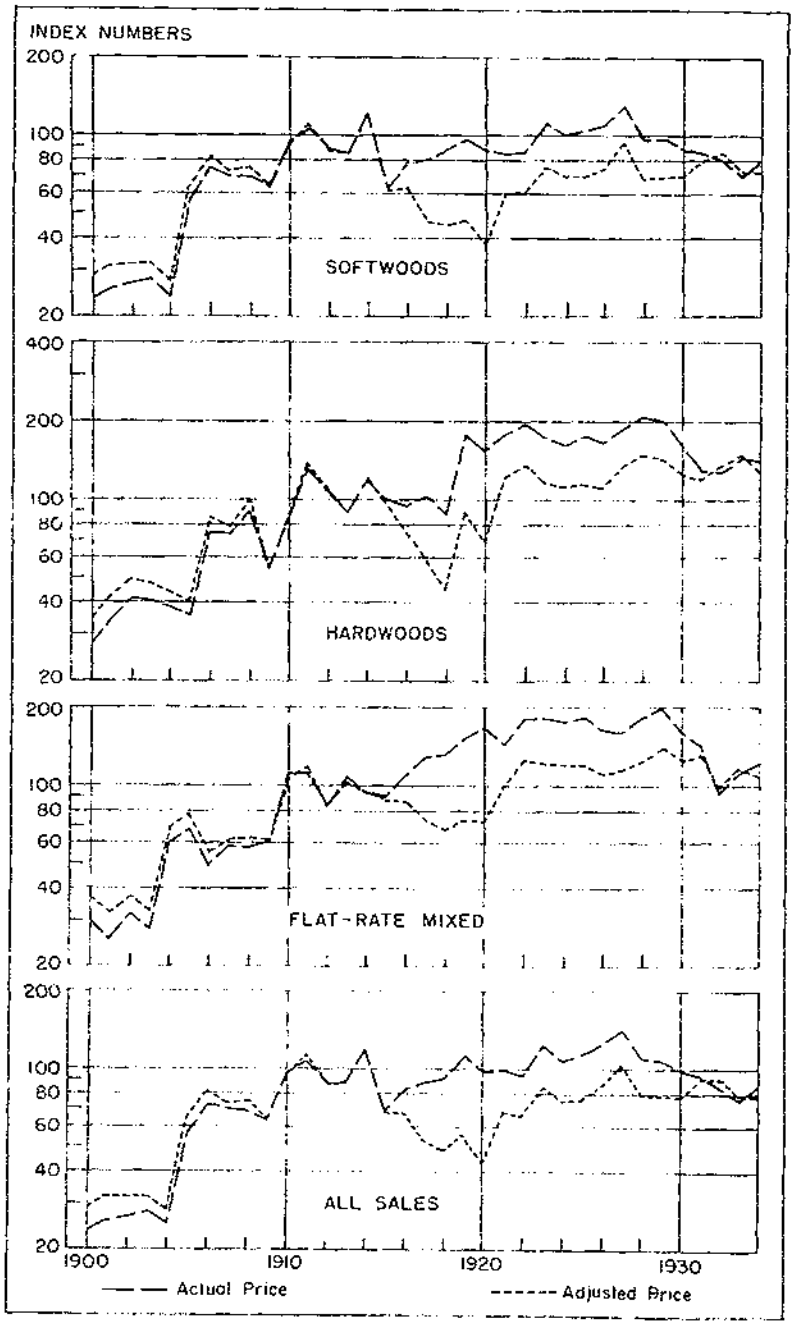

FIGURE 4. Index numbers of actual and adjusted stumpage prices for the United States in the four principal classifications, 1900–1934.

TABLE 5. *Actual and adjusted average annual prices of softwoods, hardwoods, flat-rate mixed, and all sales of stumpage in the United States, 1900–1934*— Con.

INDEX NUMBERS OF PRICE[1]

Year	Softwoods		Hardwoods		Flat-rate mixed		All sales	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1900	23	29	..	..	41	37	24	29
1901	26	32	..	..	26	32	26	32
1902	..	..	41	45	32	37	..	..
1903	28	32	40	47	28	32	28	32
1904	24	27	..	..	60	69	26	29
1905	56	64	35	40	69	79	56	64
1906	75	83	74	83	49	55	73	81
1907	70	74	73	77	59	62	70	73
1908	69	76	90	99	58	63	69	75
1909	64	65	54	55	61	61	63	64
1910	91	92	86	87	109	106	95	93
1911	107	113	130	139	111	117	107	114
1912	89	88	107	107	82	82	88	87
1913	86	84	87	86	107	105	88	87
1914	120	121	118	120	93	94	117	118
1915	62	61	99	98	89	88	68	67
1916	78	62	94	76	109	87	83	67
1917	80	47	101	59	128	74	88	52
1918	87	45	86	45	132	69	91	48
1919	96	47	176	88	151	75	111	55
1920	87	38	154	69	167	74	96	42
1921	85	59	177	125	144	101	97	68
1922	86	61	191	139	180	128	98	69
1923	111	75	172	118	182	124	123	84
1924	100	70	161	113	177	124	107	75
1925	105	70	171	116	182	121	114	76
1926	110	75	165	114	165	113	121	83
1927	129	93	186	135	160	115	141	102
1928	96	68	209	150	179	126	111	79
1929	96	69	199	144	198	142	109	79
1930	88	70	161	129	161	128	98	78
1931	85	80	128	121	143	134	94	89
1932	81	86	127	135	92	97	86	92
1933	70	73	142	149	113	117	77	80
1934	80	73	140	129	121	110	86	79

[1] Here and elsewhere unless otherwise specified, the period 1910–14 has been used as a base in computing index numbers.

The first logical division of United States average stumpage prices is into two major regions—east and west of the Great Plains—because of the important basic differences between these two regions with reference to kinds of timber and nearness to market. Some of the most important of these differences should be kept in mind:

(1) The western forests consist almost entirely of softwoods. So few hardwoods of commercial importance occur in commercial quantities west of the Great Plains that they may, for purposes of this study, be disregarded.

(2) The same species of softwoods do not occur in the two regions.

(3) Very little virgin timber remains in the East, while except for a relatively small volume of second growth in western Washington and Oregon, the commercial timber stands of the West consist entirely of virgin timber.

(4) The difference in accessibility between regions is very great, both with regard to the distance from the centers of large consumption of lumber and other forest products and the accessibility of individual tracts of timber. Timber in the East is, by and large, relatively more accessible from the standpoint of the ease and cost of logging, prin-

cipally because greater density of population has resulted in a more complete network of roads over which the logs can be hauled. Many large areas of virgin timber in the West are in inaccessible and undeveloped localities where the cost of exploitation would be prohibitive under present economic conditions. The cost of shipping lumber and other forest products to the centers of large consumption is considerably less for eastern forests than for western.

These factors should and do result in higher stumpage prices in the East than in the West, even when softwoods only are concerned. Table 6 shows the price record of all softwood species and of all species in the eastern United States for the period 1900–1934. The price record of hardwoods and of flat-rate mixed sales is practically identical with the national averages. Figure 5 shows the record of actual prices and of their index numbers of all stumpage sales in the eastern United States. Graphs of eastern softwood prices have not been shown because they are practically the same as prices of all sales (table 6).

TABLE 6. *Actual and adjusted average annual stumpage prices for the eastern regions, softwood and all sales, 1900–1934*

Year	Price in dollars				Index numbers of prices			
	Softwoods		All sales		Softwoods		All sales	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1900	$1.05	$1.28	$1.05	$1.28	23	28	25	30
1901	1.13	1.40	1.11	1.38	25	31	26	33
1902	1.27	1.48	1.25	1.45	28	33	29	34
1903	1.74	2.00	1.70	1.95	39	44	40	46
1904	2.07	2.37	1.93	2.21	46	52	46	52
1905	2.67	3.04	2.63	3.00	59	67	62	71
1906	3.56	3.95	3.18	3.53	79	87	75	83
1907	3.62	3.80	3.42	3.59	80	84	81	85
1908	2.95	3.21	2.91	3.17	65	71	69	75
1909	3.65	3.70	3.22	3.26	81	82	76	77
1910	4.64	5.51	4.36	4.24	103	100	103	100
1911	4.58	5.15	4.54	4.79	108	114	107	113
1912	4.15	4.11	3.78	3.75	92	91	89	88
1913	4.46	4.38	4.16	4.08	99	97	98	96
1914	4.54	4.57	4.31	4.37	101	101	102	103
1915	3.73	3.67	3.38	3.33	83	83	80	79
1916	4.59	3.65	4.00	3.20	102	81	94	75
1917	5.05	2.94	4.53	2.64	112	65	107	62
1918	5.89	3.07	4.91	2.56	131	68	117	61
1919	6.97	3.44	5.62	2.78	155	76	133	66
1920	6.87	3.05	5.89	2.62	152	67	139	62
1921	6.05	4.69	5.28	4.71	135	104	125	88
1922	4.54	3.21	5.46	3.87	101	71	129	91
1923	7.90	5.38	6.82	4.64	175	119	161	109
1924	7.24	5.05	6.37	4.45	161	112	150	105
1925	5.36	3.56	5.70	3.77	118	79	134	89
1926	4.79	3.28	5.15	3.53	106	73	121	83
1927	6.36	4.58	6.05	4.34	141	101	143	102
1928	5.89	4.17	6.22	4.40	131	92	147	104
1929	5.00	3.60	5.98	4.30	111	80	141	101
1930	4.80	3.81	5.19	4.12	106	84	122	97
1931	4.23	3.97	4.47	4.19	94	88	105	99
1932	4.54	4.80	4.33	4.58	101	106	102	108
1933	3.42	3.56	3.55	3.69	76	79	91	94
1934	3.98	3.64	4.28	3.92	88	81	101	92

Figure 6 shows the price record of eastern and western stumpage sales of softwoods and all species for the same period. The similarity of trends is striking and was to be expected, for the same general economic factors affect stumpage prices in the entire country. The price differential between the East and West in actual dollars and cents has varied considerably during the past 35 years. The spread between eastern and western stumpage prices has been proportionately constant during the past 30 years, and the long-time regional trends of adjusted prices are distinctly upward and follow nearly parallel lines.

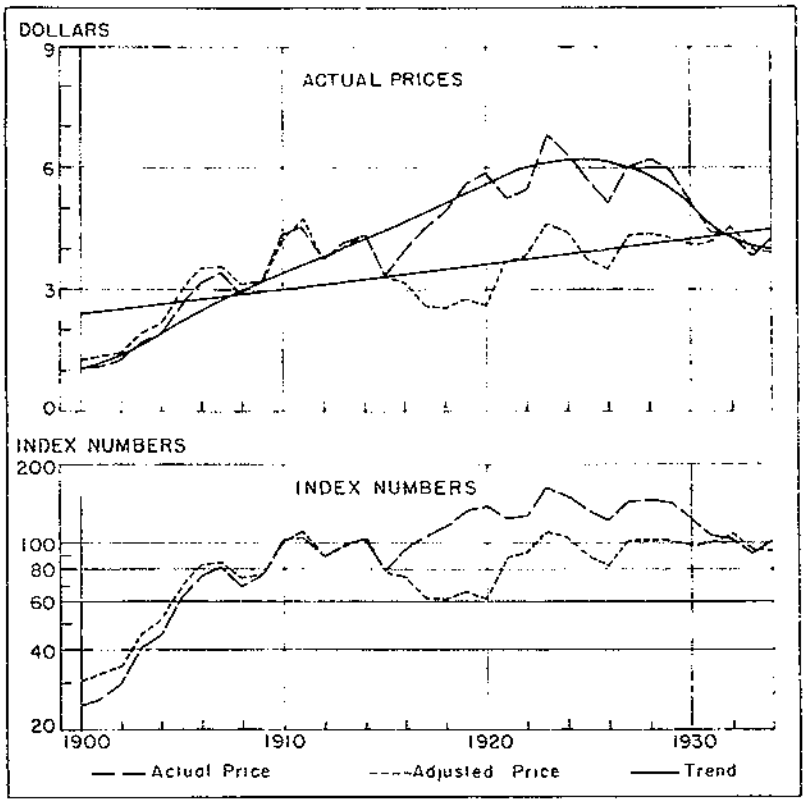

FIGURE 5.—Eastern stumpage prices, all sales, 1900-1934, actual and adjusted, in dollars and index numbers. (Basis 165,893 million feet, board measure.)

Actual and adjusted prices and index numbers of western stumpage sales are given in table 7. When the stumpage price records of the two major regions of the country, Eastern and Western, are considered, the same general characteristics that were evident for the country as a whole are apparent. The yearly actual average price of softwoods and of all sales of timber has decreased in both regions since the middle of the 1920's. When, however, the actual prices are weighted by the purchasing power of the dollar, it is seen that eastern softwood prices have remained practically constant since 1920; the

average price of all eastern species has increased (due to the weighted effect of the rise of hardwood prices); and the average price of all western species has materially increased.

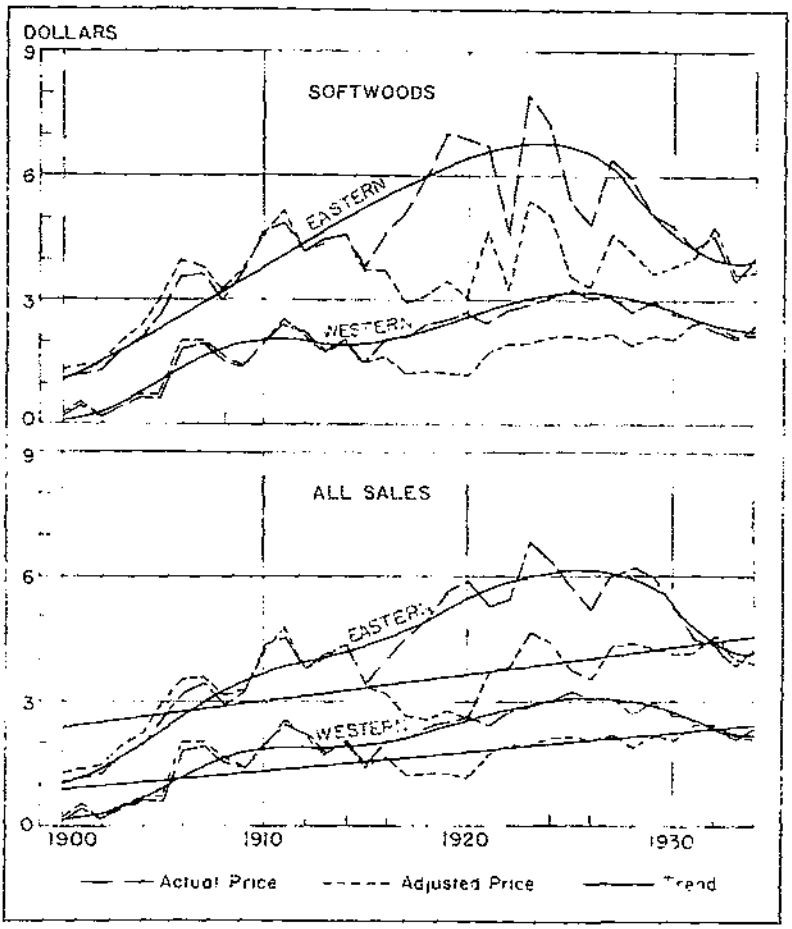

FIGURE 8.—Comparison of eastern and western stumpage prices, actual and adjusted, for softwoods and all sales, 1900–1934. (Basis, in million feet board measure: Eastern softwoods 102,381; western softwoods 324,551; eastern all sales 165,593; western all sales 321,606.)

A discussion of regional stumpage prices forms the next logical break-down of these data, and the several States have been grouped into regions for this purpose.

TABLE 7.—*Actual and adjusted average annual stumpage prices (with index numbers) for the Western States, softwood and all sales, 1900–1934*

Year	Softwood price		All sales		Index numbers, all sales	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1900	$0.10	$0.12	$0.10	$0.12	5	6
1901	.44	.55	.44	.55	22	27
1902	.14	.16	.14	.16	7	8
1903	.41	.47	.41	.47	20	23
1904	.62	.71	.62	.71	31	35
1905	.63	.72	.63	.72	31	36
1906	1.81	2.01	1.81	2.01	90	100
1907	1.94	2.04	1.94	2.04	97	101
1908	1.52	1.66	1.52	1.66	76	83
1909	1.38	1.40	1.38	1.40	69	70
1910	2.00	1.95	2.00	1.95	100	97
1911	2.42	2.56	2.42	2.56	120	127
1912	2.22	2.20	2.22	2.20	110	109
1913	1.76	1.72	1.76	1.72	87	86
1914	2.01	2.02	2.01	2.02	100	101
1915	1.46	1.44	1.46	1.44	73	72
1916	2.04	1.63	2.04	1.63	101	81
1917	2.09	1.22	2.09	1.22	104	61
1918	2.40	1.25	2.40	1.25	119	62
1919	2.51	1.24	2.51	1.24	125	62
1920	2.68	1.19	2.68	1.19	133	59
1921	2.43	1.71	2.43	1.71	121	85
1922	2.75	1.95	2.75	1.95	137	97
1923	2.87	1.95	2.87	1.95	143	97
1924	3.02	2.11	3.02	2.11	150	105
1925	3.24	2.14	3.24	2.14	161	106
1926	3.04	2.08	3.04	2.08	151	103
1927	3.07	2.20	3.07	2.20	153	109
1928	2.71	1.92	2.71	1.92	135	96
1929	2.99	2.15	2.99	2.15	149	107
1930	2.64	2.09	2.64	2.09	131	104
1931	2.59	2.43	2.59	2.43	129	121
1932	2.29	2.42	2.29	2.42	114	120
1933	2.08	2.16	2.08	2.16	103	107
1934	2.38	2.18	2.38	2.18	118	108

REGIONAL STUMPAGE PRICES

It has been estimated that nearly half the land area of the United States, or a total of approximately 820,000,000 acres, was covered with forests when the first white settlers arrived.

In the eastern United States a magnificent forest of old-growth timber, wonderfully rich in variety of species and quality of material, stretched in an almost unbroken expanse from the Atlantic Ocean to the prairies. Pines and other softwoods predominated in the north and along the Atlantic and Gulf coasts, while in the Appalachians and on the fertile soils of the Central States and the lower Mississippi Valley oak, hickory, ash, chestnut, yellow poplar, and other valuable hardwoods abounded. In the West practically all of the area not too arid to support tree growth was also covered with a forest of virgin timber interspersed with occasional patches of younger, even-aged stands, as of Douglas fir and western white pine, following fire. Along the Pacific coast the heavy stands of redwood, Douglas fir, western hemlock, and western red cedar formed one of the finest forests in the world (*54, pp. 31 32*).

The composition and distribution of the principal forest types of the United States, together with the 11 unit regions into which the several States have been grouped in the compilation of stumpage and log-price records are shown in figure 7. The boundaries of these units have been determined partly by the extent of the various types of forest, and partly by economic and geographical conditions. They

coincide in the main with the regional set-up used by the Forest Service for many years in connection with lumber production, distribution, and price investigations.

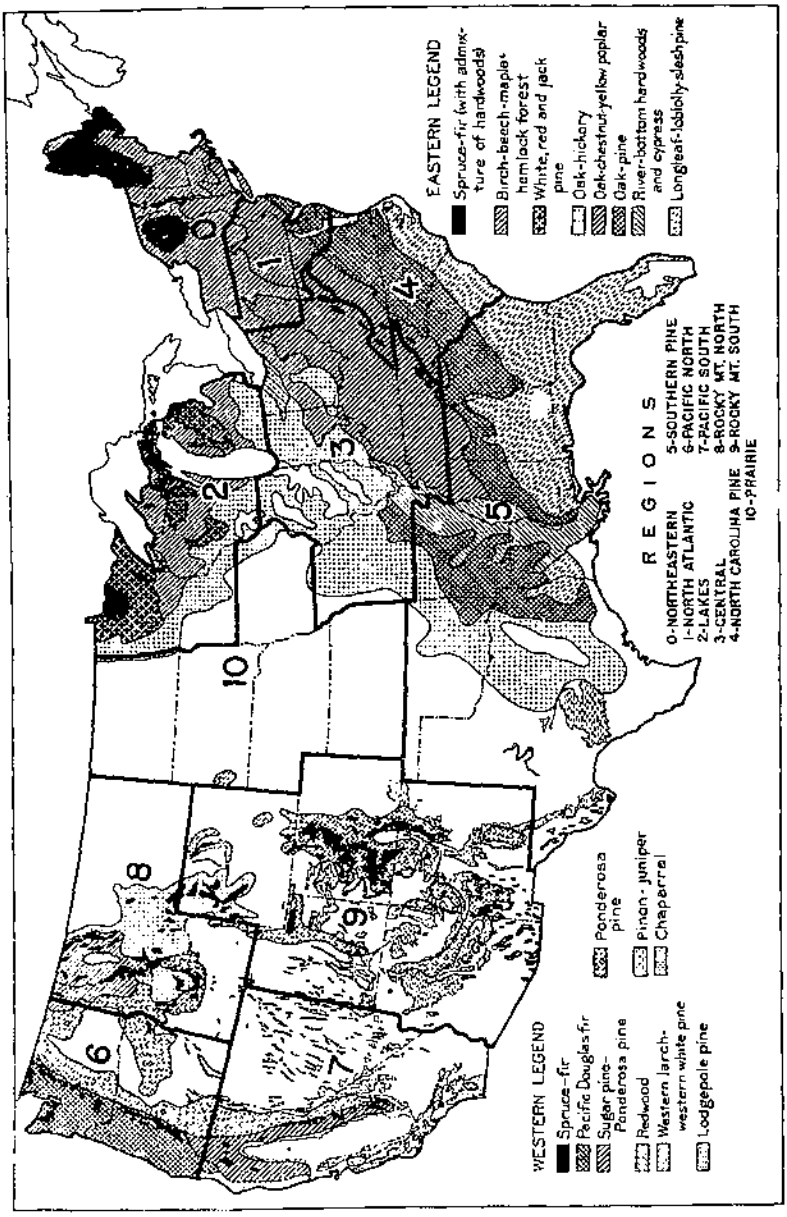

FIGURE 7.—Chief forest types and principal stumpage and log regions of the United States.

A consideration of the stumpage-price records of these major timber-producing regions discloses the same general characteristics noted for the price record of the country as a whole.

(1) Actual average stumpage prices have declined since the late 1920's, while (2) the level of average prices, when weighted for the purchasing power of the dollar has been maintained or increased since 1920; (3) hardwood prices have shown a greater appreciation during the past three decades than have softwoods, and have more nearly maintained the price level reached in the middle 1920's.

REGION 6 NORTHEASTERN

The principal commercial softwood trees of the Northeastern region, which comprises the New England States and New York, are white pine, eastern spruce and hemlock, balsam fir, and northern white cedar. The principal hardwood species are birch, beech, maple, and oak.

The stumpage-price record for this region is based on a total of nearly 7 billion feet of timber for the period 1900–1934. Of this total an average of 61 percent was sold in flat-rate sales which did not permit an accurate segregation by species (fig. 8). Softwoods comprised about 4⅛ billion feet; hardwoods 1 billion feet; and flat-rate mixed (softwoods and hardwoods) about 1⅝ billion feet of the timber sold. Figures 9 and 10 show the stumpage price records of softwoods, hardwoods, flat-rate mixed, and all sales, together with corresponding index numbers. Actual and adjusted prices and trends for each type of sale are given in table 8. Here as elsewhere in this report, unless otherwise stated, the period 1910–14 has been used as the base period in computing both the index numbers of prices and the purchasing power of the dollar.

TABLE 8.—*Actual and adjusted*[1] *average annual prices of softwoods, hardwoods, flat-rate-mixed, and all sales of stumpage in the Northeast, 1900–1934*

PRICE IN DOLLARS

Year	Softwoods		Hardwoods		Flat-rate-mixed		All sales	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1900	$2.67	$3.26			$3.03	$3.70	$2.70	$3.30
1901	4.05	5.02			3.18	4.31	3.90	4.83
1902	3.77	4.38			3.80	4.42	3.83	4.45
1903	3.74	4.30			4.84	5.56	4.02	4.62
1904	3.58	4.11	$2.54	$2.91	3.53	4.51	3.64	4.18
1905	3.63	4.14			4.94	5.63	3.95	4.50
1906	3.77	4.18			5.09	5.64	3.92	4.35
1907	4.80	5.04	2.05	2.15	5.35	5.62	4.80	5.04
1908	4.48	4.85	3.08	3.35	3.12	3.40	4.25	4.63
1909	4.76	4.82	1.98	2.01	5.02	5.09	4.53	4.59
1910	5.18	5.04	3.99	3.88	6.20	6.03	5.23	5.09
1911	5.45	5.76	3.40	3.59	7.98	8.43	5.63	5.95
1912	5.69	5.64	1.06	4.02	6.41	6.35	5.75	5.70
1913	2.83	2.78	2.27	2.23	1.99	1.95	2.56	2.51
1914	5.02	5.05	2.09	2.10	2.77	2.79	3.52	3.54
1915	5.24	5.16	1.09	4.03	3.62	3.57	4.88	4.81
1916	5.10	4.09	3.32	2.66	4.80	3.80	4.77	3.82
1917	6.99	4.08	4.32	2.52	4.98	2.90	6.04	3.52
1918	7.59	3.96	4.62	2.41	6.57	3.43	7.19	3.75
1919	8.10	4.00	6.01	2.97	6.04	2.98	7.63	3.77
1920	10.26	4.56	6.80	3.06	7.69	3.41	9.48	4.21
1921	9.14	6.42	6.06	4.68	5.25	3.69	8.56	6.01
1922	8.70	6.16	6.35	4.50	7.30	5.17	8.37	5.93
1923	9.87	6.72	9.23	6.29	6.85	4.69	9.06	6.17
1924	8.71	6.08	5.05	3.52	9.33	6.51	6.75	4.71
1925	8.52	5.64	6.04	4.00	8.02	5.31	7.79	5.16
1926	6.14	4.21	5.49	3.76	6.16	4.23	6.07	4.16
1927	8.48	6.09	6.12	4.39	6.90	4.88	7.79	5.59
1928	8.43	5.97	9.43	6.68	5.09	3.54	7.59	5.37
1929	7.90	5.68	8.28	4.52	3.96	2.85	6.08	4.37
1930	8.15	6.46	6.66	5.28	5.61	4.45	7.29	5.78
1931	6.61	6.20	5.35	5.02	5.57	5.22	6.17	5.79
1932	5.93	6.27	6.31	6.67	4.85	5.13	5.93	6.27
1933	4.36	4.53	5.91	6.15	3.51	3.65	4.34	4.51
1934	4.96	4.64	5.59	5.11	3.67	3.36	4.06	4.48

[1] On basis of purchasing power of the dollar as determined by the Bureau of Labor Statistics.

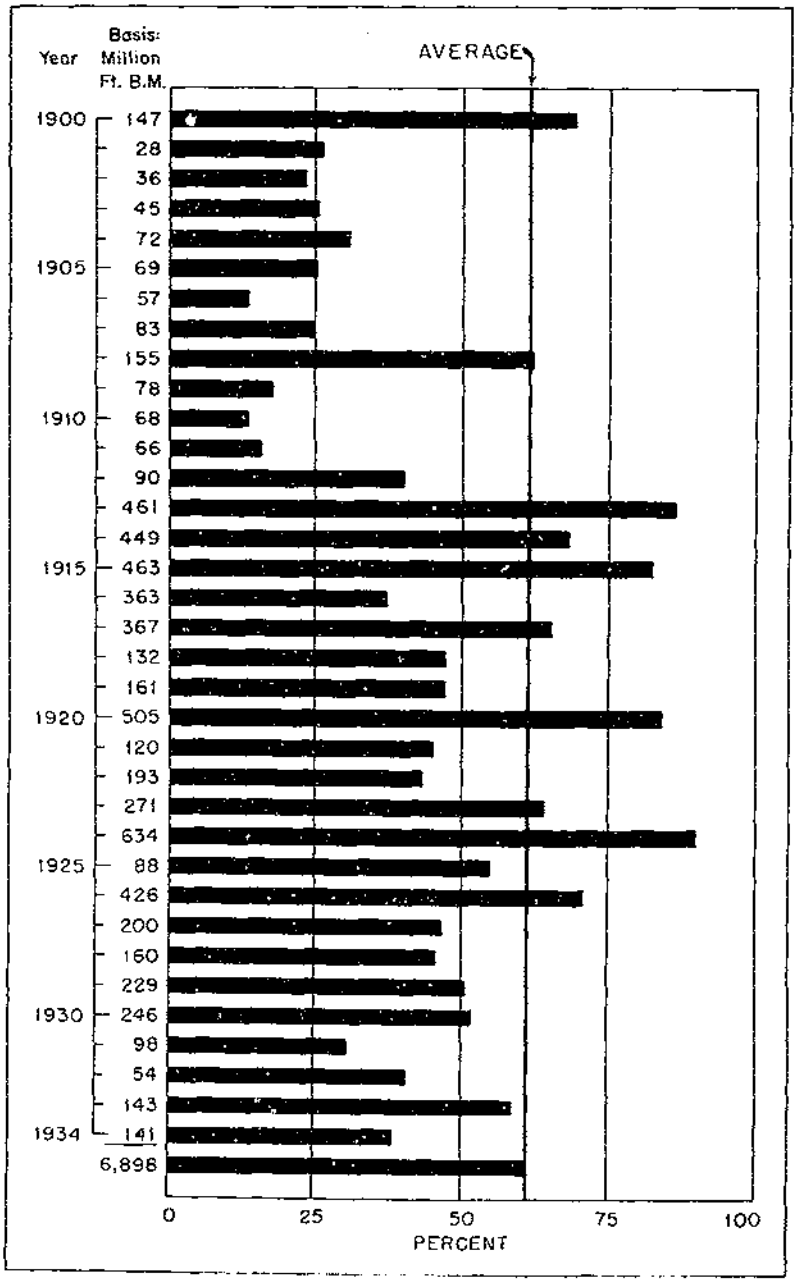

FIGURE 8. Proportion of privately owned timber reported in flat-rate sales in the Northeast, 1900-1934.

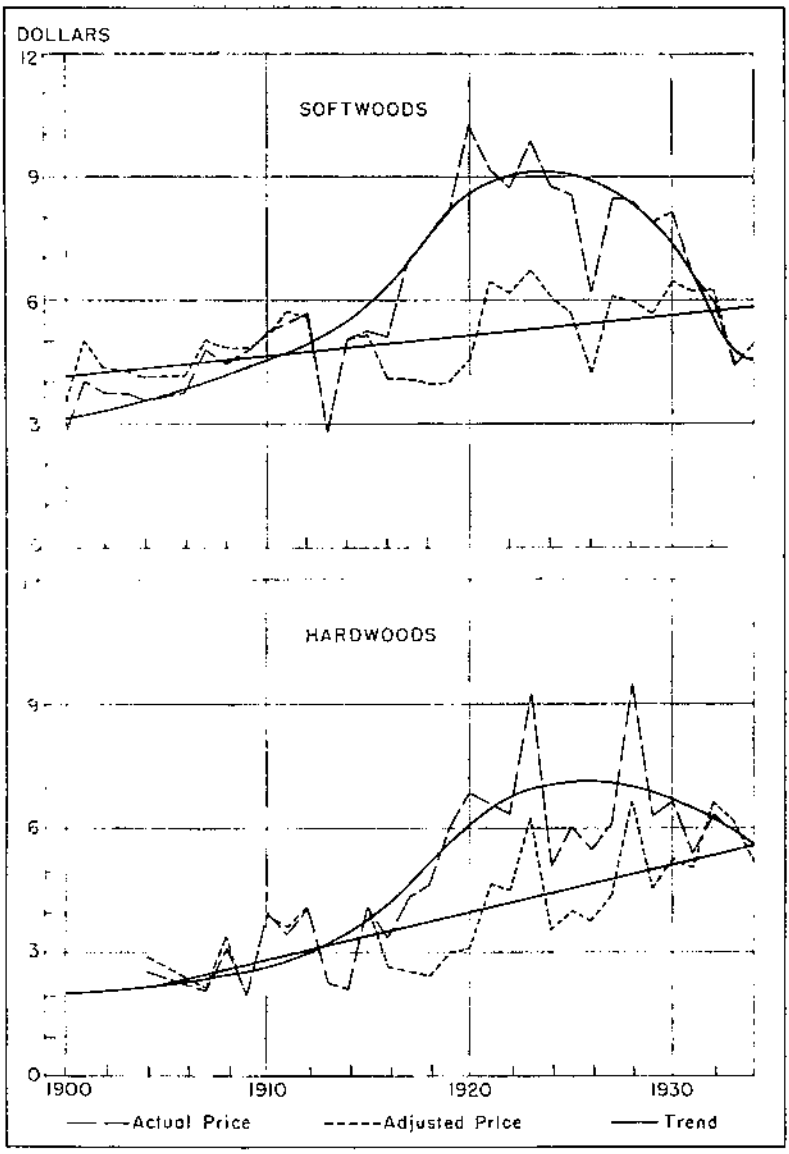

FIGURE 9.—Northeastern stumpage prices, actual and adjusted, with indicated trends: softwoods and hardwoods; 1900–1934. (Basis, million feet board measure: Softwoods 4,303; hardwoods 920.)

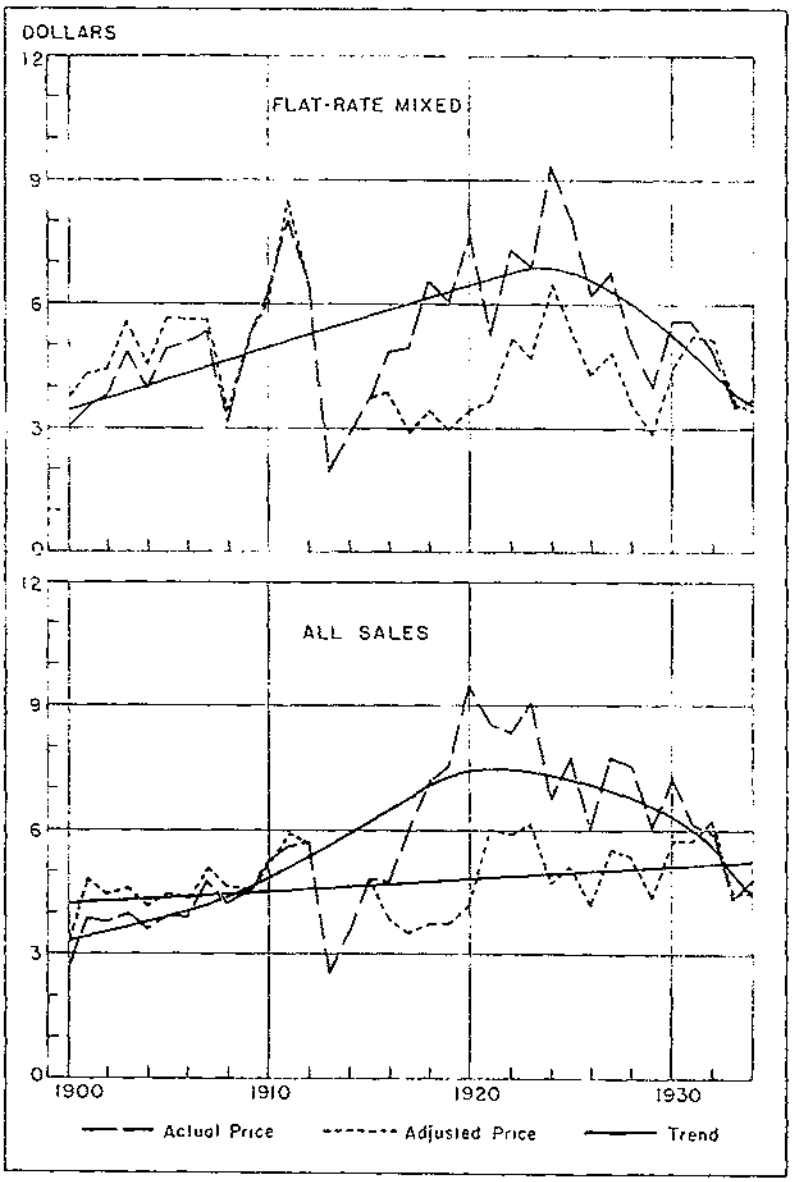

FIGURE 10.—Northeastern stumpage prices, actual and adjusted, with indicated trends; flat-rate mixed and all sales; 1900–1934. (Basis, million feet board measure. Flat-rate mixed 1,675; all sales 6,808.)

TABLE 8.—*Actual and adjusted average annual prices of softwoods, hardwoods, flat-rate-mixed, and all sales of stumpage in the Northeast, 1900–1934.*—Continued

INDEX NUMBERS OF PRICE

Year	Softwoods		Hardwoods		Flat-rate-mixed		All sales	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1900	65	59			111	135	76	93
1901	99	122			127	157	110	137
1902	92	107			139	161	109	126
1903	91	105			177	203	114	131
1904	87	100	97	111	143	165	103	118
1905	88	101			180	205	112	127
1906	92	102			186	206	111	123
1907	117	123	78	82	195	205	136	143
1908	109	119	118	128	114	124	120	131
1909	116	118	76	77	153	156	128	130
1910	126	123	152	149	226	220	148	144
1911	138	140	130	138	291	308	159	169
1912	138	136	156	154	234	232	163	161
1913	69	68	87	85	73	71	73	71
1914	122	123	80	80	101	102	100	100
1915	127	126	156	154	132	130	138	136
1916	124	100	127	102	177	142	135	108
1917	170	100	165	97	152	106	171	100
1918	185	97	176	92	240	125	204	106
1919	197	98	229	114	220	109	216	107
1920	250	111	263	117	281	124	269	119
1921	322	187	254	170	192	135	243	170
1922	212	150	242	172	266	189	237	168
1923	240	164	352	241	251	171	257	175
1924	212	148	193	135	341	238	191	133
1925	207	138	231	153	286	191	221	146
1926	149	103	210	144	226	154	172	118
1927	206	140	234	158	246	178	221	158
1928	305	146	360	256	183	129	215	152
1929	192	139	240	173	145	104	172	124
1930	198	158	254	202	205	162	207	164
1931	161	151	204	192	203	191	175	164
1932	144	153	241	256	177	187	168	178
1933	106	110	226	236	128	133	123	128
1934	121	111	213	196	134	123	139	127

The most striking feature in figures 9 and 10 is the unmistakable upward trend of the average of all hardwood prices when adjusted for the purchasing power of the dollar, particularly from 1918 to 1934, despite the distinct downward trend in actual and adjusted softwood stumpage prices in recent years. The influence of the hardwoods is sufficiently great to affect materially the average of all sales and to result in an upward trend of the adjusted prices of all sales from 1916 to 1934.

REGION I NORTH ATLANTIC

The North Atlantic region, comprising Delaware, Maryland, New Jersey, and Pennsylvania, is the smallest of the regions. The principal commercial trees here are somewhat similar to those in the Northeast. The spruce-fir type does not occur, but Pennsylvania supported at one time some of the finest stands of northern white pine in the country. Hemlock, oak, hickory, and maple are other important species.

The stumpage-price record of this region is based on approximately 1,250 million feet of timber, of which softwoods comprise about 200 million; hardwoods, 650 million; and flat-rate mixed, about 400 million feet. Sixty-six percent of the timber reported sold during the period 1900–1934 was in flat-rate sales (fig. 11). Table 9 and figures 11, 12, and 13 show the stumpage price records for this region by type of sale, prices, and trends in a manner similar to that used for the northeastern region.

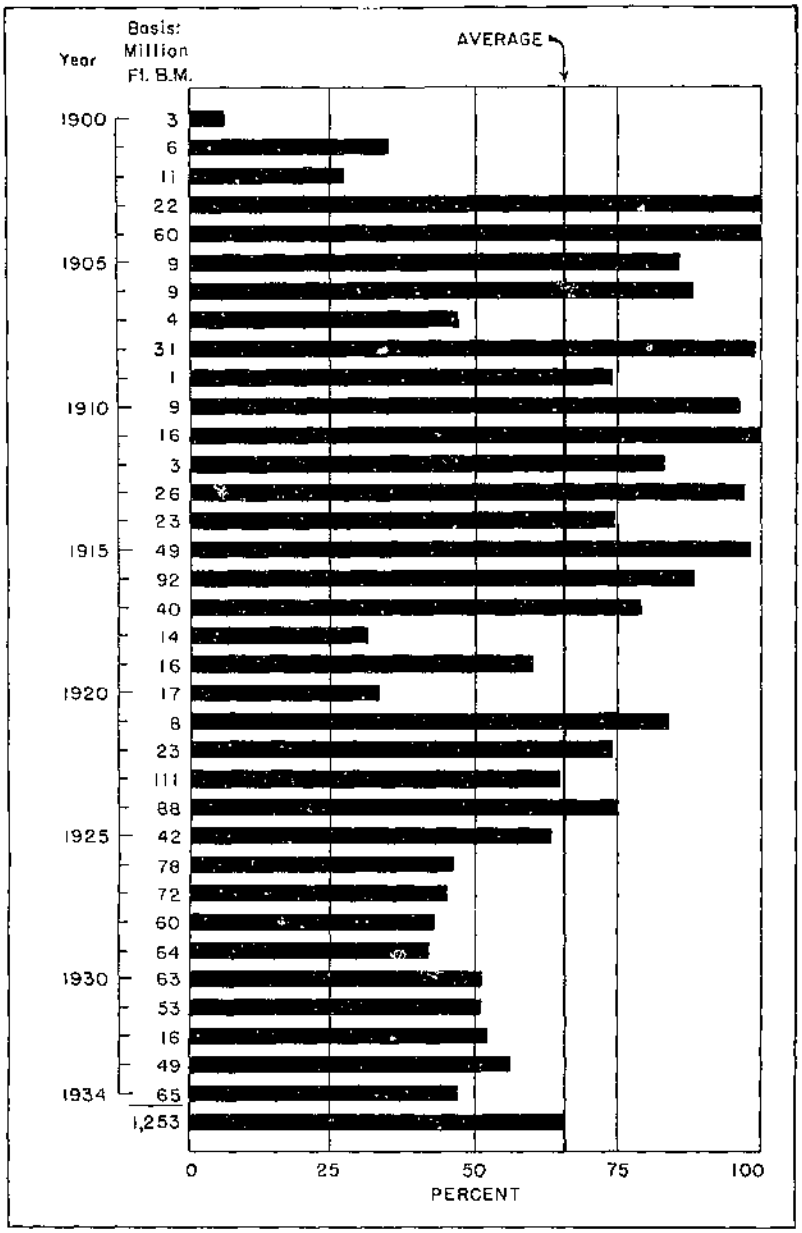

FIGURE 11.—Proportion of privately owned timber in the North Atlantic region reported in flat-rate sales, 1900-1934.

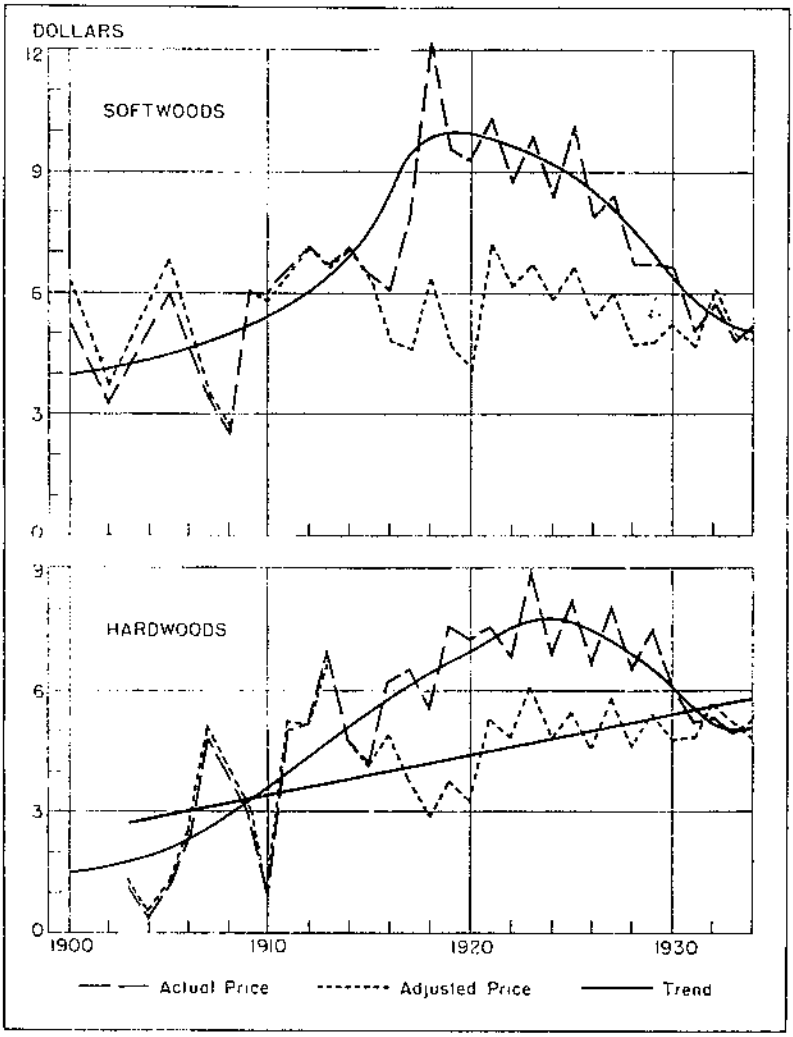

FIGURE 12.—North Atlantic stumpage prices, actual and adjusted, with indicated trends; softwoods and hardwoods; 1900-1934. (Basis, million feet board measure: Softwoods, 210; hardwoods, 663.)

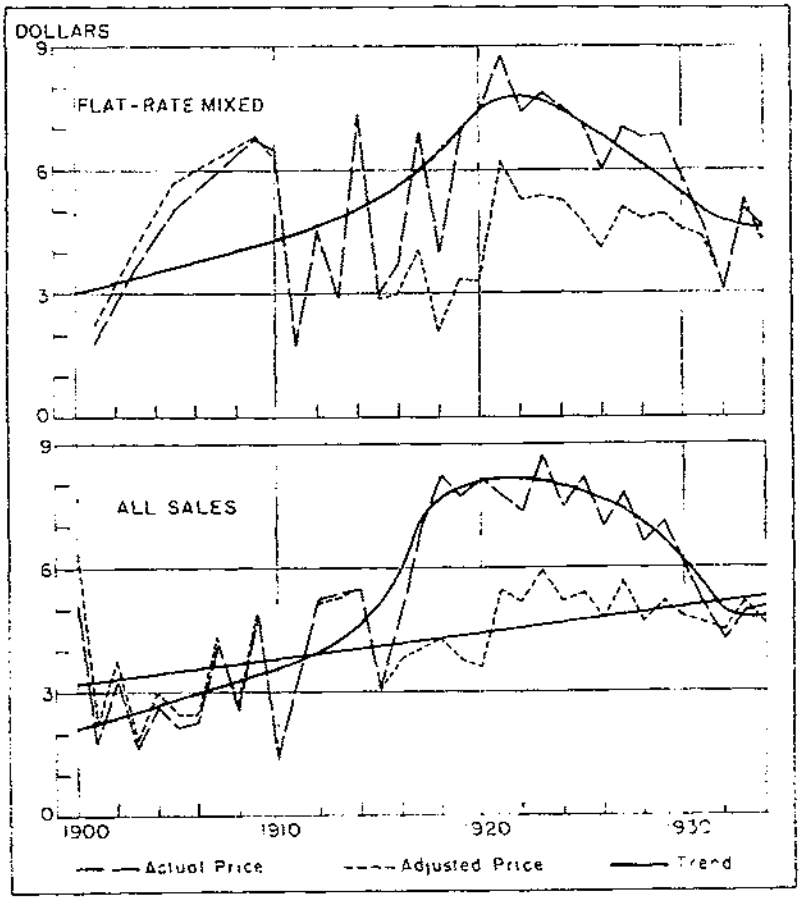

FIGURE 18.—North Atlantic stumpage prices, actual and adjusted, with indicated trends, flat-rate mixed and all sales; 1900-1934. (Basis, million feet board measure. Flat-rate mixed, 389, all sales, 1,253

TABLE 9.—*Actual and adjusted*[1] *average annual prices of softwoods, hardwoods, flat-rate mixed, and all sales of stumpage in the North Atlantic region, 1900–1934*

PRICE IN DOLLARS

Year	Softwoods		Hardwoods		Flat-rate mixed		All sales	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1900	$5.30	$6.47			$1.75	$2.17	$5.30	$6.47
1901	3.25	3.78					1.75	2.17
1902			$1.19	$1.37	3.53	4.06	3.25	3.78
1903			.39	.45			1.02	1.86
1904	5.00	6.84	1.12	1.28	5.00	5.70	2.62	3.01
1905			2.25	2.70			2.15	2.46
1906	3.42	3.59	4.82	5.06			2.25	2.50
1907	2.50	2.72					4.11	4.32
1908	6.00	6.08	3.00	3.04	6.72	6.81	2.53	2.76
1909	6.00	5.84	.08	.95	6.46	6.29	4.87	4.93
1910			5.02	5.30	1.70	1.80	1.37	1.33
1911	7.15	7.09	5.12	5.07	4.55	4.51	3.37	3.36
1912	6.76	6.63	6.87	6.74	2.95	2.89	5.23	5.18
1913	7.10	7.14	4.71	4.74	7.35	7.39	5.37	5.27
1914	6.45	6.35	4.16	4.10	2.90	2.86	5.49	5.52
1915	6.66	4.85	6.14	4.92	3.73	2.99	3.11	3.06
1916	7.95	4.63	6.50	3.79	6.03	4.04	4.74	3.80
1917	12.22	6.38	5.52	2.88	3.92	2.05	6.90	4.02
1918	9.53	4.71	7.57	3.74	6.51	3.36	8.22	4.29
1919	9.27	4.12	7.24	3.21	7.43	3.30	7.69	3.80
1920	10.32	7.24	7.52	5.26	8.77	6.16	8.10	3.60
1921	8.71	6.17	6.79	4.81	7.37	5.22	7.74	5.43
1922	9.89	6.74	8.88	6.05	7.89	5.37	7.33	5.19
1923	8.37	5.84	6.86	1.80	7.52	5.25	8.71	5.93
1924	10.09	6.68	8.17	5.11	7.14	4.73	7.48	5.10
1925	7.85	5.40	6.60	4.52	5.07	1.69	8.15	5.40
1926	8.40	6.03	7.99	5.74	7.06	5.06	6.99	1.70
1927	6.74	4.77	6.47	4.58	6.70	4.81	7.81	5.61
1928	6.72	4.83	7.46	5.36	6.85	4.93	6.60	4.67
1929	6.65	5.27	6.02	4.77	5.72	4.54	7.17	5.16
1930	5.04	1.73	5.12	4.80	4.67	4.38	6.06	4.81
1931	5.76	6.11	5.30	5.60	3.03	3.20	5.01	4.70
1932	4.80	4.99	4.01	5.11	5.10	5.30	4.25	4.49
1933	5.27	4.82	5.28	4.81	4.59	4.20	4.05	5.15
1934							5.05	4.62

INDEX NUMBERS OF PRICE

1900	75	92	112	136			117	143
1901					52	64	39	48
1902	46	54					72	83
1903			25	28	105	120	36	41
1904			8	9			58	66
1905	85	97	23	26	149	169	48	54
1906			46	52			50	55
1907	49	51	100	104			91	95
1908	35	39					56	61
1909	85	87	62	63	200	202	106	109
1910	85	83	20	20	102	187	30	28
1911			104	100	31	33	75	79
1912	102	101	106	105	135	134	116	114
1913	96	94	142	139	85	86	110	116
1914	101	102	97	98	219	210	121	122
1915	92	90	86	85	86	85	89	86
1916	86	69	127	101	111	89	105	84
1917	113	66	134	78	206	120	153	89
1918	174	91	114	50	117	61	182	95
1919	136	67	156	77	203	100	170	84
1920	132	59	150	66	221	98	179	79
1921	147	103	155	109	261	188	171	120
1922	124	88	140	99	219	155	162	115
1923	141	96	183	125	235	159	103	131
1924	119	83	142	99	224	156	164	115
1925	144	95	169	112	213	140	180	119
1926	112	77	136	93	178	121	155	106
1927	126	86	165	118	210	150	173	124
1928	96	68	134	94	202	143	146	103
1929	96	69	154	111	204	146	159	114
1930	95	75	124	98	170	135	134	106
1931	72	87	106	99	139	130	111	104
1932	92	97	110	115	99	95	94	99
1933	88	71	101	105	152	157	110	114
1934	75	69	109	99	137	125	112	102

[1] On basis of purchasing power of the dollar as determined by the Bureau of Labor Statistics.

Actual prices of softwoods (fig. 12) would not have declined as they have done if available supplies of white pine timber in this region had not been seriously depleted. The original stands of white pine, by far the most valuable softwood species, were largely logged, or sold to concerns which eventually logged them, prior to the period covered by this bulletin. Some white pine was left standing, however, probably in small tracts, and sales of this timber during the first half of the period were largely responsible for the distinct upward trend in the average price of all sales up to 1920. A part, at least, of the price decline since that year is due to the decreasing amount of white pine sold at relatively high prices and the increasing amount of species previously considered as of little or no value, such as hemlock and certain inferior hardwoods. This condition is not peculiar to this region but is equally true in other parts of the East where the best of the timber was removed several decades ago. In other words, the price decline during the last 15 or 20 years is due not to the fact that timber of comparable quality sold for constantly decreasing prices, but rather, to the sale of increasingly large volumes of the less valuable species at prices very much lower than those which would have been paid for the more valuable kinds of timber.

As in the Northeast, the greater stability of hardwood prices when adjusted for the purchasing power of the dollar is very evident, and the long-time trend of hardwood prices is distinctly upward (fig. 12). Hardwoods are of sufficient importance in the region to more than offset the decline in softwood prices and the result is a practical stabilization of the average price of all sales (adjusted for the purchasing power of the dollar) during the last 15 years.

REGION 2—LAKES

The Lakes region, comprising the States of Michigan, Minnesota, and Wisconsin, at one time contained the largest and finest bodies of northern white and Norway pine in the country. A brief history of logging in this region has been given (p. 18). There is probably no other region in the United States for which it is so difficult to obtain stumpage-price records that over a long period will show price changes on a comparable basis. The early lumbermen considered the pines to be the only trees of real value. Hemlock and hardwoods were not considered of any appreciable value, and many thousands of acres of land were cut over principally for the pine. As the original stands of pine approached depletion, species considered valueless only a few years previous found a market, and their values increased as time went on. The bulk of the privately owned pine timber in these three States was either logged prior to the period covered by this study or was held by lumber companies for future logging. Such records and data as have been obtained prior to 1900 are given in a later section (p. 80). In this regional treatment of price records the four major types of sales only will be briefly discussed.

The record given in table 10 for the Lakes region is based on approximately 28 billion feet of timber, of which 88 percent was in flat-rate sales (fig. 14); softwoods comprised nearly 5 billion feet; hardwoods 1½ billion feet; and flat-rate mixed, over 22 billion feet. The bulk of the timber reported in flat-rate mixed sales consisted of hemlock and hardwoods, and shows a remarkably steady trend up to 1930 (figs. 15 and 16).

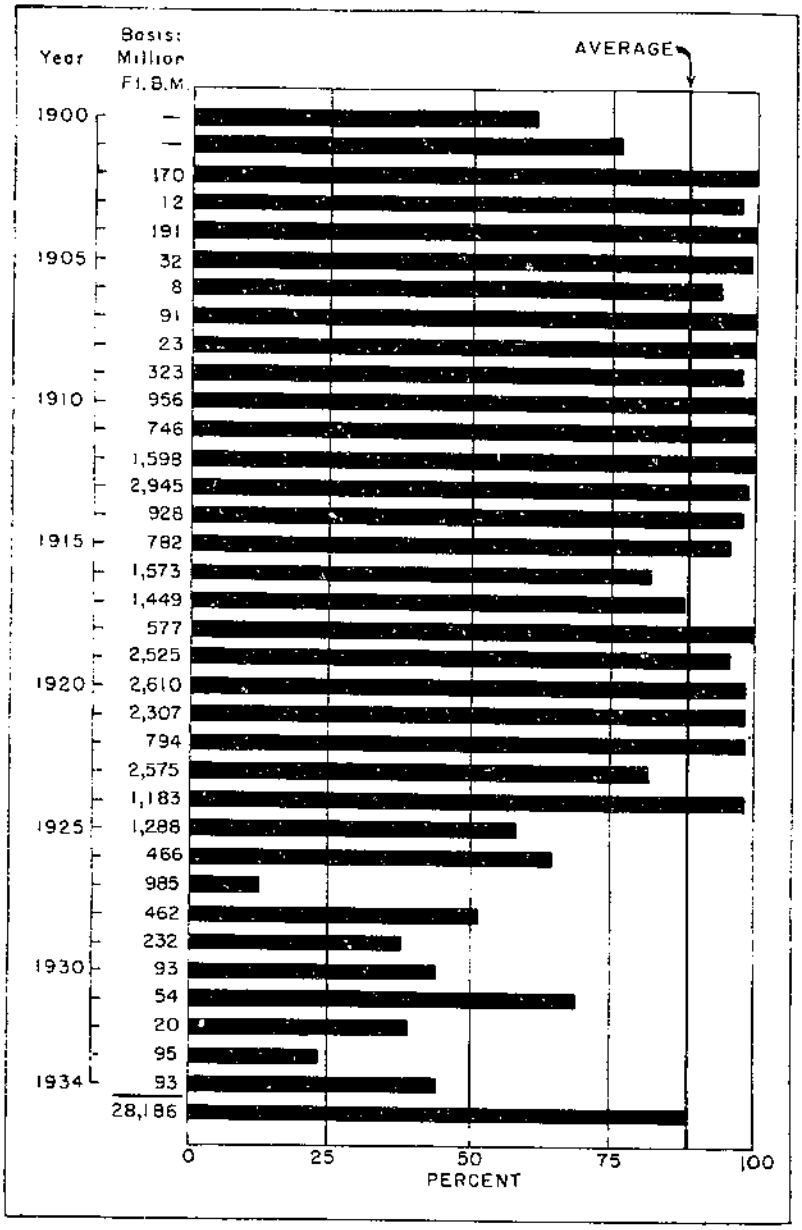

FIGURE 14.—Proportion of privately owned timber in the Lakes region reported in flat-rate sales, 1900–1934. Basis for 1900 and for 1901 is less than 0.5 million feet board measure.

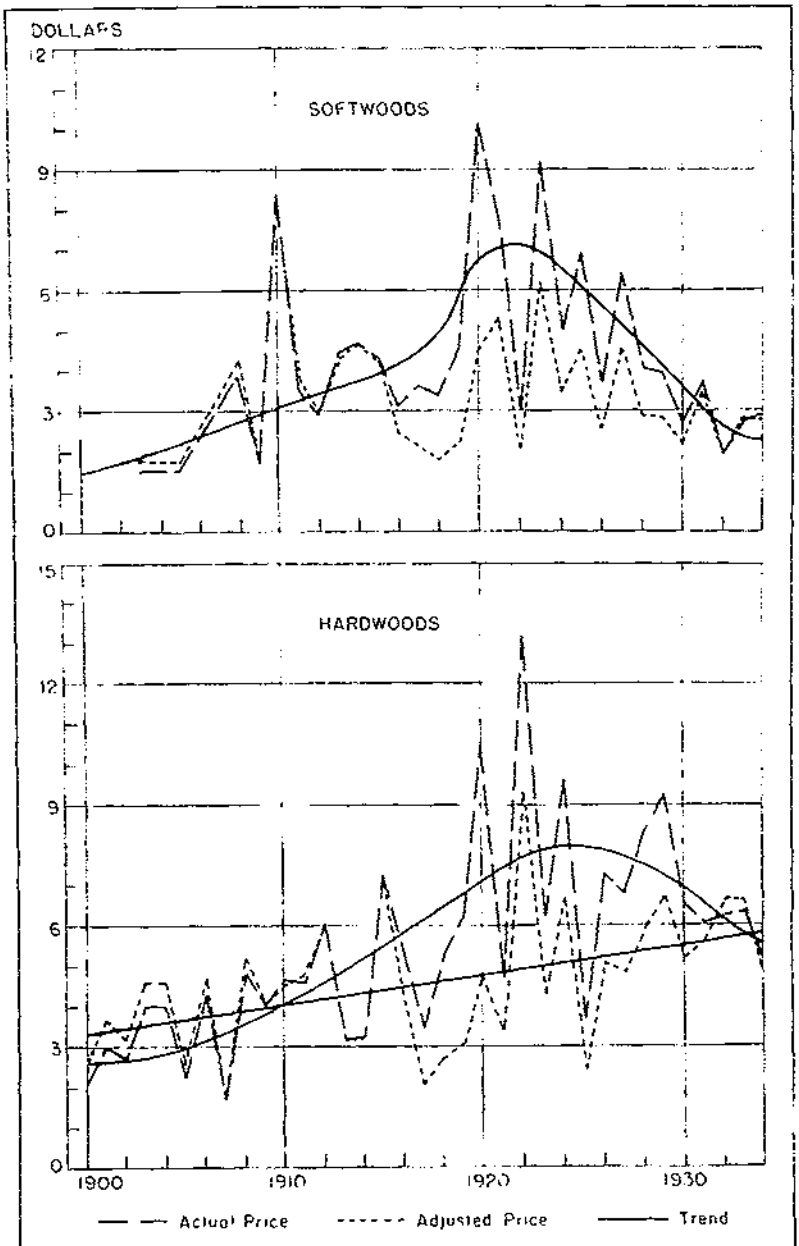

FIGURE 15. Lake States stumpage prices, actual and adjusted, with indicated trends; softwoods and hardwoods: 1900-1934. (Basis, million feet board measure: Softwoods 4,705; hardwoods 1,429.)

The irregularity of softwoods and hardwoods is due in part, at least, to the scarcity of the data (12 percent) on individual sales. There has been a decline in actual prices in recent years in this region as in those which have been previously considered. It is interesting to note that

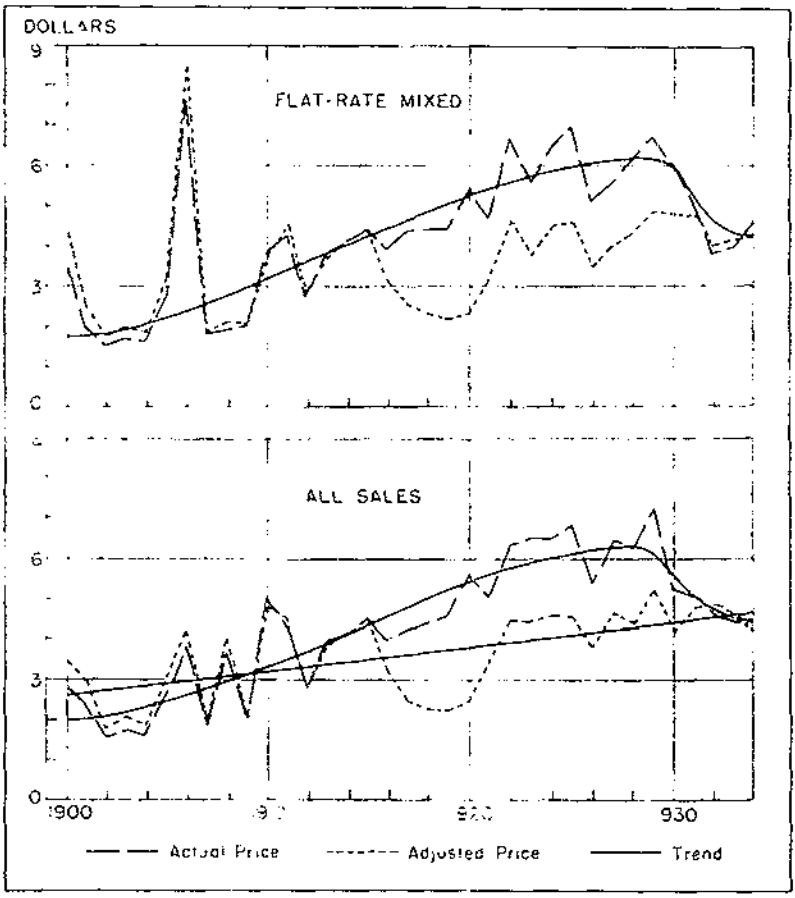

FIGURE 16.—Lake States stumpage prices, actual and adjusted, with indicated trends: flat-rate mixed and all sales; 1900–1931. (Basis, million feet board measure. Flat-rate mixed 22,652; all sales 28,166.)

in spite of the constantly increasing use of species once considered inferior, such as aspen and jack pine, the adjusted average price of all stumpage sales has maintained its level since 1922, and that the general trend of adjusted prices since 1920 has been upward.

TABLE 10. *Actual and adjusted[1] average annual prices of softwoods, hardwoods, flat-rate mixed, and all sales of stumpage in the Lakes region, 1900–1934*

PRICE IN DOLLARS

Year	Softwoods		Hardwoods		Flat-rate mixed		All sales	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1900			$2.00	$2.44	$3.71	$4.53	$2.86	$3.49
1901			3.00	3.72	2.04	2.53	2.42	3.00
1902			2.67	3.11	1.54	1.79	1.54	1.79
1903	$1.50	$1.72	4.00	4.60	1.74	2.00	1.77	2.03
1904			4.00	4.59	1.63	1.78	1.63	1.87
1905	1.50	1.71	2.26	2.58	2.79	3.18	2.78	3.17
1906			4.27	4.74	7.63	8.46	3.82	4.24
1907			1.67	1.75	1.81	1.90	1.81	1.90
1908	3.92	4.27	4.85	5.26	1.93	2.10	3.68	4.01
1909	1.77	1.79	4.00	4.05	2.02	2.05	2.00	2.03
1910	8.09	7.87	4.66	4.53	3.86	3.76	4.98	4.85
1911	3.50	3.70	4.55	4.80	4.29	4.53	4.29	4.53
1912	2.88	2.85	6.01	5.96	2.78	2.75	2.78	2.75
1913	4.40	4.32	3.19	3.13	3.82	3.75	3.97	3.89
1914	4.67	4.70	3.19	3.21	4.09	4.11	4.10	4.12
1915	4.31	4.25	7.29	7.18	4.45	4.38	4.50	4.43
1916	3.07	2.46	5.27	4.22	3.55	3.16	3.91	3.13
1917	4.62	2.11	3.44	2.01	4.38	2.55	4.16	2.43
1918	3.39	1.77	5.22	2.72	4.42	2.31	4.32	2.26
1919	4.48	2.21	6.21	3.07	4.46	2.20	4.52	2.23
1920	8.90	4.42	10.55	4.68	5.34	2.37	5.61	2.49
1921	7.62	5.35	4.68	3.20	4.64	3.29	5.03	3.53
1922	3.02	2.14	13.21	9.35	6.61	4.68	6.32	4.47
1923	9.17	6.24	6.19	4.22	5.55	3.78	6.50	4.43
1924	4.92	3.43	9.71	6.78	6.46	4.51	6.50	4.54
1925	6.90	4.57	3.57	2.36	7.00	4.63	6.35	4.52
1926	3.67	2.51	7.36	5.04	5.11	3.50	5.39	3.69
1927	6.42	4.61	6.75	4.85	5.58	4.01	6.45	4.63
1928	4.03	2.85	8.33	5.90	6.13	4.34	6.23	4.41
1929	3.94	2.83	9.29	6.68	6.75	4.86	7.22	5.19
1930	2.72	2.16	8.51	6.16	6.06	4.81	5.27	4.18
1931	3.71	3.51	6.05	5.67	5.09	4.77	5.03	4.72
1932	1.93	2.04	6.29	6.65	3.81	4.03	4.61	4.87
1933	2.73	2.84	6.38	6.64	3.99	4.15	4.44	4.62
1934	2.98	2.73	5.19	4.75	4.56	4.17	4.39	4.02

INDEX NUMBERS OF PRICE

1900			61	75	102	125	73	90
1901			92	114	56	70	62	78
1902			82	96	42	49	39	46
1903	29	34	123	142	48	55	45	53
1904			123	141	45	52	42	48
1905	29	34	69	79	76	88	71	82
1906			131	146	209	233	98	110
1907			51	54	50	52	46	49
1908	75	84	149	162	53	58	94	104
1909	34	35	123	125	55	56	51	53
1910	156	154	143	139	106	104	128	126
1911	67	73	140	148	118	125	110	117
1912	55	56	184	183	76	76	71	71
1913	85	85	98	96	105	103	102	101
1914	90	92	98	99	112	113	105	107
1915	83	83	224	221	122	121	115	115
1916	59	48	162	130	108	87	100	81
1917	70	41	106	62	120	70	107	63
1918	65	35	160	84	121	64	111	59
1919	86	43	190	94	122	61	116	58
1920	192	87	324	144	146	65	144	65
1921	147	105	144	101	127	90	129	91
1922	58	42	405	288	181	129	162	116
1923	176	122	190	130	152	104	167	115
1924	95	67	298	209	177	124	167	118
1925	133	90	110	73	192	128	175	117
1926	71	49	226	155	140	96	138	96
1927	123	90	207	149	153	110	165	120
1928	78	56	256	182	168	120	160	114
1929	76	55	285	206	185	134	185	134
1930	52	42	200	159	166	133	135	108
1931	72	69	186	174	139	131	129	122
1932	37	40	193	205	104	111	118	126
1933	53	56	196	204	109	114	114	120
1934	57	54	159	146	125	115	113	104

[1] On basis of purchasing power of the dollar as determined by the Bureau of Labor Statistics.

REGION 3—CENTRAL

The Central region, in which are included Illinois, Indiana, Kentucky, Missouri, Ohio, Tennessee, and West Virginia, originally contained the finest bodies of hardwood timber in the country. The principal native species are oak and yellow poplar, and, on the higher slopes of the Appalachian Mountains, beech, birch, maple, and other hardwoods commonly associated with white pine and hemlock.

The reduction in the original forest area through clearing of land for agricultural purposes has been heaviest in the more fertile and more densely populated sections, where once dense stands of magnificent hardwoods occurred over immense areas. In spite of these early clearings, the Central region has been one of the principal sources of hardwoods during the last 35 years, and still is, despite constant overcutting and the resultant diminution of timber supplies.

The stumpage price record in the Central region is based on approximately 7.5 billion feet of timber, of which 83 percent was sold in flat-rate sales (fig. 17); softwoods occurring principally in the mountains of Kentucky, Tennessee, and West Virginia, together with shortleaf pine in Missouri, constituted approximately 0.25 billion feet; hardwoods over 4 billion feet; and flat-rate mixed, about 3 billion feet (table 11 and figs. 18 and 19).

The same general trend of hardwood prices (adjusted for the purchasing power of the dollar) noted in Regions 0, 1, and 2 occurs in this region. It is estimated that more than 80 percent of the timber sold in flat-rate mixed sales was hardwoods, which accounts for an upward trend in the adjusted prices for this type of sale since 1916 fully as striking as that for hardwoods alone. The same trend also holds true for the adjusted average prices of all sales, since the bulk of the timber is of the hardwood variety.

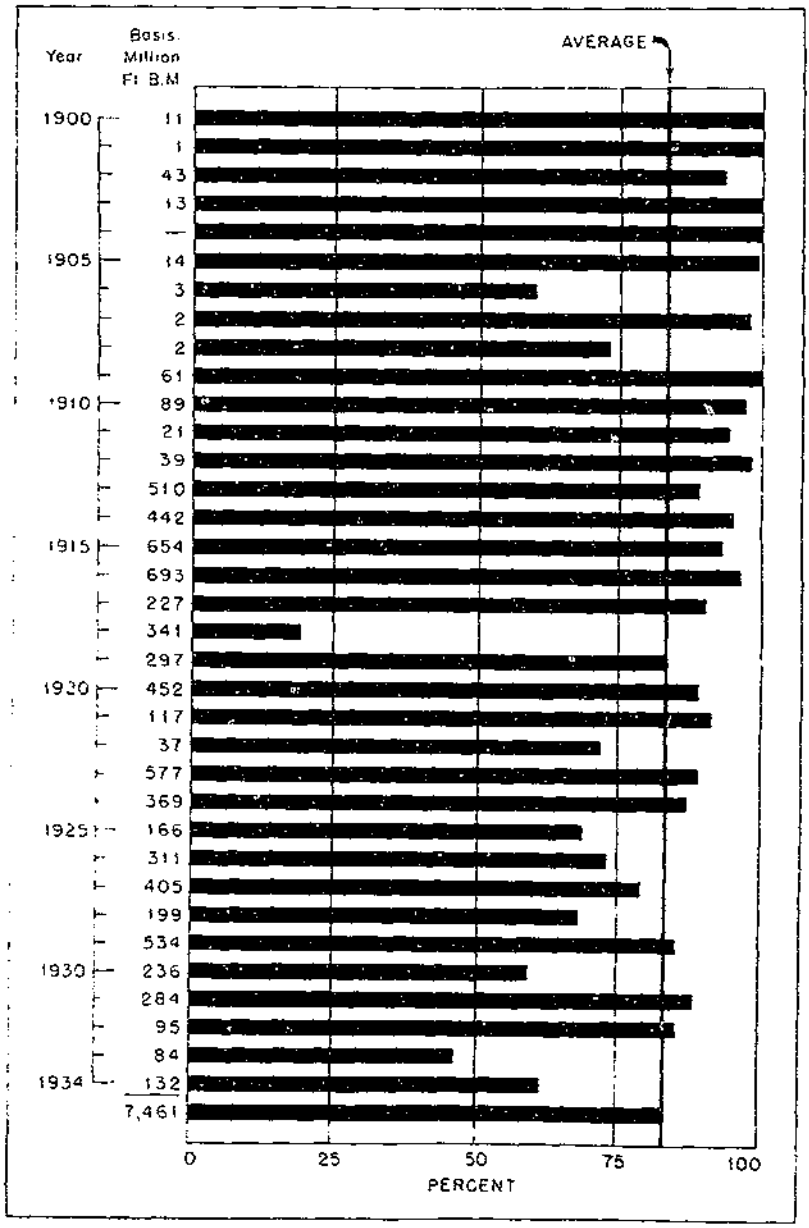

FIGURE 17.—Proportion of privately owned timber in the Central region reported in flat-rate sales, 1900–1934. (Basis for 1904 is less than 0.5 million feet board measure.)

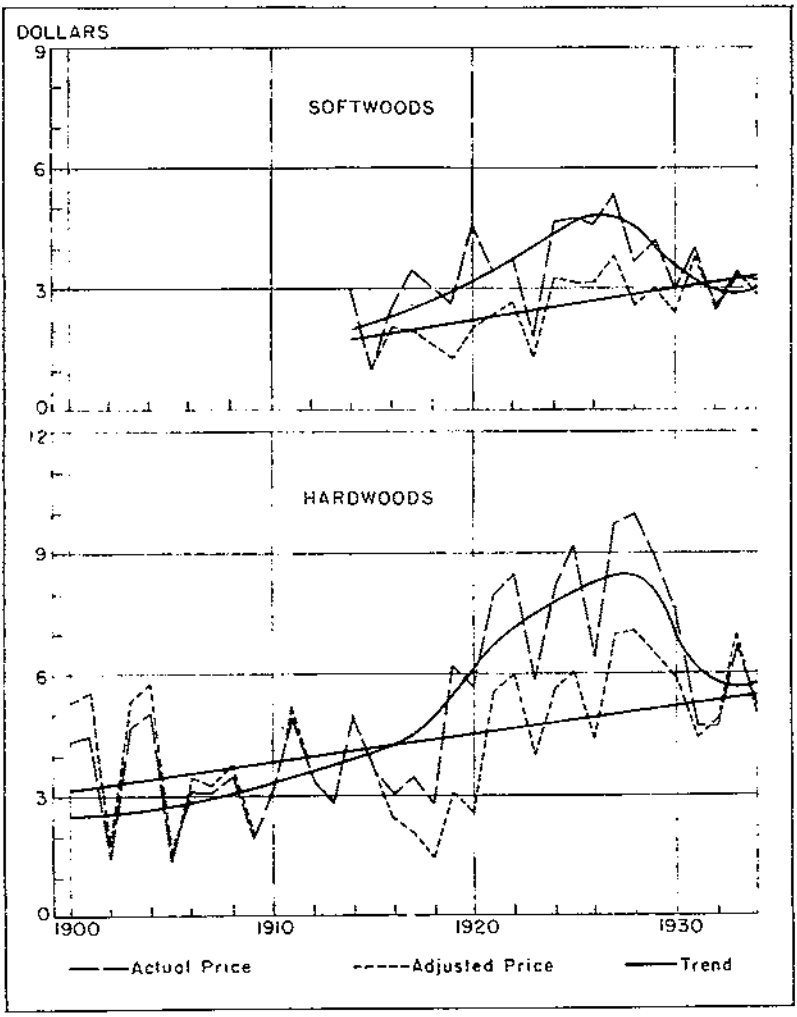

FIGURE 18.—Central region stumpage prices, actual and adjusted, with indicated trends; softwoods (1914–1931) and hardwoods (1900–1934). (Basis, million feet board measure: Softwoods, 224; hardwoods, 4,204.)

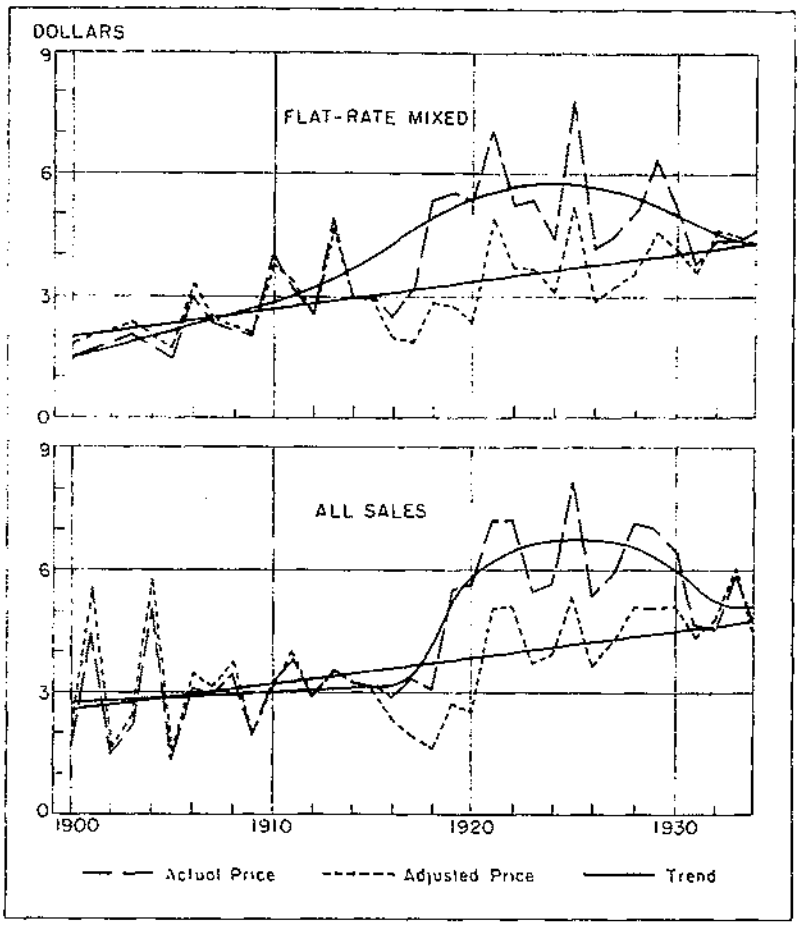

FIGURE 10.—Central region stumpage prices, actual and adjusted, with indicated trends; flat-rate mixed and all sales; 1900–1934. (Basis, million feet board measure: Flat-rate mixed, 3,033; all sales, 7,461.)

TABLE 11.—*Actual and adjusted*[1] *average annual prices of softwoods, hardwoods, flat-rate mixed, and all sales of stumpage in the Central region, 1900–1934*

PRICE IN DOLLARS

Year	Softwoods[2]		Hardwoods		Flat-rate mixed		All sales	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1900			$4.33	$5.29	$1.51	$1.84	$1.67	$2.04
1901			4.47	5.54			4.47	5.54
1902			1.44	1.67			1.44	1.67
1903			4.67	5.37	2.06	2.37	2.14	2.46
1904			5.06	5.80			5.06	5.80
1905			1.33	1.52	1.50	1.71	1.33	1.52
1906			3.11	3.45	3.00	3.33	3.10	3.44
1907			3.08	3.23	2.33	2.45	2.97	3.12
1908			3.48	3.79			3.48	3.79
1909			1.90	1.92	2.00	2.03	1.90	1.92
1910			3.23	3.14	4.00	3.89	3.23	3.14
1911			4.02	5.20	3.20	3.38	3.87	4.09
1912			3.34	3.31	2.50	2.48	2.90	2.87
1913			2.90	2.75	4.04	4.85	3.60	3.53
1914	$2.98	$3.00	4.98	5.01	2.91	2.93	3.24	3.26
1915	.99	.98	3.68	3.62	2.94	2.90	3.15	3.10
1916	2.57	2.09	4.00	2.40	2.45	1.99	2.90	2.32
1917	3.42	1.99	3.48	2.03	3.15	1.84	3.34	1.95
1918			2.75	1.44	5.38	2.81	3.06	1.61
1919	2.62	1.29	6.21	3.07	5.53	2.73	5.50	2.72
1920	4.55	2.02	5.60	2.53	5.31	2.36	5.57	2.52
1921	3.39	2.38	7.06	5.59	7.08	4.97	7.22	5.07
1922	3.74	2.65	8.47	6.00	5.19	3.67	7.25	5.13
1923	1.77	1.21	5.80	3.95	5.35	3.64	5.45	3.71
1924	4.65	3.25	8.05	5.62	4.34	3.03	5.67	3.96
1925	4.77	3.16	9.16	6.06	7.85	5.20	8.13	5.38
1926	4.55	3.12	6.35	4.35	4.12	2.82	5.34	3.66
1927	5.31	3.81	9.72	6.98	4.47	3.21	5.93	4.26
1928	3.61	2.56	9.94	7.04	5.02	3.55	7.17	5.08
1929	4.20	3.02	8.77	6.31	6.36	4.57	7.07	5.08
1930	2.97	2.36	7.44	5.90	5.25	4.16	6.49	5.15
1931	4.03	3.78	4.67	4.39	3.74	3.51	4.64	4.35
1932	2.40	2.54	4.81	4.87	4.36	4.61	4.55	4.81
1933	3.32	3.45	6.66	6.93	4.31	4.48	5.81	6.04
1934	3.15	2.88	5.13	4.69	4.60	4.21	4.84	4.43

INDEX NUMBERS OF PRICE

1900			134	166	42	52	49	60
1901			138	174			131	164
1902			45	52			42	49
1903			145	168	58	67	63	73
1904			157	182			148	172
1905			41	48	42	48	39	46
1906			96	108	84	94	91	102
1907			95	101	65	69	87	92
1908			108	119			102	112
1909			59	60	56	57	56	57
1910			100	98	112	109	95	93
1911			152	163	89	95	113	121
1912			103	104	70	70	85	85
1913			87	86	138	136	106	104
1914			154	157	81	82	95	96
1915			114	113	82	81	92	92
1916			93	75	69	56	85	69
1917			108	64	88	52	98	58
1918			85	45	150	70	90	48
1919			192	96	154	77	161	80
1920			176	79	148	66	166	75
1921			246	175	198	140	212	150
1922			262	188	145	103	213	152
1923			180	124	149	102	160	110
1924			249	176	121	85	166	117
1925			284	190	219	146	238	159
1926			197	136	115	79	157	108
1927			301	219	125	90	174	126
1928			308	221	140	100	210	150
1929			272	198	178	128	207	150
1930			230	185	147	117	190	152
1931			145	137	104	93	136	129
1932			143	153	122	129	133	142
1933			206	217	120	126	170	179
1934			159	147	128	118	142	131

[1] On basis of purchasing power of the dollar as determined by the Bureau of Labor Statistics.
[2] Since the record of softwood prices begins with 1914, index numbers on the 1910–14 base cannot be given.

REGION 4—NORTH CAROLINA PINE

From the standpoint of composition and characteristics of timber types, this region, which includes the Carolinas and Virginia, is similar to the northern part of Georgia, Alabama, and Mississippi. These three States have been considered as a separate region not because of great differences in the kinds and quality of the timber here and in the Southern region, but because the forests of these States are nearer the principal markets for lumber and other forest products, and because they were exploited very much earlier than were those of the Southern region as a whole.

The southern pines, with some cypress and gum near the coast, constitute the principal species in the eastern three-fourths of these States. The forests of the western fourth originally contained some of the finest hardwoods in the country, principally yellow poplar, oak, and associated species. The original stand of timber in the Appalachian Mountains was similar to that in the southeastern part of the Central region and consisted principally of yellow poplar, oak, beech, birch, maple, and other hardwoods which occur with white pine and hemlock.

As in the other eastern regions, a large part of the original timber of this region was logged prior to the period covered by this study. The price data for the years prior to 1900 will be discussed later. The stumpage price record for the period 1900–1934, based on approximately 11 billion feet of timber, is shown in table 12. Only 51 percent of the timber reported sold during this period was sold in flat-rate sales (fig. 20). Approximately 5 billion feet was softwoods; 1 billion, hardwoods; and 5 billion, flat-rate mixed. The accessibility of the forests of this region, particularly the southern pine forests of the coastal and Piedmont sections, has probably influenced to no small degree the relatively greater stability of stumpage prices here in recent years. This is the first region in which the trend of adjusted softwood stumpage prices has been distinctly upward since 1917 (fig. 21 and 22). It is largely because of this that the trend of all sales is also upward.

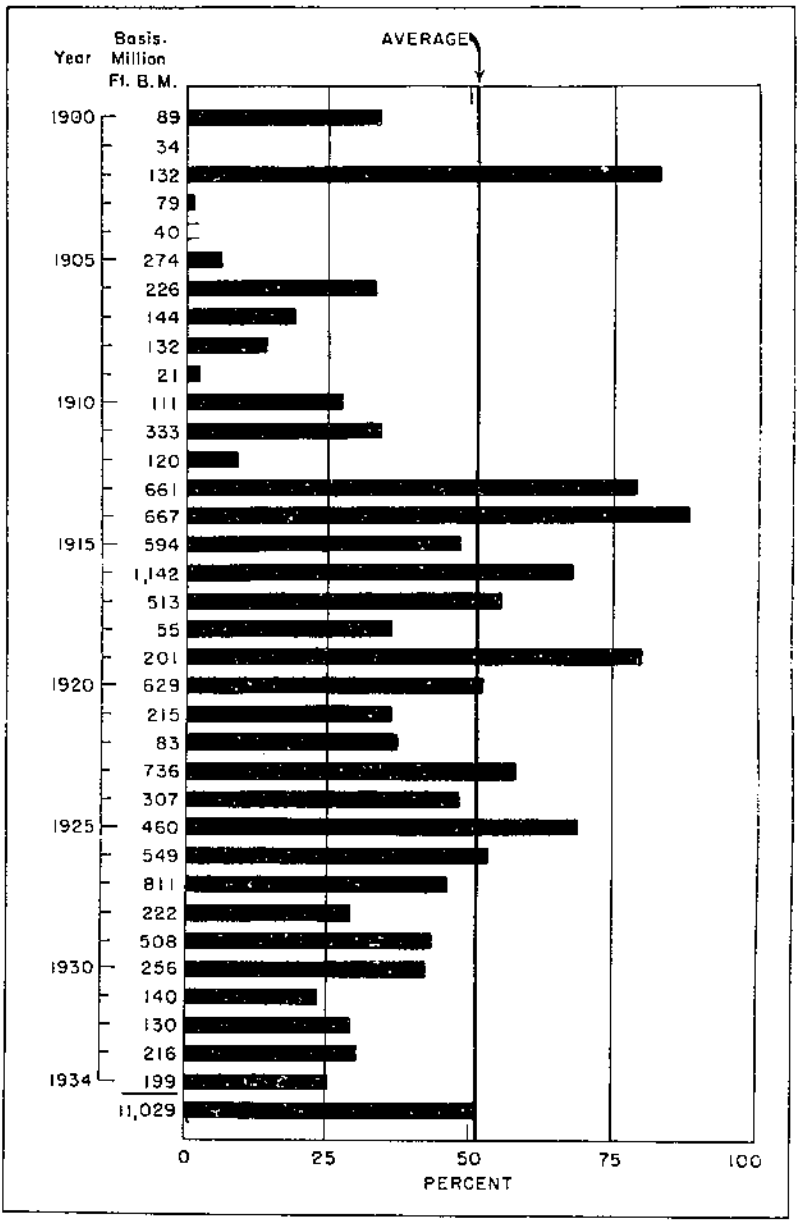

FIGURE 30.—Proportion of privately owned timber in the North Carolina Pine region reported on flat-rate sales, 1900-1934.

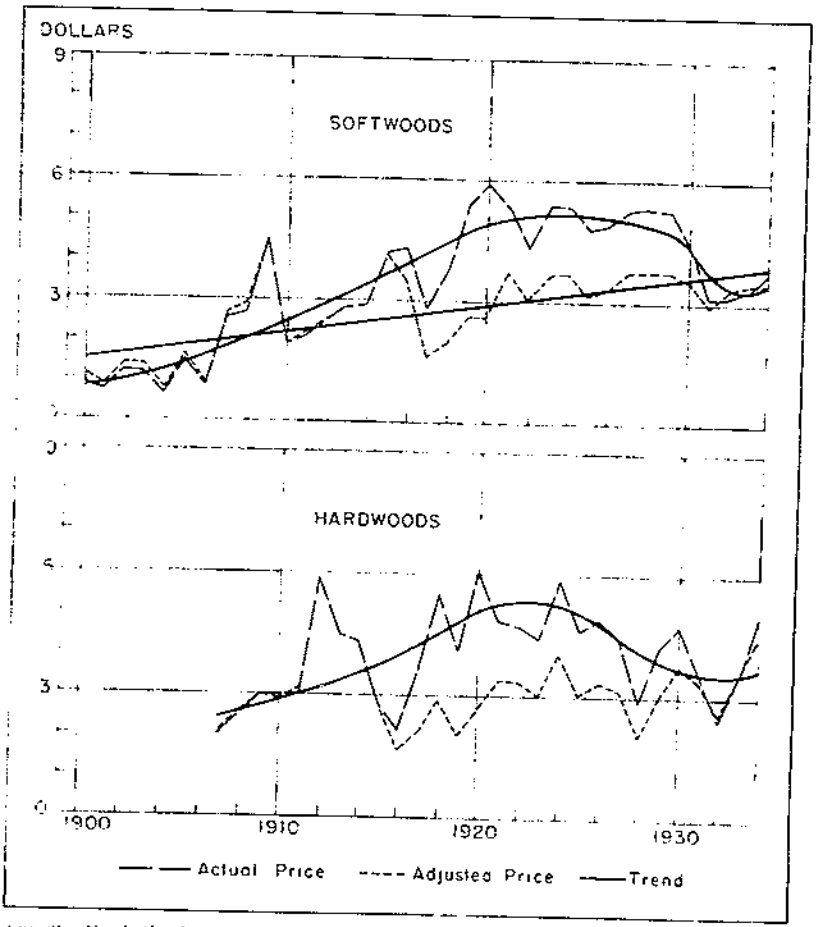

FIGURE 21.—North Carolina Pine region stumpage prices, actual and adjusted, with indicated trends softwoods (1900-1934) and hardwoods (1907-1934). (Basis, million feet board measure. Softwoods 4,888 hardwoods 1,187.)

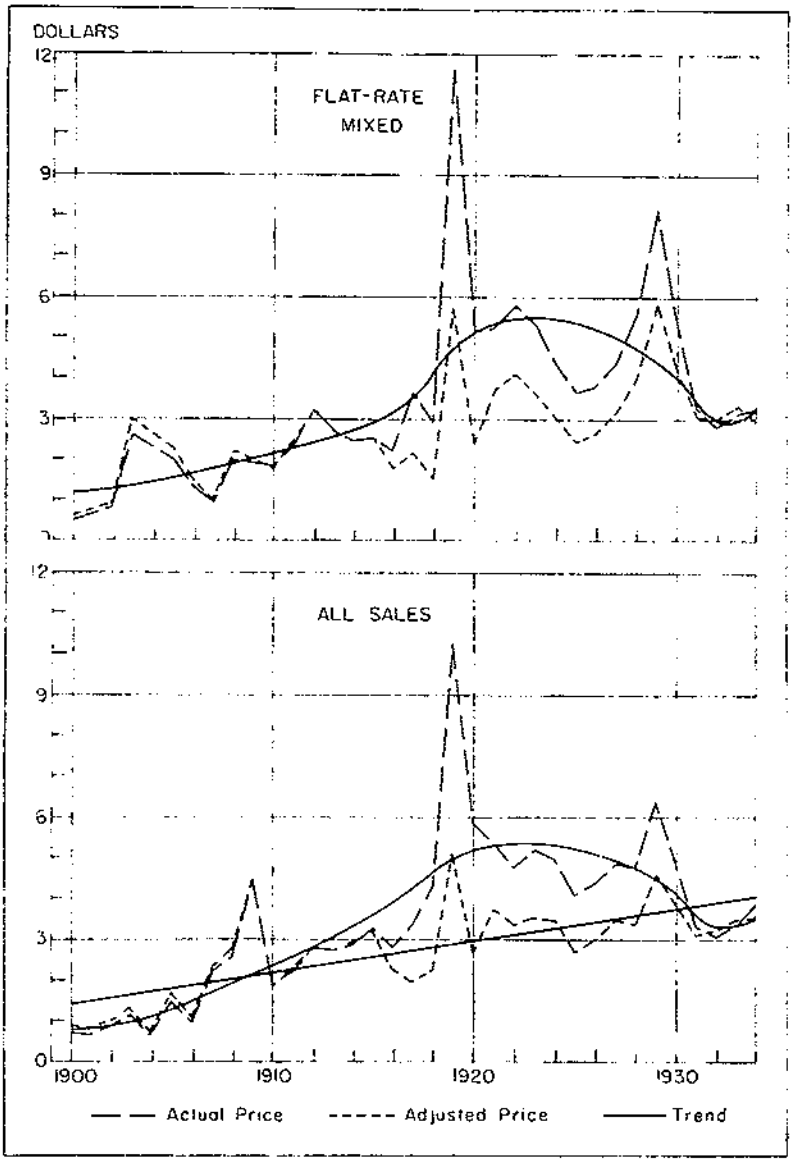

FIGURE 22.—North Carolina Pine region stumpage prices, actual and adjusted, with indicated trends, flat-rate mixed and all sales: 1900–1934. (Basis, million feet board measure. Flat-rate mixed 4,954; all sales 11,928.)

TABLE 12. *Actual and adjusted[1] average annual prices of softwoods, hardwoods, flat-rate mixed, and all sales of stumpage in the North Carolina Pine region, 1900–1934*

PRICE IN DOLLARS

Year	Softwoods		Hardwoods		Flat-rate mixed		All sales	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1900	$0.91	$1.11			$0.76	$0.81	$0.77	$0.94
1901	.72	.89					.72	.89
1902	1.22	1.42			.81	.94	.86	1.02
1903	1.15	1.36			2.79	2.98	1.20	1.36
1904	.65	.73					.65	.73
1905	1.49	1.70			1.06	1.20	1.11	1.26
1906	.85	.94			.84	.93	1.00	1.11
1907	2.34	2.47	$2.00	$2.10	.81	.80	2.23	2.34
1908	2.67	2.91			2.09	2.27	2.50	2.72
1909	4.47	4.53	3.90	4.01			4.44	4.50
1910	4.95	4.98	4.00	4.02	4.85	4.79	4.92	4.97
1911	2.12	2.24	4.00	4.11	2.31	2.47	2.20	2.32
1912	2.57	2.65	4.00	4.12	2.61	2.69	2.79	2.76
1913	2.56	2.54	4.00	4.17	2.61	2.58	2.77	2.74
1914	2.96	2.90	4.36	4.39	3.45	3.47	3.39	3.35
1915	4.20	4.14	3.80	3.72	3.74	3.70	3.98	3.93
1916	4.32	4.16	4.11	3.92	3.29	3.13	3.83	3.67
1917	2.83	2.67	3.80	3.49	2.76	2.61	3.36	3.16
1918	3.79	3.37	3.50	3.11	3.91	3.48	4.30	3.84
1919	7.39	6.65	4.00	3.62	11.53	10.37	10.29	9.25
1920	2.85	2.64	2	2	2.44	2.26	2.68	2.48
1921	3.40	3.79	4	4	3.43	3.82	3.34	3.72
1922	4.37	4.05	4.36	4.05	3.77	3.50	4.11	3.82
1923	3.42	3.09	4.14	3.72	3.34	3.01	3.92	3.53
1924	3.49	3.26	4.29	4.01	3.47	3.24	3.95	3.69
1925	4.34	4.20	4.62	4.48	4.26	4.12	4.65	4.50
1926	4.35	4.30	4.92	4.86	4.26	4.21	4.56	4.50
1927	3.32	3.32	4.42	4.42	3.26	3.26	4.34	4.34
1928	3.38	3.34	2.96	2.93	3.45	3.41	3.37	3.33
1929	3.81	3.72	4.29	4.18	3.45	3.37	4.23	4.13
1930	4.54	3.80	4.71	3.94	4.29	3.59	4.47	3.74
1931	3.17	2.97	3.85	3.62	3.29	3.08	3.31	3.10
1932	3.21	3.39	2.46	2.60	2.58	2.99	3.06	3.23
1933	3.46	3.51	3.37	3.41	3.14	3.17	3.36	3.40
1934	1.87	3.32	1.06	1.84	1.25	2.17	1.88	3.27

INDEX NUMBERS OF PRICE

1900	37	45			36	41	36	45
1901	30	36					33	41
1902	50	58			32	37	39	47
1903	48	56			102	117	46	52
1904	27	30					24	27
1905	61	69			37	40	41	47
1906	35	38			31	34	38	42
1907	104	100	45	47	37	36	84	86
1908	109	118	77	83	77	83	95	100
1909	183	184	77	83			167	165
1910	40	41	77	83	72	70	72	70
1911	47	91	77	83	85	87	83	84
1912	105	104	133	132	126	126	105	103
1913	117	111	103	100	105	101	104	102
1914	118	117	98	96	96	97	109	109
1915	172	168	94	93	100	98	123	121
1916	177	111	99	99	86	89	105	85
1917	116	87	81	87	144	85	126	73
1918	155	80	126	87	114	60	162	84
1919	221	108	92	47	156	226	387	100
1920	244	107	138	51	202	91	229	97
1921	221	154	110	77	205	144	201	140
1922	178	125	107	76	227	167	170	127
1923	222	150	100	65	209	146	195	132
1924	221	153	133	92	171	129	187	130
1925	198	190	104	89	144	97	153	101
1926	203	138	111	76	150	103	165	112
1927	218	155	100	71	172	124	182	130
1928	220	135	65	46	220	156	179	128
1929	218	137	96	69	319	230	240	172
1930	186	146	107	87	207	165	152	144
1931	130	121	82	77	124	121	124	116
1932	132	135	55	57	111	118	115	121
1933	139	144	80	83	123	129	126	131
1934	158	143	112	102	127	117	146	133

[1] On basis of purchasing power of the dollar as determined by the Bureau of Labor Statistics.

A considerable part of the softwood timber reported sold during the early years of the period covered by this investigation was original growth. The percent of virgin softwood timber reported sold has, however, constantly decreased, while the percent of second-growth softwood has as constantly increased. There is naturally a differential between the prices paid for old-growth virgin timber and second-growth timber. The early prices of softwood timber are based largely on virgin timber which sold, on the average, for higher prices than the second-growth constituting the greater percentage of the timber sold in recent years. These facts should not be lost sight of in considering the price records of this region. Other eastern regions have a similar history. Second-growth timber in the East will be considered in subsequent pages.

REGION 5 SOUTHERN PINE

The Southern Pine region includes Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, Oklahoma, and Texas. No extensive development of the lumber industry took place in this region until after the Civil War, whereas the forests of the Carolinas and Virginia have been exploited for forest products from the time of the first settlements. The southern pines are, of course, the principal commercial species of this region. Although the great bulk of the original stands has been removed, the vast area of these pinelands, coupled with the facility with which pine reproduces and the rapid growth that has occurred where fire has been kept out, indicates that this region will continue to produce a large share of the Nation's supply of softwoods. A considerable volume of hardwoods also occurs in the Mississippi bottom lands, the central and northern sections of Georgia, Alabama, and Mississippi, and in certain portions of Arkansas and Texas. The principal hardwood species are oak, gum, ash, hickory, and yellow poplar. Cypress is also an important commercial species.

The stumpage price record for the period 1900–1934 is based on 111 billion board feet of which only 20 percent was sold in flat-rate sales (fig. 23); a total of approximately 88 billion feet of softwoods, 3.4 billion feet of hardwoods, and 19.6 billion feet of mixed softwoods and hardwoods were reported sold during this period. The years prior to 1900 will be discussed later.

The actual price record of all softwoods (table 13) does not reflect the actual price changes which occurred, since the class of timber reported has changed materially during the period under consideration. In the early years of the century a considerable percent of the pine timber sold was high-quality old growth. This percent has decreased from year to year as the original stands became depleted, and as the ownership of the remaining bodies of virgin timber became concentrated in the hands of companies intending to log them in the future. Occasionally, as for example in 1923, 1924, and 1927, fairly large bodies of virgin pine were sold at high prices, materially raising the average price for those years. As was to be expected, however, an increasing percent of the timber reported sold each year is second growth which sells for an average price materially less than that which old-growth timber would bring.

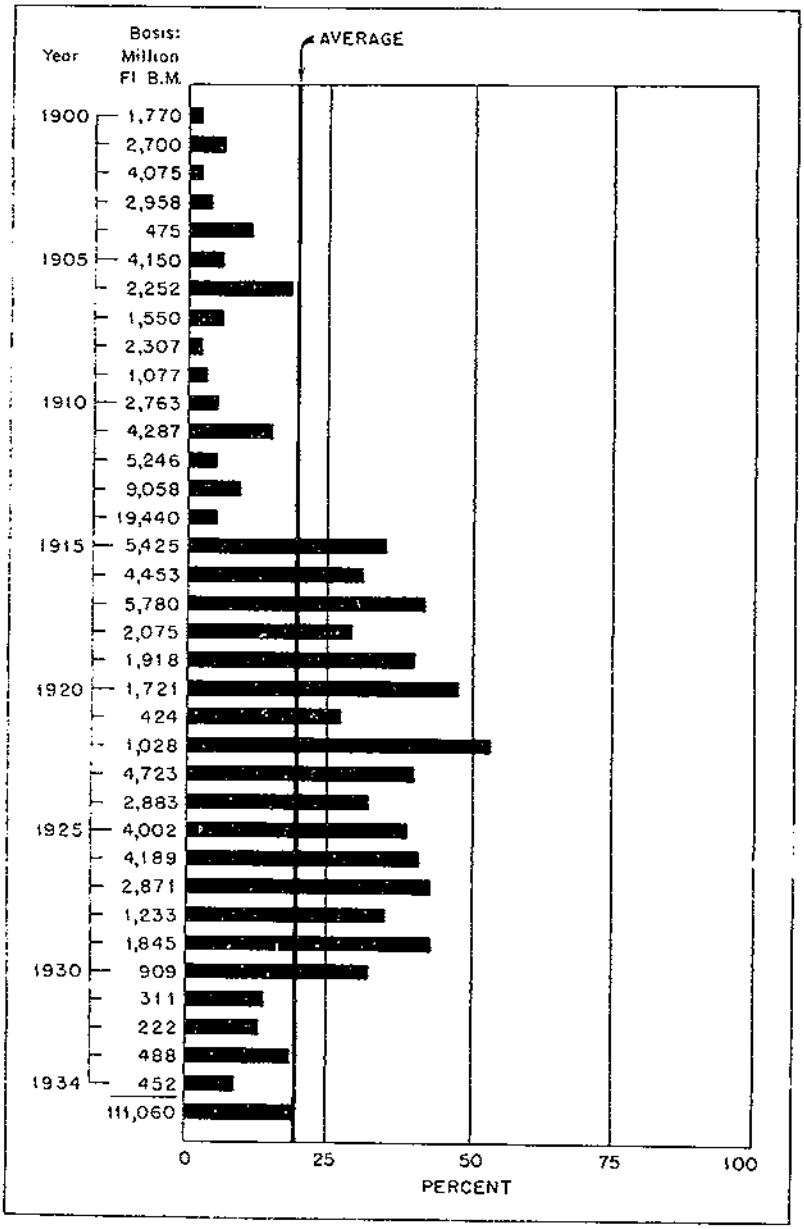

FIGURE 23.—Proportion of privately owned timber in the Southern Pine region reported in fire-rate sales, 1911–1934.

TABLE 13.—*Actual and adjusted*[1] *average annual prices of softwoods, hardwoods, flat-rate mixed, and all sales of stumpage in the Southern Pine region, 1900–1934*

PRICE IN DOLLARS

Year	Softwoods		Hardwoods		Flat-rate mixed		All sales	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1900	$0.92	$1.12			$0.50	$0.61	$0.91	$1.11
1901	1.10	1.36			.70	.87	1.08	1.34
1902	1.25	1.45			.25	.29	1.22	1.42
1903	1.73	1.99	$1.00	$1.15	.15	.17	1.68	1.93
1904	2.00	2.29			.25	.29	1.82	2.09
1905	2.73	3.11	.81	.92	2.00	2.28	2.69	3.07
1906	3.76	4.17	2.00	2.22	1.51	1.67	3.35	3.72
1907	3.65	3.83	2.24	2.35	1.94	2.04	3.55	3.73
1908	2.87	3.13	2.31	2.52	1.17	1.27	2.84	3.09
1909	3.61	3.66	2.08	2.11	.64	.65	3.54	3.59
1910	4.37	4.25	3.90	3.79	2.30	2.24	4.26	4.14
1911	5.04	5.32	3.01	3.18	3.11	3.28	4.75	5.02
1912	4.17	4.13	3.81	3.78	1.45	1.44	4.08	4.04
1913	4.55	4.46	2.27	2.23	3.12	3.06	4.42	4.34
1914	4.54	4.57	3.92	3.94	2.49	2.50	4.45	4.46
1915	3.54	3.49	3.54	3.49	2.38	2.34	3.13	3.08
1916	4.73	3.79	3.22	2.58	4.15	3.32	4.42	3.54
1917	5.21	3.04	3.66	2.13	4.08	2.38	4.67	2.72
1918	5.92	3.09	3.67	1.60	4.04	2.11	5.27	2.75
1919	7.42	3.67	6.57	3.25	4.75	2.35	6.40	3.16
1920	5.28	2.34	4.23	1.88	5.62	2.50	5.30	2.35
1921	6.57	3.91	4.15	2.91	3.87	2.72	5.11	3.59
1922	3.46	2.45	3.61	2.56	4.90	3.47	5.20	2.97
1923	7.73	5.26	6.07	4.54	6.53	4.45	7.25	4.94
1924	7.30	5.10	5.17	3.61	4.66	3.25	6.45	4.50
1925	5.04	3.34	6.23	4.12	5.76	3.81	5.35	3.54
1926	4.64	3.18	5.18	3.55	5.76	3.95	5.09	3.49
1927	6.48	4.65	5.05	4.27	5.57	4.00	6.10	4.38
1928	5.93	4.20	7.42	5.25	6.02	4.26	6.12	4.33
1929	4.64	3.34	4.94	3.55	6.33	4.55	5.34	3.84
1930	4.05	3.21	3.89	3.08	5.08	4.03	4.30	3.41
1931	4.00	3.75	3.87	3.63	4.88	4.58	4.11	3.86
1932	5.01	5.30	3.38	3.57	2.39	2.53	4.57	4.83
1933	3.25	3.38	3.64	3.79	3.73	3.88	3.36	3.49
1934	3.57	3.54	5.25	4.80	3.75	3.43	3.97	3.63

INDEX NUMBERS OF PRICE

1900	20	25			18	22	21	25
1901	24	30			25	31	24	30
1902	28	32			9	10	28	32
1903	38	44	26	33	5	6	38	44
1904	44	50			9	10	41	47
1905	60	69	23	26	72	82	61	69
1906	83	92	56	63	55	60	76	84
1907	81	84	63	67	70	73	80	84
1908	63	69	65	71	42	46	64	70
1909	80	81	58	60	23	23	80	81
1910	96	94	110	107	83	81	97	93
1911	111	117	85	90	113	118	108	113
1912	92	91	107	107	53	52	93	91
1913	100	98	64	63	113	110	100	98
1914	100	101	110	112	90	90	101	101
1915	78	77	99	99	86	84	71	70
1916	104	83	90	73	150	119	100	80
1917	115	67	103	60	148	86	106	61
1918	131	68	80	45	146	76	120	62
1919	164	81	185	92	172	85	145	71
1920	117	52	119	53	204	90	120	53
1921	123	86	117	82	140	98	116	81
1922	76	54	101	73	178	125	95	67
1923	171	116	187	129	237	160	164	112
1924	161	112	145	102	169	117	146	102
1925	111	74	175	117	209	137	121	80
1926	102	70	146	101	209	142	115	79
1927	143	102	167	121	202	144	138	99
1928	131	93	208	149	218	153	139	98
1929	102	74	139	101	229	164	121	87
1930	89	71	109	87	184	145	98	77
1931	88	83	109	103	177	165	93	87
1932	111	117	95	101	87	91	104	109
1933	72	74	102	107	135	140	76	79
1934	85	78	147	136	136	123	90	82

[1] On basis of purchasing power of the dollar as determined by the Bureau of Labor Statistics.

The South is constantly becoming a more important source of hardwood lumber and other hardwood forest products. This partially explains the greater stability of the hardwood prices in the South when compared with softwoods, for as supplies of hardwoods were depleted in other regions and the industry turned to the South, hardwood species previously considered as having no value became merchantable, increased in value, and sold for higher prices. In 1900, 18 percent of the ash lumber produced in the United States came from the Southern Pine region. This percent constantly increased, until in 1933 the South furnished 56 percent of the total quantity of ash lumber produced. The percent of hickory lumber produced in the South increased from 10 in 1900 to 52 in 1933, while that of oak increased from 12 to 52. Similar increases have been recorded for several other species, such as elm and sycamore.

The same general price trends are given for the Southern Pine region as for the region previously discussed. When adjusted for the purchasing power of the dollar, the trend of softwood prices has been slightly upward since 1918, and that of hardwoods has distinctly increased (fig. 24). The long-time trend of all stumpage prices in this region since 1900 has been distinctly upward.

REGION 6—NORTH PACIFIC

The North Pacific region comprises two types of forest which differ greatly as to species and density of stand. Those west of the Cascade Mountains, where Douglas fir, Sitka spruce, western red cedar, and western hemlock are the most important species, and those of the eastern portion, where ponderosa pine is the principal species. A break-down of this region into its natural subregions will be made subsequently.

Inasmuch as the volume of commercial hardwood timber in this region, which comprises Oregon and Washington, is relatively negligible, "all sales" only is presented. This record is based on more than 229 billion feet, of which 74 percent was reported in flat-rate softwood sales (fig. 25).

The yearly fluctuation of actual prices in this region is very much less than that in the regions previously discussed (fig. 26). Although this may be due in some measure to the greater volume of timber reported sold, it is believed that the principal reasons for the smoother price record are (1) the abundance of the timber supply which has precluded the possibility of any spectacular price increase, and (2) the fact that probably 95 percent of the timber reported sold during the period has been original old growth (table 14). Other factors are important, such as the relative accessibility of the timber sold during the period 1920–34 as compared to that of the timber sold from 1900–1920. The influence of some of these factors will be more readily understandable in the species and subregional discussions which will be made later.

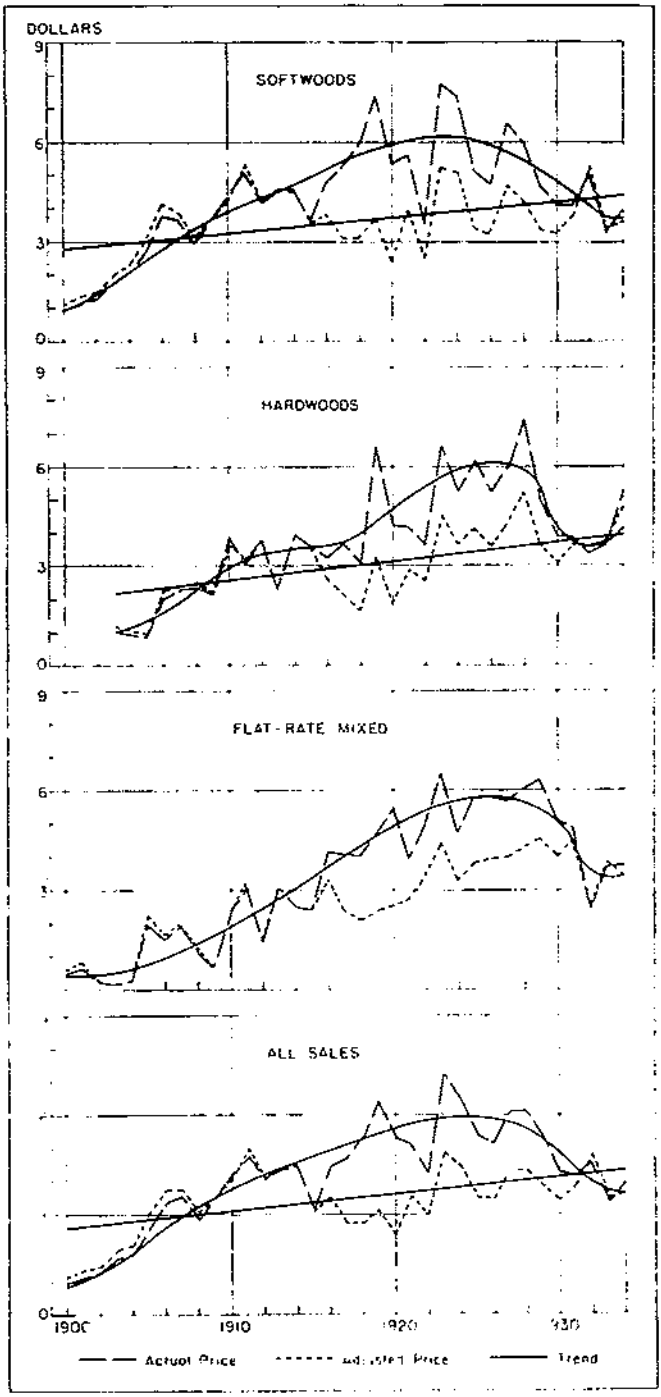

FIGURE 24.—Southern Pine region stumpage prices, actual and adjusted, with indicated trends, softwoods, hardwoods, flat-rate mixed, and all sales: 1900–1934. (Basis, million feet board measure. Softwoods, 88,050; hardwoods, 3,355; flat-rate mixed, 10,655; all sales, 111,060.)

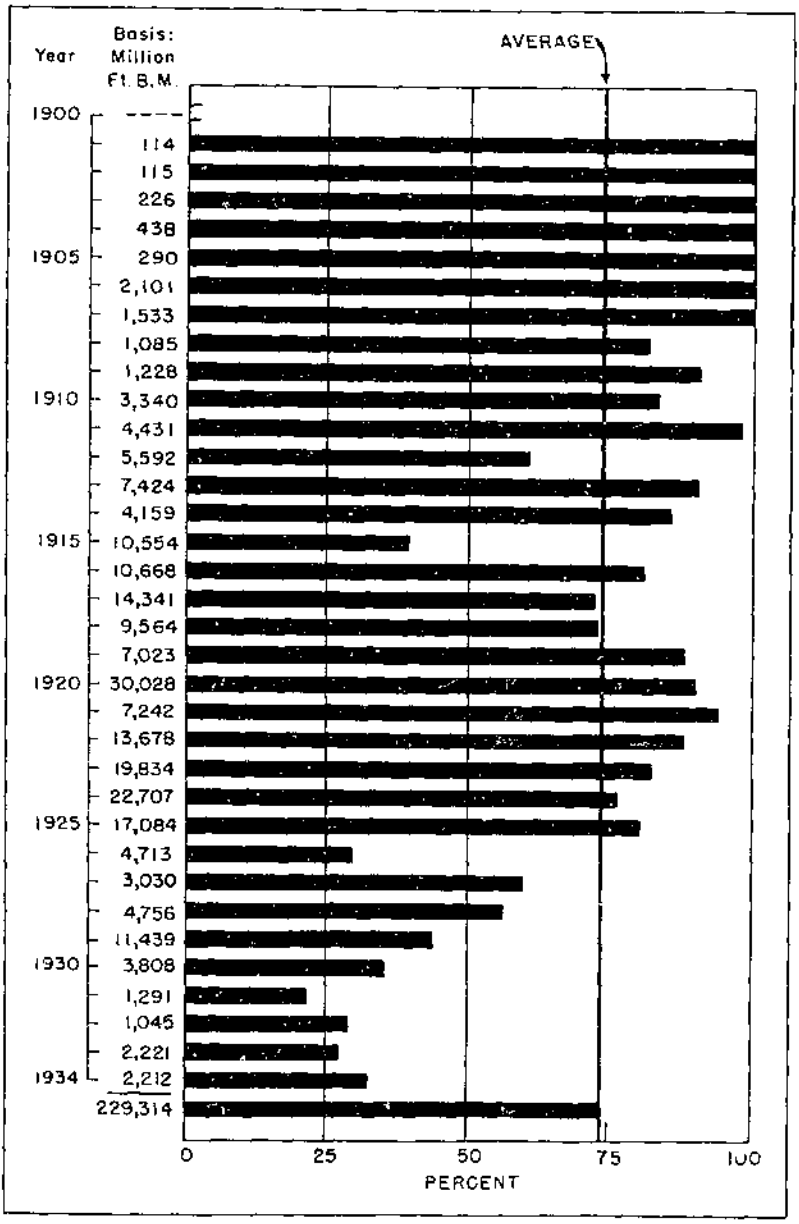

FIGURE 25.—Proportion of privately owned timber in the North Pacific region reported in flat-rate sales, 1901–1934.

Some second-growth stands of timber (principally Douglas fir) in western Oregon and Washington have been reported sold in recent years. The quantity of timber of this type of growth included in the averages is, however, of little importance in comparison to the great volume of virgin timber sold.

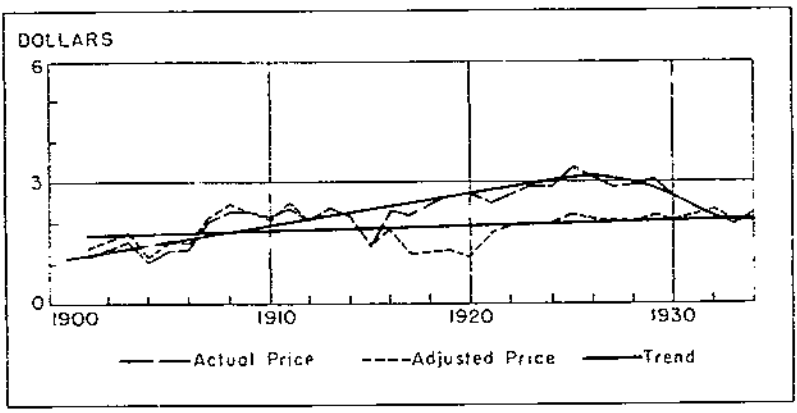

FIGURE 26.—North Pacific region stumpage prices, actual and adjusted, with indicated trends; all sales 1901-34. (Basis, million feet board measure: 220,314.)

It is interesting to note that the trend of average prices, when adjusted for the purchasing power of the dollar, has been distinctly up since 1917.

TABLE 14.—*Actual and adjusted average annual stumpage prices for the North Pacific region, all sales, 1901-34*

Year	Price in dollars		Index numbers of prices		Year	Price in dollars		Index numbers of prices	
	Actual	Adjusted	Actual	Adjusted		Actual	Adjusted	Actual	Adjusted
1901	$1.11	$1.41	51	64	1918	$2.41	$1.26	109	57
1902	1.37	1.59	62	72	1919	2.68	1.32	121	59
1903	1.56	1.79	70	81	1920	2.68	1.19	121	54
1904	1.02	1.17	46	53	1921	2.47	1.73	111	78
1905	1.33	1.52	60	68	1922	2.70	1.91	122	86
1906	1.31	1.49	60	67	1923	2.88	1.96	130	88
1907	2.05	2.15	92	97	1924	2.87	2.00	129	90
1908	2.25	2.45	101	110	1925	3.33	2.20	150	99
1909	2.24	2.27	101	102	1926	3.05	2.09	137	94
1910	2.12	2.06	95	93	1927	2.88	2.07	130	93
1911	2.34	2.47	105	111	1928	2.90	2.05	131	92
1912	2.07	2.05	93	92	1929	3.02	2.17	136	98
1913	2.34	2.30	105	104	1930	2.61	2.07	118	93
1914	2.16	2.17	97	98	1931	2.34	2.19	105	99
1915	1.45	1.43	65	64	1932	2.18	2.30	98	104
1916	2.30	1.84	104	83	1933	1.95	2.03	88	91
1917	2.16	1.26	97	57	1934	2.19	2.00	99	90

REGION 7: SOUTH PACIFIC

As in the North Pacific, there are practically no commercial hardwoods in this region, which includes Nevada and California. Since there is very little privately owned timber in Nevada, the prices given herewith apply to California only.

The price record for the period 1900–1934, as summarized in table 15 is based on nearly 77 billion feet of timber, of which 81 percent was reported sold in flat-rate sales of softwoods (fig. 27). Here also actual average prices of all sales are much more stable than those of regions 0 to 5, inclusive, and the trend of adjusted prices has been distinctly upward since 1916 (fig. 28). California has two distinct timber types, in which redwood and pine, respectively, are the principal species. The history of prices in these regions will be discussed in a later section. The same general upward trend of stumpage prices, when adjusted for the purchasing power of the dollar, holds true for this region, except that the gradient is steeper than it was in the North Pacific, in which, also, only softwoods are involved.

TABLE 15.—*Actual and adjusted average annual stumpage prices for the South Pacific region, all sales, 1900–1934*

Year	Price in dollars		Index numbers of prices		Year	Price in dollars		Index numbers of prices	
	Actual	Adjusted	Actual	Adjusted		Actual	Adjusted	Actual	Adjusted
1900	$0.20	$0.24	13	16	1918	$1.72	$0.90	111	59
1901	.82	1.02	53	67	1919	1.39	.69	90	45
1902	.13	.15	8	10	1920	2.68	1.19	173	78
1903	.43	.49	28	32	1921	2.01	1.43	130	93
1904	.71	.81	46	53	1922	2.54	1.80	164	118
1905	.75	.83	35	41	1923	2.64	1.80	170	118
1906	2.00	2.22	129	146	1924	3.63	2.53	234	166
1907	1.93	2.03	125	134	1925	2.47	1.64	159	108
1908	.78	.85	50	56	1926	2.63	1.80	170	118
1909	.41	.42	26	28	1927	3.66	2.63	236	173
1910	1.49	1.45	96	95	1928	2.35	1.66	152	109
1911	1.50	1.58	97	104	1929	2.47	1.78	159	117
1912	2.52	2.50	163	164	1930	2.77	2.20	179	145
1913	1.08	1.06	70	70	1931	3.01	2.82	194	186
1914	1.97	1.98	127	130	1932	2.47	2.61	159	172
1915	2.28	2.25	147	148	1933	2.08	2.16	134	142
1916	.93	.74	60	49	1934	2.32	2.12	150	139
1917	1.35	.79	87	52					

REGION 8—NORTH ROCKY MOUNTAIN

Approximately 18.5 billion feet of timber was reported sold in this region, which includes Idaho and Montana, during the period 1900–1934. Of this, 90 percent was reported sold in flat-rate sales (fig. 29). Since no hardwoods occur in this region in commercial quantities, the all-sales averages in table 16 are of softwood timber.

The principal commercial species in this region are western white pine, ponderosa pine, Douglas fir, and western larch. Lodgepole pine, Engelmann spruce, western red cedar, and several varieties of the true firs occur in somewhat limited quantities. Of these species, the western white pine of northern Idaho and northwestern Montana, and also of northeastern Washington (outside this region), is by far the most valuable. Of much less value but next in importance, and the most common species of the region, is ponderosa pine. With the exception of western red cedar, which is adapted to specialized uses (principally posts and poles), the remaining species are inferior and are of little or no commercial value except in limited areas where the pines do not occur.

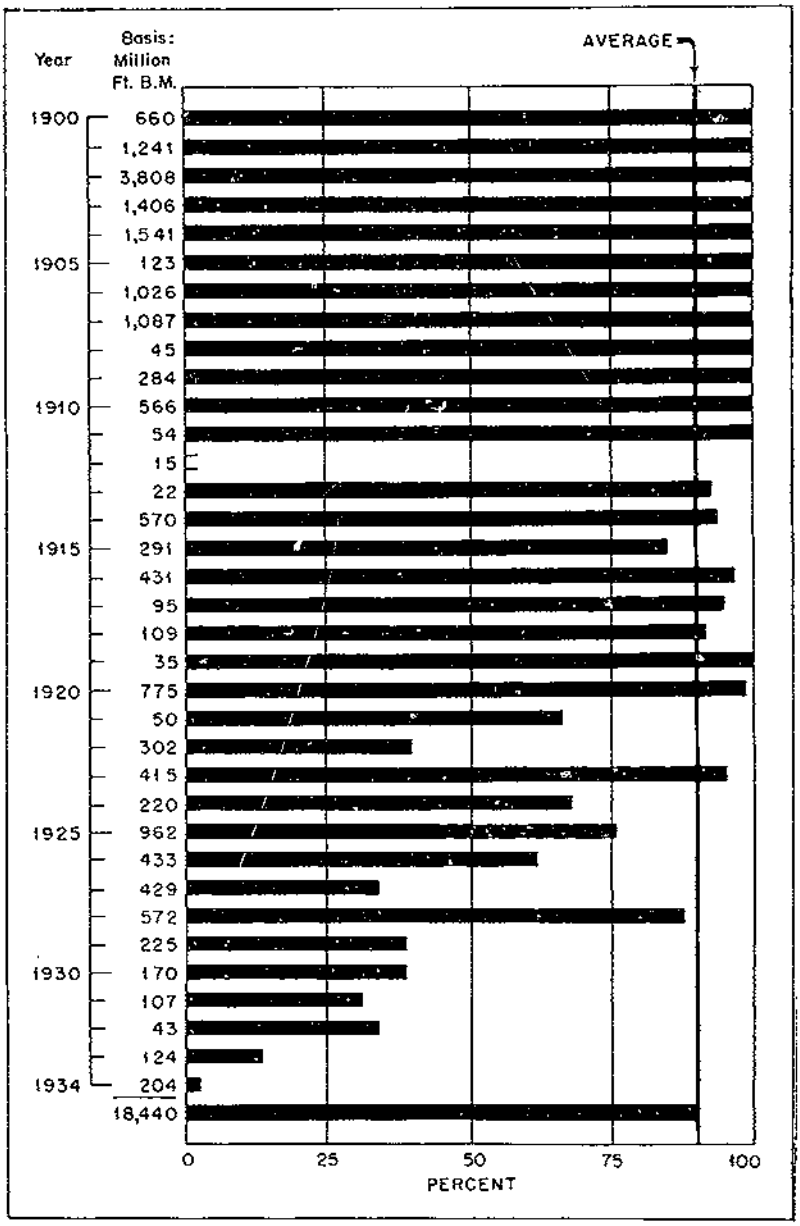

FIGURE 27.—Proportion of privately owned timber in the South Pacific region reported in flat-rate sales 1900–1934.

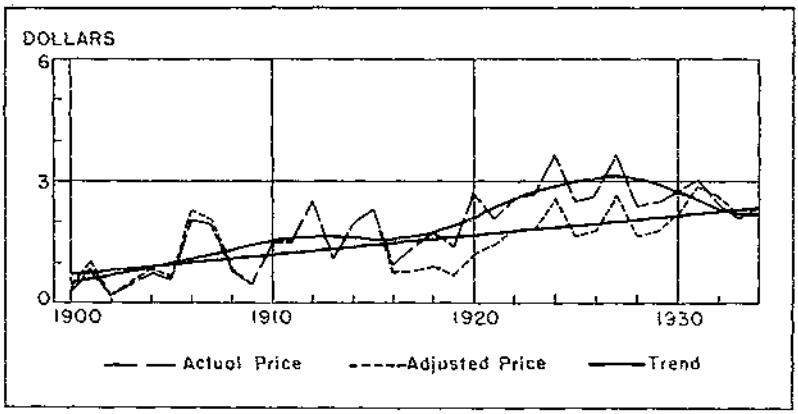

FIGURE 28.—South Pacific region stumpage prices, actual and adjusted, with indicated trends; all sales; 1900–1934. (Basis, million feet board measure: 76,688.)

TABLE 16.—*Actual and adjusted average annual stumpage prices for the North Rocky Mountain region, all sales, 1900–1934*

Year	Price in dollars		Index numbers of prices		Year	Price in dollars		Index numbers of prices	
	Actual	Adjusted	Actual	Adjusted		Actual	Adjusted	Actual	Adjusted
1900	$0.08	$0.10	7	9	1918	$1.93	$1.01	169	89
1901	.27	.33	24	29	1919	2.29	1.13	201	100
1902	.19	.22	17	19	1920	2.60	1.15	228	102
1903	.19	.22	17	19	1921	5.41	3.80	475	336
1904	.39	.45	34	40	1922	5.38	3.81	472	337
1905	.36	.41	32	36	1923	2.44	1.66	214	147
1906	2.76	3.05	242	271	1924	2.53	1.77	222	157
1907	1.82	1.91	160	169	1925	3.83	2.54	336	225
1908	.34	.37	30	33	1926	3.38	2.32	296	205
1909	.62	.63	54	56	1927	3.06	2.20	268	195
1910	1.46	1.42	128	126	1928	1.52	1.08	133	96
1911	.12	.13	11	12	1929	2.84	2.04	249	181
1912	1.22	1.21	107	107	1930	2.09	1.66	183	147
1913	2.16	2.12	189	188	1931	1.98	1.86	174	165
1914	.88	.89	77	79	1932	2.66	2.81	233	249
1915	1.11	1.09	97	96	1933	4.26	4.43	374	392
1916	2.02	1.62	177	143	1934	4.04	4.25	407	376
1917	4.73	2.76	415	244					

The stumpage price record shows a trend greatly at variance with the records of the other western regions (fig. 30). This trend, which is distinctly down from 1922 to 1928 and up from 1928 to 1934, is misleading unless the peculiar circumstances obtaining in this region are taken into consideration. Yearly average stumpage prices here are greatly influenced by the proportion of western white pine in the tracts sold. The stumpage price of western white pine is held fairly constant by limited supply and constant demand. The price paid for the inferior species and the volume of lumber manufactured from them vary greatly with general economic conditions and particularly with the lumber price level. During good times in the lumber industry, it may pay to cut the inferior species and manufacture lumber from them. During periods of low lumber prices, a large volume of the inferior trees are left uncut in the woods, with the result that a

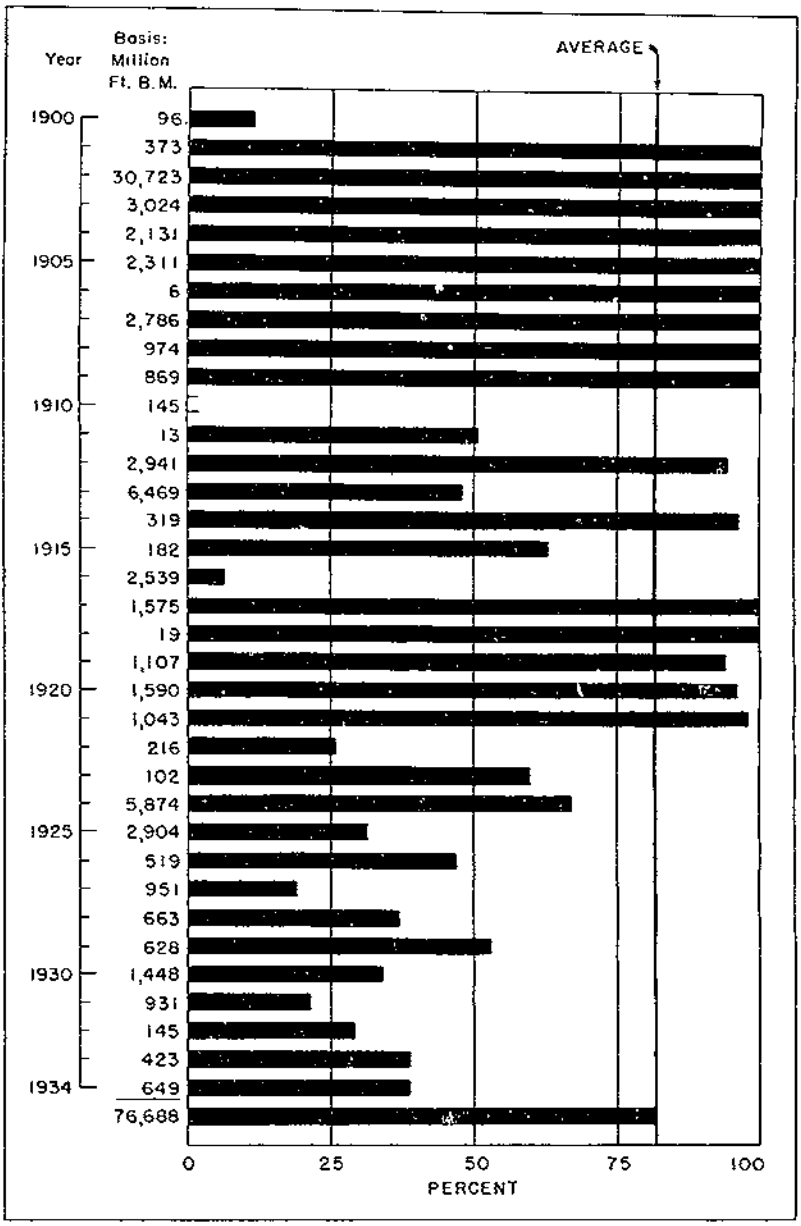

FIGURE 29.—Proportion of privately owned timber in the North Rocky Mountain region reported in flat-rate sales, 1900–1934.

larger percentage of the lumber produced is from western white and ponderosa pines. This condition has a pronounced effect on the level of stumpage prices and the volume of the several species sold. Although prices of lumber manufactured from the inferior species could not be considered as high during the period 1923–28, they were high enough to permit more complete utilization of these species than was the case during the period 1928–34. These conditions were reflected in the stumpage market, and resulted in the stumpage sales for the period 1922–28 containing a high percentage of inferior species, and in 1930–34 a high percentage of valuable species.

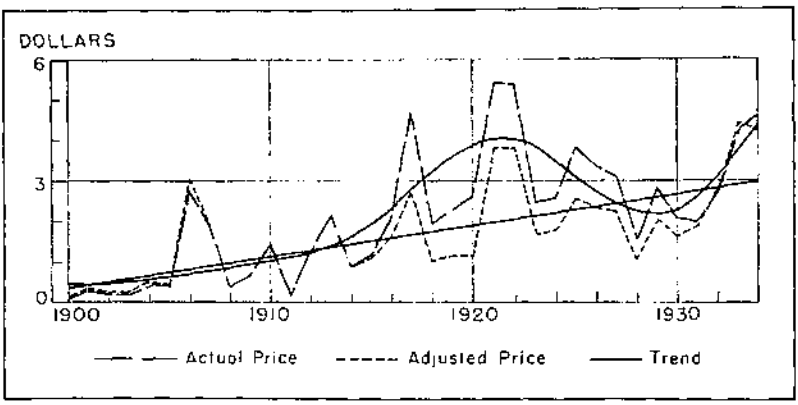

FIGURE 30.—North Rocky Mountain region stumpage prices, actual and adjusted, with indicated trends; 1900–1934. (Basis, million feet board measure: 18,440.)

The proportion of western white pine included in the total stumpage sales decreased from 28 percent in 1923 to 5 percent in 1928, and then increased to 64 percent in 1934. In 1930, 20 percent of the timber reported sold was white pine, 30 percent was ponderosa pine, and 50 percent was inferior species. During the next 4 years white pine increased to 64 percent (in 1934), ponderosa pine decreased to 22 percent, and the inferior species decreased to 14 percent. These variations explain the peculiar trend of the all-sales price average. It was found, in breaking these data down by species (pp. 94–98) that the price record of the several species show a different trend.

REGIONS 9 AND 10

Price records of privately owned timber in regions 9 and 10, South Rocky Mountain and Prairie, are fragmentary and so incomplete as to preclude the development of accurate price trends. There is relatively little privately owned timber in Arizona, Colorado, New Mexico, Utah, and Wyoming; and Iowa, Kansas, Nebraska, and the Dakotas have very little commercial timber of any type of ownership.

INDIVIDUAL SPECIES AND SPECIAL REGIONS

In considering the price records of individual species, the large percentage of flat-rate sales among all sales reported must be borne in mind. Because of this the compilation of satisfactory individual price records has been impossible except for a few of the more impor-

tant and commercially valuable species, which are apt to occur in pure stands, are in regions where earlier independent investigations are made, or are much more valuable than their associates.

One of the most important conditions, which is bound to have had a marked effect upon the price record of individual species, is that, as time has elapsed, high-quality virgin timber of the more important commercial species available for cutting has grown constantly less, and the quality of the remaining virgin and of second-growth timber has become constantly poorer. This is particularly true in the East. Only in the far West are the price records based principally on virgin timber, and even there the changes that have taken place with regard to such conditions as accessibility have had a marked effect on price and must be taken into consideration. The stumpage prices that could have been realized even during the years of the depression for a tract of several thousand acres of virgin white pine in the Lakes region, or for original white oak timber in the Central region on the present market would unquestionably be much greater than the prices obtained for the inferior timber sold in recent years.

Even in the Douglas fir region where relatively large bodies of virgin timber remain, it has been estimated that the readily accessible timber logged 30 years ago would be worth from 5 to 10 times as much on the stump as is the less accessible, lower quality virgin timber which can be purchased today. How much would operators in the South be willing to pay per thousand feet for virgin yellow pine timber of the quality they logged 30 to 50 years ago?

An indication of these hypothetical prices may be had from the actual prices at which small quantities of virgin timber have been sold in recent years. Several fairly large sales of virgin white oak stumpage suitable for the production of tight cooperage stock at $20 to $25 per thousand feet were reported in 1935. A few sales of virgin white pine in the Lakes region at prices ranging from $15 to $20 have been reported in recent years, and similar prices are not uncommon for what little virgin longleaf pine and cypress has been sold during the past decade.

Although the individual price records which follow are based on sales of the same species of timber during the entire period for which records are available, the two factors mentioned—constantly diminishing supplies and decreasing quality of virgin timber—together with the very great change in the factor of accessibility, have resulted in price trends which, it is safe to say, are entirely different from those which would have resulted if these conditions had remained approximately the same throughout the period.

NORTHERN WHITE PINE AND EASTERN SPRUCE IN THE NORTHEAST

The price records of northern white pine and eastern spruce in the Northeast are given in table 17 and figure 31. These two price records are similar in trend up to 1920, and entirely different since that year. The drop in the average price of pine since 1920, although due in some measure, at least, to the factors mentioned above, can be more fully explained by other circumstances which are perhaps peculiar to this species and region. A profitable system of forest management of white pine had been built up in the Northeast, calling for a relatively short period of rotation and for the production of a comparatively poor grade of lumber suitable for boxes and for use in

rough construction work. The rapidly increasing use of fiber containers probably had some effect on the decline of this type of forest management, but of vastly greater importance was the effect of the importation of large quantities of low-grade lumber from the Pacific Northwest, which were laid down in consuming centers at prices so low as to preclude successful competition from white pine lumber produced locally. The lumber industry in the Pacific Northwest characteristically has large investments in timber, logging equipment, and manufacturing plants, resulting in a tremendously high overhead which piles up whether the industry is operating or not. Operators generally have adopted a policy of operating even at a loss, or at least until the point is reached when the amount of the loss exceeded the overhead expenses which would have to be met anyway. Lumber producers on the Pacific Coast took advantage of cheap water rates to lay down huge quantities of low-grade lumber on the Atlantic seaboard at prices which the producers of low-grade northern white pine could not meet without reducing the price paid for stumpage.

TABLE 17.– *Actual and adjusted average annual stumpage prices for the Northeastern region, northern white pine and eastern spruce, 1900–1934*

Year	Price in dollars				Index numbers of prices			
	Northern white pine		Eastern spruce		Northern white pine		Eastern spruce	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1900	$5.01	$6.12	$2.67	$3.26	69	85	56	68
1901	5.07	6.26	3.00	3.72	70	87	63	77
1902	4.84	5.63	3.10	3.61	67	78	65	75
1903	4.99	5.73	3.13	3.60	69	79	65	75
1904	4.52	5.18	3.29	3.77	63	72	69	78
1905	4.63	5.26	3.29	3.75	64	73	69	78
1906	4.99	5.53	3.46	3.84	69	77	72	80
1907	7.34	7.71	3.96	4.16	102	107	83	87
1908	6.37	6.94	3.98	4.33	88	96	83	90
1909	6.36	6.44	4.35	4.41	88	89	91	92
1910	6.97	6.76	4.56	4.44	96	94	95	92
1911	7.20	7.60	4.82	5.09	100	105	100	106
1912	7.69	7.62	5.11	5.06	106	105	107	105
1913	7.74	7.59	5.23	5.13	107	105	109	107
1914	6.73	6.77	4.62	4.65	93	94	96	97
1915	7.03	7.52	4.68	4.61	106	104	98	96
1916	6.42	5.14	5.24	4.20	89	71	109	87
1917	8.99	5.24	5.80	3.38	124	73	121	70
1918	8.63	4.50	6.73	3.51	119	62	140	73
1919	10.06	4.97	7.06	3.49	139	69	147	73
1920	10.75	4.77	8.11	3.60	149	66	169	75
1921	11.69	8.21	8.01	5.62	162	114	167	117
1922	10.40	7.36	7.53	5.19	144	102	153	108
1923	11.15	7.59	10.00	6.81	154	105	208	142
1924	9.82	6.85	6.24	4.36	136	95	130	91
1925	9.48	6.28	7.59	5.02	131	87	158	104
1926	8.73	5.98	8.37	5.73	121	83	174	119
1927	9.49	6.81	8.64	6.20	131	94	180	129
1928	9.35	6.62	8.38	5.93	129	92	175	123
1929	7.88	5.67	8.78	6.31	109	78	183	131
1930	8.33	6.61	9.07	7.19	115	91	189	150
1931	6.60	6.19	7.92	7.43	91	86	165	155
1932	6.47	6.84	7.04	7.44	90	95	147	155
1933	4.65	4.84	4.40	4.58	64	67	92	95
1934	5.36	4.90	4.12	3.77	74	68	86	78

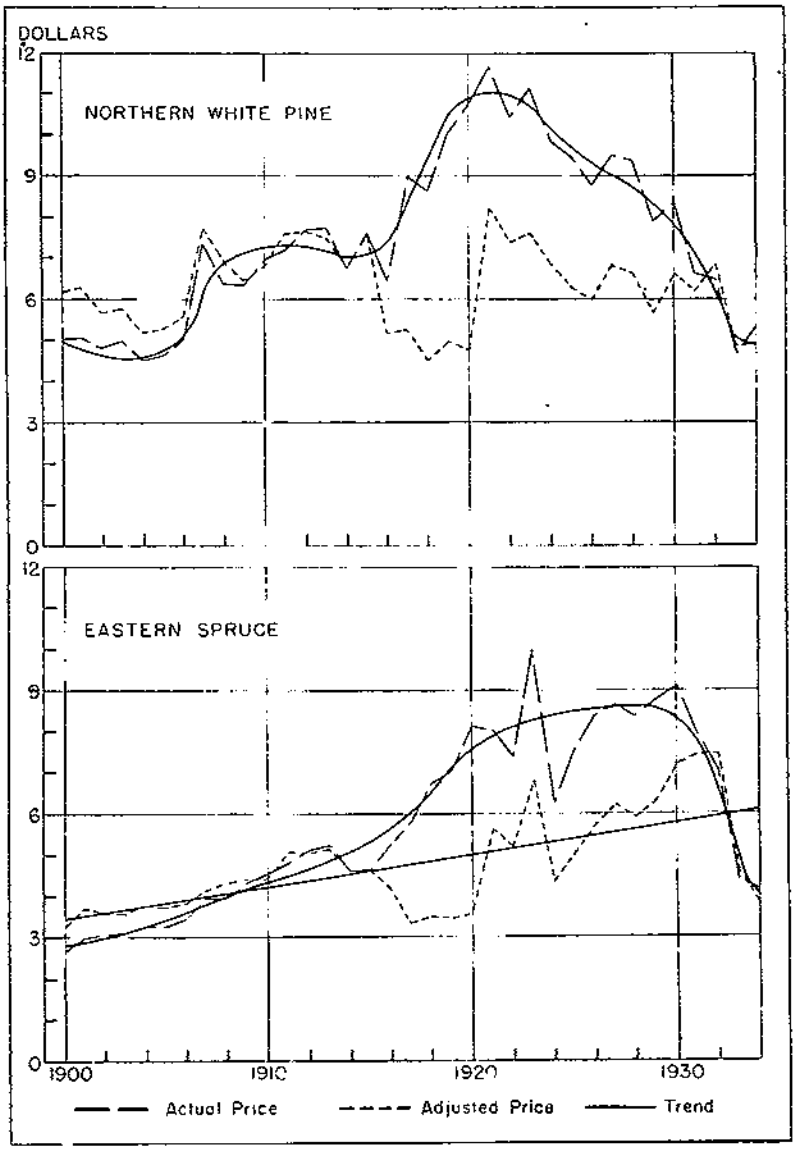

FIGURE 31.—Northern white pine and eastern spruce stumpage prices (Northeastern region), actual and adjusted, with indicated trends, 1900–1934. (Basis, million feet board measure: Northern white pine 974; eastern spruce 1,228.)

The price of eastern spruce increased during 1920–30. Since the major use of this species is for pulp, the precipitous drop in price after 1930 may be partly due to the greatly increased output of the newly established pulp and paper industry on the west coast. The difference in the cost of wood used in the production of paper in favor of the Pacific Northwest is great enough to more than offset the cost of shipping the product by water from the west coast to the Atlantic seaboard. One way of reducing this differential is through a reduction in stumpage prices, where a considerable difference has existed in the past. In 1930 the average stumpage prices of spruce and hemlock in the Northeast were $9.07 and $5.63 per thousand feet, respectively, whereas those for Sitka spruce and western hemlock in Washington and Oregon were $3.65 and $1.09.

The average prices of both species, when adjusted for the purchasing power of the dollar, show a much greater degree of stability than does the record of actual prices. The 1934 adjusted prices of both species were at approximately the 1918 level.

NORTHERN WHITE PINE IN THE LAKES REGION

Probably no other region of the country has gone from riches to poverty in timber resources as completely as has the Lakes region. The saga of the quick rise and precipitous decline of the lumber industry in this region forms one of the most interesting chapters of American industrial history. The original stands of pine timber upon which the industry was primarily based were of splendid quality and so plentiful that in popular opinion the supply could never be exhausted. Figure 32 graphically portrays the rise and fall of the production of pine lumber in Michigan, Minnesota, and Wisconsin since 1829. Quantities are given in table 18. The 1934 production of pine lumber in these three States was 107 million feet, or less than 2 percent of the 1899 production of approximately 6 billion feet. The exhaustion of the supply simply means that there are no data on sales of pine in recent years comparable with early sales because there is no virgin timber of high quality left to sell.

TABLE 18.- *Lumber production of northern white pine in Michigan, Minnesota, and Wisconsin, for specified years, 1829–99 and 1904–34*

Year	Michigan	Minnesota	Wisconsin	Year	Michigan	Minnesota	Wisconsin
	M ft. b. m.	*M ft. b. m.*	*M ft. b. m.*		*M ft. b. m.*	*M ft. b. m.*	*M ft. b. m.*
1829	3,000			1916	64,040	962,765	187,447
1839	4,000			1917	47,571	901,941	160,630
1849	58,000	2,000	29,000	1918	46,664	830,439	126,228
1859	314,000	99,000	127,000	1919	57,501	560,544	125,959
1869	1,714,000	230,000	763,000	1920	36,186	429,210	88,979
1879	3,540,000	524,000	1,112,000	1921	38,553	327,819	116,547
1889	3,498,000	1,209,000	2,451,000	1922	29,553	444,019	83,925
1899	1,282,799	2,264,777	2,430,184	1923	30,475	467,442	107,140
1904	522,839	1,902,532	1,579,200	1924	30,163	438,824	88,696
1905	463,308	1,847,072	1,467,078	1925	28,406	479,930	80,732
1906	435,211	1,664,734	933,169	1926	20,102	409,147	67,639
1907	319,997	1,521,125	656,383	1927	20,133	357,797	68,718
1908	205,235	1,072,613	502,555	1928	22,831	342,093	66,415
1909	258,080	1,308,361	612,327	1929	20,302	266,395	63,015
1910	128,400	1,280,239	577,674	1930	19,239	144,391	42,153
1911	128,794	1,295,474	494,592	1931	13,037	51,841	22,979
1912	141,003	1,225,674	397,540	1932	5,761	38,007	14,165
1913	101,281	1,027,265	308,841	1933	9,469	34,603	19,516
1914	91,487	1,108,021	223,433	1934	12,350	64,289	30,927
1915	64,267	869,574	191,306				

Sources: 1829–89, Forest Service estimate; 1899–1934 from Census publications.

The records and trends of stumpage prices in the Lakes region shown in table 19 and figure 33 are, therefore, based on sales in which the volume of original-growth white pine constantly decreased. They represent sales made during the period when the industry, having practically exhausted the pine timber, or at least seeing the end of the supply in sight, turned to the species once considered of little or no value (hemlock, jack pine, and hardwoods) for their raw materials.

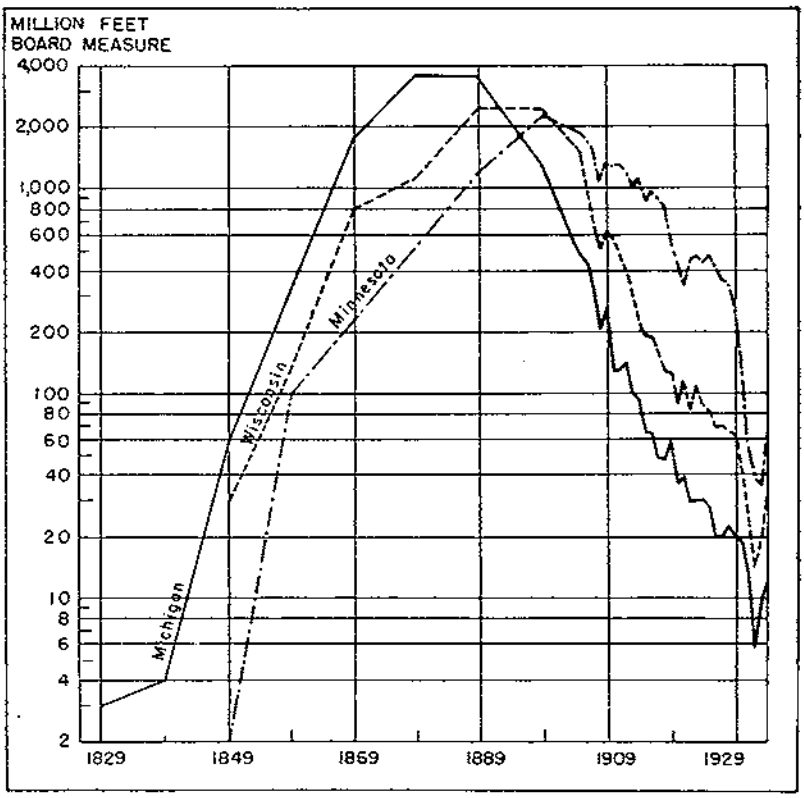

FIGURE 32.—Production of northern white pine lumber in the Lakes region from 1820 to 1934.

These price trends reflect the appreciation in value up to the middle 1920's and the lowering of actual prices since then of these relatively inferior species, rather than the record of the price of white pine, the species upon which the industry was originally founded. The basis for the price curve of individual sales of hemlock (fig. 34) is only 3 percent of that for hemlock and hardwoods combined, the common practice being to sell hemlock and hardwoods at a flat price.

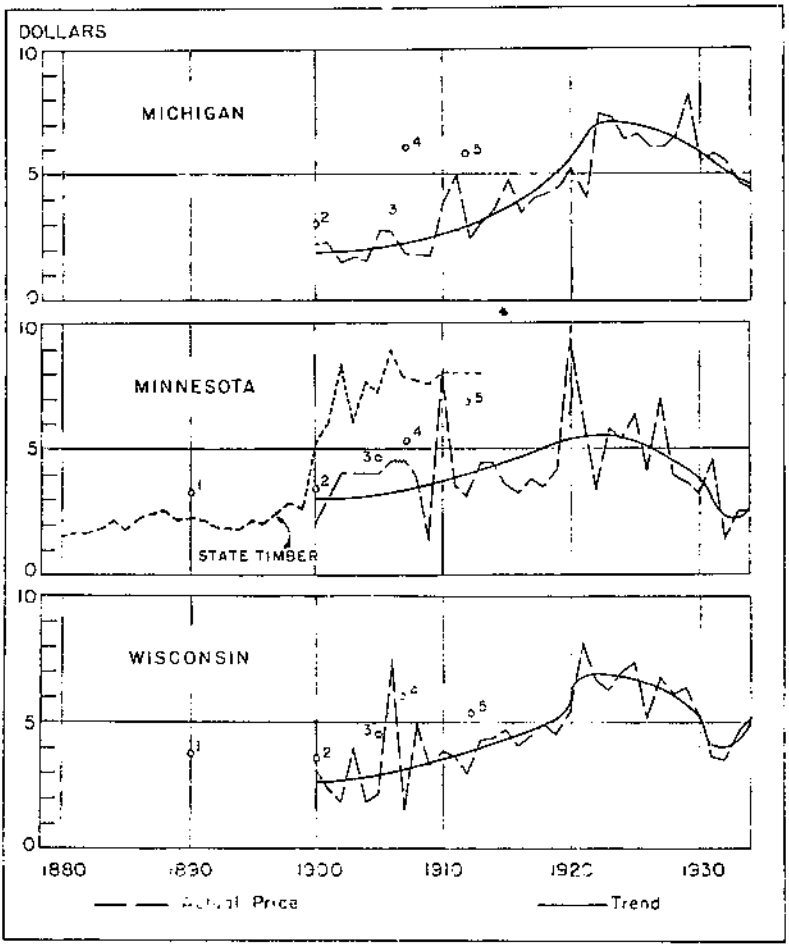

FIGURE 33.—Actual stumpage prices and indicated trends, all sales in the Lake States, 1880–1934. Sources of early estimates, indicated by number are: Census reports of (1) 1890, (2) 1900, and (3) 1905; Forest Service, (4) Pierson in 1907 and (5) Smith in 1912. (Basis, million feet board measure: Michigan 12,692; Minnesota 5,118; Wisconsin 10,186.)

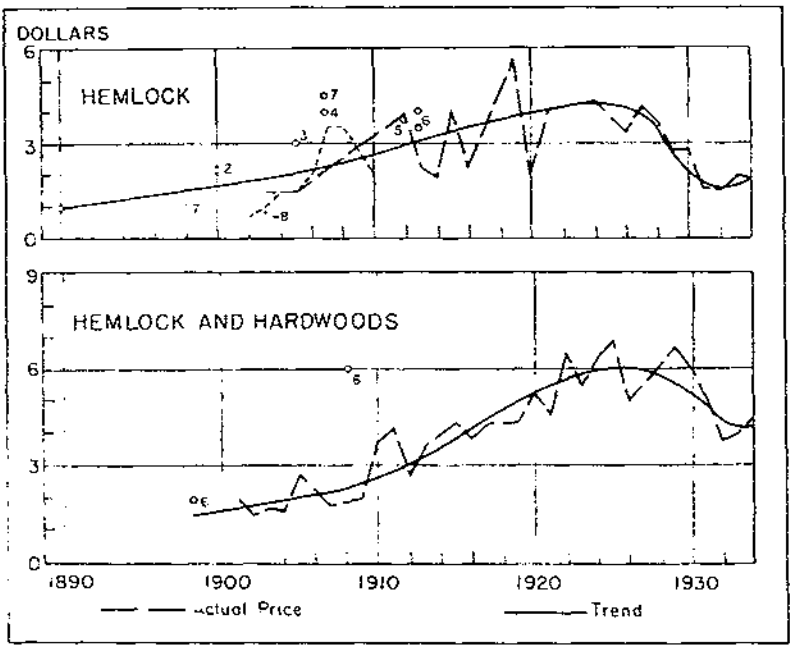

FIGURE 34.- Actual stumpage prices and indicated trends for hemlock and hemlock and hardwood in the Lakes region, 1890-1934. Sources of early estimates, indicated by number are: Census reports of (1) 1890, (2) 1900, and (3) 1905; Forest Service, (4) Pierson in 1907 and (5) Smith in 1912; The Lumber Industry part I, page 198 (U. S. Department of Commerce, Bureau of Corporations, 1913), (6) for Michigan, (7) for Wisconsin, and (8) the estimate of one Wisconsin concern. (Basis, million feet board measure: Hemlock 672; hemlock and hardwoods 22,052.)

TABLE 19. *Average actual stumpage prices for all sales in Michigan, Minnesota, and Wisconsin, and actual prices of hemlock and hemlock and hardwoods in the Lakes region, 1900-1934*

Year	All sales			Hemlock	Hemlock and hardwoods	Year	All sales			Hemlock	Hemlock and hardwoods
	Michigan	Minnesota	Wisconsin				Michigan	Minnesota	Wisconsin		
1900	$2.29	$2.00	$3.10			1918	$4.11	$3.52	$1.85		$4.42
1901	2.33	3.00	2.30		$2.04	1919	4.57	4.26	4.50	$5.66	4.46
1902	1.54	4.00	1.53		1.54	1920	5.23	9.59	5.40	2.00	5.34
1903	1.73	4.00	4.00	$1.50	1.74	1921	4.02	6.82	8.15	4.00	4.64
1904	1.63	4.00	1.75		1.63	1922	7.33	3.35	6.61		6.61
1905	2.79	4.00	2.10	1.50	2.79	1923	7.21	5.89	6.25	4.26	5.55
1906	2.76	4.50	7.52			1924	6.31	5.41	7.03	4.33	6.46
1907	1.81	4.50	1.50		1.81	1925	6.52	6.45	7.37	3.81	7.00
1908	1.89	4.00	5.00		1.93	1926	6.02	4.10	5.13	3.34	5.11
1909	1.78	1.38	3.25		2.02	1927	6.02	7.13	6.78	4.21	5.56
1910	3.88	8.00	3.86		3.86	1928	6.48	3.97	6.13	3.80	6.13
1911	5.03	3.54	3.69		4.20	1929	8.17	3.67	6.37	2.80	6.76
1912	2.57	3.12	2.93	4.00	2.78	1930	5.55	3.25	5.20	2.83	6.06
1913	3.13	4.45	4.29	2.23	3.82	1931	5.66	4.63	3.57	1.59	5.09
1914	3.69	4.48	4.34	2.00	4.09	1932	5.49	1.43	3.45	1.58	3.81
1915	4.75	3.57	4.67	4.00	4.45	1933	4.65	2.56	4.55	1.96	3.99
1916	3.53	3.24	4.08	2.25	3.95	1934	4.46	2.63	5.21	1.94	4.56
1917	4.03	3.86	4.46	3.25	4.38						

Although there is no comprehensive record of the stumpage price of white pine in the Lakes region, estimates of its value have been made from time to time because of the continued commercial im-

portance of this species since the early days of the lumber industry. As a matter of historical interest, and with full appreciation of their fragmentary nature, these estimates have been brought together in figure 35, together with the results of the present investigation, and a rough price trend indicated.

THE SOUTHERN PINES

The area originally covered by stands of yellow pine (longleaf, slash, shortleaf, and loblolly) in the Southern and Southeastern States was unquestionably larger than that given over to any similar group of timber species. Many estimates of the volume of this valuable timber have been made, the first one published being that of the Census of 1880, which gave 237 billion feet. The Census of 1890 gave the total estimated quantity as 300 billion feet, and there has been as great variance between subsequent estimates. None of these estimates are comparable for the reason that each was made in accordance with lumbering practices at that particular time, and there has been a constant change in methods of lumbering and a constant increase in the accuracy of timber estimating. The volume of timber considered merchantable has constantly increased, and the accretion by growth must also be taken into consideration. The following estimates have been published:

	Million feet b. m.
Census of 1880	237, 141
Census of 1890	300, 000
B. E. Fernow (1892)	250, 000
G. W. Hotchkiss (1898)	187, 000
American Lumberman (1905)	300, 000
Bureau of Corporations (1914)	384, 400
Southern Pine Association (1919)	260, 000
Forest Service (1920):	
Original stand	650, 000
1920	257, 691
Southern Pine Association (1924)	211, 900
Southern Pine Association (1931)	176, 000
Forest Service (1932, saw timber)	118, 132

Figure 36 shows the course of production of yellow pine in the eastern United States during the period 1799 to 1934, inclusive. Quantities are given in table 20. It is estimated that a total of approximately 550 billion feet of yellow pine lumber has been produced in the East, 98 percent of which was from the Southern and Southeastern States.

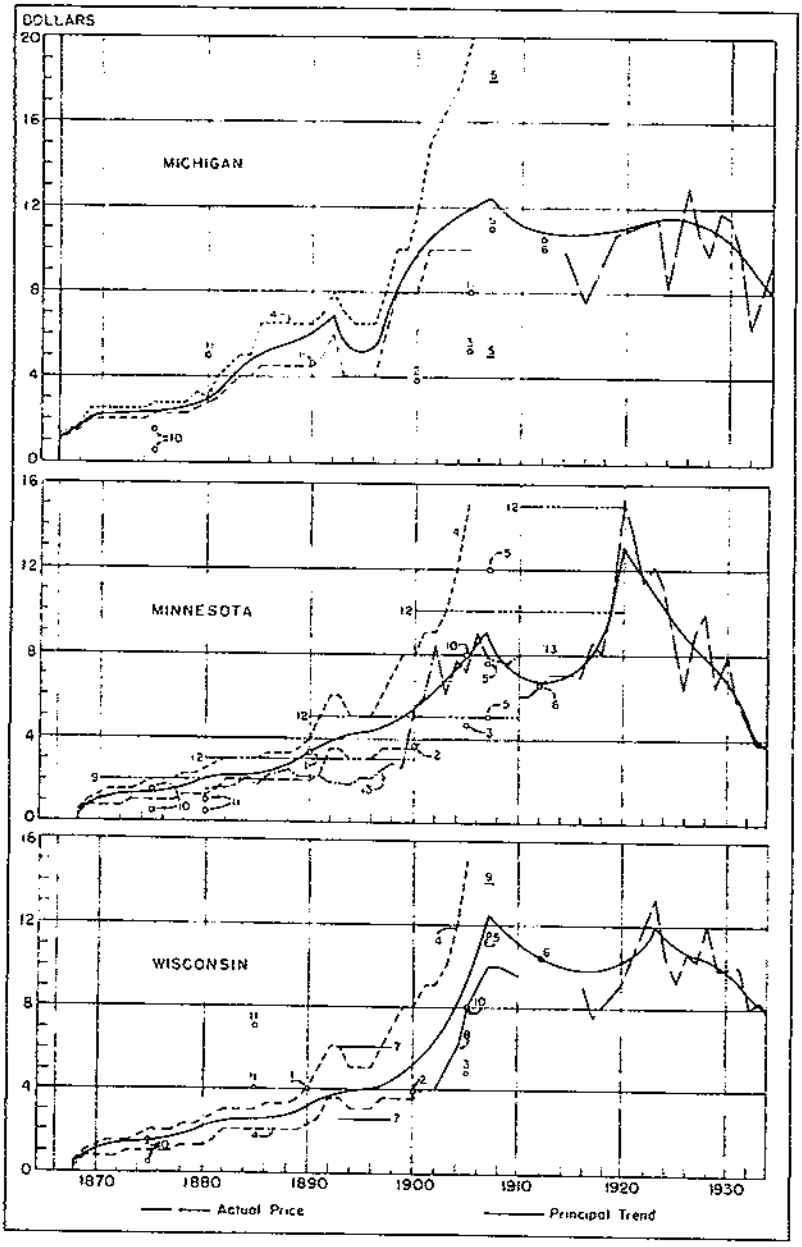

FIGURE 35. Estimates of actual stumpage prices of northern white pine in the Lakes region, all available sources, 1886-1934. Sources of early estimates, indicated by number are: Census reports of (1) 1890, (2) 1900, and (3) 1905; Forest Service, (4) unpublished compilation in 1905 from trade journal reports of sales (5) average annual price and price range in 1907 by Pierson, and (6) Smith in 1912; Bureau of Corporations, Department of Commerce, in The Lumber Industry, part I, page 198, 1913, (7) range in price 1893-98, (8) price given by Wausau operator 1902-10, and (9) price range in 1907; individual estimates (10) by W. I. Ewart in American Lumberman, September 2, 1905, (11) by J. D. Lacey in Southern Lumberman, April 23, 1910, (12) by W. T. Cox in Timberman, August 1931; and (13) sales of State timber.

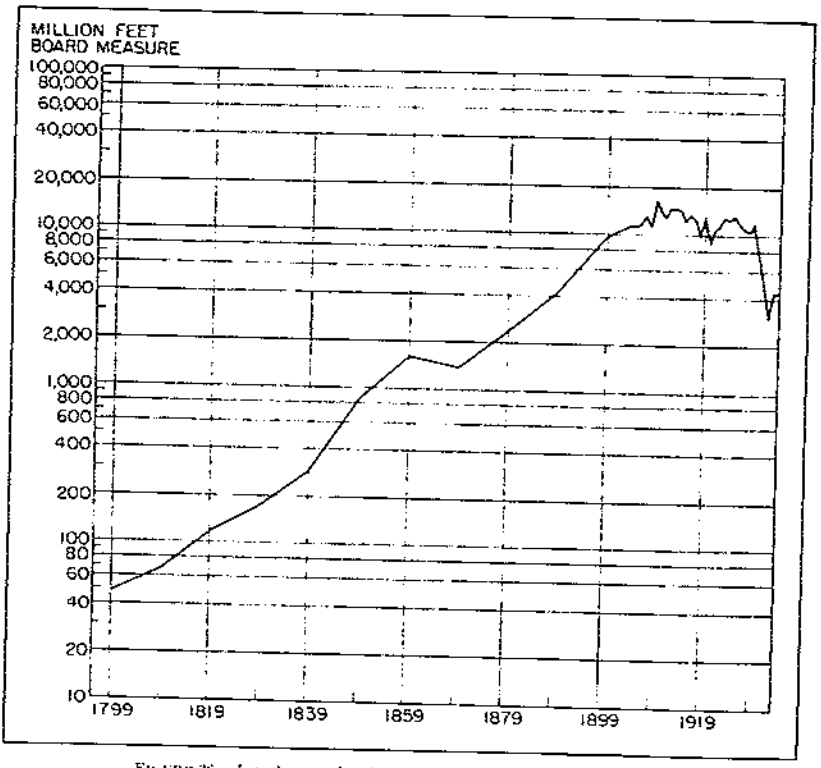

FIGURE 36. Lumber production, southern yellow pines, 1799-1934

TABLE 20. *Lumber production, southern yellow pines, specified years, 1799-1899 and 1904-34* [1]

Year	Production	Year	Production	Year	Production
	Million ft. b. m.		*Million ft. b. m.*		*Million ft. b. m.*
1799	48	1907	13,215	1921	10,960
1809	67	1908	11,236	1922	11,501
1819	117	1909	16,277	1923	12,949
1829	171	1910	143	1924	12,487
1839	290	1911	12,892	1925	13,236
1849	846	1912	14,737	1926	11,752
1859	1,605	1913	14,839	1927	10,891
1869	1,378	1914	11,473	1928	10,610
1879	2,379	1915	12,177	1929	11,630
1889	4,219	1916	13,411	1930	7,450
1899	9,659	1917	12,183	1931	4,430
1904	11,533	1918	9,942	1932	3,069
1905 [1]	8,772	1919	13,063	1933	4,446
1906	11,661	1920	8,964	1934	4,473

Sources: 1799-1889, Forest Service estimates, 1899-1934 from Census publications.
[1] Data incomplete.

Table 21 and figure 37 give the price record and trends of sales of 107 billion feet of southern yellow pine timber in the entire eastern United States during the period 1880-1934. The second-growth trend is based on sales since 1900 of nearly 6 billion feet. As the virgin

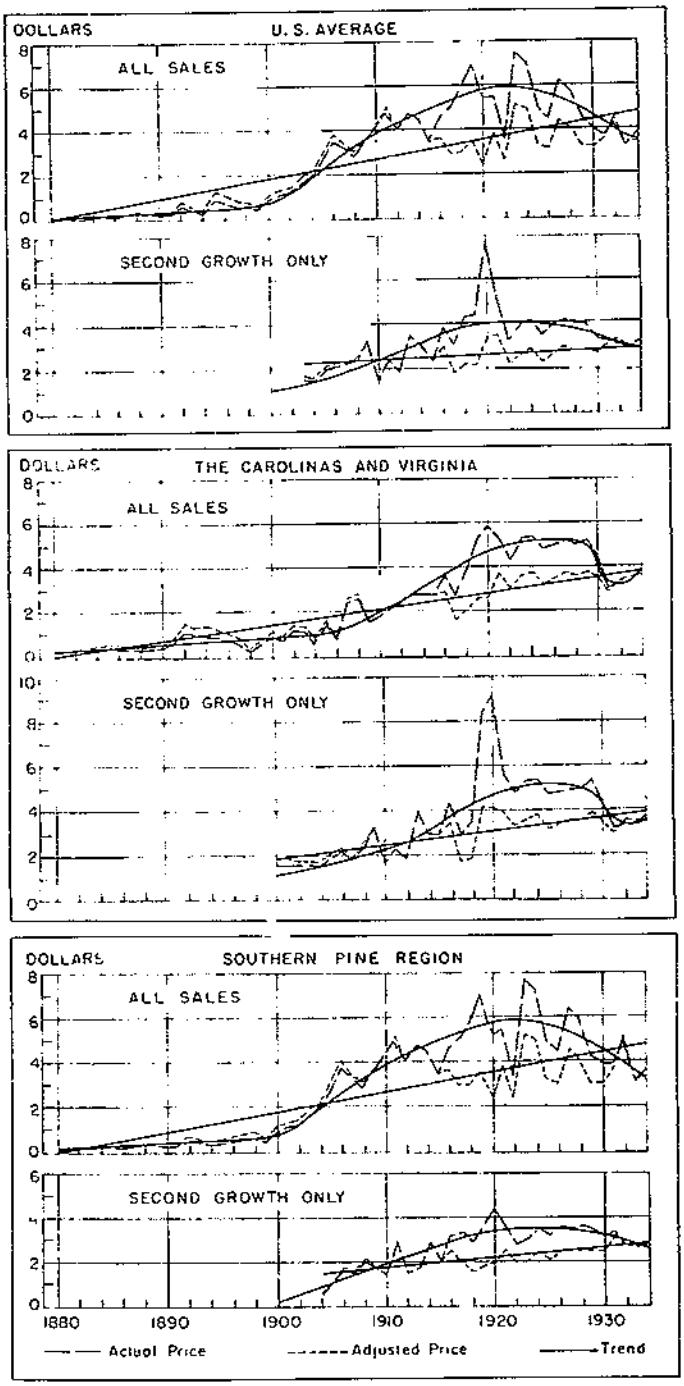

FIGURE 37.—Stumpage prices of southern yellow pines, actual and adjusted with indicated trends, all sales and second growth only; United States average, Carolinas and Virginia, and southern pine region; 1880–1934. (Basis, million feet board measure: United States average, all sales 107,056, second growth 5,981; Carolinas and Virginia, all sales 5,060, second growth 2,228; southern pine, all sales, 101,727, second growth 3,608.)

yellow pine stands have been cut, the industry has had to depend more and more on second-growth timber, with which foresters and lumbermen will be more concerned as time goes on. The stability of the actual prices of second-growth timber is apparent from this record. On the other hand, the appreciation in the price of second-growth timber, when adjusted for the purchasing power of the dollar, has been marked and constant since 1917.

TABLE 21.—*Average stumpage prices of southern yellow pines, actual and adjusted, with index numbers, for all sales, 1880–1934 and for second growth only, 1900–1934*

ALL SALES

Year	Price in dollars						Index numbers					
	United States average		Carolinas and Virginia		Southern Pine region		United States average		Carolinas and Virginia		Southern Pine region	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1880	0.10	0.11	0.30	0.32	0.10	0.11	2	3	12	13	2	2
1881	.15	.16	.32	.34			3	4	13	14		
1882	.17	.18	.34	.35	.17	.18	4	4	14	14	4	4
1883	.11	.12	.37	.39	.11	.12	2	3	15	16	2	3
1884	.21	.24	.37	.42	.20	.23	5	5	15	17	4	5
1885	.18	.22	.40	.48	.18	.22	4	5	17	20	4	5
1886	.12	.15	.43	.53	.12	.15	3	3	18	22	3	3
1887	.25	.30	.38	.46	.25	.30	6	7	16	19	5	7
1888	.37	.44	.32	.38	.37	.44	8	10	13	16	8	10
1889	.26	.31	.38	.45	.26	.31	6	7	16	18	6	7
1890	.20	.24	.44	.54	.20	.24	4	5	18	22	4	5
1891	.27	.33	.62	.76	.26	.32	6	7	26	31	6	7
1892	.62	.81	1.11	1.46	.59	.66	14	18	46	60	11	14
1893	.45	.58	1.04	1.33	.45	.58	10	13	43	54	10	13
1894	.30	.43	.97	1.39	.39	.43	7	9	40	57	7	9
1895	.91	1.28	.91	1.28			20	28	38	52		
1896	.75	1.10	.75	1.10			17	24	31	45		
1897	.60	.88	.60	.88			13	19	25	36		
1898	.37	.80	.22	.31	.66	.93	13	18	9	13	14	20
1899	.49	.64	.60	.79	.48	.63	11	14	25	32	10	14
1900	.93	1.14	.91	1.11	.92	1.12	20	25	38	45	20	24
1901	1.10	1.36	.72	.89	1.10	1.36	24	30	30	36	24	30
1902	1.25	1.45	1.22	1.42	1.25	1.45	28	32	50	58	27	32
1903	1.65	1.90	1.18	1.36	1.66	1.91	36	42	49	56	36	42
1904	1.88	2.16	.65	.75	2.00	2.29	41	47	27	31	44	50
1905	2.66	3.03	1.49	1.70	2.74	3.12	59	66	62	69	60	68
1906	3.54	3.93	.85	.94	3.76	4.17	78	86	35	38	82	91
1907	3.26	3.42	2.54	2.67	3.32	3.49	72	75	105	109	72	76
1908	2.86	3.11	2.67	2.91	2.87	3.13	63	68	110	119	63	68
1909	3.59	3.64	1.61	1.63	3.61	3.66	79	80	67	67	79	80
1910	4.30	4.18	1.86	1.80	4.37	4.25	95	92	76	74	95	92
1911	4.86	5.13	2.12	2.24	5.02	5.30	107	112	88	91	109	115
1912	4.14	4.10	2.57	2.55	4.17	4.13	91	90	106	104	91	90
1913	4.81	4.72	2.86	2.81	4.85	4.76	106	103	118	115	106	103
1914	4.55	4.58	2.88	2.90	4.55	4.58	100	100	119	118	99	100
1915	3.54	3.49	2.84	2.80	3.56	3.51	78	76	117	114	78	76
1916	4.63	3.71	3.69	2.96	4.72	3.78	102	81	153	121	103	82
1917	5.02	2.93	2.79	1.63	5.15	3.00	110	64	115	67	112	65
1918	5.61	3.03	3.88	2.03	5.81	3.03	128	66	160	83	127	66
1919	7.09	3.50	5.39	2.66	7.23	3.57	156	77	223	109	158	78
1920	5.49	2.44	6.00	2.66	5.29	2.35	121	53	248	109	115	51
1921	5.52	3.88	5.40	3.79	5.57	3.91	121	85	223	155	121	85
1922	3.57	2.53	4.35	3.08	3.46	2.45	79	55	180	126	75	53
1923	7.56	5.15	5.37	3.66	7.80	5.31	166	113	222	149	170	115
1924	7.17	5.00	5.44	3.80	7.29	5.09	158	109	225	155	159	111
1925	4.97	3.29	4.92	3.26	4.97	3.29	109	72	203	133	108	72
1926	4.53	3.10	5.06	3.47	4.48	3.07	100	68	209	142	98	67
1927	6.23	4.47	5.29	3.80	6.50	4.67	137	98	218	155	142	102
1928	5.81	4.11	5.15	3.65	5.92	4.19	128	90	213	149	129	91
1929	4.55	3.27	5.27	3.79	4.34	3.12	100	72	218	155	95	68
1930	4.05	3.21	4.43	3.51	3.96	3.14	89	70	183	143	86	68
1931	3.76	3.53	3.15	2.95	3.96	3.71	83	77	130	120	86	81
1932	4.42	4.67	3.21	3.39	5.01	5.30	97	102	133	138	109	115
1933	3.25	3.38	3.43	3.57	3.18	3.31	71	74	142	146	69	72
1934	3.82	3.50	3.99	3.65	3.75	3.43	84	77	165	149	82	75

TABLE 21.—*Average stumpage prices of southern yellow pines, actual and adjusted, with index numbers, for all sales, 1880–1934 and for second growth only, 1900–1934*—Continued

SECOND GROWTH ONLY

Year	Price in dollars						Index numbers					
	United States average		Carolinas and Virginia		Southern Pine region		United States average		Carolinas and Virginia		Southern Pine region	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1900	------	------	1.50	1.83	------	------	------	------	58	70	------	------
1901	------	------	1.50	1.86	------	------	------	------	58	71	------	------
1902	------	------	1.50	1.74	------	------	------	------	58	67	------	------
1903	1.50	1.72	1.50	1.72	------	------	57	65	58	66	------	------
1904	1.41	1.62	1.50	1.72	0.50	0.57	54	61	58	66	19	21
1905	1.87	2.13	1.85	2.11	------	------	71	80	72	81	------	------
1906	2.04	2.26	2.00	2.32	1.60	1.77	78	85	81	89	59	64
1907	2.21	2.32	1.75	1.84	1.50	1.58	84	87	68	71	56	57
1908	2.30	2.57	2.37	2.58	2.00	2.18	90	97	92	99	74	79
1909	3.23	3.27	3.23	3.27	------	------	123	123	126	125	------	------
1910	1.55	1.51	1.55	1.51	1.49	1.45	59	57	60	58	55	52
1911	2.37	2.50	2.25	2.38	2.84	3.00	91	94	88	91	105	108
1912	1.86	1.84	1.84	1.82	1.50	1.49	71	69	72	70	56	54
1913	3.58	3.51	3.98	3.90	1.74	1.71	137	132	155	149	64	62
1914	2.99	3.01	2.94	2.96	2.93	2.95	114	113	114	113	109	106
1915	2.42	2.38	2.85	2.81	2.07	2.04	92	90	111	108	77	74
1916	3.91	3.13	4.34	3.48	3.22	2.58	149	118	169	133	119	93
1917	3.04	1.77	2.83	1.65	3.38	1.97	116	67	110	63	125	71
1918	4.33	2.26	3.49	1.82	2.95	1.54	165	85	136	70	109	56
1919	4.43	2.19	8.45	4.17	3.71	1.83	169	82	329	160	137	66
1920	7.78	3.45	9.31	4.13	4.41	1.96	297	130	362	158	163	71
1921	5.10	3.58	5.56	3.90	3.67	2.58	195	135	216	149	136	93
1922	3.21	2.27	4.72	3.34	2.84	2.01	123	85	184	128	105	73
1923	3.92	2.67	5.30	3.61	3.03	2.06	150	100	206	138	112	74
1924	4.19	2.92	5.38	3.76	3.54	2.47	160	110	209	144	131	89
1925	3.54	2.34	4.79	3.17	3.20	2.12	135	88	186	122	119	77
1926	3.96	2.71	4.86	3.33	3.59	2.46	151	102	189	128	133	89
1927	4.22	3.03	4.96	3.56	3.54	2.54	161	114	193	136	131	92
1928	4.02	2.85	4.98	3.53	3.60	2.55	153	107	194	135	133	92
1929	4.04	2.90	5.40	3.88	3.49	2.51	154	109	210	146	129	91
1930	3.46	2.74	4.37	3.47	3.17	2.51	132	103	170	133	117	91
1931	3.31	3.10	3.16	2.96	3.39	3.18	126	117	123	113	126	115
1932	3.14	3.32	3.36	3.55	2.81	2.97	120	125	131	136	104	107
1933	2.92	3.04	3.37	3.50	2.69	2.80	112	114	131	134	100	101
1934	3.25	2.97	3.76	3.44	2.90	2.65	124	112	146	132	107	96

These data have been broken down into the two principal subregions: (1) The Carolinas and Virginia (fig. 37) based on 5 billion feet and (2) the Southern Pine region, including Florida, Georgia, Mississippi, Alabama, Louisiana, Texas, Oklahoma, and Arkansas (fig. 37) based on nearly 102 billion feet. The difference of about 300 million feet between the total basis for the two regions and for the eastern United States is based on a few sales of yellow pine in States outside these two regions. The close identity of the second-growth timber price records in the Carolina Pine region since 1921 with that of all sales reflects the lack of virgin pine timber in this region. Notwithstanding the fact that the quality of timber sold has steadily depreciated since 1880, it is interesting to note the steady appreciation in price when adjusted for the purchasing power of the dollar. The same is true in general of the price records for the whole southern pine region. The steady appreciation in second-growth prices since 1904, when adjusted for the purchasing power of the dollar, is striking.

THE DOUGLAS FIR REGION OF WASHINGTON AND OREGON

That region designated as the North Pacific, including Oregon and Washington, falls naturally into three timber subregions: The Douglas fir region, which consists of that part of the two States west of the Cascade Mountains; the Klamath region of Oregon, which includes Josephine, Jackson, Klamath, and Lake Counties; and the Inland Empire, comprising the eastern part of the two States and extending into Idaho and Montana.

Data for the Douglas fir region will be presented by States, not because there is any great or basic difference in the timber stands, but because the logging and milling industry was started earlier in western Washington and developed faster and produced more lumber than in western Oregon (with the exception of a limited area along the lower Columbia River), with the result that western Washington stumpage has generally sold for higher prices than has comparable timber in western Oregon.

Table 22 gives the price record of stumpage sales in western Washington from 1890 to 1934 of the four principal species, total individual and all sales. The trend of these four species and their combined trend (individual sales), based on only 15.5 billion feet (fig. 38), do not vary greatly from the trend of all sales, based on more than 128 billion feet. Actual prices increased at a fairly constant rate until 1925, and the decrease since that year has taken prices back to about the 1918 level. When adjusted for the purchasing power of the dollar, however, the long-time trend of prices since 1890 has been distinctly upward.

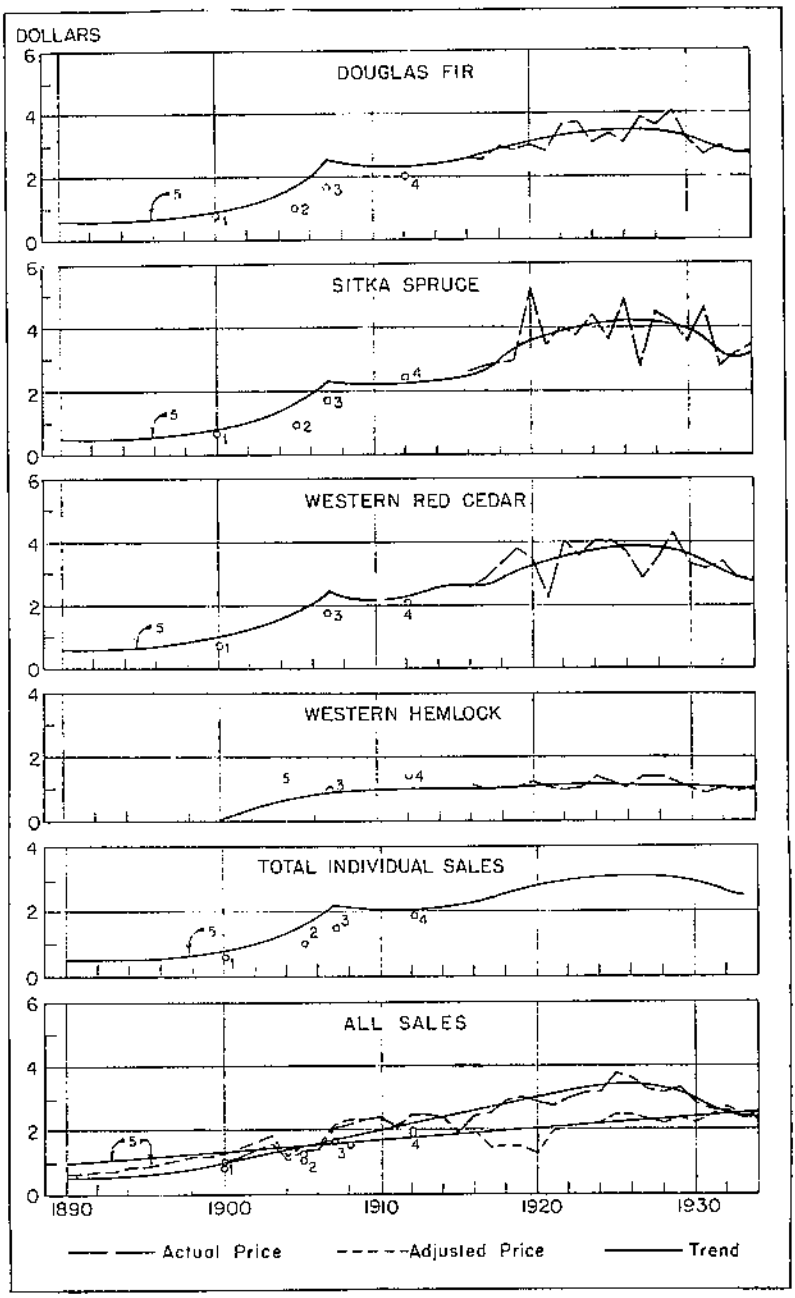

FIGURE 38.—Actual stumpage prices in individual sales of four principal species in western Washington, and actual and adjusted stumpage prices of all sales in this region, 1890–1934. Sources of earlier estimates indicated by number, are: Census reports of (1) 1900 and (2) 1905; Forest Service, (3) Pierson in 1907 and (4) Smith in 1912; (5) Brindley (7), 1916, from whose figure is derived trend curve prior to record of actual prices. (Basis, million feet board measure, 1916–34: Douglas fir 11,641; Sitka spruce 461; western red cedar 1,337; western hemlock 1,902; all sales, 1890–1934, 128,350.)

TABLE 22.—*Actual average annual stumpage prices of four principal species of the Douglas fir region of western Washington, total individual sales, and all sales, 1890–1934*

Year	Individual sales, actual prices					All sales	
	Douglas fir	Sitka spruce	Western red cedar	Western hemlock	Total	Actual	Adjusted
1890	$0.53	$0.48	$0.60		$0.50	$0.50	$0.61
1891	.53	.48	.60		.50	.51	.63
1892	.54	.48	.60		.51	.53	.70
1893	.56	.50	.62		.52	.55	.71
1894	.58	.51	.65		.53	.58	.83
1895	.60	.53	.68		.55	.60	.84
1896	.64	.56	.72		.58	.64	.94
1897	.70	.60	.78		.60	.70	1.03
1898	.76	.65	.84		.65	.79	1.12
1899	.82	.72	.92		.70	.88	1.15
1900	.90	.80	1.00	$0.05	.73	1.00	1.22
1901	1.00	.91	1.12	.21	.99	1.14	1.41
1902	1.12	1.04	1.24	.37	1.03	1.37	1.59
1903	1.25	1.20	1.40	.52	1.17	1.56	1.79
1904	1.45	1.40	1.56	.64	1.35	1.02	1.17
1905	1.68	1.64	1.78	.75	1.57	1.33	1.52
1906	2.00	1.93	2.07	.83	1.85	1.37	1.52
1907	2.50	2.30	2.40	.90	2.26	2.05	2.15
1908	2.40	2.25	2.30	.94	2.20	2.14	2.33
1909	2.34	2.22	2.22	.99	2.15	2.32	2.35
1910	2.30	2.22	2.18	1.02	2.12	2.38	2.32
1911	2.28	2.22	2.18	1.03	2.11	2.01	2.12
1912	2.29	2.24	2.30	1.05	2.13	2.47	2.46
1913	2.32	2.28	2.45	1.07	2.17	2.46	2.41
1914	2.35	2.32	2.55	1.08	2.20	2.36	2.37
1915	2.44	2.40	2.62	1.08	2.28	1.91	1.88
1916	2.58	2.50	2.65	1.09	2.39	2.40	1.92
1917	2.53	2.79	2.86	1.06	2.49	2.49	1.45
1918	2.94				2.61	2.88	1.50
1919	2.86	2.97	3.84	1.14	2.75	2.99	1.46
1920	2.96	5.22	3.51	1.23	2.88	2.84	1.26
1921	2.80	3.41	2.23	1.06	2.97	2.74	1.92
1922	3.00	4.03	4.03	1.09	3.06	2.96	2.10
1923	3.71	3.74	3.59	1.07	3.10	3.11	2.12
1924	3.03	4.40	4.04	1.46	3.17	3.15	2.20
1925	3.34	3.54	4.04	1.25	3.10	3.75	2.48
1926	3.05	4.89	3.71	1.10	3.19	3.62	2.48
1927	3.83	2.68	2.84	1.43	3.18	3.26	2.34
1928	3.61	4.50	3.50	1.41	3.16	3.17	2.22
1929	4.07	4.17	4.30	1.29	3.08	3.33	2.39
1930	3.19	3.50	3.29	1.07	3.00	2.83	2.24
1931	2.68	4.66	3.17	.90	2.88	2.62	2.46
1932	2.96	2.72	3.35	1.06	2.68	2.57	2.72
1933	2.76	3.15	2.82	1.01	2.57	2.36	2.45
1934	2.74	3.41	2.80	1.03	2.54	2.56	2.34

The price record of individual species in western Washington, compiled from individual sales (which constituted but 12 percent of the total volume), shows the price trends from 1890 to 1916, developed by Brindley (7) when a student at the University of Washington. Because of the very great volume of timber sold in early years in flat-rate sales, according to the data available for this investigation, 1916 was the earliest year for which there was an adequate record of individual sales. That was also the last year for which Brindley obtained individual stumpage-price averages. It is interesting to note that the 1916 average prices resulting from the two investigations, one made in 1916 and the other about 20 years later, were within 10 cents of each other for all four species.

The great demand for Sitka spruce for airplane stock during the World War and for a few years thereafter, as well as the relatively small volume of this species, probably accounts for a more rapid rise in price during the decade, 1916–26, than was experienced for the other species.

Sales for 1900–1934 in western Oregon (table 23, fig. 39) are based on a total of over 60 billion feet. The long-time trend of stumpage

prices when adjusted for the purchasing power of the dollar is distinctly upward and similar to that of western Washington as was to be expected. Here, partially because there is no earlier study available, such as that by Brindley in western Washington, it is possible to show individual price records only for Douglas fir and hemlock.

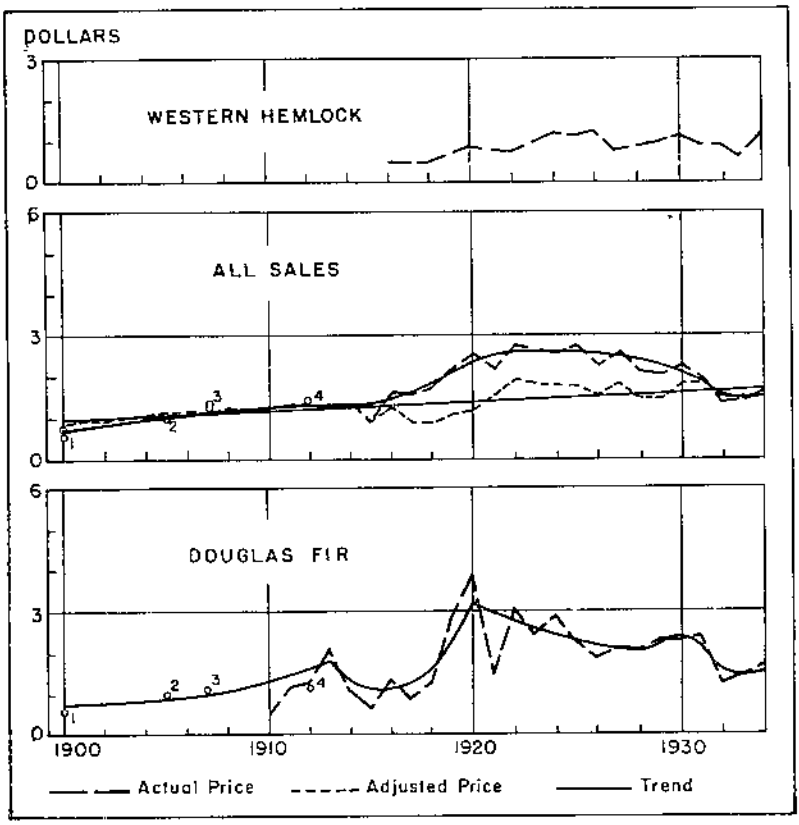

FIGURE 39.—Actual stumpage prices in western Oregon for Douglas fir (1910–1934) and western hemlock (1915–1934), and actual and adjusted prices for all sales (1900–1934), with indicated trends. Sources of earlier estimates, indicated by number, are: Census reports of (1) 1900 and (2) 1905; Forest Service (3) Pierson in 1907 and (4) Smith in 1912.

Two interesting features are that Washington prices have been consistently higher than have those of Oregon, and that the adjusted average prices in Washington have increased since 1922 while those in Oregon have decreased. Although western Washington's supply of virgin timber is not by any means exhausted, the fact that it is not so plentiful as it once was may have some bearing on this price appreciation. Timber is, generally speaking, more plentiful in western Oregon, where conditions of accessibility are not so favorable as they are in western Washington.

TABLE 23.—*Actual average annual stumpage prices of Douglas fir and western hemlock in western Oregon, with all sales actual and adjusted, 1900–1934*

Year	Individual sales		All sales		Year	Individual sales		All sales	
	Douglas fir	Western hemlock	Actual	Adjusted		Douglas fir	Western hemlock	Actual	Adjusted
1900	$0.70		$0.70	$0.85	1918	$1.26	$0.51	$1.70	$0.89
1901	.72		.75	.93	1919	2.85		2.19	1.08
1902	.76		.80	.93	1920	3.87	.88	2.59	1.15
1903	.79		.88	1.01	1921	1.47		2.13	1.50
1904	.82		.93	1.07	1922	3.08	.75	2.76	1.95
1905	.85		1.00	1.14	1923	2.41	1.00	2.86	1.81
1906	.89		1.06	1.18	1924	2.86	1.19	2.57	1.79
1907	.95		1.11	1.17	1925	2.20	1.14	2.72	1.80
1908	1.03		1.17	1.27	1926	1.86	1.26	2.26	1.55
1909	1.13		1.20	1.22	1927	2.06	.79	2.59	1.86
1910	.47		1.25	1.22	1928	2.03	.89	2.12	1.49
1911	1.16		1.29	1.36	1929	2.27	.97	2.05	1.47
1912	1.27		1.30	1.29	1930	2.27	1.14	2.28	1.81
1913	2.08		1.32	1.29	1931	2.37	.95	1.97	1.85
1914	1.03		1.34	1.35	1932	1.23	.94	1.36	1.44
1915	.63		.93	.92	1933	1.43	.63	1.41	1.47
1916	1.31	$0.50	1.60	1.28	1934	1.89	1.10	1.64	1.50
1917	.87	.50	1.56	.91					

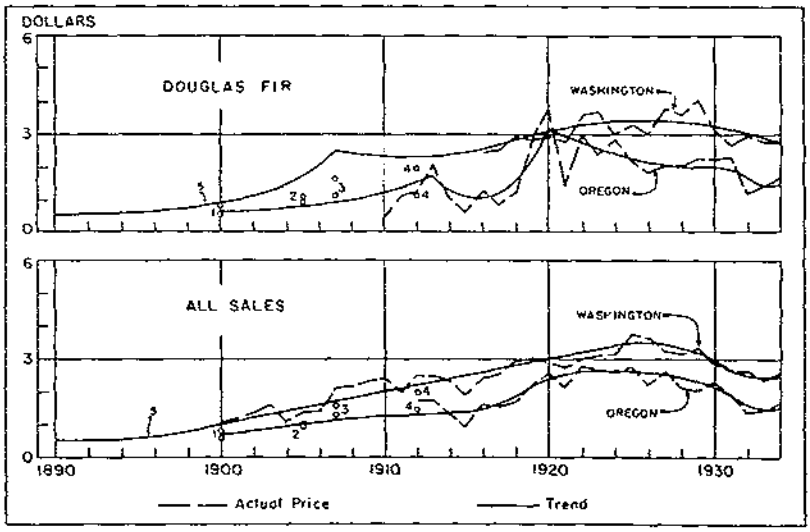

FIGURE 40.—Comparison of stumpage prices in western Washington and western Oregon, Douglas fir and all sales, with indicated trends, 1890–1934. Sources of earlier estimates, indicated by number, are: Census reports of (1) 1900 and (2) 1905; Forest Service, (3) Pierson in 1907 and (4) Smith in 1912; (5) Brindley (7) 1916, from whose figure is derived trend curve prior to record of actual prices.

The difference in the trends of Douglas fir stumpage prices as between the two States (fig. 40) is interesting in spite of the fact that the trends of all sales prices are very similar. These investigations indicate that the price record for Washington is based principally on operable bodies of stumpage, while that for Oregon, particularly for the period 1912–30, is based largely on speculative transactions. It is a matter of common knowledge that speculative buying and selling timber has been much more common in western Oregon than in western Washington.

THE KLAMATH REGION

The relatively small section in south-central Oregon known as the Klamath region has since the early days of the lumber industry been considered separately. One reason for this was that the only rail outlet by which lumber could be shipped was until recent years to the south into California. Lumber-producing concerns in the Klamath region have been members of the California Lumber Association, partly because their product was shipped to market through northern California in competition with the northern California mills, and partly because the Klamath timber more closely resembled the pine timber of the California Pine region than it did that of eastern Oregon. Sugar pine, which is a true white pine mainly found in northern California, grows in commercial quantities in the Klamath region, and the ponderosa pine of the Klamath region is, generally speaking, larger, of higher grade, and occurs in heavier stands than it does in eastern Oregon as a whole.

For these reasons stumpage prices in this region have been presented separately (table 24). The average price of timber sold from the Klamath Indian Reservation from 1917 to 1929, amounting to nearly 4 billion feet, is shown, because of the importance of the Indian timber to the Klamath region. The volume of Indian timber sold is not included in the total of approximately 14 billion feet which forms the basis of the all-sales record for this region (fig. 41).

TABLE 24.—*Actual average annual stumpage prices in the Klamath region, and indicated trends; ponderosa pine, all sales, and Klamath Indian Reservation, 1910–84*

Year	Ponderosa pine	All sales	Indian sales	Year	Ponderosa pine	All sales	Indian sales	Year	Ponderosa pine	All sales	Indian sales
1910	$1.46	$1.46	-------	1919	$1.09	$1.72	$5.19	1927	$2.97	$2.48	$7.64
1911	-------	-------	-------	1920	2.16	2.14	4.88	1928	5.50	5.20	5.90
1912	-------	.99	-------	1921	-------	1.59	-------	1929	5.30	4.99	6.92
1913	1.50	1.28	-------	1922	1.01	2.17	-------	1930	4.06	3.56	-------
1914	.78	1.74	-------	1923	1.79	1.75	3.75	1931	3.64	3.62	-------
1915	-------	-------	-------	1924	2.47	2.09	5.94	1932	2.21	2.10	-------
1916	.65	2.04	-------	1925	3.11	2.63	6.01	1933	2.75	2.34	-------
1917	1.00	1.30	$3.44	1926	3.79	2.97	7.63	1934	2.95	2.84	-------
1918	2.15	2.38	3.38								

The rapid increase in stumpage prices between 1920 and 1928 was due primarily to keen competition among Klamath operators for supplies of standing timber. The annual production of lumber in the Klamath region rose from less than 100 million feet in 1916 to 576 million in 1928, through the installation of new mills and increasing the capacity of existing plants. It was estimated by the Indian Service in 1931[9] that the investment in plants and equipment made possible an annual production of 800 million feet of lumber, which would exhaust the timber supply of the region in from 23 to 30 years. In view of this situation, operators sought to buy as much timber as they could in order that their investments in manufacturing plants could be amortized at a reasonably low rate per thousand feet. With everybody trying to do the same thing, stumpage prices rose rapidly. Particularly was this true of Klamath Indian timber, where long-term

[9] MUCK, I., and MELIS, P. E. THE STATUS OF INDIAN FORESTS IN RELATION TO A NATIONAL PROGRAM OF SUSTAINED YIELD. U. S. Off. Indian Affairs, 55 pp. 1931. [Mimeographed.]

contracts entailing relatively small carrying charges were made. Stumpage prices from 1928 to 1932 declined as rapidly as they had risen, and are now back to about the 1924 level.

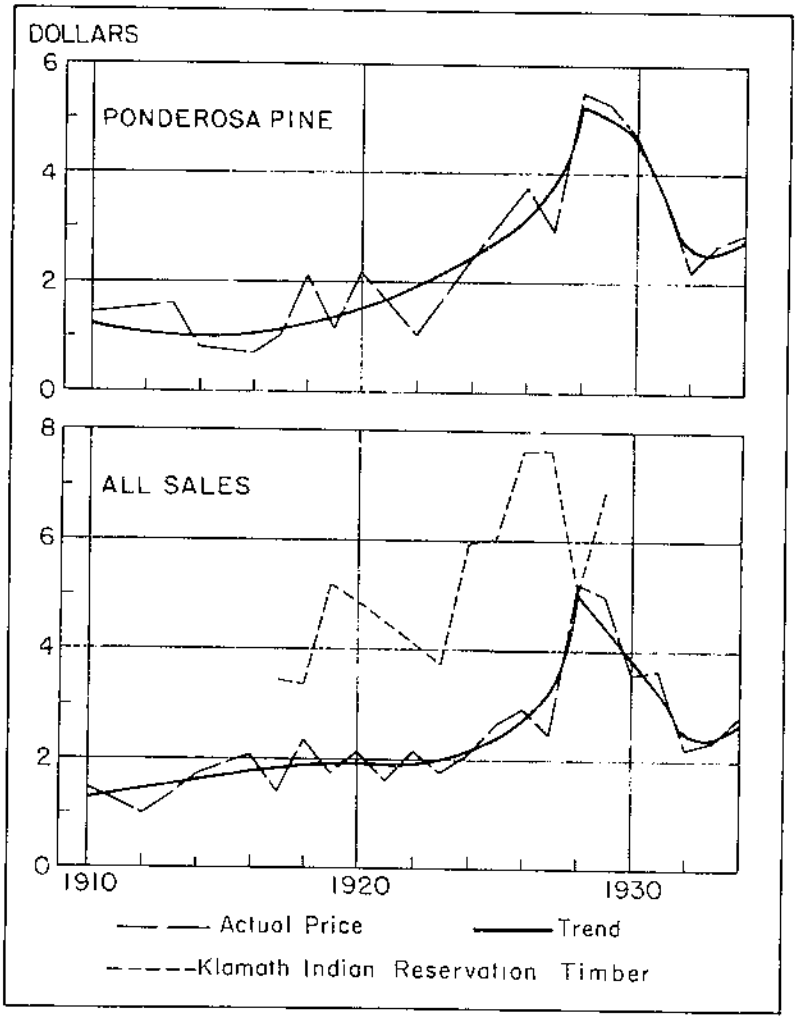

FIGURE 41.—Average stumpage prices of ponderosa pine and all sales in the Klamath region, with indicated trends, 1910–30; Indian reservation timber sales, 1917–29. (Basis, million feet board measure: Ponderosa pine 7,156; all sales 14,409; Indian reservation 3,805.)

CALIFORNIA PINES AND REDWOOD

Average prices of privately owned timber in California since 1890 based on 76 billion feet (table 25) are of general interest only, for California's two main timber types are quite dissimilar. The redwood type occurs on a relatively narrow strip of land adjacent to the coast, extending from the Oregon line almost to San Francisco. Redwood is the principal species of this type, and is associated most commonly with Douglas fir, but also with limited quantities of western red cedar, Sitka spruce, Port Orford cedar, and some of the true firs.

The pine type occurs chiefly in the northern and eastern third of the State, the principal species being ponderosa pine, sugar pine, incense cedar, and, to a limited extent, Douglas fir and the true firs.

TABLE 25.—*Average annual stumpage prices in the pine and redwood regions of California, 1890–91, 1897, and 1900–1934*

Year	Ponderosa pine		Sugar pine		Actual prices		
	Actual	Adjusted	Actual	Adjusted	Pine region	Redwood region	All sales
1890						$0.66	$0.66
1891						.75	.75
1897						.23	.23
1900					$1.00	.10	.20
1901					1.00	.81	.81
1902					.27	.12	.13
1903					.60	.12	.43
1904					.58	1.39	.71
1905					.41	.89	.55
1906						2.00	2.00
1907					.85	2.02	1.93
1908	$1.25	$1.36			.79	.57	.77
1909					.38	.54	.41
1910	1.75	1.70	$1.75	$1.70	1.49		1.49
1911	1.50	1.58			1.50		1.50
1912	2.15	2.13			2.17	2.54	2.52
1913	1.25	1.23			1.08		1.08
1914	2.42	2.43	2.94	2.96	2.00	1.11	1.97
1915	2.12	2.09			2.05	2.36	2.28
1916	1.00	.80	1.50	1.20	1.36	.89	.93
1917					1.33	1.70	1.35
1918					1.27	2.15	1.72
1919	3.25	1.61			1.39	1.70	1.39
1920	3.16	1.40			2.97	2.46	2.68
1921	2.64	1.85	2.50	1.76	2.01		2.01
1922	2.75	1.95	3.48	2.46	2.57	1.82	2.54
1923	3.85	2.62	4.51	3.07	2.45	4.59	2.84
1924	2.33	1.63	2.51	1.75	4.08	2.45	3.63
1925	2.72	1.80	3.94	2.61	2.13	2.86	2.47
1926	3.39	2.32	4.60	3.15	3.02	1.82	2.63
1927	4.67	3.35	3.00	2.58	3.97	2.53	3.66
1928	3.25	2.30	3.87	2.74	2.40	2.33	2.35
1929	2.58	1.86	4.31	3.10	2.61	1.96	2.47
1930	3.46	2.74	5.47	4.34	2.90	2.22	2.77
1931	3.30	3.10	2.62	2.46	2.00	3.32	3.01
1932	2.58	2.73	2.38	2.52	2.46	2.48	2.47
1933	2.44	2.54	3.27	3.40	2.12	2.00	2.08
1934	3.00	2.83	3.74	3.42	2.39	1.82	2.32

The long-time trend of the average prices of all sales in the redwood region can best be expressed by a straight line which shows a steady trend of price increase (fig. 42). This is the only instance where a straight line was found to fit the basic data better than a freehand curve. If, however, average prices for 1935 and 1936 are not materially higher than those of 1933 and 1934, the straight line of the trend cannot be extended. The facts that the redwood region is not large, as timber areas go, and that the bulk of the timber is held by operating companies or by strongly financed investors who are unwilling to sell at less than what they consider to be a fair price, account for the greater stability of stumpage prices here than in the pine region.

About 25 percent of the timber sold in the pine region was reported in individual sales. Average prices of sales of approximately 6,500 million feet of ponderosa pine and 700 million feet of sugar pine are shown in figure 42. The similarity in price trends of these two

species was to be expected, as also was the fact that sugar pine has generally sold for higher prices than has ponderosa pine. The steady

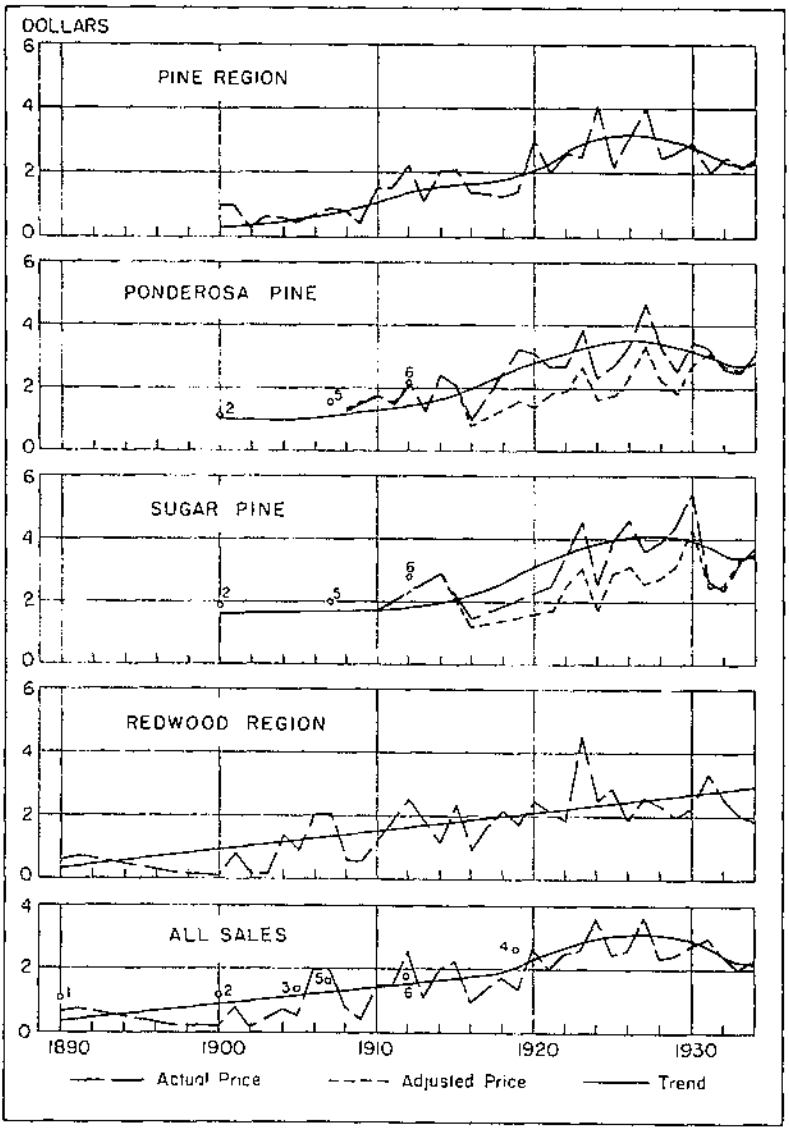

FIGURE 42.—Average stumpage prices in the redwood and pine regions of California, with indicated trends, 1890–1934. Sources of early estimates, indicated by number, are: Census reports for (1) 1890, (2) 1900, (3) 1905, (4) 1919; Forest Service, (5) Pierson in 1907 and (6) Smith in 1912. (Basis, million feet board measure: All sales 76,619; redwood region 46,983; pine region 29,636; ponderosa pine 6,412; sugar pine 734.)

upward trend in the price of both species since 1916, when adjusted for the purchasing power of the dollar, is apparent.

THE "INLAND EMPIRE"

The largest of the important timber-producing regions of the West, from the standpoint of area, comprises eastern Washington, eastern Oregon, northern Idaho, and western Montana. This region is not a political or geographical unit and has no fixed boundary lines, but the name "Inland Empire" is in common usage to designate the territory which Spokane serves as a commercial center.

The record of stumpage prices, based on nearly 47 billion feet of timber for the region as a whole and for its component parts (by States), is given in table 26. The peculiar trend of Idaho prices since 1930 (fig. 43) has already been explained in the recorded increase in white pine from 20 to 64 percent of the cut in the North Rocky Mountain region. The price trends of stumpage in Montana, eastern Washington, and eastern Oregon are similar, as was to have been expected.

TABLE 26. *Actual average annual stumpage prices for the "Inland Empire," all sales and ponderosa pine, 1900–1934*

ALL SALES

Year	Idaho	Montana	Eastern Oregon	Eastern Washington	Inland Empire	Year [1]	Idaho	Montana	Eastern Oregon	Eastern Washington	Inland Empire
1900	$1.09	$1.18			$0.08	1918	$2.77	$1.86	$2.49	$1.02	$2.13
1901					.27	1919	2.74	2.02	1.25	2.89	2.44
1902					.19	1920	2.78	3.04	2.82	2.06	2.53
1903					.19	1921	6.51	2.74	1.53	1.64	2.38
1904					.39	1922	7.11	2.55	1.61	1.65	2.15
1905	1.39	1.33			.36	1923	2.51	2.00	2.29	2.17	2.30
1906					2.76	1924	3.39	1.56	2.35	3.10	2.79
1907	1.67	1.92			1.82	1925	3.95	1.93	2.09	2.17	3.13
1908					.34	1926	3.74	2.41	3.05	2.26	2.92
1909				$0.82	.65	1927	3.53	1.83	2.20	2.12	2.76
1910			$0.76	1.60	1.43	1928	3.72	1.18	2.71	1.87	1.08
1911					.12	1929	3.22	2.24	2.78	1.96	2.41
1912	2.15				1.22	1930	2.29	1.85	2.39	2.09	2.14
1913	1.80		.93	2.06	1.17	1931	2.39	1.79	2.55	1.93	2.06
1914	2.04	1.08	1.35		1.00	1932	2.74	2.24	1.84	1.95	2.01
1915	1.08	1.65	1.97	1.21	1.90	1933	4.47	1.41	1.36	1.72	2.11
1916	2.29	1.62	2.49	1.09	2.26	1934	5.06	1.71	2.36	1.53	3.32
1917	4.90	1.74	2.53	1.77	2.58						

PONDEROSA PINE [1]

1900	$1.11	$1.23	$0.79	$0.85	$1.00	1922	$3.50	$2.87	$2.47	$2.24	$2.31
1905			.85	1.39	1.12	1923	2.28	1.77	2.46	1.18	2.46
1907	1.82	2.10	1.08	1.88	1.74	1924	2.37	2.11	2.77	3.42	3.19
1910			.75		.75	1925	1.00	2.67	2.19	2.86	2.43
1912	2.13	2.19	1.90	1.63	1.96	1926	2.32	3.08	3.08	2.52	2.98
1913			1.36		1.42	1927	1.86	2.04	2.18	2.37	2.32
1914	2.00		1.62		1.63	1928	2.82	2.53	2.75	2.34	2.42
1915	.93		1.98		1.98	1929	2.27	3.19	2.79	2.43	2.62
1916	2.78	2.00	2.53	1.69	2.51	1930	2.27	2.04	2.77	2.20	2.43
1917			2.51	1.75	2.53	1931	2.43	2.04	2.55	2.00	2.26
1918	1.50		2.67		2.67	1932	2.39	2.34	1.96	2.15	2.02
1919			.91	1.50	.91	1933	2.09	2.19	2.86	2.03	2.41
1920		3.00	3.11	1.55	3.05	1934	2.85	1.74	2.51	1.91	2.27
1921	2.50		1.67	1.76	1.71						

[1] Years of no record omitted.

The evident influence of Idaho prices since 1930 on average prices for the entire region is due to the large percentage of Idaho sales in this region during the period 1930–34.

Western white pine is the most valuable species of timber in this region and is in great demand, particularly for the manufacture of match stock. The available supply is limited, since it occurs in com-

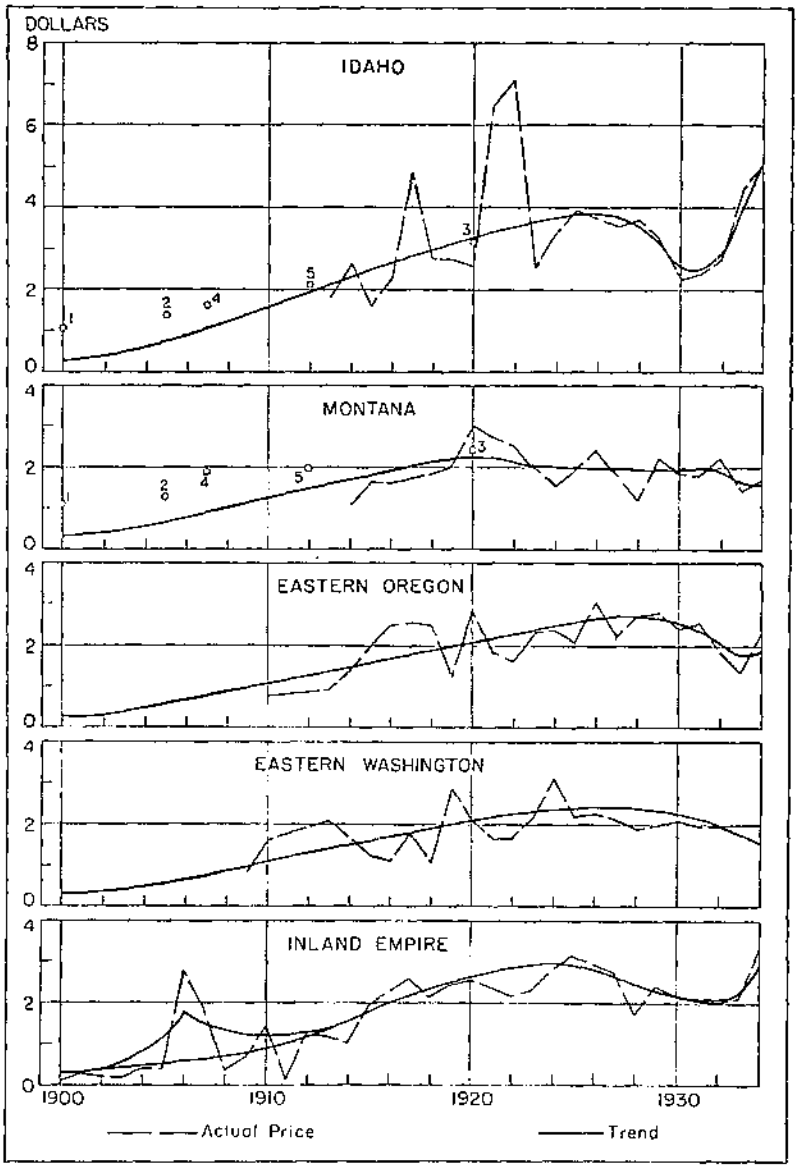

FIGURE 43.—Average stumpage prices in the "Inland Empire" with indicated trends, by States; all sales, 1900–1934. (Sources of earlier estimates, indicated by number, are: Census report of (1) 1900, (2) 1905, and (3) 1920; Forest Service (4) Pierson in 1907 and (5) Smith in 1912. (Basis, million feet board measure: Idaho 4,206; Montana 1,748; eastern Oregon 17,828; eastern Washington 5,610; Inland Empire 46,834.)

mercial quantities only in northern Idaho and over a small contiguous area in western Montana and eastern Washington. The stumpage-price record of this species, based on sales of over 1 billion feet, has

had a remarkable average stability during the past decade, as is evident from figure 44, which is based on the following average prices in specified years:

1900	$1. 50	1920	$5. 93	1928	$7. 76
1907	2. 44	1921	7. 05	1929	6. 29
1912	2. 25	1922	9. 03	1930	4. 91
1914	3. 08	1923	5. 25	1931	4. 90
1915	3. 18	1924	8. 32	1932	6. 65
1916	4. 00	1925	6. 16	1933	6. 70
1918	4. 21	1926	5. 60	1934	6. 04
1919	3. 50	1927	5. 94		

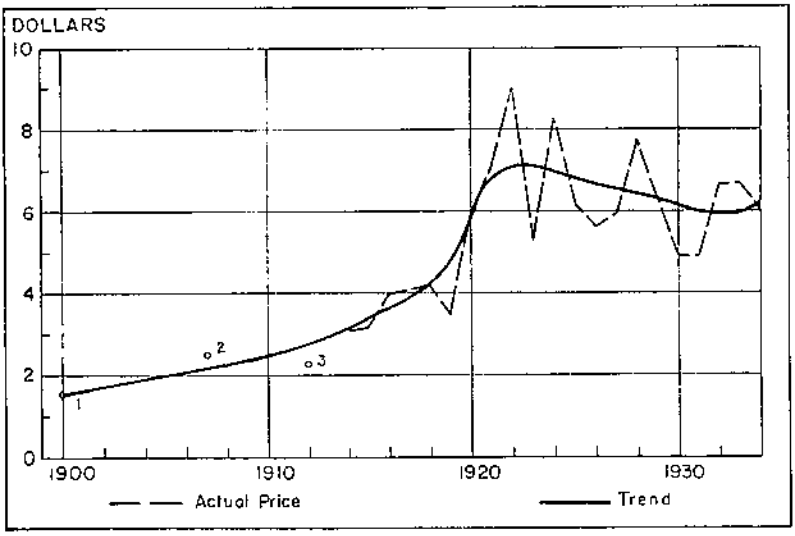

FIGURE 44.—Western white pine stumpage prices in the "Inland Empire," with indicated trend, 1900–1934 Sources of earlier estimates, indicated by number, are: (1) Census reports of 1900; Forest Service, (2) Pierson in 1907, and (3) Smith in 1912. (Basis, 1,013 million feet board measure.)

In the Inland Empire as a whole, ponderosa pine is the most important commercial species. More than two-thirds of the privately owned timber reported sold in this region during the period 1900–1934 was in flat-rate sales; yet individual transactions involving over 15.5 billion feet were reported. The price record of these sales is given in table 26 for Idaho, Montana, eastern Oregon, eastern Washington, and the entire region. In recent years the volume sold has greatly decreased, but average prices have remained more nearly at the level of the middle 1920's than have those for most other softwood species in the West, neither reaching abnormal heights during the years immediately following 1919 nor declining precipitately after 1929 (fig. 45).

Subject, of course, to considerable variation between species and regions, and particularly between softwoods and hardwoods, the price records of the individual species presented above follow the same general trends and have the same general characteristics as did the regional price records of the four principal types of sale (softwoods, hardwoods, flat-rate mixed, and all sales). As a broad generalization, it is true that actual stumpage prices have declined since the middle

or late 1920's. It is also generally true that the price of standing timber when adjusted for the purchasing power of the dollar has not only been maintained since 1920, but has materially increased.

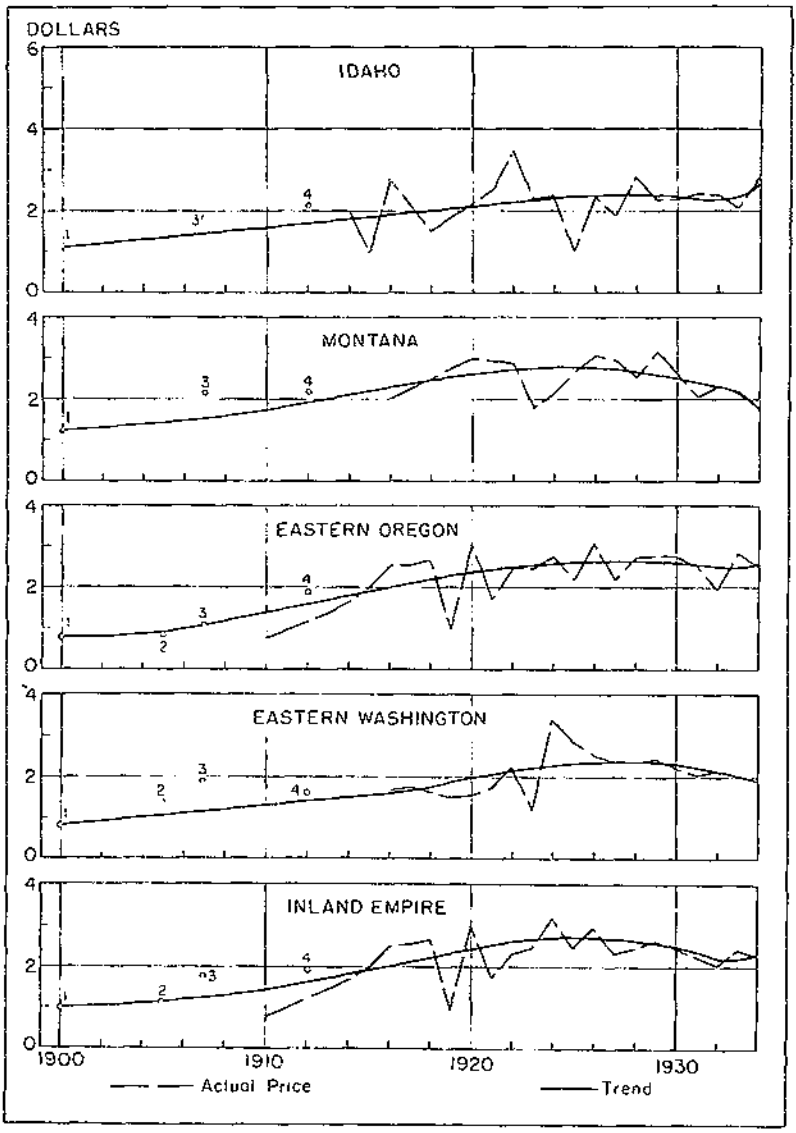

FIGURE 45.—Average stumpage prices in the "Inland Empire," with indicated trends, by States; ponderosa pine, 1900–1934. Sources of earlier estimates, indicated by number, are: Census reports of (1) 1900 and (2) 1905; Forest Service (3) Pierson in 1907 and (4) Smith in 1912. (Basis, million feet board measure; Idaho 213; Montana 188; eastern Oregon 13,089; eastern Washington 2,092; Inland Empire 15,582.)

As already pointed out, the most serious decreases in softwood prices in recent years have been caused, in some degree at least, by inadequate supplies of high-quality timber. The poorer quality, less

accessible virgin timber, and the lower grade, lighter stands of second-growth timber which form an ever-increasing percentage of the total sold have, as was to be expected, commanded considerably lower prices. Insofar as stumpage-price decreases have been caused by this factor, they are more apparent than real.

Among the important factors that have affected stumpage prices are, of course, conditions of supply and demand and the price level of lumber and other forest products. The price of lumber, which is the most important forest product, and particularly the price of softwood lumber which comprises the bulk of the lumber produced, declined steadily from 1923 to 1929 and precipitously from 1929 to 1932. That this reduction in the price of lumber has caused the price level of the raw material from which it is produced (standing timber) to drop, is axiomatic. The reduction in stumpage prices has, however, been less in the case of species of timber having specialty uses, such as the better hardwoods, western white pine, and Port Orford cedar. In these and similar instances, limited supplies as well as specialty uses have resulted in less elastic demand and the maintenance or in some instances the appreciation of the stumpage price level of the early 1920's.

COMPARATIVE STUDY OF STUMPAGE, LOG, AND LUMBER PRICES

The production of logs, in one form or another, is the first step in the conversion of standing timber into usable forest products. The record of prices at which logs have been sold should, if it can be obtained in such a manner as to permit the compiling of trends over a period of years, furnish economic data of value in predicting future price trends, insofar as past records form a sound basis for so doing. It is also important to determine how log prices have behaved with reference to both stumpage prices and lumber prices; that is, whether the price records of the three items follow similar trends or move independently of one another. It has generally been assumed that the price of both stumpage and logs moved up or down as did the price of lumber, pulp and paper, veneer, and other forest products, but was not subject to as wide or rapid fluctuations. Although this is a reasonable assumption, no published statistical data have been found to substantiate it. Trends of log prices will first be considered as a check on the trends of both stumpage and lumber prices.

LOG PRICES

Available records of log prices with reference to total production are not as adequate as are stumpage-price records. For the country as a whole, during the period covered by this investigation, the usual practice has been for the purchaser of standing timber to produce his own logs and fabricate them in his own manufacturing plant. This is particularly true of the lumber industry, but less true of other types of primary wood-using establishments. The customary procedure has been for an operator to acquire enough stumpage to run a sawmill for a sufficient length of time to amortize the amount invested in plant and equipment over the estimated life of the operation, and conduct his own logging as well as milling. As operations progressed, he would supplement his own holdings by purchases of logs from farmers and small timberland owners who did not have sufficient timber to warrant running a sawmill of their own. As large bodies of timber, usually

owned by large lumber producers, were depleted, the mills became increasingly dependent on logs cut from small and isolated holdings. The above procedure generally holds true also in the case of pulp and paper mills, but not to so great an extent with veneer, cooperage, and other specialty plants, many of which maintain log buyers in the field all the time and ship logs several hundred miles to their establishments.

The total volume of logs actually purchased in any 1 year constitutes, therefore, only a small percent of the volume manufactured, and representative log prices are more difficult to obtain than are stumpage or wholesale lumber prices.

Organized log markets, where standard log grades and standard log-scaling methods are generally recognized and accepted, occur only in the Douglas fir region of Washington and Oregon. Even in this region some concerns produce the bulk of the logs they manufacture. There are, however, numerous independent log producers who sell their logs in the open market, and many sawmills and veneer plants which depend entirely on logs so purchased. Elsewhere in the United States log markets are for the most part unorganized, scaling practices are not uniform, and it is common for manufacturing concerns to establish their own log grades and specifications to govern the log purchases which they may make.

Log prices f. o. b. the manufacturing plant have been obtained, as have a considerable quantity of stumpage-price data, through a cooperative agreement with the Bureau of the Census that has been in effect since 1923. Some log-price data for the East for years prior to 1923 were obtained during that year through the use of a special questionnaire, and in the case of a few of the more important species the record goes back to 1900. Generally speaking, however, the record for the early 1900's is fragmentary.

Similar data for the area west of the Great Plains are available for only 5 years (1930–34), although some of the western offices of the Forest Service, particularly the Portland office, have compiled log-price records which go back for 20 years or longer.

One of the advantages of standing timber as an asset is that it need not, under ordinary circumstances, be sold on an unfavorable market but can be held for several years or even decades without serious deterioration. Similarly, manufactured lumber, which can be classified as a durable commodity, can be held under proper storage conditions for relatively long periods of time without deterioration. When, on the other hand, a tree is felled and cut into logs, the logs must be manufactured fairly promptly or serious deterioration from insects, stain, or fungi will result. This means that a producer of logs who has no manufacturing facilities must dispose of his logs promptly after they are cut, or suffer a loss in value through deterioration. Accordingly, his operation will be largely dependent upon a favorable market; to purchase stumpage and cut logs without a reasonably certain market in sight would spell disaster.

Where an adequate record of log prices can be obtained, however, it is much more uniform than is the record of stumpage prices. The price of logs from which lumber is to be manufactured, for example, is influenced by fewer variables than is the price paid for the standing timber from which the logs were cut. Aside from the self-evident effect of species and quality, log prices in the main are set by lumber producers. The lumber producer, theoretically at least, sets the price

he can pay for logs delivered at his mill according to the price he receives for lumber and what it will cost him to produce it, plus as much profit as he can get away with. Other things being equal, a log producer is apt to get more for his product if there are a number of conerns in the market for the logs which he produces than he is if there are only one or two. In other words, the intensity of competition has its effect on the level of log prices, as it does on the price level of other commodities.

The cost of standing timber, of logging, and of log transportation directly concerns the log producer, for two logs of the same size, species, and grade are worth the same amount to the lumber manufacturer in spite of the fact that it may have cost the log producer twice as much to deliver one log as it did the other. Logging costs must concern the manufacturer as well as the log producer in the long run, however, for logging operations must show a profit if log producers are to stay in business.

The observation that stumpage prices have, generally speaking, been of more significance than have log prices, though generally true for the whole period under consideration, becomes less accurate when applied to recent years. The log-market situation is by no means static. As timber directly adjacent to wood-manufacturing establishments has been depleted, these plants have been either closed down and dismantled or kept operating with logs hauled over considerable distances, many of which have been purchased.

Some establishments originally built to use the more valuable kinds of timber have, when stands of such species were depleted, been redesigned to utilize the so-called inferior species. Such redesigning, incidentally, has frequently called for a more complete fabrication of forest products than before, resulting in the use of a smaller volume of raw material and more local labor per unit of raw material consumed. The going back for the so-called inferior species over an area previously logged for the more valuable trees, and the logging of second-growth stands, which are apt to be scattered, represent a type of logging operation better suited to small operators than to the large-scale logging methods previously used. Much of this type of logging is done by individuals or small concerns who sell or contract their output to manufacturing establishments.

Throughout much of the East, the dependence of many wood-manufacturing plants on logs purchased from farmers and other owners of small tracts of timber is constantly increasing. For these reasons, log prices are becoming of greater significance yearly.

Although it would be more satisfactory if as complete records of log transactions could be obtained as are available for standing timber, it is felt that the data presented herewith are sufficiently complete and representative to furnish the basis for reasonably accurate price records and comparisons.

Eighty percent of the logs reported sold in the eastern United States during the period 1900–1934 were reported in individual sales. Logs are not commonly sold at a fixed rate per thousand feet "woods-run" that is, at the same price per thousand feet for all species and sizes. As a result, the proportion of log-price data that can be analyzed by individual species is more than twice as great as that of the stumpage data, and the analysis is correspondingly more accurate. All wood-using establishments are more or less specialized as to the product or products

which they manufacture and are in a position to pay more for logs of a certain species and size than they are for others. In the case of a sawmill, for example, the cost of manufacturing lumber from logs of different species but of the same general size will be approximately the same. Since the selling price of lumber of several species will vary and costs of manufacture, including overhead, will be approximately the same, the lumber-price differential between species should be and commonly is carried back and applied proportionately to the price of logs at the mill.

As a matter of fact, considerably less than 20 percent of the logs sold in the East during the period under consideration were actually sold in flat-rate sales. The average small sawmill owner keeps no bookkeeping records at all, or only inadequate ones. Such a mill may, and commonly does, pay varying prices for different species and sizes of logs but keeps no detailed record of purchases, so that at the end of the year only the total amount of logs bought and the total purchase price can be determined. The log purchases reported by such mills must be included in the flat-rate classification, although they are, in reality, totals of a number of individual transactions. Nor are such inadequate records limited to small mills; large mills are commonly unable to furnish a record by species of logs purchased.

The record of actual and adjusted log prices in the eastern United States during the period 1900-1934 is given in table 27 for the same major classifications that were used for stumpage sales—softwoods, hardwoods, flat-rate mixed, and all sales. The data involve a total of nearly 15 billion feet, of which 7 billion were softwoods, 6 billion hardwoods, and less than 2 billion flat-rate mixed. The trend of actual prices was decidedly up until and including 1929 (figs. 46 and 47). Actual log prices fell sharply (along with prices of other commodities) in 1930-32, but recovered somewhat in 1933 and 1934. When actual prices are adjusted for the purchasing power of the dollar, somewhat different price trends result. A straight line fitted by the least-squares method fits the data for softwoods, hardwoods, and all sales as closely, considering the long-time trend for the whole period, as would a freehand curve or trend. A trend for the flat-rate mixed sales has not been developed because of the great price variation from year to year, which is due not so much to the change in price as to the varying percent of softwoods and hardwoods comprising the yearly totals. The rate of price increase when adjusted for the purchasing power of the dollar has been greater for hardwoods than for softwoods, as was also true of stumpage prices.

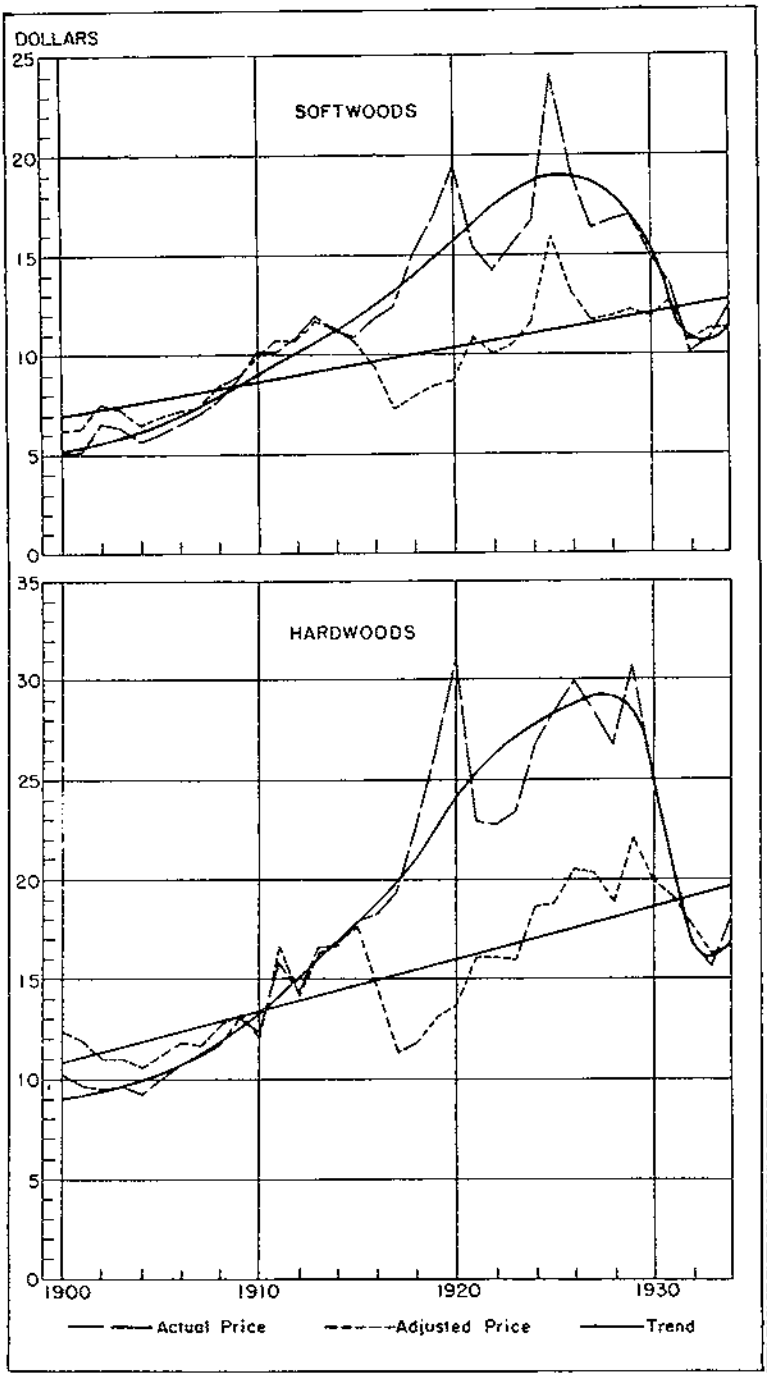

FIGURE 48.—Actual and adjusted average log prices for the eastern United States, softwoods and hardwoods, with indicated trends, 1900–1934. (Basis, million feet board measure: Softwoods 6,965; hardwoods 6,149.)

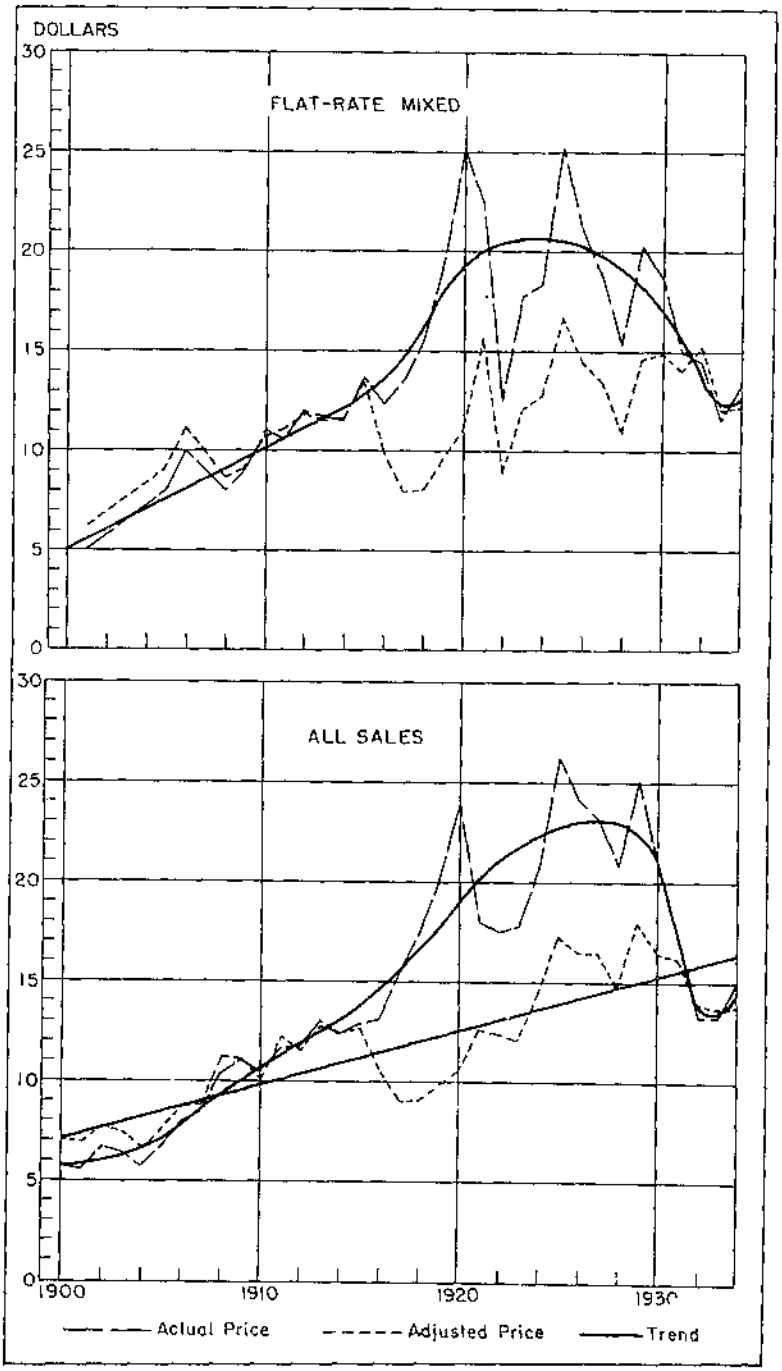

FIGURE 47.—Actual and adjusted average log prices for the eastern United States, flat-rate mixed and all sales, with indicated trends, 1900–1934. (Basis, million-feet board measure: Flat-rate mixed 1,050; all sales 14,764.)

TABLE 27.—*Actual and adjusted* [1] *log prices for the eastern United States; softwoods, hardwoods, flat-rate mixed, and all sales; with index numbers, 1900–1934*

PRICE IN DOLLARS

Year	Softwoods		Hardwoods		Flat-rate mixed		All sales	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1900	$5.09	$6.21	$10.14	$12.38			$5.72	$6.98
1901	5.11	6.33	9.62	11.92	$5.00	$6.20	5.50	6.93
1902	6.48	7.54	9.46	11.00			6.64	7.72
1903	6.32	7.28	9.60	11.03			6.45	7.41
1904	5.64	6.47	9.25	10.61			5.77	6.62
1905	6.03	6.87			8.00	9.12	6.68	7.62
1906	6.50	7.21	10.69	11.86	10.00	11.09	7.90	8.76
1907	7.02	7.37	11.17	11.73			8.43	8.85
1908	7.71	8.40	11.68	12.72	8.00	8.71	10.38	11.30
1909	8.70	8.87	13.08	13.25	9.00	9.12	11.01	11.15
1910	10.16	9.89	12.32	11.99	11.00	10.70	10.44	10.16
1911	10.17	10.74	15.87	16.76	10.50	11.09	11.62	12.27
1912	10.85	10.75	14.35	14.22	12.00	11.89	11.68	11.57
1913	11.93	11.70	16.03	16.31	11.72	11.50	13.07	12.82
1914	11.25	11.32	16.73	16.83	11.56	11.63	12.35	12.42
1915	10.87	10.71	17.93	17.66	13.62	13.42	12.90	12.71
1916	11.80	9.45	18.20	14.65	12.35	9.89	13.09	10.48
1917	12.42	7.21	19.45	11.34	13.54	7.89	15.46	9.01
1918	15.12	7.39	22.72	11.86	15.59	8.09	17.46	9.11
1919	17.00	8.40	26.54	13.11	19.44	9.60	20.01	9.88
1920	19.50	8.70	31.00	13.76	25.08	11.14	23.88	10.60
1921	15.41	10.82	22.90	16.14	22.43	15.75	18.01	12.64
1922	14.23	10.07	22.84	16.17	12.46	8.82	17.55	12.43
1923	15.52	10.57	23.51	16.01	17.75	12.09	17.85	12.16
1924	16.72	11.67	26.82	18.72	18.40	12.84	20.67	14.43
1925	21.14	15.98	28.52	18.88	25.20	16.68	26.25	17.38
1926	19.23	13.17	30.05	20.58	21.05	14.42	24.19	16.57
1927	16.35	11.74	28.41	20.40	18.78	13.48	23.20	16.66
1928	16.76	11.87	26.77	18.95	15.36	10.87	20.91	14.80
1929	17.01	12.23	30.81	22.15	20.34	14.62	25.12	18.06
1930	15.01	11.90	25.10	19.95	18.75	14.87	20.78	16.48
1931	13.57	12.73	20.47	19.20	14.08	14.05	17.31	16.24
1932	10.08	10.65	16.82	17.78	14.50	15.33	13.26	14.02
1933	10.80	11.23	15.64	16.27	11.60	12.06	13.26	13.79
1934	12.39	11.34	18.24	16.69	13.36	12.24	15.12	13.83

INDEX NUMBERS OF PRICES

1900	47	57	65	80			48	59
1901	47	56	62	77	43	54	47	58
1902	59	69	61	71			56	65
1903	58	67	62	71			54	62
1904	52	59	60	68			48	56
1905	55	63			70	79	56	64
1906	60	66	69	76	87	96	66	74
1907	64	68	72	75			71	74
1908	71	77	75	82	70	75	87	95
1909	80	81	84	85	78	79	92	94
1910	93	91	79	77	96	93	88	85
1911	93	99	102	108	91	96	98	103
1912	99	99	93	91	104	103	98	97
1913	109	107	107	105	102	100	110	108
1914	103	104	108	108	100	101	104	104
1915	100	98	116	114	118	116	108	107
1916	108	87	118	94	107	86	110	86
1917	114	66	125	73	118	68	130	76
1918	138	72	146	76	135	70	147	76
1919	156	77	171	84	169	83	168	83
1920	179	80	200	88	218	96	201	89
1921	141	99	148	104	195	136	151	106
1922	130	92	147	104	108	76	147	104
1923	142	97	152	103	154	105	150	102
1924	153	107	173	120	160	111	174	121
1925	221	147	184	121	219	144	220	146
1926	176	121	194	132	183	125	203	139
1927	150	108	183	131	163	117	195	140
1928	153	109	173	122	133	94	176	124
1929	156	112	199	142	177	127	211	152
1930	137	109	162	128	163	129	174	138
1931	124	117	132	123	130	122	145	136
1932	92	98	108	114	126	133	111	118
1933	99	103	101	105	101	104	111	116
1934	113	104	118	107	116	106	127	116

[1] On basis of purchasing power of the dollar as determined by the Bureau of Labor Statistics.

The index numbers of actual prices and of prices adjusted for the purchasing power of the dollar are given for all four types of sales in table 27.

Because of the great variety of species, changing standards of merchantability and of utilization, and the several uses for which the logs were purchased, the log-price records while of interest and importance, do not reflect price changes so accurately as would the price record of a single species or the price record of several species which were purchased primarily for the manufacture of one product. Logs have accordingly been classified by the product for the manufacture of which they were primarily purchased—that is, box shook, lumber, ties, cooperage, fuel wood, pulpwood, mine timbers, veneer, poles and posts, and miscellaneous. A considerable amount of log-price data for uses other than lumber has been obtained for years subsequent to 1923; earlier data are principally for lumber logs. The price of lumber logs has been somewhat lower than that of all logs because of the proportion of valuable veneer logs in the "other" classification which makes up about 20 percent of the total number of logs reported sold.

Table 28 gives the price record of lumber logs in the eastern United States for the period 1900–1934 by the same four major types previously used. The record is based on a total of nearly 12 billion feet, of which 6 billion feet were softwoods, 4.5 billion feet hardwoods, and 1.5 billion feet flat-rate mixed. Although there are some differences in the price record of lumber logs when compared with the price record of all logs sold, particularly since 1918, the same general trends (figs. 48 and 49) apply in both cases—that is, a distinct upward trend of actual prices up to and including 1929, a falling off in price in 1930, 1931, and 1932, and a partial recovery in 1933 and 1934. A decided upward trend in adjusted prices since 1900, as in the case of all logs sold, can best be expressed by a straight line fitted by the least-squares method.

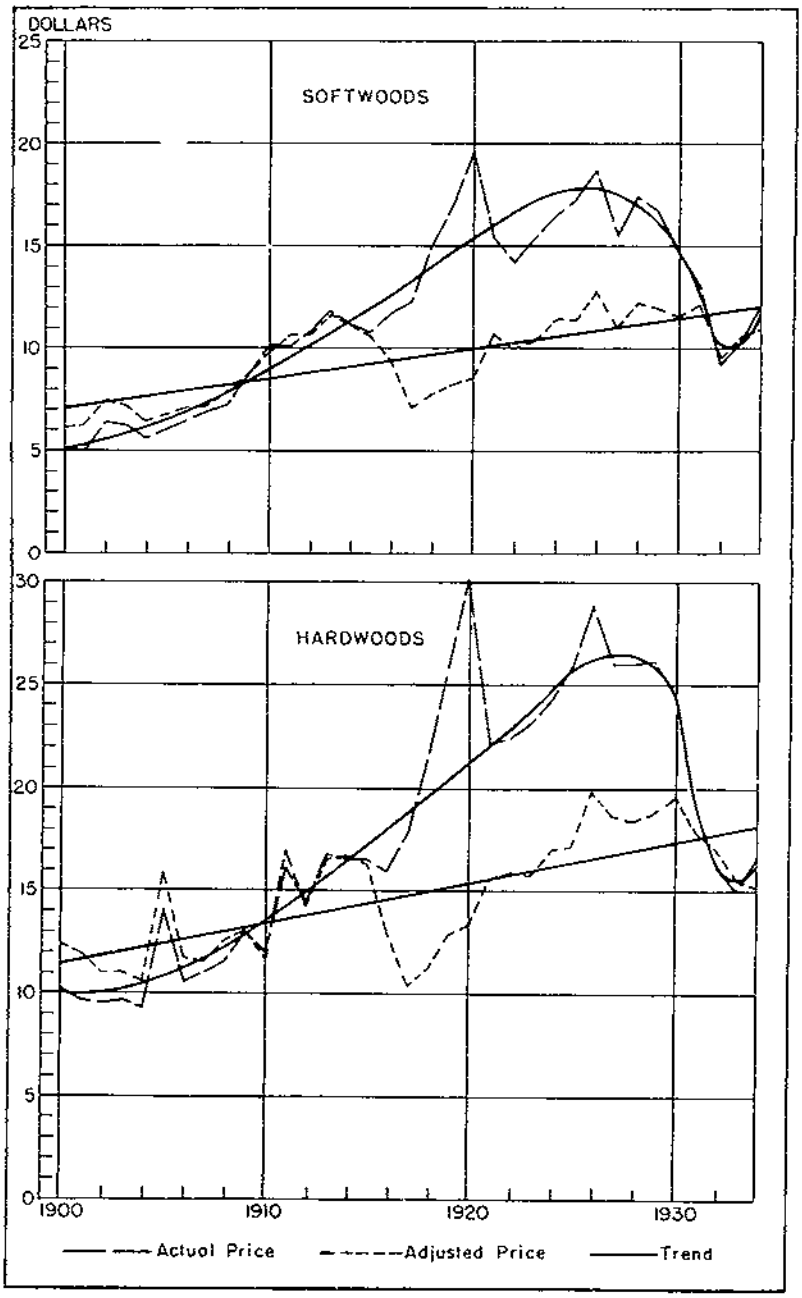

FIGURE 48.—Actual and adjusted average prices of lumber logs only for the eastern United States, softwoods and hardwoods, with indicated trends, 1900–1934. (Basis, million feet board measure: Softwoods 5,938; hardwoods 4,526.)

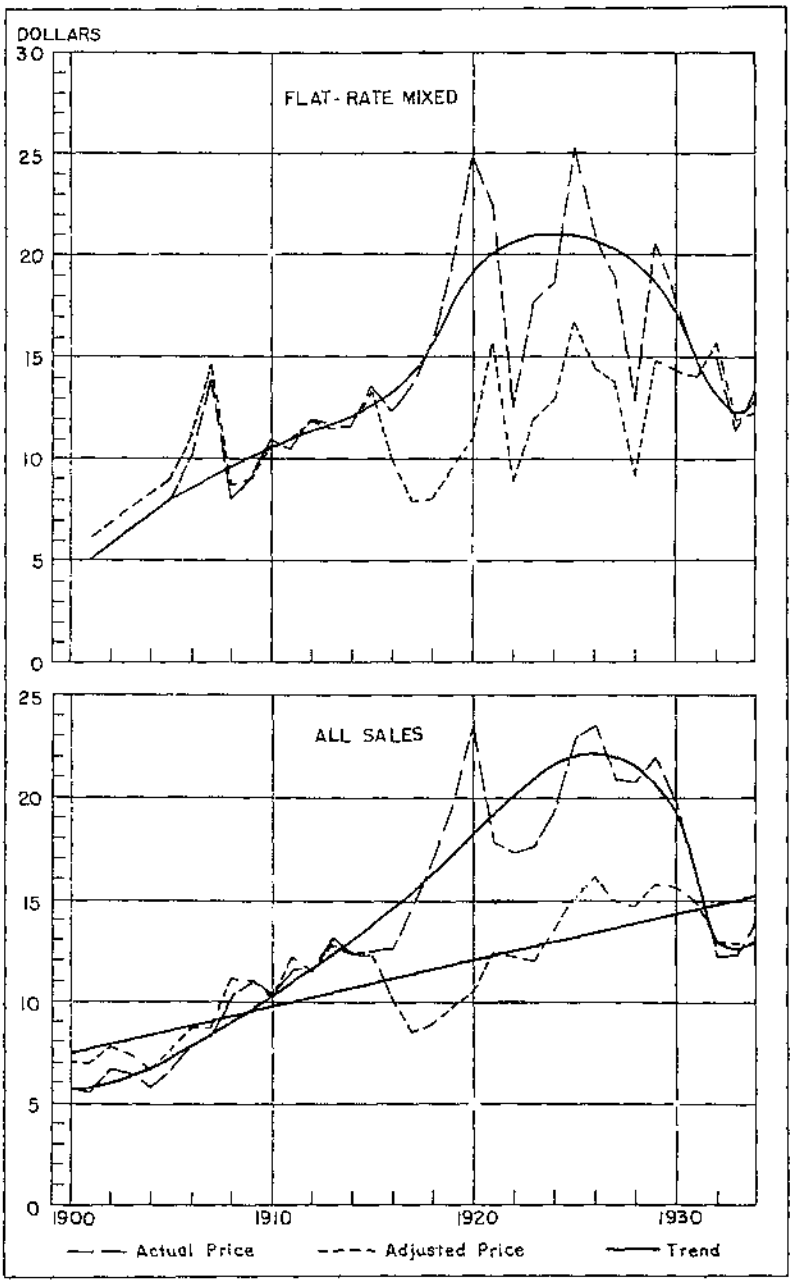

FIGURE 48. - Actual and adjusted average prices of lumber logs only for the eastern United States, flat-rate mixed and all sales, with indicated trends, 1900-1934. (Basis, million feet board measure: Flat-rate mixed 1,481; all sales 11,945.)

TABLE 28.—*Actual and adjusted* [1] *prices of lumber logs for the eastern United States; softwoods, hardwoods, flat-rate mixed, and all sales; with index numbers, 1900–1934*

PRICE IN DOLLARS

Year	Softwoods		Hardwoods		Flat-rate mixed		All sales	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1900	$5.03	$6.14	$10.14	$12.38			$5.65	$6.94
1901	5.05	6.26	9.62	11.92	$5.00	$6.20	5.55	6.88
1902	5.45	7.50	9.46	11.00			6.63	7.71
1903	6.30	7.24	9.60	11.03			6.44	7.40
1904	5.61	6.43	9.25	10.61			5.75	6.60
1905	6.01	6.85	14.05	16.02	8.00	9.12	6.61	7.54
1906	6.47	7.18	10.54	11.69	10.00	11.09	7.83	8.68
1907	6.92	7.27	10.99	11.54	14.00	14.70	8.32	8.74
1908	7.30	7.95	11.56	12.59	8.00	8.71	10.21	11.12
1909	8.69	8.80	12.88	13.05	9.00	9.12	10.94	11.08
1910	10.15	9.88	11.98	11.66	11.00	10.70	10.37	10.09
1911	10.13	10.70	16.05	16.95	10.50	11.09	11.56	12.21
1912	10.80	10.70	14.36	14.23	12.00	11.89	11.61	11.51
1913	11.91	11.08	16.74	16.42	11.72	11.50	13.04	12.79
1914	11.24	11.31	16.53	16.63	11.56	11.63	12.29	12.36
1915	10.82	10.60	16.54	16.29	13.62	13.42	12.51	12.32
1916	11.78	9.44	15.91	12.74	12.35	9.89	12.59	10.08
1917	12.32	7.18	17.79	10.37	13.84	7.89	14.71	8.38
1918	15.10	7.88	21.46	11.20	15.50	8.09	17.02	8.88
1919	16.99	8.39	25.93	12.81	19.44	9.60	19.76	9.76
1920	19.61	8.71	30.15	13.39	25.08	11.14	23.53	10.45
1921	15.40	10.81	22.13	15.54	22.43	15.75	17.73	12.45
1922	14.16	10.04	22.40	15.86	12.46	8.82	17.31	12.26
1923	15.45	10.52	23.11	15.74	17.66	12.03	17.62	12.00
1924	16.54	11.54	24.28	16.95	18.63	13.00	19.37	13.52
1925	17.30	11.45	25.83	17.10	25.37	16.79	22.93	15.18
1926	18.79	12.87	28.92	19.81	21.04	14.41	23.67	16.21
1927	15.43	11.08	25.97	18.65	19.13	13.74	20.87	14.98
1928	17.43	12.34	25.94	18.37	12.77	9.04	20.75	14.69
1929	16.79	12.07	26.08	18.75	20.62	14.83	22.07	15.87
1930	14.76	11.70	24.55	19.47	18.12	14.37	19.79	15.69
1931	13.06	12.27	19.02	17.84	14.91	13.99	15.94	14.95
1932	9.19	9.71	16.11	17.03	14.88	15.73	12.27	12.97
1933	10.26	10.67	14.89	15.49	11.38	11.84	12.36	12.85
1934	12.17	11.14	16.56	15.14	13.47	12.33	14.01	12.82

INDEX NUMBERS OF PRICES

1900	46	56	65	79			48	59
1901	46	58	62	76	43	54	47	58
1902	59	69	61	71			56	65
1903	58	67	62	71			54	62
1904	51	59	60	68			48	56
1905	55	63	90	103	70	79	56	64
1906	59	66	68	75	87	96	66	73
1907	63	67	71	74	122	127	70	74
1908	67	73	74	81	70	75	86	94
1909	80	81	83	84	78	79	92	94
1910	93	91	77	75	96	93	87	85
1911	93	98	103	109	91	96	97	103
1912	99	98	92	91	104	103	98	97
1913	109	107	108	105	102	100	110	105
1914	103	104	106	107	100	101	104	104
1915	99	98	106	104	118	116	105	104
1916	108	87	102	82	107	86	106	85
1917	113	66	114	67	118	68	124	72
1918	139	72	138	72	135	70	144	75
1919	156	77	167	82	169	83	167	82
1920	180	80	194	86	218	96	198	88
1921	141	99	142	100	195	136	149	105
1922	130	92	144	102	108	76	146	103
1923	142	97	149	101	153	104	149	101
1924	152	106	156	109	162	113	163	114
1925	159	105	166	110	220	145	193	128
1926	172	118	186	127	183	125	200	137
1927	142	102	167	120	166	119	176	126
1928	160	113	167	118	111	78	175	124
1929	154	111	168	120	179	128	186	134
1930	135	108	158	125	157	124	167	132
1931	120	113	122	114	130	121	134	126
1932	84	89	104	109	129	135	103	109
1933	94	98	96	99	99	103	104	109
1934	112	102	107	97	117	107	118	108

[1] On basis of purchasing power of the dollar as determined by the Bureau of Labor Statistics.

Space will not permit the presentation of detailed log-price data by regions and species. It has been found in general, however, that the same major characteristics holding true of the records of log prices hold when the data are broken down by regions and for those species for which adequate records are available. There was a decided appreciation in the actual selling price of logs from 1900 to 1929, a falling off in 1930–32 and a partial recovery in 1933 and 1934. In practically all cases the long-time trend of prices adjusted for the purchasing power of the dollar has been upward over the period under discussion.

Log-price data for the eastern United States are based on a total of nearly 15 billion feet, distributed among the several regions as follows: Northeastern 1.3 billion feet; North Atlantic 0.25 billion feet; Lakes, 3.3 billion feet; Central, 1.8 billion feet; Carolina Pine region, 1.5 billion feet; and the Southern Pine region, 6.7 billion feet. Flat-rate sales vary from 13 percent in the Lakes region to 27 percent in the Northeastern, the average being 20 percent.

In only the North Atlantic region and for only one type (softwoods) in this region has the trend of adjusted log prices been down. Log-price data for this region are available only since 1910, and for the period 1910–34 are based on a total of only 220 million feet. It is probable that the quality of the softwood logs produced in this region has declined to a greater degree than in other regions, principally because of the exhaustion of the virgin forests of Pennsylvania.

In other regions of the eastern United States the trends of actual and adjusted log prices have followed in a general way those of the whole eastern United States. Representative records are given in table 29 of the Northeastern, Lakes, Central, and Southern Pine regions, and also shown in figures 50 to 54. The greater price appreciation of hardwood logs in the Lakes region when compared to that of softwoods (table 30 and fig. 52) is interesting and checks with the relationship between softwood and hardwood stumpage, log, and lumber prices in other regions and for the country as a whole.

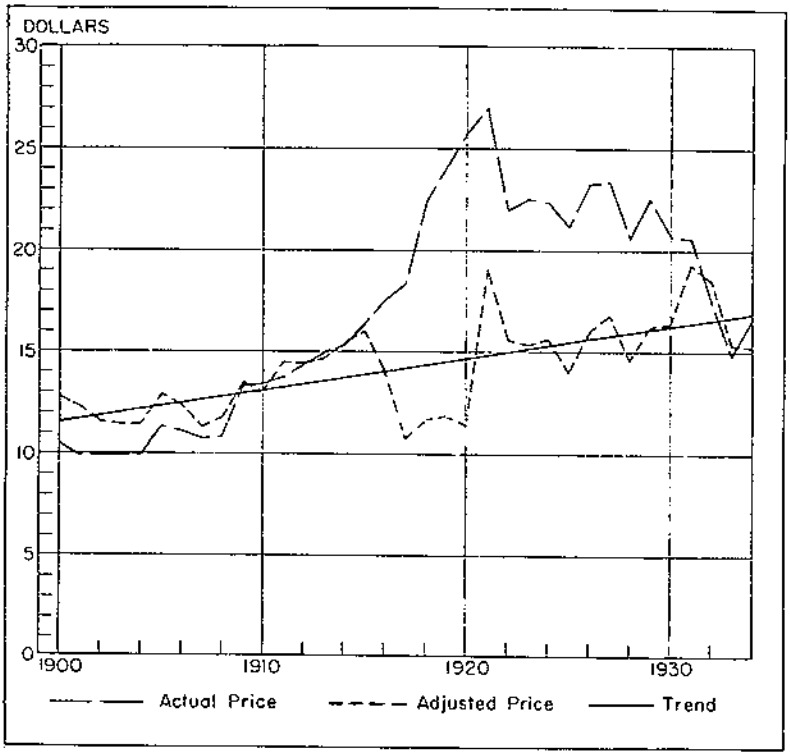

FIGURE 50.—Northeastern log prices, actual and adjusted, with indicated trend of adjusted prices, all sales, 1900-1934. (Basis, 1,322 million feet board measure.)

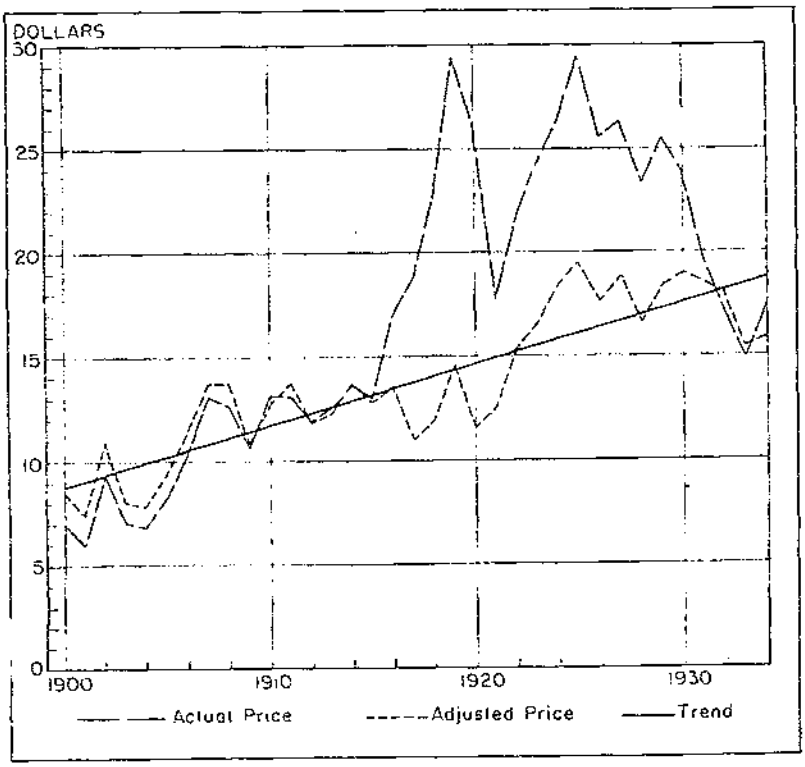

FIGURE 51.—Lakes region log prices, actual and adjusted, with indicated trend of adjusted prices, all sales, 1900–1934. (Basic, 3,325 million feet board measure.)

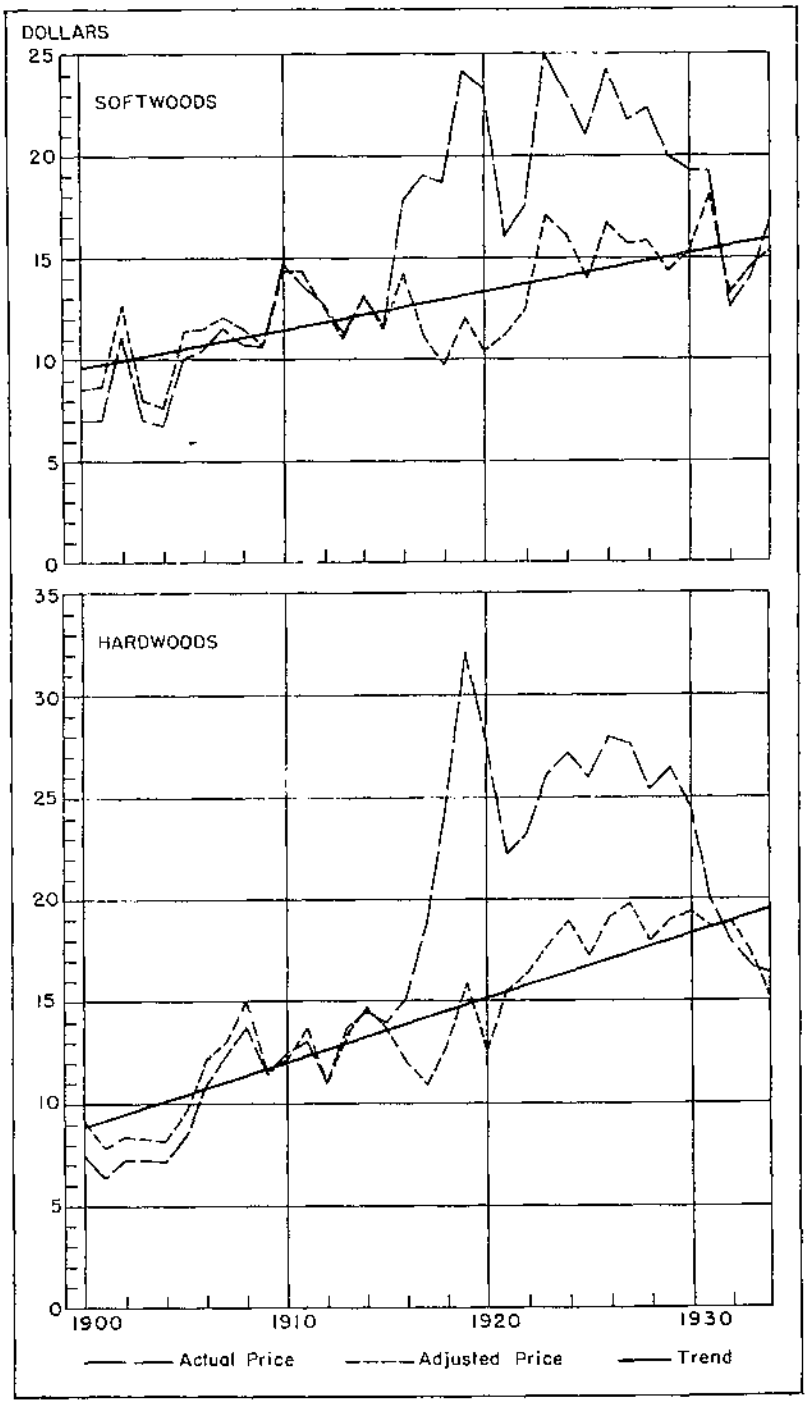

FIGURE 52.—Lakes region prices of lumber logs, actual and adjusted, with indicated trend of adjusted prices, softwoods and hardwoods, 1900-1934. (Basis, million feet board measure: Softwoods 867; hardwoods 1,281.)

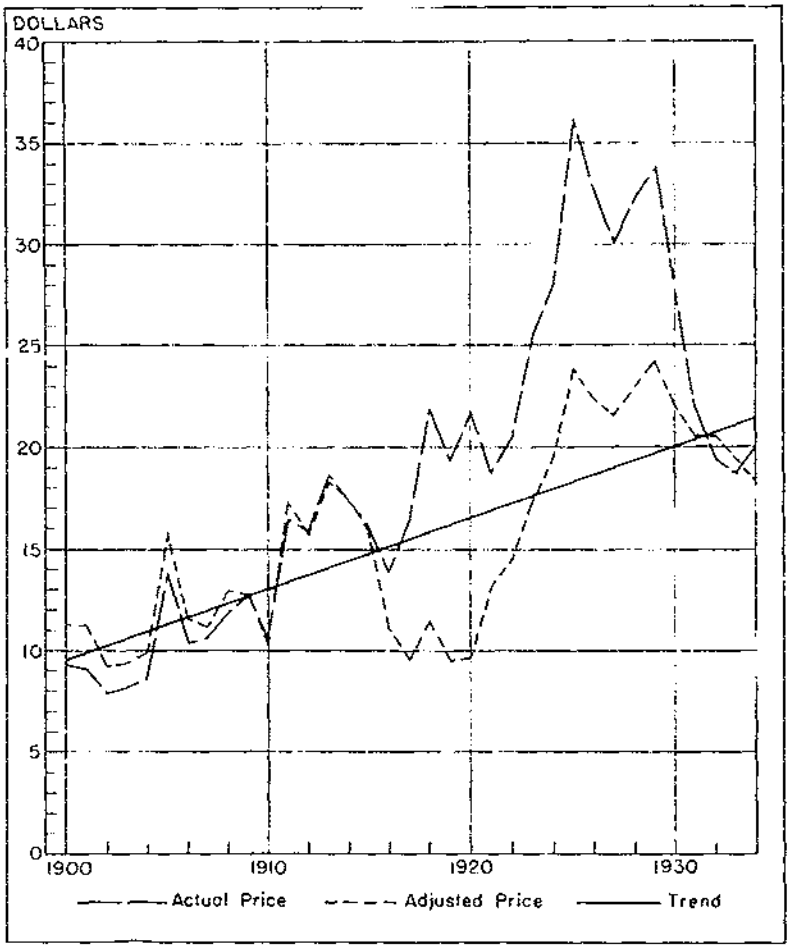

FIGURE 55.—Central region prices of lumber logs, actual and adjusted, with indicated trend of adjusted prices, all sales, 1900–1934. (Basis, 1,384 million feet board measure.)

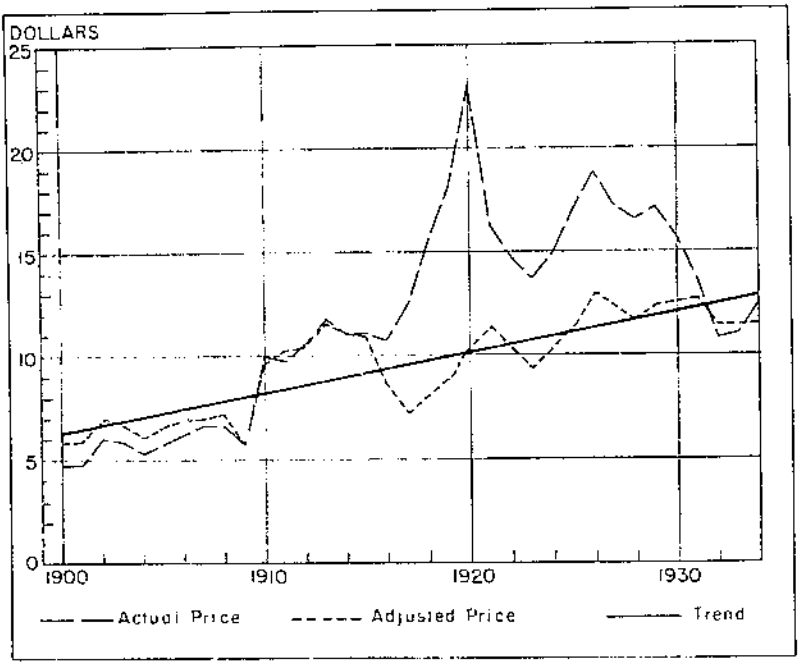

FIGURE 54.—Southern Pine region log prices, actual and adjusted, with indicated trend of adjusted prices, all sales, 1900–1934. (Basis 5,917 million feet board measure.)

TABLE 29.—*Actual and adjusted log prices, all sales, for the Northeastern, Lakes, Central, and Southern Pine regions, 1900–1934*

Year	Northeastern region		Lakes region		Central region [1]		Southern Pine region	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1900	$10.40	$12.70	$6.97	$8.51	$9.25	$11.29	$4.73	$5.78
1901	9.86	12.24	6.00	7.43	9.08	11.25	4.77	5.91
1902	9.99	11.51	9.40	10.93	7.89	9.18	6.00	6.98
1903	9.90	11.38	7.01	8.05	8.15	9.36	5.86	6.73
1904	9.94	11.40	6.83	7.83	8.62	9.89	5.29	6.07
1905	11.28	12.86	8.30	9.46	13.80	15.73	5.77	6.58
1906	11.10	12.31	10.30	11.42	10.29	11.52	6.20	6.88
1907	10.73	11.27	13.02	13.67	10.67	11.20	6.65	6.98
1908	10.79	11.75	12.58	13.70	11.93	12.99	6.61	7.20
1909	13.23	13.40	10.49	10.63	12.75	12.92	5.63	5.70
1910	13.37	13.01	13.09	12.74	16.61	16.32	9.85	9.61
1911	13.71	14.48	13.02	13.75	16.30	17.31	9.72	10.26
1912	14.33	14.29	11.87	11.76	15.83	15.69	10.52	10.43
1913	14.92	14.64	12.50	12.26	18.61	18.26	11.70	11.54
1914	15.26	15.35	13.53	13.64	17.24	17.34	11.06	11.13
1915	16.34	16.00	12.94	12.75	16.05	15.81	11.06	10.89
1916	17.49	14.01	16.87	13.51	13.83	11.08	10.69	8.56
1917	18.26	10.65	18.69	10.90	10.37	9.54	12.46	7.26
1918	22.25	11.62	22.66	11.83	21.89	14.43	15.54	8.11
1919	23.92	11.82	29.42	14.53	19.23	9.50	18.00	8.89
1920	25.63	11.38	25.92	11.51	21.69	9.63	23.21	10.31
1921	27.03	18.98	17.72	12.44	18.70	13.13	16.21	11.38
1922	21.89	15.50	21.68	15.35	20.55	14.55	14.67	10.39
1923	22.46	15.30	24.26	16.52	25.54	17.39	13.70	9.33
1924	22.32	15.58	26.27	18.34	28.04	19.57	14.83	10.35
1925	21.05	13.94	29.49	19.52	30.15	23.93	16.98	11.24
1926	23.23	15.91	25.54	17.49	32.09	22.39	18.89	12.94
1927	23.36	16.77	26.25	18.85	30.10	21.61	17.20	12.35
1928	20.56	14.56	23.27	16.48	32.34	22.90	16.51	11.71
1929	22.55	16.21	25.57	18.38	33.84	24.33	17.13	12.32
1930	20.06	16.38	23.84	18.91	27.77	22.02	15.78	12.51
1931	20.55	19.28	19.66	18.44	21.95	20.59	13.65	12.80
1932	17.49	18.49	17.02	17.99	19.44	20.55	10.92	11.54
1933	14.69	15.28	14.78	15.37	18.72	19.47	11.07	11.51
1934	16.61	15.20	17.26	15.79	20.02	18.32	12.55	11.48

[1] Lumber logs only.

TABLE 30.—*Softwood and hardwood lumber-log prices in the Lakes region, actual and adjusted 1900–1934*

Year	Softwoods		Hardwoods		Year	Softwoods		Hardwoods	
	Actual	Adjusted	Actual	Adjusted		Actual	Adjusted	Actual	Adjusted
1900	$7.09	$8.55	$7.40	$9.04	1918	$18.05	$9.74	$24.56	$12.82
1901	7.00	8.07	6.33	7.84	1919	24.18	11.94	32.11	15.86
1902	10.05	12.73	7.21	8.42	1920	23.34	10.36	27.04	12.41
1903	7.00	8.04	7.20	8.27	1921	15.99	11.22	22.19	15.58
1904	6.70	7.68	7.17	8.22	1922	17.56	12.43	23.21	16.43
1905	10.00	11.40	8.50	9.69	1923	25.05	17.06	26.16	17.81
1906	10.40	11.53	10.99	12.19	1924	23.10	16.12	27.21	18.99
1907	11.50	12.08	12.43	13.05	1925	20.98	13.89	25.05	17.18
1908	10.65	11.60	13.82	15.05	1926	24.32	16.66	27.96	19.15
1909	10.58	10.72	11.39	11.54	1927	21.76	15.62	27.62	19.83
1910	14.68	14.28	12.51	12.17	1928	22.33	15.81	25.30	17.08
1911	13.55	14.31	13.03	13.76	1929	19.96	14.35	26.48	19.04
1912	12.71	12.69	10.99	10.89	1930	19.27	15.28	24.46	19.40
1913	11.23	11.02	13.72	13.46	1931	19.24	18.05	19.91	18.68
1914	13.00	13.08	14.53	14.62	1932	12.54	13.25	17.87	18.89
1915	11.59	11.42	13.93	13.72	1933	13.94	14.50	16.63	17.30
1916	17.73	14.20	15.09	12.09	1934	16.85	15.42	16.30	14.91
1917	18.08	11.07	18.67	10.88					

The general appreciation in adjusted log prices for each major type of sale represents, of course, the average for several species and, in the case of the all-sales records, the average price paid for logs for several different manufacturing purposes. It is recognized that the degree of the average upward price trend not only varies considerably among the several species and types of logs (lumber, veneer, box-shook, etc.), but that a downward price trend may exist in some instances. For example, whereas the long-time trend of adjusted prices of softwood logs in the Northeastern region is distinctly up (table 31 and fig. 55), the trend of adjusted prices of logs intended primarily for the manufacture of lumber is down, and that of box-shook logs is up. The upward trend of the price of logs of other softwood species (and of white pine box-shook logs) has been more than enough to offset the downward trend of the white pine lumber logs, and results in an upward trend for softwoods as a whole.

Eighty-one percent of the logs reported sold in the eastern United States during the period 1900–1934 were intended primarily for the manufacture of lumber and, with the exception of white pine box-shook logs in the Northeast, sufficient data for the development of price trends of other than lumber logs are not available. This is because the forms for reporting log sales and purchases have been sent mainly to lumber producers. A considerable quantity of price data for logs intended for the manufacture of products other than lumber, comprising a little more than 21 percent of the total reported sold, is, however, available for years subsequent to 1923.

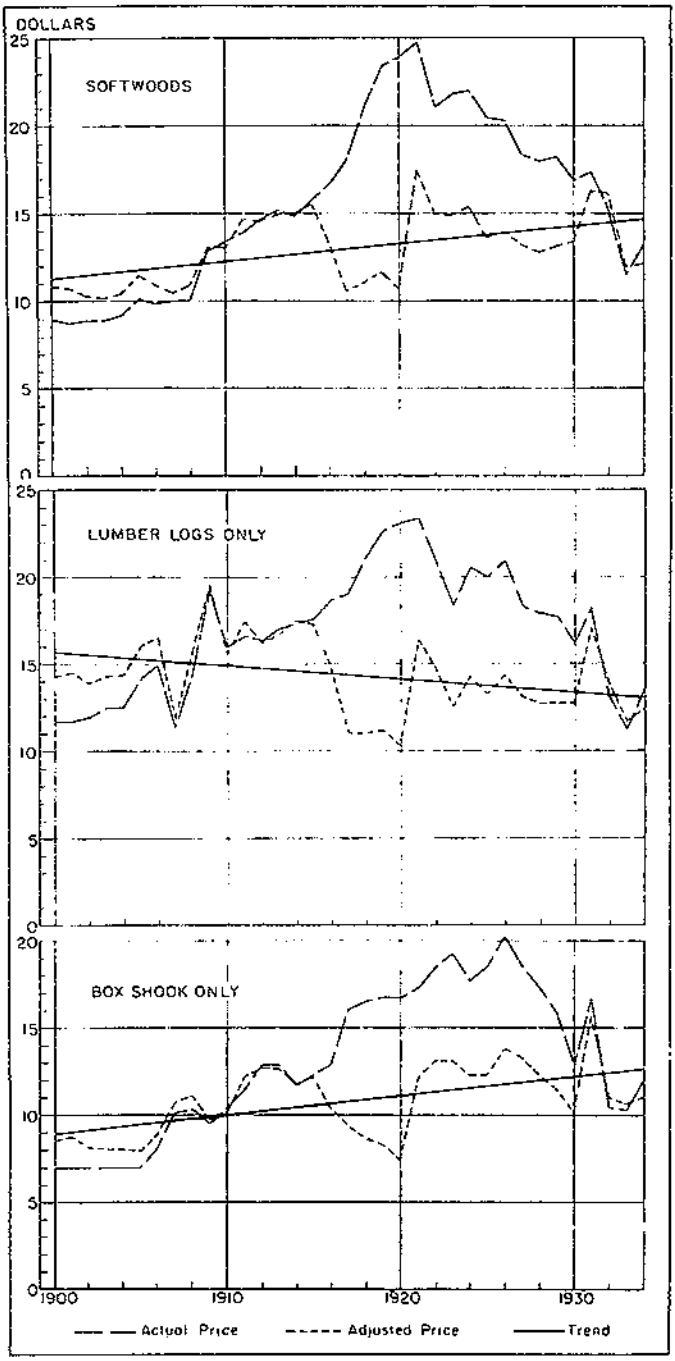

FIGURE 55.--Comparison of log prices in the Northeast, actual and adjusted, for all softwood logs, white pine lumber logs, and white pine box-shook logs, with indicated trend of adjusted prices, 1900–1934. (Basis million feet board measure: Softwood logs 845; lumber logs 260; box-shook logs 100.)

TABLE 31.—*Northeastern log prices, actual and adjusted: all softwood logs, white pine lumber logs, and white pine box-shook logs; 1900–1934*

Year	All softwood logs		White pine lumber logs		White pine box-shook logs	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1900	$8.85	$10.81	$11.71	$14.30	$7.00	$8.55
1901	8.64	10.70	11.74	14.55	7.00	8.67
1902	8.82	10.26	11.97	13.92	7.00	8.14
1903	8.83	10.15	12.46	14.32	7.00	8.04
1904	9.09	10.43	12.49	14.33	7.00	8.03
1905	10.04	11.45	14.16	16.14	7.00	7.98
1906	9.83	10.90	14.88	16.50	8.00	8.87
1907	9.94	10.44	11.36	11.93	10.14	10.65
1908	10.01	10.90	14.48	15.77	10.22	11.13
1909	12.84	13.01	19.33	19.58	9.54	9.66
1910	13.35	12.99	15.98	15.55	10.40	10.12
1911	13.86	14.64	16.60	17.53	11.55	12.20
1912	14.04	14.51	16.37	16.22	12.85	12.73
1913	15.15	14.86	17.05	16.73	12.85	12.61
1914	14.85	14.94	17.34	17.44	11.67	11.74
1915	15.77	15.53	17.02	17.38	12.29	12.11
1916	16.60	13.30	18.68	14.96	12.85	10.29
1917	17.90	10.49	18.86	11.00	16.67	9.37
1918	21.09	11.01	21.05	11.00	16.50	8.61
1919	23.46	11.59	22.65	11.19	16.67	8.23
1920	24.05	10.63	23.14	10.27	16.67	7.40
1921	24.78	17.40	23.38	16.41	17.36	12.14
1922	20.99	14.86	20.85	14.76	18.59	13.16
1923	21.83	14.87	18.31	12.47	19.33	13.16
1924	22.01	15.36	20.51	14.32	17.67	12.33
1925	20.45	13.54	19.99	13.23	18.50	12.25
1926	20.29	13.90	21.00	14.39	20.21	13.84
1927	18.32	13.15	16.25	13.10	18.49	13.28
1928	17.96	12.72	17.01	12.68	17.29	12.24
1929	18.18	13.07	17.79	12.79	15.94	11.46
1930	16.83	13.35	16.10	12.77	12.82	10.17
1931	17.29	16.22	18.24	17.11	16.68	15.65
1932	15.26	16.13	13.10	13.85	10.42	11.01
1933	11.42	11.88	11.18	11.63	10.25	10.66
1934	13.19	12.07	13.58	12.43	12.07	11.04

LUMBER PRICES

Lumber is the most important forest product of the United States both in the quality produced and the value of the product. Although the annual production of lumber has decreased in recent years and the production of some other forest products (such as veneers, plywood, and wood pulp) has increased, it is probable that lumber will continue to maintain its present primary position for many years to come.

A considerable volume of data on lumber prices f. o. b. the mill, obtained in connection with the census of lumber production, are available by species and States. Lumber prices for 1899, 1904, 1906–12, and 1915–34 have been taken from the records of the Bureau of the Census and the Forest Service, which have cooperated for many years. The record of actual lumber prices and of prices adjusted for the purchasing power of the dollar of softwoods, hardwoods, and of all sales is given in table 32 and figure 56. The general similarity in the trend of prices of softwoods and hardwoods (both actual and adjusted) was to be expected, but the greater stability of hardwood lumber prices since 1923, particularly of the adjusted prices, checks with the record of both stumpage and log prices of hardwoods and softwoods as developed by this investigation.

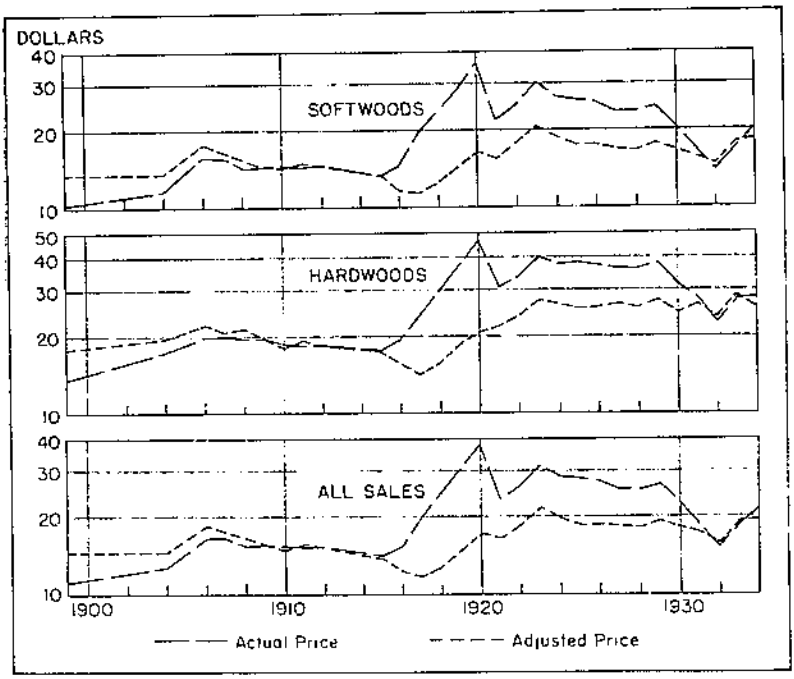

FIGURE 56.—Lumber prices f. o. b. the mill, all regions, actual and adjusted, for softwoods, hardwoods, and all sales, 1899–1934.

TABLE 32.—*Average lumber prices f. o. b. the mill, all regions, actual and adjusted; softwoods, hardwoods, and all sales specified years, 1899–1934*

Year	Softwoods		Hardwoods		All sales	
	Actual	Adjusted	Actual	Adjusted	Actual	Adjusted
1899	$10.27	$13.47	$13.52	$17.75	$11.13	$14.60
1904	11.69	13.41	17.00	19.60	12.76	14.64
1906	15.75	17.47	19.94	22.00	16.54	18.34
1907	15.53	16.31	19.90	20.90	16.56	17.39
1908	14.06	15.31	19.49	21.22	15.37	16.74
1909	14.08	14.26	19.52	19.77	15.38	15.58
1910	14.41	14.02	18.46	17.95	15.30	14.89
1911	14.17	14.06	18.19	19.21	15.05	15.80
1912	14.35	14.42	18.29	18.13	15.35	15.21
1915	13.25	13.05	17.48	17.22	14.04	13.83
1916	14.42	11.55	19.16	15.35	15.32	12.27
1917	19.45	11.34	24.20	14.11	20.32	11.85
1918	23.66	12.35	30.02	15.67	24.79	12.94
1919	28.39	14.02	37.22	18.39	30.21	14.92
1920	36.43	16.17	46.26	20.54	38.42	17.06
1921	21.85	15.34	30.92	21.71	23.47	16.48
1922	24.79	17.55	33.50	23.72	26.15	18.51
1923	30.13	20.52	39.82	27.12	31.78	21.64
1924	26.52	18.51	37.54	26.41	28.57	19.94
1925	25.89	17.14	38.21	25.30	28.02	18.55
1926	25.22	17.28	37.34	25.58	27.31	18.73
1927	23.47	16.85	36.71	26.36	25.80	18.52
1928	23.41	16.57	36.35	25.74	25.61	18.13
1929	24.31	17.48	38.04	27.35	26.94	19.37
1930	20.86	16.56	31.49	24.97	22.81	18.09
1931	16.74	15.70	26.00	26.26	18.56	17.41
1932	13.94	14.73	22.45	23.73	15.12	15.98
1933	16.94	17.02	27.81	28.02	18.55	19.29
1934	20.05	18.35	28.01	25.63	21.47	19.65

[1] Comparable lumber-log prices are given in table 28; stumpage in table 5.

The record of countrywide lumber prices is compared in figures 57 and 58 with similar records for logs primarily intended for the manufacture of lumber, and for stumpage. Lumber and stumpage prices

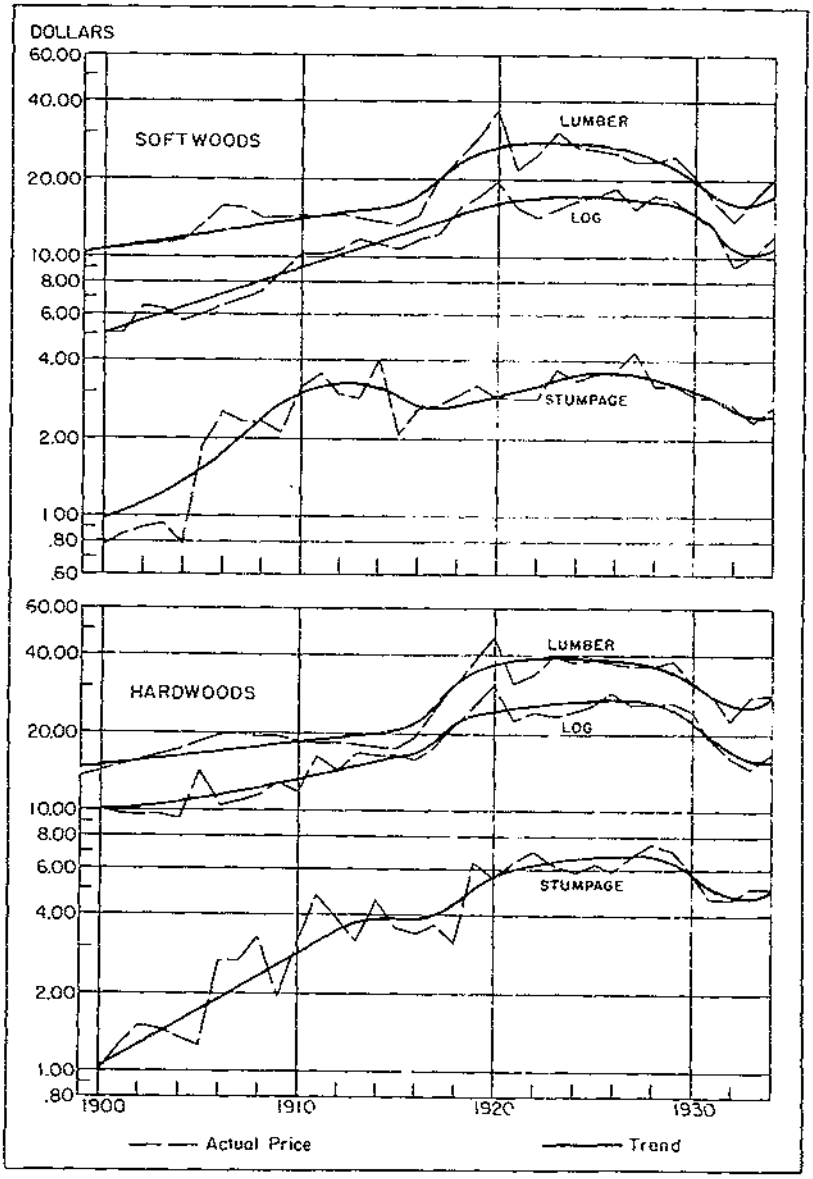

FIGURE 57.—Comparison of lumber, lumber-log, and stumpage prices of softwoods and hardwoods, with indicated trends, 1899-1934, representing data presented in tables 5, 28, and 32. Lumber-log prices are eastern United States averages.

are averages for the entire United States, and log prices are for the eastern United States only.

It is evident from an examination of these data that stumpage, log, and lumber prices follow similar long-time trends, maintaining on the average a reasonably constant proportionate relationship to each other. This is particularly evident for the period 1920–34, for which the stumpage- and log-price data are more complete and representative than for previous years.

These data include a great variety of species and prices which vary to a considerable degree between regions. The extent to which the apparent relationships are true and significant depends upon whether or not they hold true with regard to the data for individual species of timber and for the several regions.

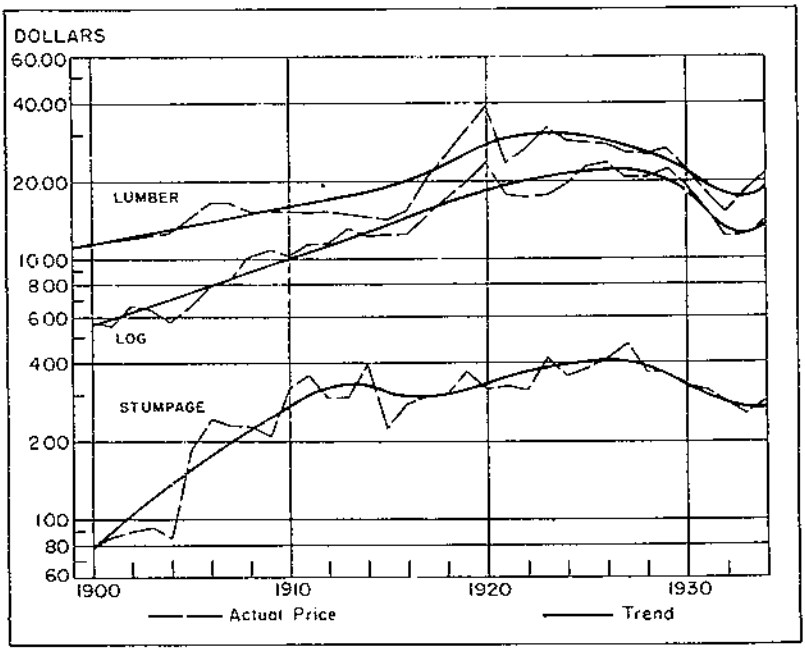

FIGURE 58.—Comparison of lumber, lumber-log, and stumpage prices of all species, with indicated trends, 1899–1934, representing data presented in tables 5, 28, and 32. Lumber log prices are eastern United States averages.

It is to be regretted that the price records for log sales are not so adequate as those for stumpage and lumber sales. Representative log prices are, however, available for some of the more important species, and the record of lumber, log, and stumpage prices of a few of these follows.

In the price record for southern yellow pine, which is given for the southern pine region and the Carolinas and Virginia (table 33 and fig. 59) the same general characteristics are evident as in that of lumber, log, and stumpage prices of softwoods for the entire country. Because of the increasing importance of second-growth southern yellow pine timber and the increasing dependence of the industry upon it, a similar comparison of this class of timber is made in figure 60. There is, of course, no way in which the price of either logs or lumber cut solely from second-growth timber can be ascertained, but

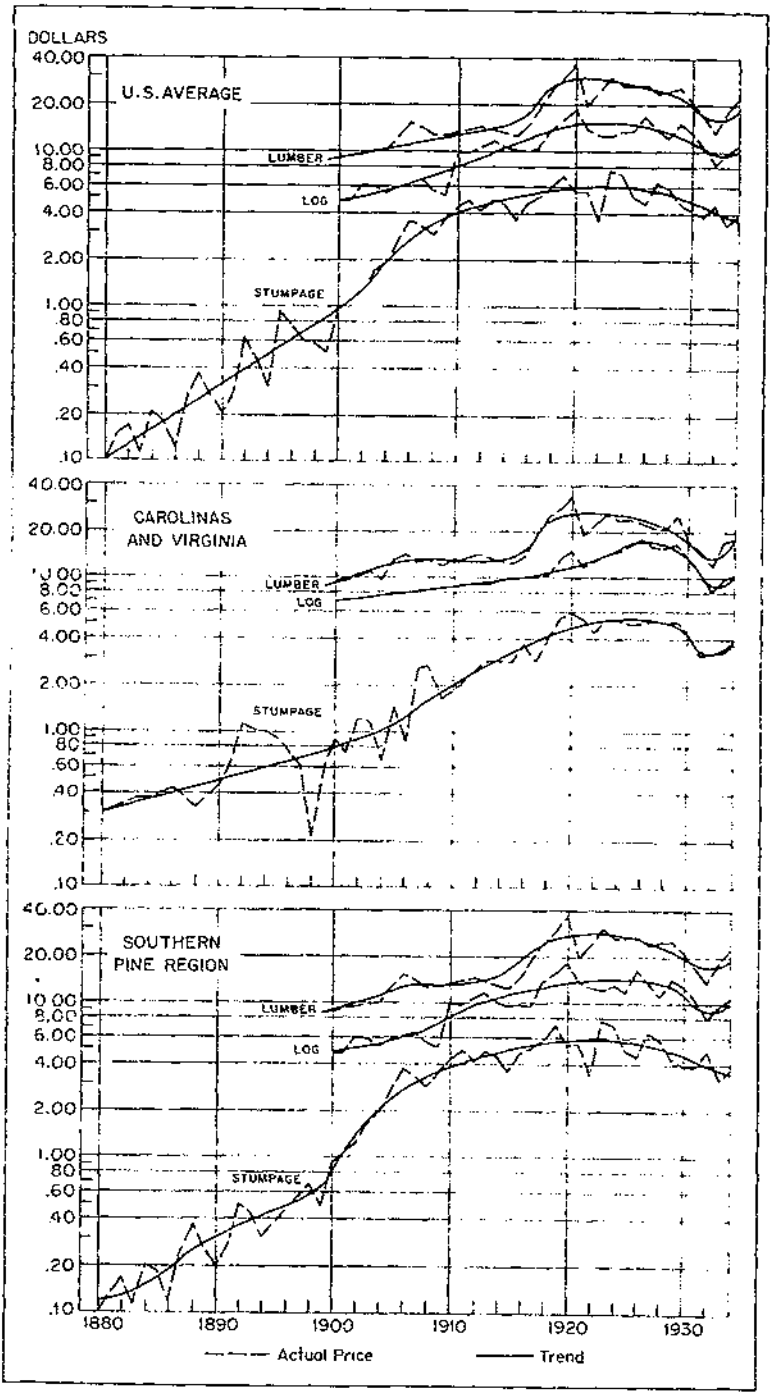

FIGURE 59. Comparison of lumber, lumber-log, and stumpage prices of southern yellow pine in the Carolinas and Virginia, the Southern Pine region and United States average, with indicated trends, 1880-1934. Stumpage data are taken from table 21.

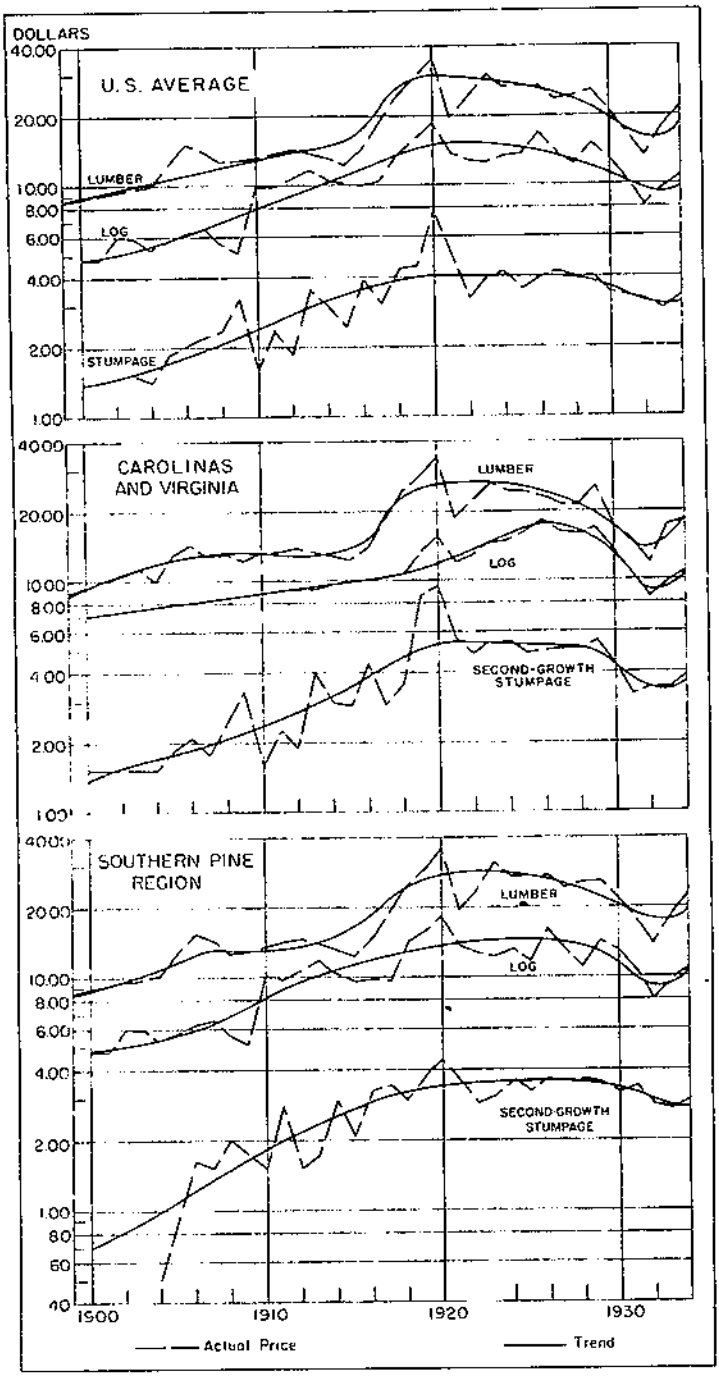

FIGURE 60. Comparison of lumber, lumber-log, and second-growth stumpage prices of southern yellow pine in the Carolinas and Virginia, the Southern Pine region and United States average, with indicated trends, 1900-1934. Stumpage data are taken from table 21.

actual sales of nearly 6 billion feet of second-growth southern yellow pine stumpage are of record. Notwithstanding the greater relative stability of second-growth pine stumpage prices since 1923, the trend of second-growth stumpage prices, when compared with log and lumber prices, follows in a general way the trend of average prices of all southern pine timber.

TABLE 33.—*Lumber-log and lumber prices of southern yellow pines,*[1] *in the North Carolina Pine and Southern Pine regions, 1899–1934*

Year	Lumber logs		Lumber		Year	Lumber logs		Lumber	
	North Carolina Pine region	Southern Pine region	North Carolina Pine region	Southern Pine region		North Carolina Pine region	Southern Pine region	North Carolina Pine region	Southern Pine region
1899			$8.50	$8.37	1917		$9.56	$17.95	$19.24
1900		$4.73			1918	$10.56	13.74	24.20	24.51
1901		4.77			1919	13.10	15.42	27.83	28.96
1902		6.00			1920	15.07	18.12	33.90	36.47
1903		5.86			1921	11.90	13.51	18.74	19.52
1904		5.20	9.68	10.02	1922	12.68	12.59	22.31	23.95
1905		5.77			1923	14.31	12.26	25.93	30.70
1906		6.20	14.07	15.32	1924	14.63	13.11	24.05	27.08
1907		6.40	12.80	14.36	1925	16.02	11.69	23.88	26.96
1908		5.58	12.94	12.60	1926	17.96	16.23	22.92	27.26
1909		5.08	12.18	12.82	1927	16.03	13.25	21.33	24.20
1910		9.88	13.03	13.38	1928	15.63	11.09	21.04	25.33
1911	$9.00	9.71	13.31	14.04	1929	16.78	14.37	25.46	25.77
1912	9.00	10.53	13.85	14.52	1930	13.48	13.02	17.34	21.98
1913	9.08	11.75			1931	10.64	10.81	15.00	17.51
1914	9.50	10.37			1932	8.32	7.90	11.76	13.79
1915		9.44	12.30	12.41	1933	9.59	9.53	17.31	18.12
1916	9.88	9.68	13.51	14.52	1934	10.67	10.09	18.06	22.78

[1] Corresponding stumpage prices, all sales and second growth only, are given in table 21.

The price record of northern white pine lumber given in table 34 is compared in figure 61 with prices for lumber logs and stumpage in the Northeastern region from tables 17 and 31. The relationship between the three prices has remained relatively constant since 1920, in spite of the fact that actual prices of all three items steadily decreased from the early 1920's to 1933.

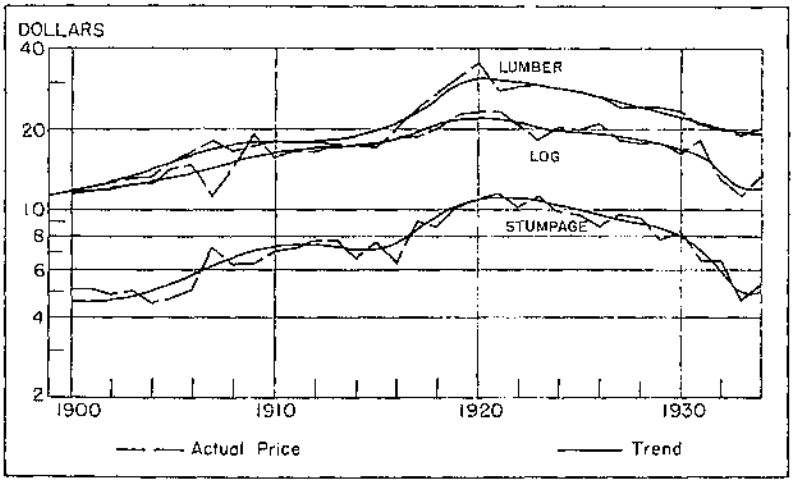

FIGURE 61.—Comparison of lumber, lumber-log, and stumpage prices of northern white pine in the Northeastern region, with indicated trends, 1899–1934, based on data given in tables 17, 31, and 34.

Similar price records of oak lumber, lumber logs, and stumpage for the United States as a whole and for the Central region, which has been the principal source of this hardwood during the period under consideration, are given in table 35. Figure 62 reveals that the relation between lumber and lumber-log prices has remained much more

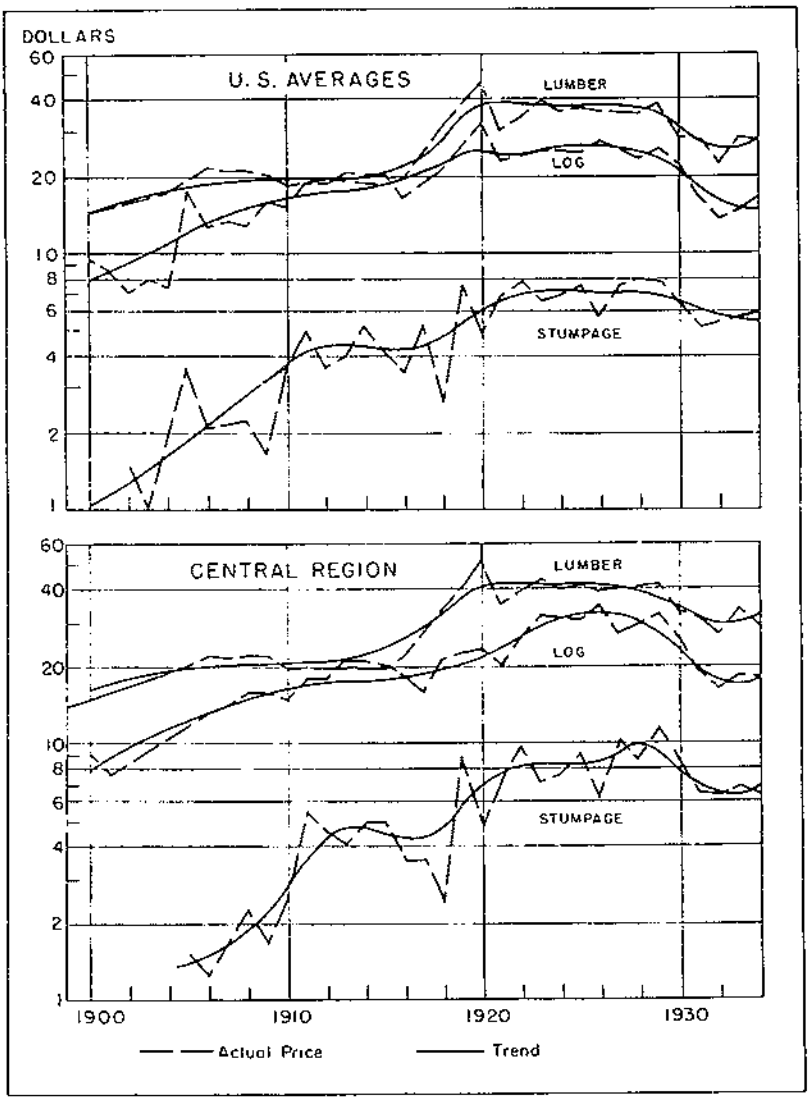

FIGURE 62.--Comparison of lumber, lumber-log, and stumpage prices of oak, with indicated trends, Central region and United States average, 1899-1934.

nearly constant, particularly since the early 1920's, than has that of stumpage prices with either of them. This is especially noticeable in the data for the Central region, and is probably due to the fact that a large percentage of oak stumpage is purchased for purposes other than the manufacture of lumber (veneer, cooperage, etc.).

TABLE 34.—*Lumber prices of northern white pine in the Northeastern region, specified years, 1899–1934*

Year	Price	Year	Price	Year	Price
1899	$11.34	1916	$20.40	1926	$26.14
1904	13.44	1917	23.90	1927	24.58
1906	16.42	1918	27.30	1928	24.52
1907	17.92	1919	30.87	1929	24.15
1908	16.60	1920	35.16	1930	23.50
1909	17.27	1921	27.93	1931	21.07
1910	18.01	1922	28.97	1932	20.06
1911	17.91	1923	29.30	1933	19.28
1912	17.75	1924	28.75	1934	20.07
1915	17.10	1925	27.88		

TABLE 35.—*Lumber, lumber-log, and stumpage prices of oak, Central region and United States average 1899–1934*

Year	United States average			Central region		
	Lumber	Lumber logs	Stumpage	Lumber	Lumber logs	Stumpage
1899	$13.78			$13.95		
1900		$9.40			$8.89	
1901		8.51			7.50	
1902		7.08	$1.50			$1.50
1903		7.92	1.00			
1904	17.51	7.41		18.49		
1905		17.38	3.64			1.50
1906	21.76	12.83	2.10	21.79	12.81	1.23
1907	21.23	13.34		21.41	13.81	
1908	21.23	12.91	2.24	21.94	15.68	2.24
1909	20.50	15.96	1.67	21.93	15.68	1.67
1910	18.76	15.23	3.49	19.50	14.70	2.40
1911	19.14	18.96	5.18	19.64	18.82	5.46
1912	19.63	18.87	3.64	19.65	18.84	4.53
1913		20.88	3.96		21.04	4.04
1914		20.70	5.36		20.97	4.84
1915	18.73	20.30	4.16	19.44	20.29	4.91
1916	20.06	16.67	3.39	21.94	18.28	3.45
1917	24.49	18.96	6.25	26.26	15.69	3.48
1918	31.11	21.55	2.63	33.26	21.24	2.39
1919	37.87	26.20	7.76	39.44	22.77	8.70
1920	46.88	32.48	4.88	50.14	29.17	4.74
1921	30.56	23.27	7.02	34.45	20.30	7.11
1922	34.01	24.16	7.83	38.02	25.42	9.73
1923	39.08	24.95	6.64	43.18	30.70	7.12
1924	36.13	25.24	6.94	39.17	30.34	7.52
1925	37.60	24.94	7.46	40.59	29.81	9.01
1926	35.67	27.29	5.80	38.43	33.81	6.20
1927	35.72	26.14	7.54	39.19	26.51	10.20
1928	35.23	23.74	7.96	39.93	28.61	8.62
1929	33.43	25.53	7.80	41.04	31.74	11.62
1930	29.29	22.05	6.48	32.40	26.12	8.53
1931	27.68	16.82	5.21	30.34	19.14	6.42
1932	22.84	13.74	5.46	26.00	16.10	6.29
1933	23.53	14.77	5.66	32.57	18.20	6.79
1934	27.64	16.50	5.88	28.89	17.98	6.39

The price records (table 36) of maple stumpage and log sales are sufficiently complete to permit the compilation of data for the Northeastern, Lakes, and Central regions, in addition to the United States averages (figs. 63 and 64). The same price relations hold true for maple, generally speaking, that obtained for the species previously discussed. The relation between stumpage, lumber-log, and lumber prices in the Central region shown in figure 64 is more constant for maple than for oak, probably because a greater proportion of the maple stumpage reported sold was intended for the manufacture of lumber.

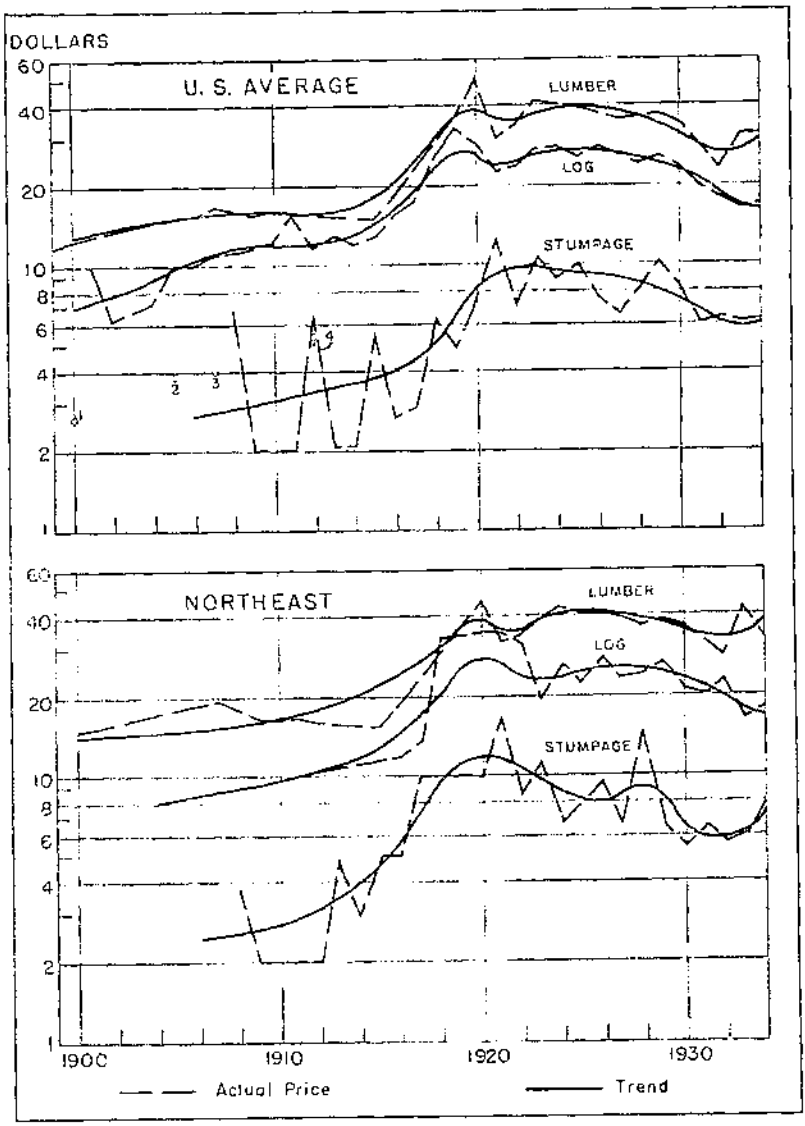

FIGURE 63.—Comparison of lumber, lumber-log, and stumpage prices of maple for the United States and the Northeastern region, with indicated trends, 1899-1934. Sources of earlier estimates, indicated by number, are: Census reports of (1) 1900 and (2) 1906; Forest Service, (3) Pierson in 1907 and (4) Smith in 1912.

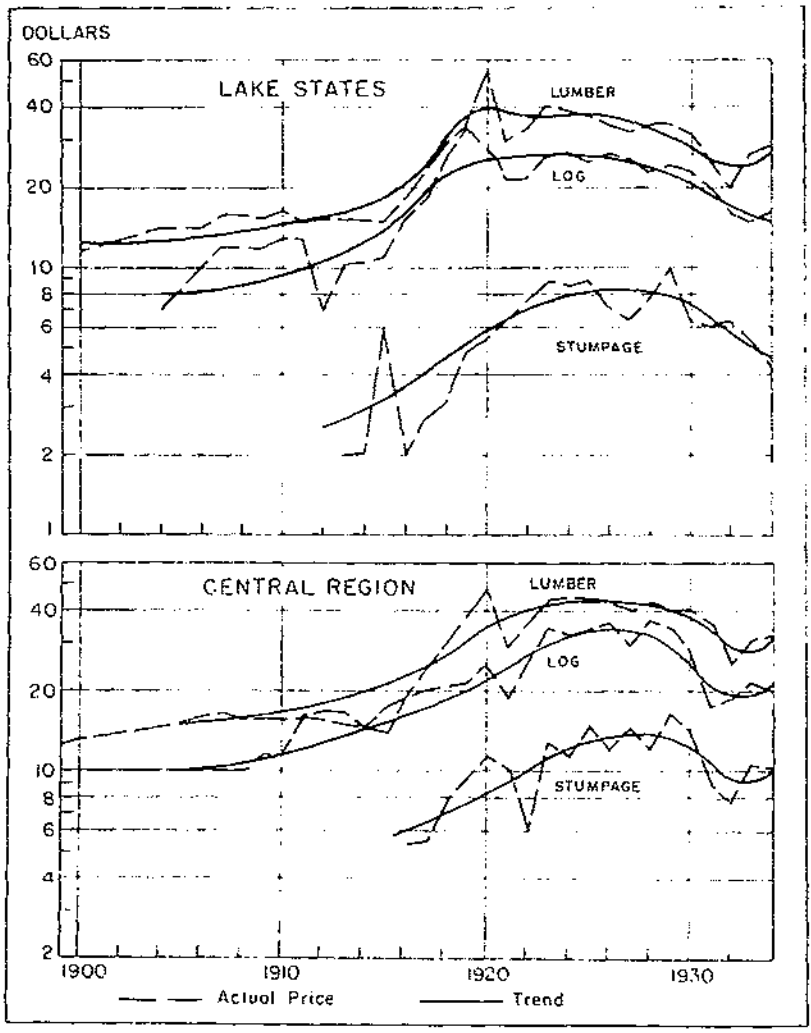

FIGURE 61 Comparison of lumber, lumber-log, and stumpage prices of maple for the Lakes and Central regions, with indicated trends, 1899–1931.

TABLE 36.—*Lumber, lumber-log, and stumpage prices of maple, United States average and Northeastern, Lakes, and Central regions, 1899–1934*

Year	United States average			Northeastern region		
	Lumber	Lumber logs	Stumpage	Lumber	Lumber logs	Stumpage
1899	$11.83			$14.00		
1900		$10.00				
1901		10.00				
1902		6.25				
1904 [1]	14.01	7.20		17.18	$8.00	
1905		10.00				
1906	15.53	10.00		18.72		
1907	16.84	11.00		19.26		
1908	16.30	11.12	$6.84	17.70		$3.86
1909	15.77	11.82	2.00	16.65		2.00
1910	16.16	12.40	2.00	16.08		2.00
1911	15.59	15.67	2.00	16.45		2.00
1912	15.56	11.84	6.45	15.96		2.00
1913		13.00	2.08			4.69
1914		12.07	2.10			3.00
1915	15.21	12.94	5.66	15.42		5.05
1916	18.24	15.41	2.66	18.32	12.00	5.00
1917	23.16	18.49	2.91	22.54	13.50	10.00
1918	29.05	25.72	6.54	28.67	32.82	10.00
1919	35.58	32.73	4.99	35.60	33.00	10.00
1920	50.16	28.82	7.22	45.37	34.63	10.00
1921	30.34	22.45	12.86	31.92	33.63	17.00
1922	33.52	33.23	7.25	33.18	31.42	8.44
1923	41.59	27.32	10.57	39.75	19.34	11.52
1924	40.36	28.03	5.87	42.23	20.77	6.75
1925	38.18	25.57	10.09	40.31	22.63	8.09
1926	37.21	27.45	7.61	39.70	28.30	9.53
1927	35.35	28.95	6.64	38.74	23.58	6.77
1928	36.31	24.40	8.03	36.73	24.20	15.17
1929	36.93	25.21	10.45	38.31	26.95	6.48
1930	34.45	23.81	8.56	36.90	21.70	5.38
1931	28.80	20.07	5.07	32.63	20.28	6.40
1932	22.82	18.14	6.24	28.06	23.00	5.76
1933	30.51	16.15	6.16	43.14	16.66	6.03
1934	30.84	16.77	6.15	33.30	17.97	7.96

Year	Lakes region			Central region		
1899	$11.00			$12.65		
1900					$10.00	
1901					10.00	
1904 [2]	14.17	$7.00		14.09		
1905					10.00	
1906	14.31	10.00		16.00	10.00	
1907	15.79	12.00		16.46	10.00	
1908	15.87	12.00		15.51	10.00	
1909	15.55	12.00		15.73	11.01	
1910	16.36	13.00		15.52	11.60	
1911	15.23	13.00		15.85	16.20	
1912	15.40	7.00		15.58	17.00	
1913		10.34	$2.03		16.92	
1914		10.66	2.07		14.74	
1915	15.16	11.17	6.00	13.08	17.77	
1916	18.11	15.01	2.00	19.02	19.40	$5.33
1917	23.19	18.22	2.77	21.25	20.47	5.49
1918	28.95	25.86	3.14	30.85	21.42	7.84
1919	34.95	33.74	4.86	38.40	21.81	
1920	52.32	25.70	5.41	40.00	25.72	11.61
1921	30.36	21.99		20.28	19.03	10.31
1922	33.25	22.20		36.48	25.28	5.82
1923	41.72	26.66	9.14	44.30	34.98	12.09
1924	39.05	27.62	8.71	44.00	32.43	11.52
1925	38.04	25.45	9.12	44.92	34.43	14.95
1926	35.23	26.05	7.25	43.05	36.40	12.03
1927	33.24	25.04	6.53	40.69	29.80	14.81
1928	34.59	23.82	7.65	43.01	36.91	12.34
1929	35.41	24.83	10.22	40.89	34.94	16.66
1930	32.95	23.77	6.58	40.36	28.03	14.38
1931	26.23	20.71	6.22	36.87	17.83	0.64
1932	20.28	16.66	6.52	25.52	18.92	7.70
1933	27.55	15.28	5.60	33.46	22.03	10.71
1934	29.11	16.44	4.40	35.21	20.35	10.46

[1] No data for 1903.
[2] No data for 1902–3.

The Pacific Northwest Forest Experiment Station, at Portland, Oreg., has compiled log prices by species and grades in the important log markets of the Douglas fir region for many years. Of the principal markets, which are British Columbia, Puget Sound, Grays Harbor, Willapa Harbor, and the Columbia River, the Puget Sound district has been the most important during the last 35 years as a whole. Log and lumber price records of the four principal species, Douglas fir, Sitka spruce, western hemlock, and western red cedar in the Puget Sound market are given in table 37, and are compared with stumpage prices in figures 65 and 66.

The average prices of Douglas fir lumber shown in figure 65 are f. o. b. the mill for Washington, Douglas fir log prices are for Puget Sound, and Douglas fir stumpage prices are for western Washington. Although lumber-price data are not available for eastern and western Washington separately, the relatively small volume of Douglas fir produced in eastern Washington will not materially affect average prices for the whole State. The records of the Portland office give Douglas fir log prices by three grades. The log prices given in table 37 are based on a hypothetical average of 20 percent No. 1 logs, 40 percent No. 2, and 40 percent No. 3. A similar trend would, however, be obtained if any one log grade were used.

TABLE 37.—*Lumber and log prices of 4 principal species in Washington, 1899–1934*[1]

Year	Douglas fir		Sitka spruce		Western hemlock		Western red cedar	
	Lumber[2]	Log[3]	Lumber[2]	Log[4]	Lumber[2]	Log[5]	Lumber[2]	Log[6]
1899	$8.47		$8.30		$9.68		$10.64	
1900		$5.23						
1901		5.80						
1902		6.10						
1903		7.40						
1904	9.64	6.40	9.79		9.60		9.87	
1905		6.00						
1906	14.34	8.20	14.61		12.23		18.66	
1907	14.40	11.80	15.00		12.26		19.86	
1908	12.05	8.15	14.58		11.00		22.14	
1909	12.57	8.26	15.63		10.55		22.58	
1910	12.95	9.33	14.41		10.31		12.47	
1911	10.95	8.36	12.89		9.70		12.17	
1912	11.53	8.45	13.88		9.33		11.15	
1913		9.23						
1914		7.86						
1915	10.56	7.73	14.08		8.43		15.40	
1916	10.85	8.95	14.08		10.23		13.46	
1917	16.17	11.10	22.34		16.30	$8.42	18.26	$14.18
1918	19.54	14.83	23.01		17.41	12.00	20.06	16.10
1919	24.89	15.20	24.69		22.79	12.08	31.74	21.91
1920	34.94	23.00	37.70		27.90	16.00	36.65	27.00
1921	17.08	15.30	20.12		14.41	10.00	42.27	17.75
1922	21.00	16.55	22.19	$15.86	18.22	11.25	30.26	21.00
1923	27.25	19.83	26.22	16.80	25.00	14.02	44.18	30.33
1924	22.36	17.02	28.08	20.11	21.17	12.64	42.06	17.38
1925	21.13	17.20	25.47	17.39	19.07	11.50	42.06	23.50
1926	20.37	17.30	22.54	16.48	18.07	12.00	40.37	
1927	19.84	16.50	24.33	16.08	17.29	11.50	34.42	14.00
1928	19.30	16.40	23.36	15.96	16.63	12.00	41.56	17.50
1929	20.50	18.00	30.15	17.05	16.63	11.50	36.96	21.50
1930	17.27	17.00	19.79	17.05	14.48	11.50	30.40	21.00
1931	12.07	13.20	19.75	14.16	11.84	10.75	22.75	26.00
1932	10.73	11.30	12.24	11.26	9.78	7.75	25.51	
1933	14.00	11.80	17.66	10.73	11.70	7.75	23.66	
1934	16.56	13.30	20.45	12.43	15.11	9.00	27.42	[7]

[1] Corresponding stumpage prices of all 4 species are given in table 22.
[2] Average prices for the State.
[3] Puget Sound log prices for 20 percent No. 1, 40 percent No. 2, and 40 percent No. 3.
[4] Puget Sound log prices for 15 percent No. 1, 35 percent No. 2, and 50 percent No. 3.
[5] Puget Sound log prices for camp-run. [6] 1935 price $13.75.

In the similar chart on Sitka spruce, log prices are based on yearly average prices, assuming that 15 percent of No. 1 logs, 35 percent of No. 2, and 50 percent of No. 3 form an average output. All of the Sitka spruce produced in the State of Washington is in the Douglas fir region.

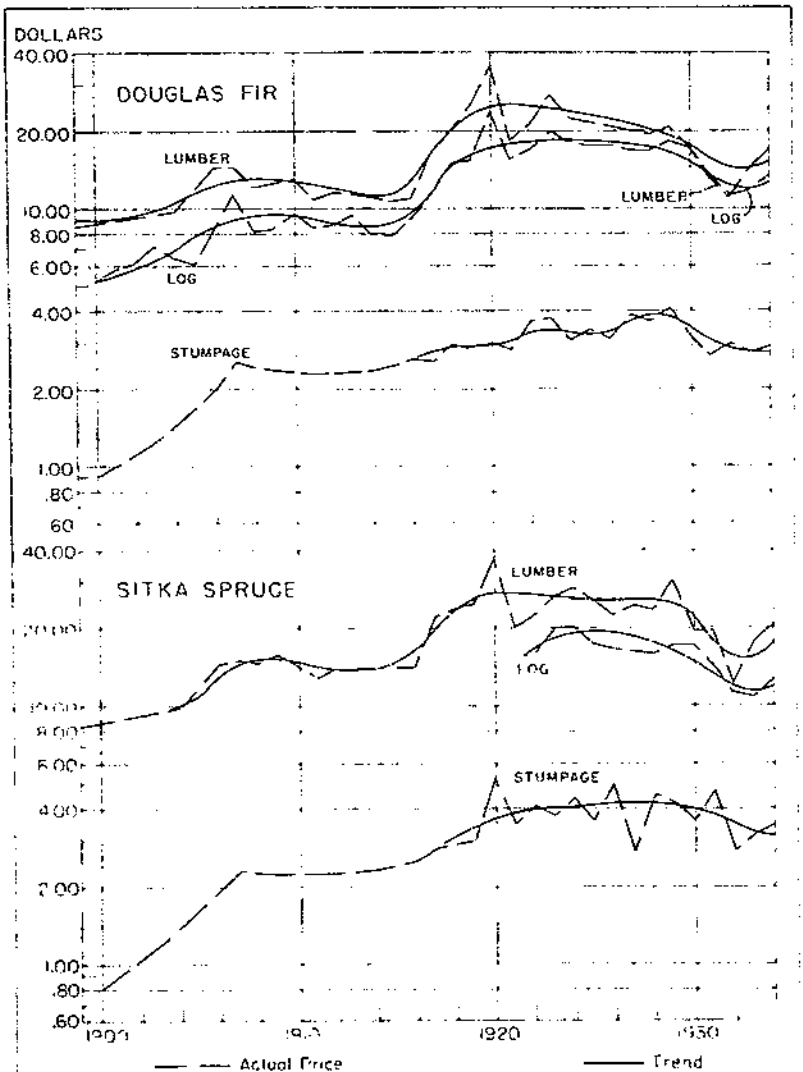

FIGURE 65.—Comparison of lumber, log, and stumpage prices of Douglas fir and Sitka spruce in western Washington, with indicated trends, 1899–1934. Stumpage data are taken from table 22

A considerable quantity of the log output of western hemlock, particularly in recent years, is used in pulp mills. The log prices, figure 66, compiled by the Portland office of the Forest Service, are camp-run prices, and include logs intended for the manufacture of

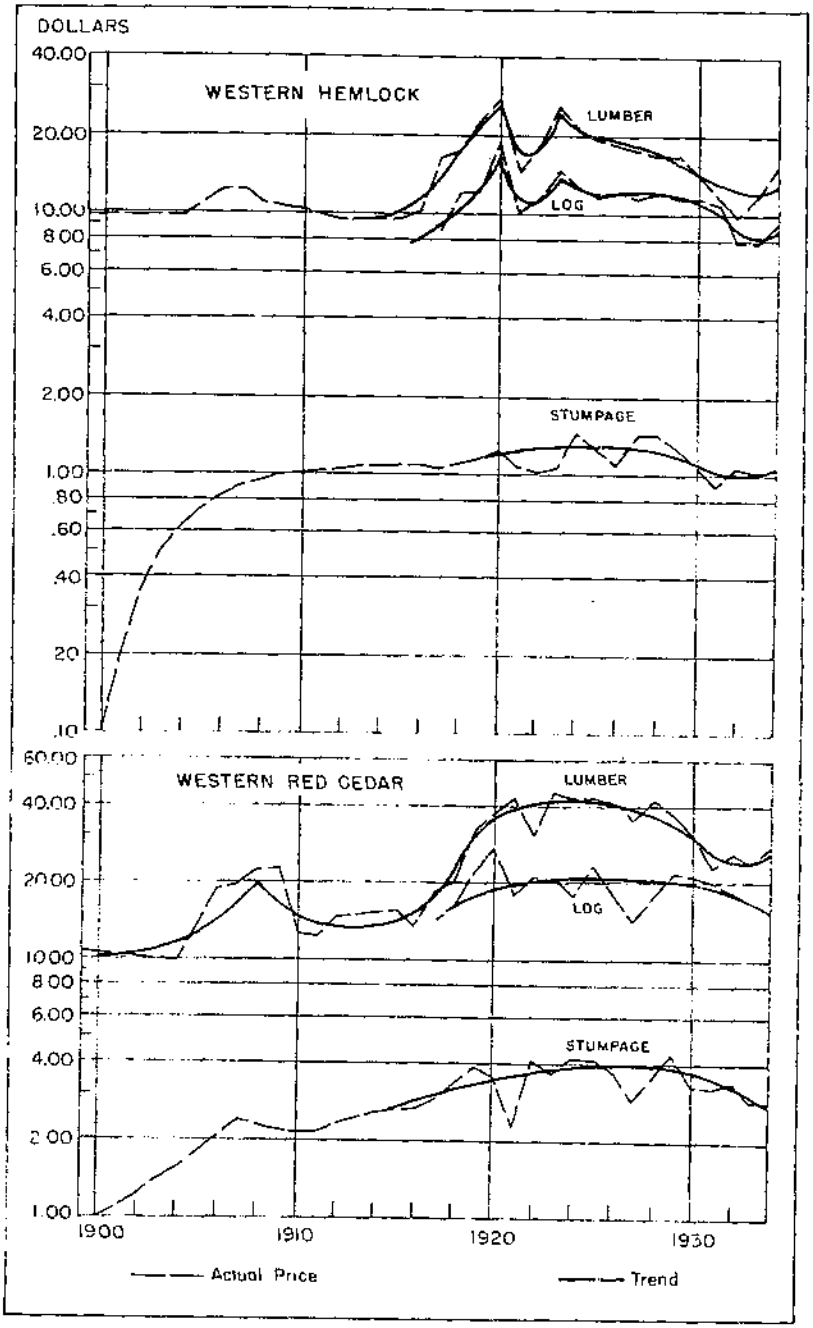

FIGURE 66.—Comparison of lumber, log, and stumpage prices of western hemlock and western red cedar in western Washington, with indicated trends, 1899-1934. Stumpage data are taken from table 22.

products other than lumber, the principal other use being pulpwood. Hemlock, as well as Sitka spruce, occurs in commercial quantities only in the Douglas fir region.

A small volume of western red cedar is manufactured in eastern Washington, but, like Douglas fir, not in sufficient quantity, to affect materially the State-wide average price of lumber. The data presented for this species are the least reliable of those from this area, largely because it has not been possible to segregate cedar logs primarily intended for the manufacture of lumber from those intended for the manufacture of shingles. It is common practice for manufacturing establishments using cedar logs as their raw material to manufacture the better grade of logs and the better portions of individual logs into cedar lumber, using the balance for shingles. Such establishments may and frequently do purchase cedar logs at camp-run prices instead of buying the lumber-log or shingle-log grades. The average log prices shown in figure 66 are camp-run prices which include shingle logs, therefore, the relation between log prices, lumber prices, and stumpage prices is not so constant as it is in the cases of the other species.

Figures 65 and 66, which compare lumber prices compiled by the Bureau of the Census and log prices compiled independently of this investigation, reveal the same general trends and relations between lumber, log, and stumpage prices as obtained in the regional and species data presented, in which the Bureau of the Census lumber-price data and stumpage and log prices compiled under the direction of the writer were used.

As an additional check on the relation between stumpage and lumber prices, although adequate log prices are not available, table 38 gives f. o. b. the mill lumber prices in the Inland Empire, one of the important lumber-producing regions of the country, with a total output in 1935 of more than 1 billion feet. Lumber prices compiled by the Forest Service at Missoula, Mont., from data furnished by the Lumbermen's Information Bureau of the Western Pine Association are compared with log prices for 1924 and 1930 to 1934 compiled by the writer. Stumpage prices for the same region have already been given in table 26. Figures 67 and 68 compare the trends of all three for all sales, western white pine, and ponderosa pine.

In addition to prices for western white pine and ponderosa pine, the regional office compiles prices of the minor species—Engelmann spruce, white fir, and western red cedar, which furnish only a very small percentage of the lumber manufactured in this region; and also of Douglas fir and larch. Of the last two there are not sufficient individual stumpage-price data available for use here, owing to the high percentage of flat-rate stumpage sales.

The same general relationship between stumpage and lumber prices is true of western white and ponderosa pine as was apparent for the species and regions previously discussed. The fragmentary log price data available seem to indicate that the same price relationships are also true for log prices in comparison with both stumpage and lumber prices.

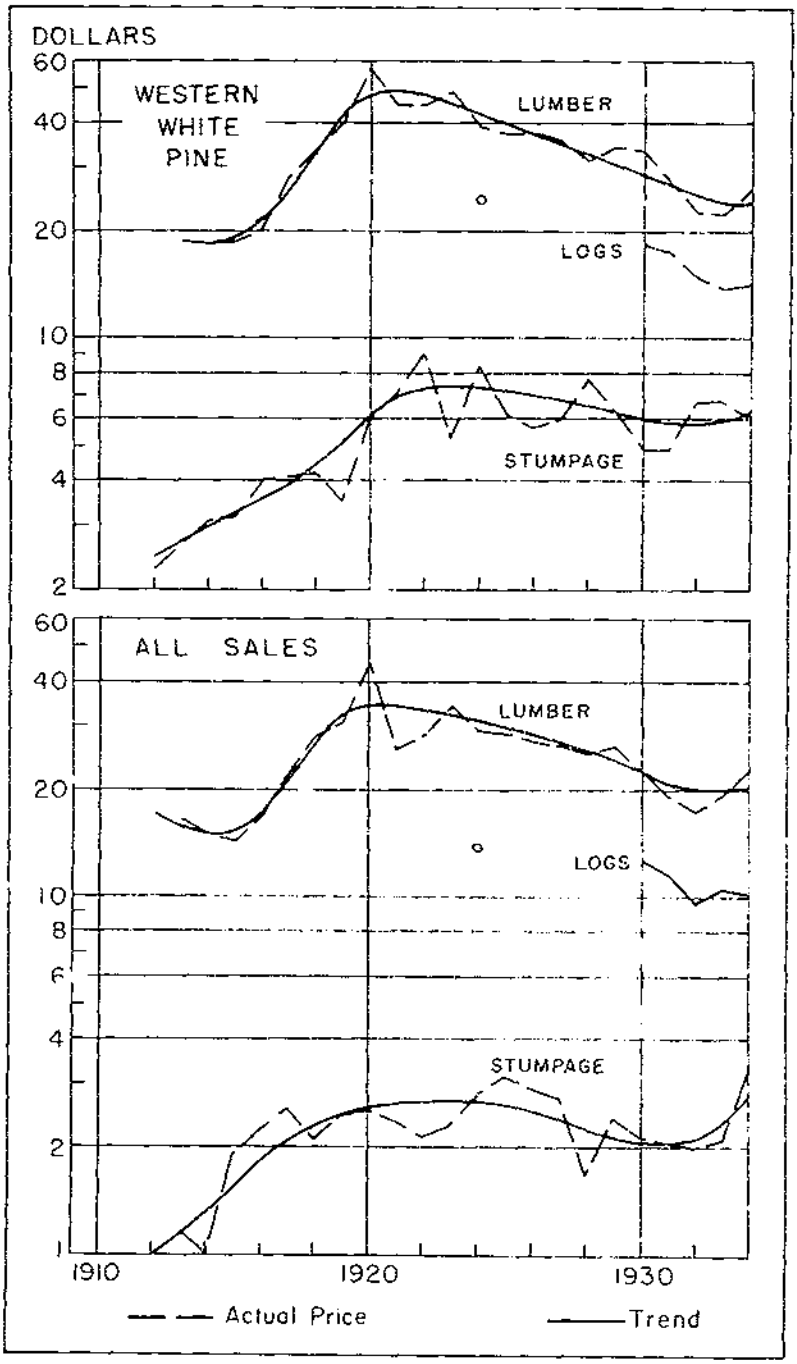

FIGURE 67.—Comparison of lumber, lumber-log, and stumpage prices of western white pine and all sales in the Inland Empire, with indicated trends, 1913-34. The data are taken from tables 26 and 38, and the tabulation on page 96.

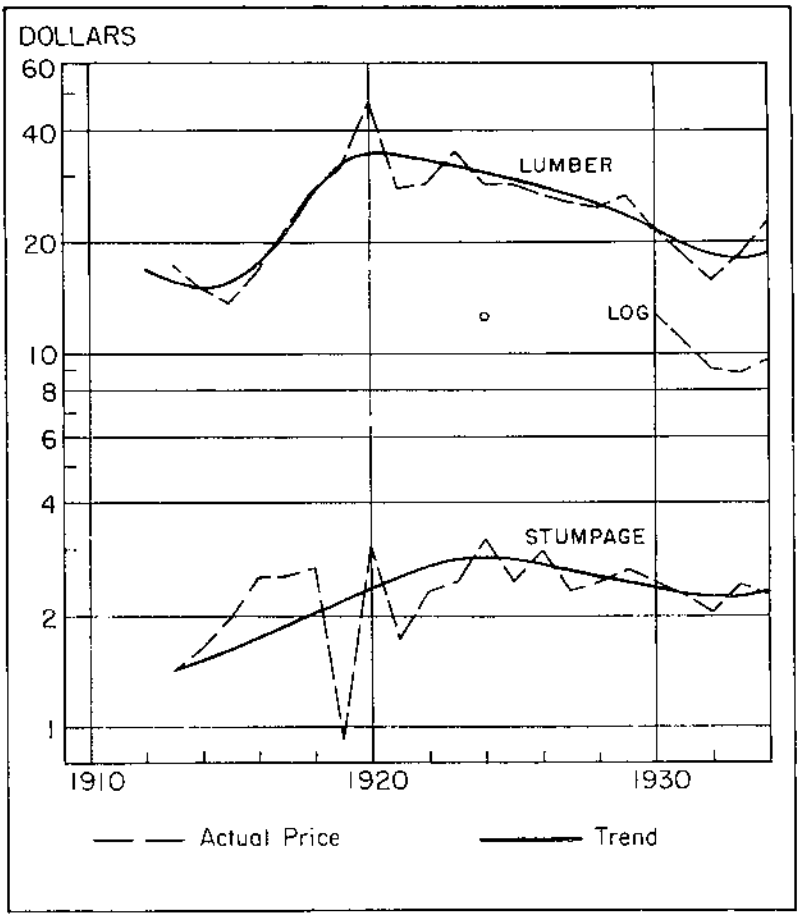

FIGURE 68.—Comparison of lumber, lumber-log, and stumpage prices of ponderosa pine in the Inland Empire, with indicated trends, 1913-34. The data are taken from tables 26 and 38, and the tabulation on page 96.

TABLE 38.—*Lumber and lumber-log prices in the Inland Empire,*[1] *1913–34*

Year	All sales		Western white pine		Ponderosa pine	
	Lumber	Lumber-logs	Lumber	Lumber-logs	Lumber	Lumber-logs
1913	$16.00	.....	$18.76	.....	$17.51	.....
1914	14.99	.....	18.43	.....	15.00	.....
1915	14.12	.....	18.67	.....	13.70	.....
1916	16.85	.....	20.09	.....	16.40	.....
1917	22.42	.....	28.06	.....	21.76	.....
1918	28.02	.....	33.42	.....	27.12	.....
1919	30.02	.....	40.00	.....	31.34	.....
1920	45.52	.....	56.05	.....	47.01	.....
1921	25.98	.....	44.77	.....	27.85	.....
1922	28.26	.....	44.53	.....	28.41	.....
1923	34.93	.....	48.85	.....	34.85	.....
1924	29.41	$13.87	39.20	$24.15	28.16	$12.51
1925	28.94	.....	37.37	.....	28.02	.....
1926	27.10	.....	37.77	.....	26.33	.....
1927	26.37	.....	35.86	.....	25.17	.....
1928	25.06	.....	31.09	.....	24.51	.....
1929	26.45	.....	34.33	.....	26.17	.....
1930	22.70	12.77	35.56	18.35	21.64	12.94
1931	19.66	11.72	27.56	17.48	18.25	10.91
1932	17.42	9.60	22.87	14.90	15.65	8.96
1933	19.33	10.40	22.32	13.79	18.31	8.78
1934	23.17	10.16	26.26	14.02	22.37	9.45

[1] Corresponding stumpage prices are given in table 26 and for western white pine, in the tabulation on p. 96. Lumber prices are compiled from data furnished by the Western Pine Association.

RELATION TO OTHER COMMODITY PRICES

Although the relation between stumpage, log, and lumber prices is significant, the behavior of stumpage and log prices in comparison with prices of other commodities is far more important. If such a comparison can be accurately made from available price records, the result should be a partial measure of the financial stability of timber growing in comparison with the production of other commodities. Such a relation, if it can be developed, would be particularly significant in the case of other products of the soil.

The business of timber growing is, however, a relatively long-time proposition when compared with other soil crops. It has been demonstrated that merchantable pulpwood can be grown in certain regions of the country in 15 to 20 years. Trees large enough to produce box and other low grades of lumber may be grown in 30 to 40 years. But a much longer period—up to several hundred years—will be required to produce timber of a size and quality equivalent to the original old-growth stands from which high-grade clear lumber or veneer can be manufactured.

The fact is, then, that the growing of timber for commercial use requires at least several decades before substantial returns will be received, as opposed to the annual maturity of other crops. This period will be considerably longer where the producer starts with bare land than where the land is under management and already has a growth of timber on it. A timber-growing enterprise starting with bare land and independent of the usual timber-harvesting operations is in no sense a going business enterprise and never should be represented as such. It is, on the contrary, a reclaiming or rehabilitating enterprise and should be so considered. When capital assets, in the form of standing timber, have been built up and can be operated for current business purposes, in other words when the enterprise is in a

position where it can utilize or sell its raw material as well as produce it, then and only then can it be considered as a going business.

Future economic conditions cannot be forecast with sufficient accuracy to determine dependably the costs of production or the monetary returns which will be realized when timber has reached economic maturity and is sold. The selling prices of standing timber, logs, and other forest products have been affected by general economic conditions in the past, as have prices of other commodities. If the relative price stability of standing timber and logs in past years can be determined with a reasonable degree of accuracy and compared with the price level of other commodities, this should form some slight basis for estimating the relationship between the two price levels that can reasonably be expected in the future, and a partial indication, at least, of relative price stability. It should also give some idea of the financial attractiveness of the business enterprise of timber growing under scientific forest-land management as compared with other businesses, particularly the production of other raw materials.

In view of the weaknesses of the stumpage- and log-price data determined by this investigation, and the peculiar circumstances which detract from the accuracy of the data, it is not proposed to carry the comparisons of the record of stumpage and log prices with past prices of other commodities further than the available basic data will warrant. Conditions which are known to have materially affected the long-time price records of both standing timber and logs but for which there is no statistical basis for price adjustment should be kept in mind. The comparisons which will be made between stumpage and log-price records and those of other commodities do not present recent stumpage and log prices in their most favorable light. On the contrary, they are lower than they would be if proper allowance could be made for the factors and conditions which have tended to lower the level of average prices.

STUMPAGE AND OTHER COMMODITY PRICES

There is a distinct similarity between the trends of country-wide average stumpage and log prices as shown by index numbers, and the all-commodity index compiled by the Bureau of Labor Statistics. The all-commodity index for the years 1900–1934 is as follows:

1900	81. 9	1912	100. 9	1924	143. 2
1901	80. 7	1913	101. 9	1925	151. 1
1902	86. 0	1914	99. 4	1926	146. 0
1903	87. 0	1915	101. 5	1927	139. 3
1904	87. 2	1916	124. 8	1928	141. 2
1905	87. 7	1917	171. 5	1929	139. 1
1906	90. 2	1918	191. 7	1930	126. 1
1907	95. 2	1919	202. 3	1931	106. 6
1908	91. 8	1920	225. 4	1932	94. 6
1909	98. 7	1921	142. 5	1933	96. 2
1910	102. 8	1922	141. 2	1934	109. 3
1911	94. 7	1923	146. 9		

It would not be logical to attempt to make a detailed comparison between the all-commodity index and the index of Nation-wide average stumpage prices or average log prices in the eastern United States. There is a wide spread in both stumpage and log prices not only between the several species and regions, but between species in any given region. Inasmuch as the percentage of the more valuable and the less valuable species reported sold may vary greatly from year to

year, the price changes by regional or country-wide averages may be caused by a shift in these percentages rather than by an actual increase or decrease in price.

It is difficult if not impossible in the majority of instances to obtain a long-time record of stumpage prices even for the same species that is based on the timber of comparable quality and accessibility, since these two factors have become constantly less favorable, by and large, during the period covered by this investigation. In a relatively few cases, however, the effect of these factors can be discounted by limiting the classification of stumpage prices to one species and to one type of growth. Although comparisons between stumpage-price records of this kind and the all-commodity index could not perhaps

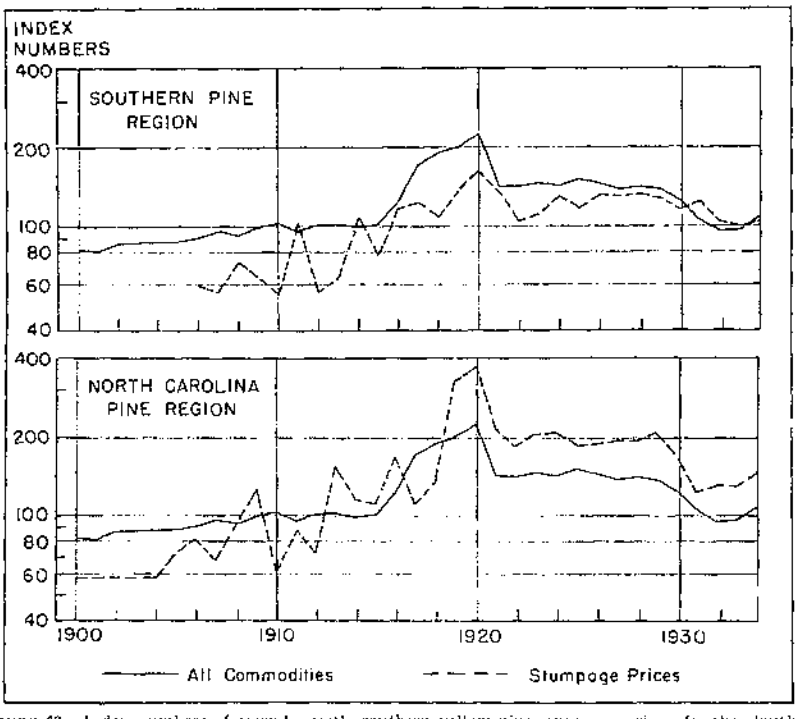

FIGURE 69.—Index numbers of second-growth southern yellow pine stumpage prices, for the Southern Pine and North Carolina Pine regions, compared with the all-commodity index (1910–14 base), 1900–1934.

be taken as absolute proof of a greater or less degree of price stability, they should at least indicate in a general way the relative price level of stumpage prices and that of all commodities. A few such comparisons have been made. Figure 69 gives the index numbers of second-growth southern yellow pine stumpage prices in the southern pine region and in the Carolinas and Virginia compared with the all-commodity index. The relative stability of second-growth pine stumpage prices in the southern pine region since 1916 is striking. Prices in the Carolinas and Virginia show a wider degree of fluctuation, principally because of the very high price received for standing timber during the inflationary years 1919 and 1920. In both cases, however, the depression price (1931–34) of pine stumpage remained above the 1910–14 average, while the all-commodity index went below.

Figure 70 compares the index numbers of virgin Douglas fir and ponderosa pine stumpage prices with the all-commodity index. The relative stability of Douglas fir stumpage prices since 1917 is worthy of notice, as is the fact that the trend of pine stumpage prices from 1908 to 1929 was decidedly upward. In both these cases, as in the southern pines, prices during 1931 to 1934 were above the pre-war average, and those for ponderosa pine have been maintained at higher levels since 1926 than the all-commodity index.

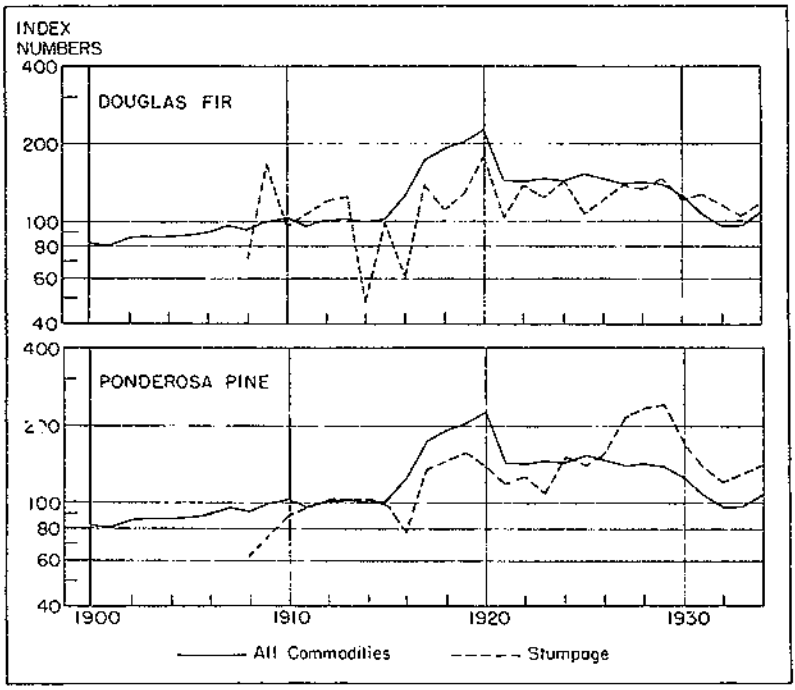

FIGURE 70.—Index numbers of Douglas fir and ponderosa pine stumpage prices compared with the all-commodity index, 1908–34.

Approximately one-third of the hardwood stumpage reported in individual sales has been oak. The index numbers of oak and all hardwoods stumpage prices are compared with the all-commodity index in figure 71. Here again in both cases stumpage prices did not go back to the pre-war level during the depression years. They have been maintained at levels appreciably higher than the all-commodity index since 1921.

Hardwoods in large commercial quantities are confined to the eastern United States, and do not present, generally speaking, as great a divergence in quality, growth, and accessibility between the several regions where they occur as do softwoods.

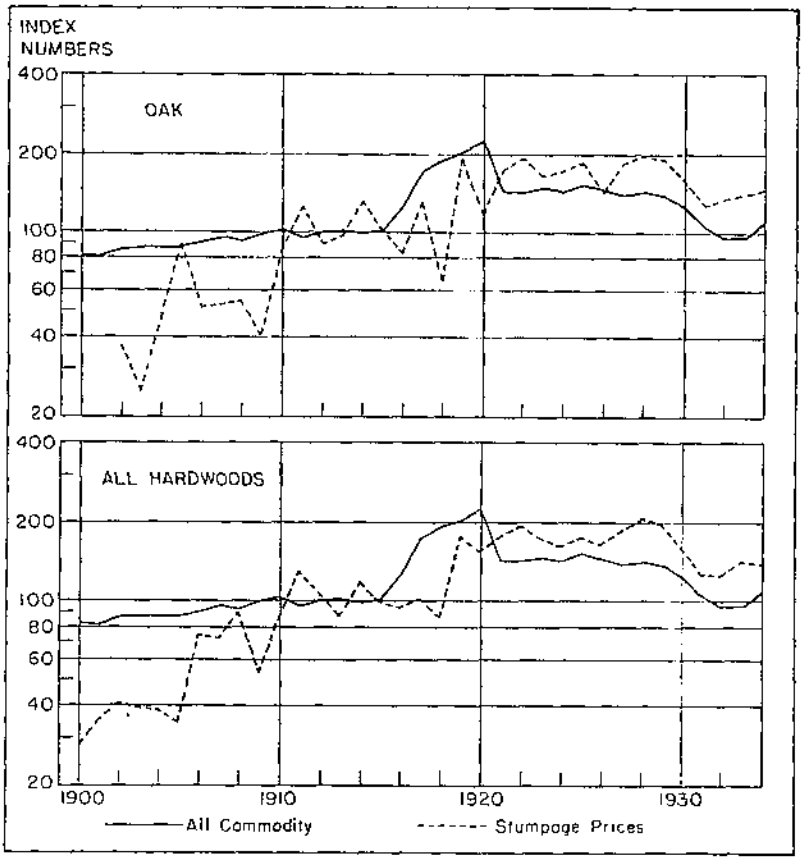

FIGURE 71.—Index numbers of oak and all hardwoods stumpage prices compared with the all-commodity index, 1900–1934.

PRICES OF LOGS AND FARM PRODUCTS

Farm woodlands constitute one-third of the total commercial forest-land area of the country and produce one-third of the total cut of timber of all kinds, according to recent estimates by the Forest Service. This includes one-fifth of the sawlogs and a much larger proportion of other products, such as pulpwood, cross ties, posts, and fuel wood. The importance of farm woodlands as a source of farm income is well established. The Bureau of Agricultural Economics estimated that forest products sold from the farm amounted to a total of $62,782,000 in 1934, ranking in ninth place among about 50 different crop items. The 1934 cash income from forest products produced on farms was about $3,000,000 greater than it was in 1933 and $8,500,000 greater than in 1932. Forest products from farms are particularly important in the eastern United States, where wood-using industries are turning more and more to timber on farm woodlands for raw materials because of the depletion of virgin timber supplies on lands of other ownership.

For these reasons the price stability of forest products produced on farms in relation to the price of other farm products is not only

of great interest to farmers and foresters but gives a reliable indication of the desirability of so managing farm woodlands that they may produce crops of forest products continuously.

If one-fifth of all the sawlogs produced in the United States are from farm woodlands as estimated, it is safe to assume that a considerably larger proportion of all the saw logs produced in the East are grown on farms. Many sawmills and other wood-using industries in this region depend largely on farms for their raw material.

The index numbers of the average price of all logs f. o. b. the mill in the eastern United States since 1900 and of the price of all farm products are contrasted in figure 72. The index numbers of all farm products for the years 1900–1934, as compiled by the Bureau of Labor Statistics are as follows:

1900	70. 8	1912	101. 8	1924	140. 3
1901	74. 1	1913	100. 3	1925	154. 0
1902	81. 9	1914	99. 9	1926	140. 3
1903	78. 0	1915	100. 3	1927	139. 4
1904	82. 0	1916	118. 4	1928	148. 5
1905	79. 1	1917	180. 9	1929	147. 1
1906	80. 4	1918	207. 6	1930	123. 8
1907	87. 2	1919	221. 0	1931	90. 9
1908	87. 2	1920	211. 4	1932	67. 6
1909	97. 6	1921	124. 0	1933	72. 1
1910	104. 2	1922	131. 6	1934	91. 6
1911	93. 7	1923	138. 3		

It will be noted that log prices did not go as high during the years of inflation nor as low during the years of the depression as did the average price of farm products. It is also evident that log prices on the average did not descend to the pre-war level during the depression, while the average price of all farm products was below the 1910–14 average in 1931 to 1934.

Although 20 percent of the logs reported sold in the eastern United States since 1900 were primarily intended for the manufacture of products other than lumber, the trend of lumber-log prices is practically identical with that of all logs.

If the relation between the index numbers of all logs and all farm products holds in specific instances, they are significant in indicating the desirability of the continuous production of forest products on farms and are not without important bearing in determining the best use of large areas of the poorer grades of farm land. The first step in the break-down of these data is a comparison of the prices of all farm products with those of all softwood and hardwood logs in the eastern United States (fig. 72). Here again logs have not gone as high in periods of inflation nor as low during the depression as all farm products. It is also interesting to note that hardwood log prices have been maintained, by and large, at higher prices since 1920 than have softwood log prices.

Comparisons of index numbers of all farm products and logs for southern yellow pine in the Southern Pine region, all hardwoods in the Central and Southern Pine regions, and white pine, hemlock, and all hardwoods in the Lake States have been made in figures 73 and 74. There is some variation between the log-price records in the different regions and between the different species, as was to be expected, but they show, generally speaking, the same relationship to the average

price of all farm products since 1921 as did the price record of all log sales in the eastern United States (fig. 72). The 1931–34 level of log prices has in none of these instances been as low as the price level of all farm products, and only in the case of softwoods have prices in recent years gone below the 1910–14 level.

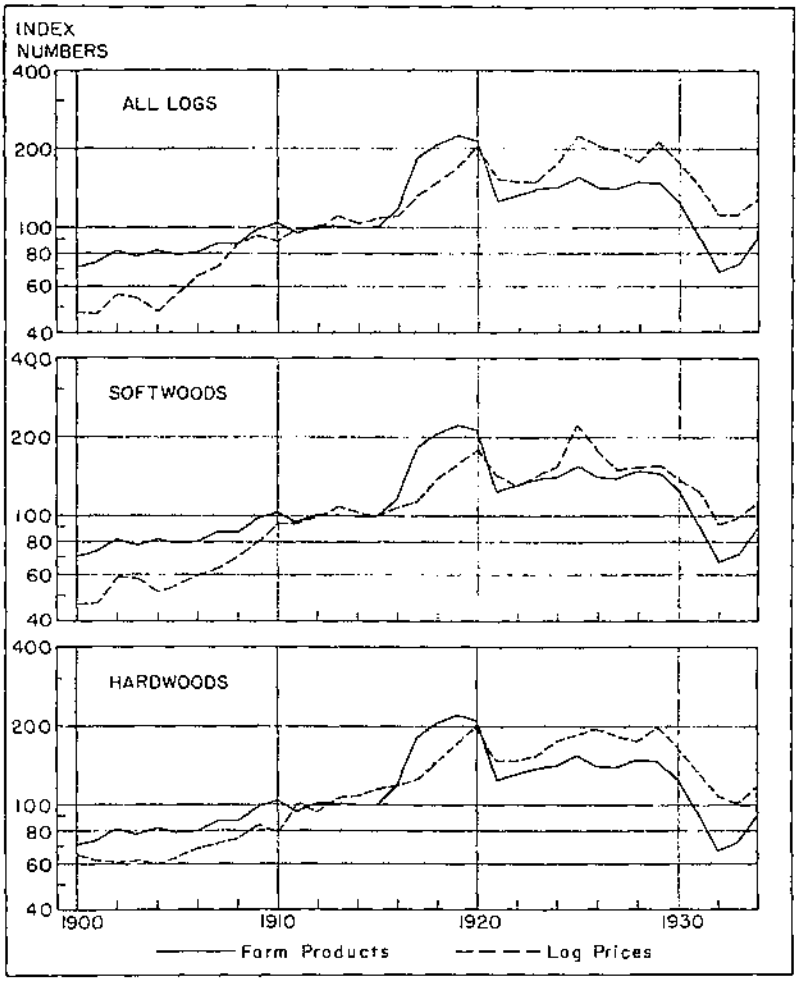

FIGURE 72.—Index numbers of eastern softwood, hardwood, and all-sales log prices compared with the all-farm-products index 1900–1934.

As a further break-down of these data, it would be desirable to compare the price record of logs of individual species with the price record of single agricultural products. It is to be expected that there would be considerable variation in the price records of different individual items classified under "all farm products," even though all might follow the same general trend. The difficulty is in obtaining price records of a single species of timber and of a specific agricultural product for the same region which are peculiar to that region.

An examination of the record of prices received by farmers for farm products as compiled by the Bureau of Agricultural Economics [11] and of wholesale prices of farm products as compiled by the Bureau of Labor Statistics (*58*) (and similar publications for previous years) clearly indicates a superior stability for stumpage and log prices.

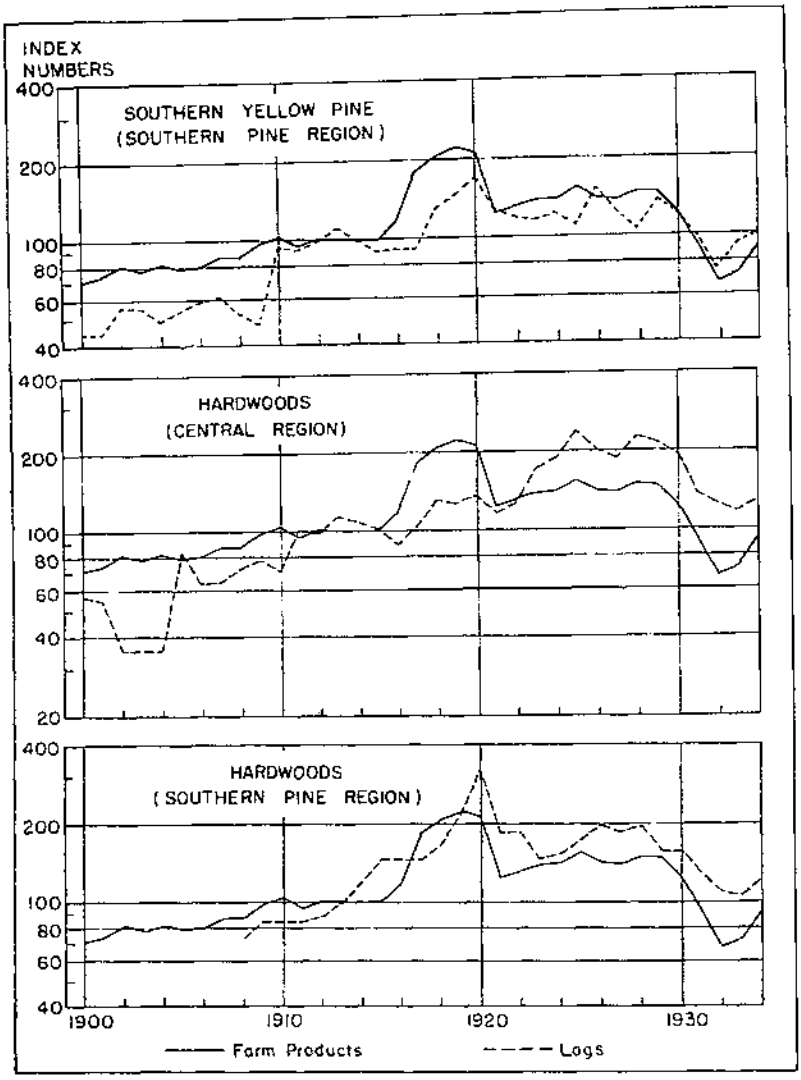

FIGURE 73.—Index numbers of log prices for southern yellow pine in the Southern Pine region and hardwoods in the Central and Southern Pine regions compared with the all-farm-products index, 1900–1934.

This is very apparent in the comparisons, by index numbers (fig. 75) of second-growth stumpage, southern yellow pine logs in the Southern Pine region, and cotton. The index numbers of cotton prices received

[11] UNITED STATES BUREAU OF AGRICULTURAL ECONOMICS. INDEX NUMBERS OF PRICES RECEIVED BY FARMERS FOR FARM PRODUCTS, 1910 TO 1935. 75 pp. 1934–35. [Mimeographed.]

by farmers as compiled by the Bureau of Agricultural Economics follow:

1910	113	1919	241	1928	150
1911	101	1920	250	1929	143
1912	87	1921	101	1930	100
1913	97	1922	156	1931	61
1914	84	1923	218	1932	47
1915	73	1924	216	1933	65
1916	110	1925	179	1934	97
1917	177	1926	122		
1918	238	1927	128		

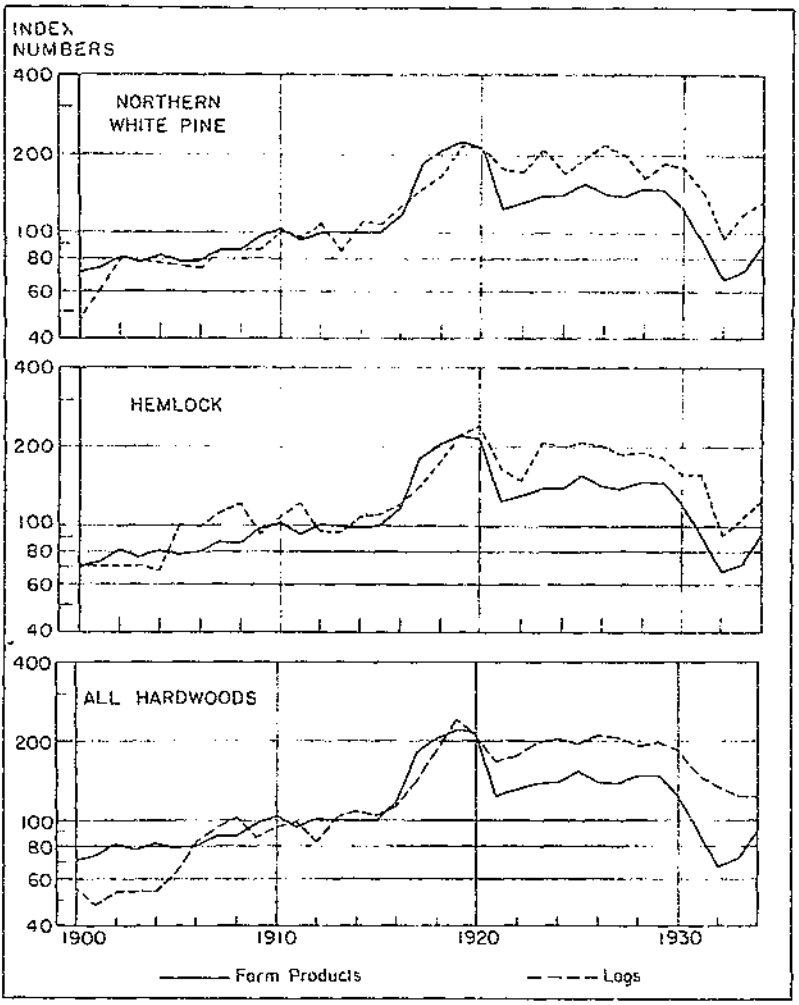

FIGURE 74.—Index numbers of log prices for Lakes region pine, hemlock, and hardwoods compared with the all-farm-products index, 1900–1934

Even more striking is the similar comparison (fig. 75) between second-growth southern yellow pine stumpage and logs f. o. b. the mill in the Carolinas and Virginia and flue-cured tobacco, old belt

type 11, the principal variety of tobacco grown in that region. Similar index numbers of tobacco prices follow:

1909	74	1918	251	1927	159
1910	78	1919	405	1928	135
1911	81	1920	166	1929	135
1912	114	1921	168	1930	82
1913	139	1922	214	1931	56
1914	83	1923	150	1932	80
1915	79	1924	167	1933	124
1916	142	1925	130	1934	212
1917	241	1926	181	1935	148

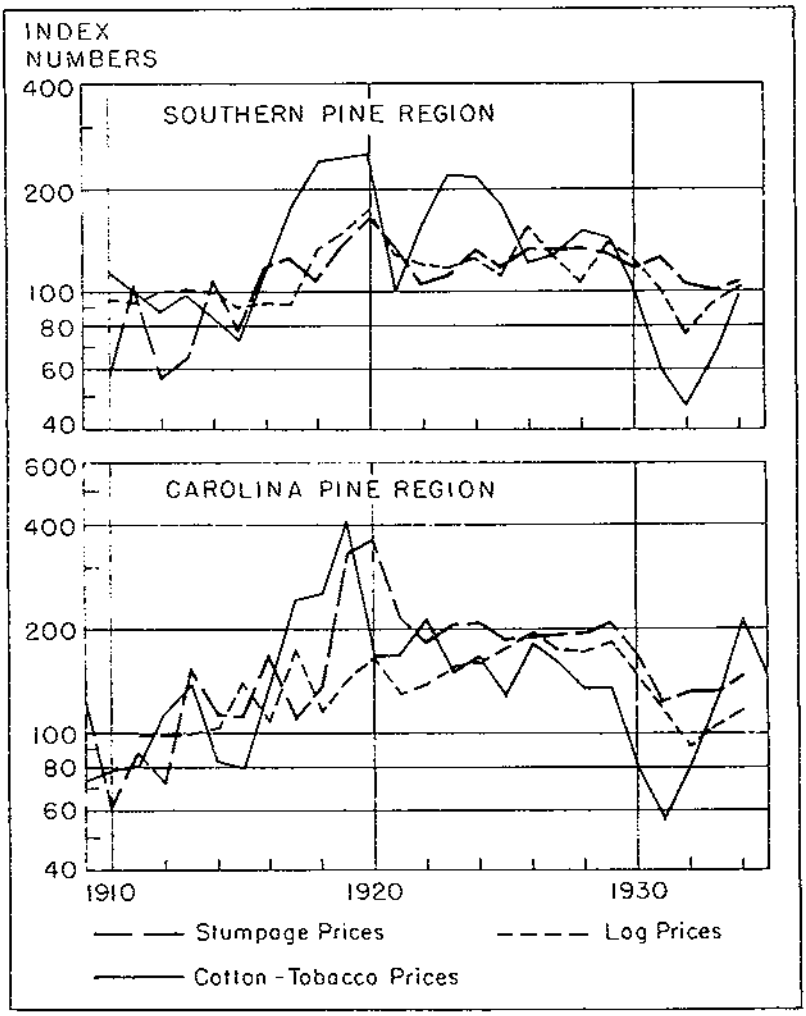

FIGURE 75. Comparison, by index numbers, of second-growth southern pine stumpage, pine log and cotton-tobacco prices in the Southern Pine and Carolina Pine regions.

Both cotton and tobacco may be called speculation crops and have perhaps been subject to a wider variation in price than has the average agricultural crop. They are, however, very important items

in the agricultural economy of these regions, and large areas of land are used for their production.

A comparison of the index numbers of hardwood stumpage and lumber-log prices in the Central region and of corn prices received by farmers (fig. 76, A) shows the same general relation—stumpage and log prices have been more stable than corn prices, and have not gone as high during periods of inflation nor as low during periods of depression. Corn index numbers are as follows:

1910	96	1919	243	1928	139
1911	90	1920	220	1929	136
1912	108	1921	88	1930	121
1913	98	1922	93	1931	78
1914	113	1923	125	1932	44
1915	112	1924	142	1933	57
1916	120	1925	156	1934	95
1917	223	1926	109		
1918	235	1927	123		

Similarly a comparison of the following index numbers of potato prices received by farmers and of second-growth stumpage prices and lumber-log prices in the eastern United States (fig. 76, *B*) shows the same relative trends:

1910	77	1919	203	1928	119
1911	114	1920	353	1929	135
1912	123	1921	149	1930	178
1913	87	1922	136	1931	104
1914	98	1923	122	1932	62
1915	76	1924	125	1933	95
1916	153	1925	163	1934	98
1917	271	1926	266		
1918	166	1927	190		

The same general relationships also hold true when the records of stumpage and log prices are compared with the price record of other agricultural products as compiled by the Bureau of Labor Statistics.

All of the available statistical material uniformly points to the general conclusion that stumpage and log prices have been more stable since 1900 than have prices of agricultural products. It is believed that the evidence presented herewith is sufficiently conclusive to warrant its consideration in formulating private, State, and Federal land-use programs for areas which might be devoted to either forestry or agricultural purposes. It is also believed that these data clearly indicate the desirability of supplementing farm incomes, particularly in the eastern United States, through the production of forest products as a regular part of farm economy. This can only be accomplished by keeping farm woodlands in a productive condition. The data also indicate that the business of growing timber has had a more stable market for its product than has farming in general. The extent to which price levels of stumpage and logs and of farm products maintain this relationship in the future depends, among other things, on whether economic history repeats itself.

STUMPAGE AND WHOLESALE PRICES

The comparisons which have been made between the price records of stumpage, logs, and farm products are legitimate and significant because of the fact that all are products of the soil. Similar comparisons between the records of other groups of commodities and forest

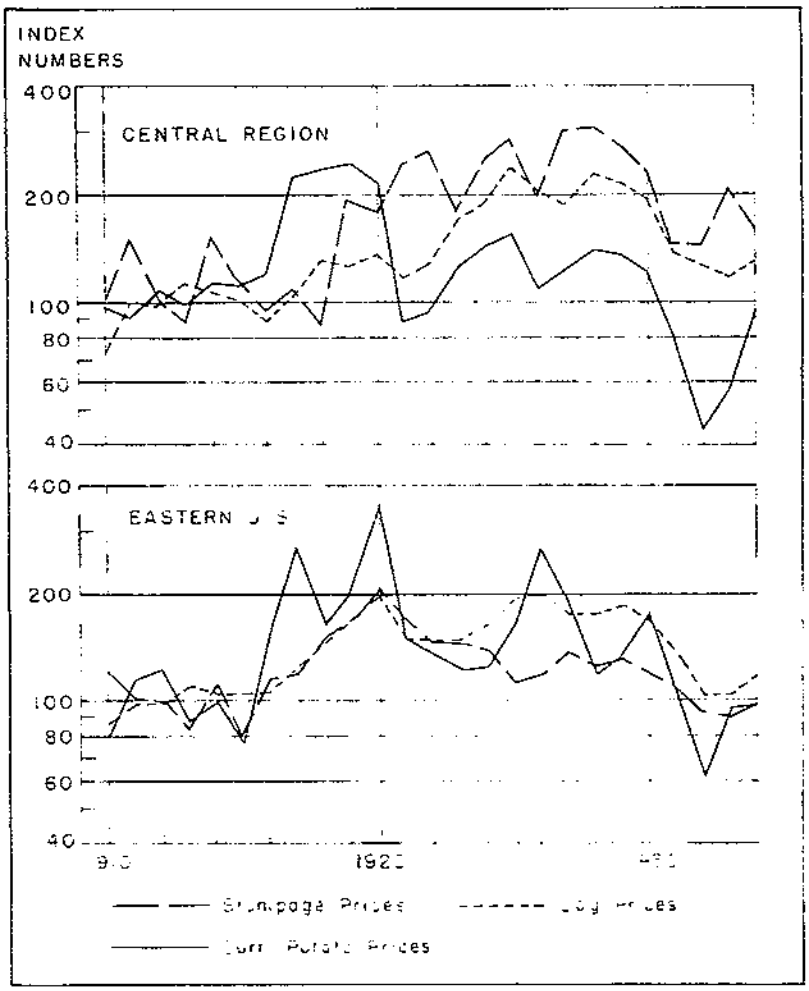

FIGURE 78.—Comparison, by index numbers, of stumpage, log, and corn and potato prices in the Central region (A) and the eastern United States (B), 1909–1934

products are not as significant because of the great divergence of factors affecting the price of commodities not produced from the soil. They are, however, interesting and pertinent to this investigation as indicative in a general way of the comparative stability of the price of forest products and the products of other industries. It has been found that although there is some variation in the stumpage-price records of the several species and regions, the trends are similar in all cases and the degree of price stability of individual species is generally similar to that of stumpage, log, and lumber prices for the country as a whole. The index numbers of stumpage prices for the period 1913–34 with the year 1926 as the base (table 39) compare favorably as regards price stability with the record of wholesale prices of the major groups of commodities as compiled by the Bureau of Labor Statistics (table 40). Though stumpage is a raw material converted by the lumber and other wood-using industries into forest products,

it is not included in the "raw material" class of the Bureau of Labor Statistics.

TABLE 39. *Index numbers of stumpage prices, 1913–34*

[1926=100]

Year	Softwoods			Hardwoods	All	Year	Softwoods			Hardwoods	All
	Total	Eastern	Western				Total	Eastern	Western		
1913	75	93	58	53	71	1921	91	151	99	98	86
1914	110	95	66	72	95	1925	96	112	107	106	92
1915	57	78	48	68	55	1926	100	100	100	100	100
1916	71	96	67	57	67	1927	118	133	101	113	114
1917	73	105	69	61	71	1928	87	129	89	127	89
1918	79	123	79	53	73	1929	87	101	96	121	86
1919	87	146	93	107	93	1930	80	100	87	96	79
1920	79	143	88	94	77	1931	75	88	86	76	76
1921	77	139	86	107	78	1932	74	95	75	77	70
1922	78	96	90	118	75	1933	64	71	65	86	62
1923	101	105	94	104	99	1934	73	83	78	85	69

This comparison between wholesale prices of groups of commodities and stumpage is not conclusive evidence that the production of standing timber is apt to be a more attractive business proposition than the production of other commodities or raw materials—nor was it the intention to attempt to prove such a hypothesis. It does indicate, however, that stumpage prices have been more stable by and large during the period covered by this investigation and especially during the period 1919 to 1934 than have prices of some other groups of commodities. If this relationship shall continue to hold in the future as it has in the past, the producer (grower) of stumpage will at least be assured of as stable a price for his product as will the producer of most other commodities, and a more stable price than will the producer of agricultural products and the producer of the average raw material.

PAST AND FUTURE STUMPAGE PRICES

Stumpage prices of the past are a partial measure of the financial feasibility of timber growing in the future, not because future prices can be accurately foretold from past prices, even where future trends may be strongly indicated, but because it can reasonably be assumed, in the absence of a better yardstick, that the level and relative stability of stumpage prices will be maintained in about the same relationship to other commodities in the future as they have been in the past.

The history of stumpage prices in the United States reflects the effects of complex forces of supply of and demand for lumber and other forest products in relation not only to the cost of production of lumber but also to the available supplies, both regional and national, of standing timber.

The theoretical market price of standing timber rests, in the main, upon the anticipation of profits to be made by manufacturing lumber or other products from it. Actual stumpage prices of privately owned timber have been influenced to a certain extent by the supply

TABLE 40.—*Index numbers of wholesale prices,*[1] *1913–34*

[1926=100]

Year	Farm products	Foods	Hides and leather products	Textile products	Fuel and lighting	Metals and metal products	Building materials	Chemicals and drugs	House-furnishing goods	Miscellaneous	All commodities	Raw materials	Semi-manufactured articles	Finished products	Non-agricultural commodities	All commodities, other than farm products and foods
1913	71.8	64.2	68.1	57.3	61.3	90.8	56.7	80.2	56.3	93.1	69.8	68.8	74.9	69.4	69.0	70.0
1914	71.2	64.7	70.9	54.6	56.6	80.2	52.7	81.4	56.8	89.9	68.1	67.6	70.0	67.8	66.8	66.4
1915	71.5	65.4	75.5	54.1	51.8	86.3	53.5	112.0	56.0	86.9	69.5	67.2	81.2	68.9	68.5	68.0
1916	84.4	75.7	93.4	70.4	74.3	116.5	67.6	160.7	61.4	100.6	85.5	82.6	118.3	82.3	85.3	88.3
1917	129.0	104.5	123.8	98.7	105.4	150.6	88.2	165.0	74.2	122.1	117.5	122.6	150.4	109.2	113.1	114.2
1918	148.0	139.1	125.7	137.2	109.2	136.5	98.6	182.3	93.3	134.4	131.3	135.8	153.8	124.7	125.1	124.6
1919	157.6	129.5	174.1	135.3	104.3	130.9	115.[illegible]	157.0	105.9	139.1	138.6	145.9	157.9	130.6	131.6	128.8
1920	150.7	137.4	171.3	164.8	163.7	149.4	150.1	164.7	141.8	167.5	154.4	151.8	198.2	149.8	154.8	161.3
1921	88.4	90.6	109.2	94.5	96.8	117.5	97.4	115.0	113.0	109.2	97.6	88.3	96.1	103.3	100.1	104.9
1922	93.8	87.6	104.6	100.2	107.3	102.9	97.3	100.3	103.5	92.8	96.7	96.0	98.9	96.5	97.3	102.4
1923	98.6	92.7	104.2	111.3	97.3	109.3	108.7	101.1	108.9	99.7	100.6	98.5	118.6	99.2	100.9	104.3
1924	100.9	91.0	101.5	106.7	92.0	106.3	102.3	98.9	104.9	93.6	98.1	97.6	108.7	96.3	97.1	99.7
1925	109.8	100.2	105.3	108.3	96.5	103.2	101.7	101.8	103.1	109.0	103.5	106.7	105.3	100.6	101.4	102.6
1926	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1927	90.4	96.7	107.7	95.6	88.3	96.3	94.7	96.8	97.5	91.0	95.4	96.5	94.3	95.0	94.6	94.0
1928	105.9	101.0	121.4	95.5	84.3	97.0	94.1	95.6	95.1	85.4	96.7	99.1	94.5	95.9	94.8	92.9
1929	104.9	99.9	109.1	90.4	83.0	100.5	95.4	94.2	94.3	82.6	95.3	97.5	93.9	94.5	93.3	91.6
1930	88.3	90.5	100.0	80.3	78.5	92.1	89.9	89.1	92.7	77.7	86.4	84.3	81.8	88.0	85.9	85.2
1931	64.8	74.6	86.1	66.3	67.5	84.5	79.2	79.3	84.9	69.8	73.0	65.6	69.0	77.0	74.6	75.0
1932	48.2	61.0	72.9	54.9	70.3	80.2	71.4	73.5	75.1	64.4	64.8	55.1	59.3	70.3	68.3	70.2
1933	51.4	60.5	80.9	64.8	66.3	79.8	77.0	72.6	75.8	62.5	65.9	56.5	65.4	70.5	69.0	71.2
1934	65.3	70.5	86.6	72.9	73.3	86.9	86.2	75.9	81.5	69.7	74.9	68.0	72.8	78.2	76.9	78.4

[1] As compiled by the Bureau of Labor Statistics.

of and demand for standing timber and the purpose for which the purchaser desired to buy. Fluctuations in the level of lumber prices greatly affect the calculations of potential purchasers of standing timber, and deviations from a normal relationship between stumpage and lumber prices are apt to be large where the evaluation of standing timber is governed by calculations of logging and milling operations to be conducted in the remote future. The estimation of these anticipated profits in the minds of more or less competent buyers and sellers has developed and determined the price at which large quantities of standing timber have been sold. As has been pointed out, however, stumpage prices have been influenced to a greater extent by the competency and financial position of both buyers and sellers.

EFFECT ON STUMPAGE PRICES OF THE REGIONAL DEVELOPMENT OF FOREST RESOURCES

The exploitation of our forests and the development of the lumber industry have progressed by regions in satisfying the national demand for lumber. As supplies of timber in any one region became depleted, and the local supply became unbalanced in relation to the demand, lumber prices rose, resulting in higher stumpage prices. This made it possible to begin to exploit the timber supplies of other regions which had heretofore had negative stumpage values. It also made it possible to utilize inferior species in the older timber-producing regions and to practice closer utilization with regard to the more valuable species. The total potential supply of timber has been a constant quantity at any given period, but the effective supply has been limited to the quantity that could, at any given time, be manufactured into lumber and sold at a profit.

The demand for standing timber may be for immediate use or to hold for future manufacturing operations in anticipation of higher prices. The demand for immediate use at any particular time has represented only a fraction of the entire potential supply and also but a small proportion of the total demand. The demand for immediate use has been largely governed by the demand for lumber at prevailing price levels. The demand for future exploitation or speculation has rested primarily upon the anticipation of future profits. The prices paid for timber for immediate exploitation have not been higher, except in unusual instances, than prevailing price levels of lumber warranted. There are exceptional cases, relatively few in number, in which a purchase price above normal has been paid primarily for a right-of-way or for timber or ground in a key position which gives the purchaser an advantage in regard to exploiting and hence purchasing other bodies of timber.

When the Lakes region was the center of the lumber industry, the timber there was held for current exploitation, and not, as a rule, for long-time investment (*15*). Prior to the shift of center of lumber production from the Lakes region to the South, as well as during the early years of large-scale production in the South, the bulk of southern timber was purchased for future operations or for holding in the belief that higher prices would obtain in the future. This same speculative tendency was even more pronounced in the West, particularly in the Douglas fir area of Washington and Oregon, and especially during the early 1900's.

Each region, however, acted as a check on the other, for the price of stumpage for current operations in any one region could not permanently stay above a limit imposed by the actual or potential competition of lumber from other regions. The price which manufacturers are able to pay for timber cannot, over any long period, be higher than the amount which will enable them to compete in national markets with lumber from other regions. Thus the abundant supplies of timber in the South limited not only the price of Lake States lumber in the Central and North Atlantic markets, but the stumpage price of the remaining supplies of timber in these regions as well. Similarly, West Coast timber has imposed a check on the increase in price of southern lumber in national markets as well as upon the increase in the price of southern stumpage. It is also true that second-growth southern pine timber imposes a similar check on West Coast lumber and stumpage prices insofar as lumber from the two regions compete in the national market.

Economic conditions in the several competing regions and the physical factors of individual tracts of timber set, under normal conditions, the limit above which stumpage prices have not gone and beyond which they cannot remain for any long period of time. It does not follow, however, that they alone have determined the prices that have actually been paid for standing timber. Lumbermen, like everyone else, buy for as little as they have to pay and sell for as much as they can get.

COST OF PRODUCING STANDING TIMBER MUST SET FUTURE STUMPAGE PRICES

Standing timber will have to be produced through human effort when virgin and volunteer second-growth supplies are exhausted and as forest lands are placed under some form of management. The fact that standing timber is the raw material from which lumber is manufactured is incidental only and cannot change the basic laws of economics which will determine the price of both commodities in the future. From the long-time point of view the cost of production governs the selling price of lumber. Does it not follow that the cost of production must also govern the price of stumpage?

Stumpage prices of privately owned timber as defined in this bulletin and as they have actually been in the past, have had no relation to the cost of production or of reproduction.

In the future, however, the normal stumpage price must be one which returns costs plus a profit to the efficient producer of timber. This does not mean that standing timber will never be sold for less than the cost of production. In the event that prices are subnormal the probable price that buyers will pay will determine whether individual forest owners attempt to grow timber or not. The element of chance will always be present—the most efficient or more favorably located producers will make a profit in most years and even the less efficient in boom years. In the main the costs of growing timber, which have not been considered in stumpage appraisals in the past, must be considered in the future if timber growing as a commercial venture is to be undertaken, prove successful, and become permanently established. As already emphasized, the grower of timber has the advantage that under normal circumstances, and particularly if he is adequately financed, he may cut or hold his timber as prices offered dictate.

The cost of production of virgin timber in the United States has been merely the cost of making it accessible (*15*). The costs of holding it, principally those of taxation, interest, and protection, in cases where timber has been bought for future exploitation or in anticipation of price increases, are not production costs. They are, rather, items of expense incurred by those who engage in the speculative or investment business of buying and selling goods. The success or failure of a business of this nature depends, among other things, upon whether the appreciation in price during the period the goods are held will be sufficient to absorb the carrying charges and leave a margin of profit.

High stumpage prices as such are no argument for timber growing until and unless they more than cover the actual costs of producing or growing timber, nor is the willingness or purpose to grow timber at the present time dependent upon present stumpage prices. The decision to grow timber "depends upon the price which the prospective grower thinks he can get for his timber in the future, when it is ready to cut or when the owner is ready to dispose of his interest" (*15*). Present methods of appraising standing timber arrive at its value solely from the standpoint of what it will cost the purchaser to liquidate it in relation to the price for which he can sell the manufactured products. In no timber appraisal in the writer's experience has consideration been given to the cost of producing timber or to the necessity of the grower of timber to recapture his costs plus a reasonable profit. Privately owned virgin forests have commonly been cut with no thought of the cost of producing the next crop and, as a matter of fact, with very little conscious effort even to obtain a future crop. In the future, the costs of commercial forestry must be returned to the producer if forestry is to be a profitable activity for private endeavor.

The day when all the timber cut will come from lands under some form of forest management is rapidly approaching, and all forms of forest management, however extensive they may be, incur some costs. If these costs are nothing more than taxes, as in the case of a forest owner who does nothing with his land but let nature take her course, he must see the possibility of disposing of the "volunteer" forest for a sum that will at least pay the taxes, or he will allow the land to revert to the Government. Similarly, he must have reasonable assurance that any forestry practice, from the most extensive to the most intensive, will pay dividends before he can be expected to adopt it. The future of forest ownership depends to a large degree upon the solution of these problems, particularly as they concern the price of standing timber and its relation to the cost of production.

NATIONAL LUMBER PRODUCTION IN RELATION TO PRICE AND CONSUMPTION

The national consumption of forest products cannot be gaged in relation to the national supply of standing timber. It is more reasonable to assume that the greater the supply of timber in regions where the greatest consumption of forest products occurs the greater the consumption will be, because the price of forest products to the consumer will be less. It is also true that the social benefits of forests, principally through the employment of labor in planting, protection, improvement, harvesting, and processing operations, are of greater importance and more valuable to the Nation as a whole when the

forests are located near to the large centers of population, which coincide with the large centers of consumption.

The fact that we as a Nation have used wood in tremendous quantities has not come about solely because wood was the best material available. It has been true principally because raw material in the form of standing timber was available in such tremendous quantities that it was possible to fabricate forest products which could be sold to the consuming public at prices so low in comparison with the higher priced substitutes that wood had a tremendous advantage when its value in use and price were compared with those of other materials.

So long as the available supply of standing timber in any given forest region was proportionately larger than the demand for forest products in that region, prices were low. As supplies of standing timber in the regions of largest consumption became depleted, with no corresponding decrease in the demand for forest products, prices tended to rise and it became economically possible to ship forest products in from other regions. As such a succession of events has brought about progressive increases in price, it has been possible to develop the forest resources of the various regions and to supply forest products to national rather than local markets. As a result of the movement of the principal activity of the lumber industry from region to region, the distribution of remaining supplies of standing timber having a positive stumpage value has constantly changed and the effect on the consumer has constantly become less favorable to the use of forest products.

Timber is now cut in every forested State, the largest cut naturally occurring in the Western States which have the largest supplies of standing timber. Consumption, on the other hand, has shifted much more slowly the great bulk of forest products still being consumed in the regions having the greatest population—the Northeast, Middle Atlantic, and East Central regions. The resultant geographical disparity has necessitated long-distance hauling of timber products, which in turn has involved increased freight, handling, and distribution costs, and therefore higher costs to the consumer.

The fact that long-distance hauling is economically practicable has tended to keep prices of locally produced forest products lower than they would otherwise have been. Transportation costs also tend to keep stumpage prices down both in the region where the lumber is produced and in the region where it is consumed. These tendencies are, however, incidental to the main point, that price to the consumer is inevitably increased as the distance of standing timber from the consumer increased. That these factors have had a pronounced effect on the consumption of forest products, particularly of lumber, is shown in a brief consideration of the effects of the shifts in source of the lumber consumed in New York State and in the Middle Atlantic region since 1920.

This information is shown on a percentage basis in figures 77 and 78, and the quantities and percentage data are given in tables 41 and 42. During the period 1920–34 the forests of New York State supplied approximately 6 percent of the lumber consumed within the State, and the forests of the Middle Atlantic region, which includes New York, Pennsylvania, Delaware, and New Jersey, supplied less than 10 percent of the lumber consumed in this region.

Is it unreasonable to assume that the consumption of lumber in this State and region would have decreased as much as it has in recent years if local supplies of standing timber had been sufficient to fill a greater proportion of the local need? It is no more reasonable to assume that consumers of forest products in the regions of greatest demand, particularly the Northeastern, Middle Atlantic, Lakes, and

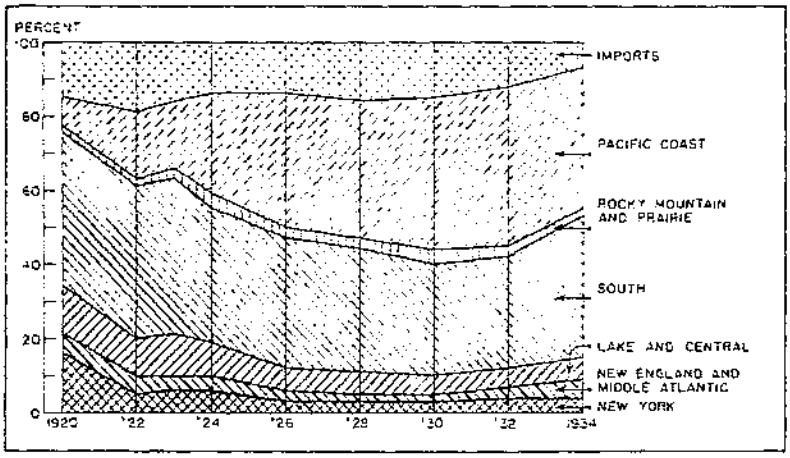

FIGURE 77.—Lumber consumption by source, New York State, 1920–34.

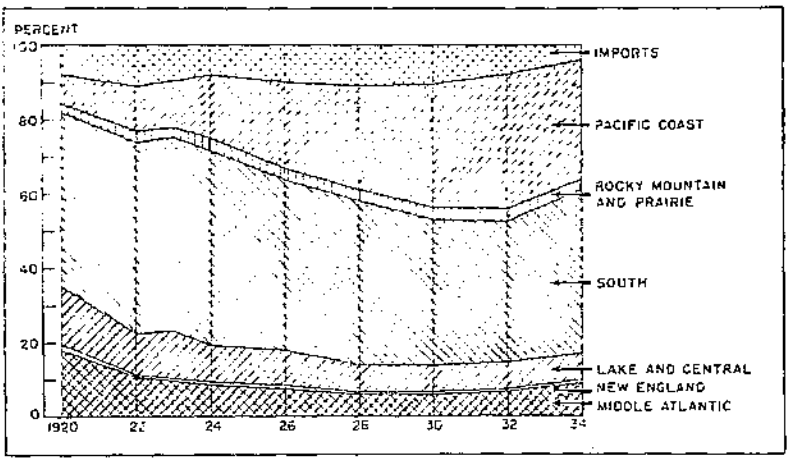

FIGURE 78.—Lumber consumption by source, Middle Atlantic region, 1920–34.

East Central regions where there are vast areas of unproductive forest land, should be dependent upon the forests of the South and the far West for their main supplies of lumber for building purposes than it would be to assume that people living in these regions should be in large measure dependent upon the Yakima Valley for their potatoes or the Wenatchee or Hood River districts for their apples.

TABLE 41.—*Source of lumber consumed in New York for specified years, 1920–34*

Source	1920		1922		1923		1924		1926		1928		1930		1932		1934	
	M ft. b. m.	*Per-cent*	*M ft. b. m.*	*Per-cent*	*M ft. b. m.*	*Per-cent*	*M ft. b. m.*	*Per-cent*	*M ft. b. m.*	*Per-cent*	*M ft. b. m.*	*Per-cent*	*M ft. b. m.*	*Per-cent*	*M ft. b. m.*	*Per-cent*	*M ft. b. m.*	*Per-cent*
New York	380,094	16	174,134	5	197,472	6	206,011	6	129,250	3	98,746	3	59,565	3	37,343	4	46,436	4
New England and Middle Atlantic States	125,759	5	167,246	5	149,876	4	138,218	4	124,454	3	68,418	2	43,273	2	33,942	3	51,228	5
Lakes and Central States	316,270	13	307,847	10	403,203	11	293,065	9	230,011	6	195,187	6	109,949	5	53,616	5	66,068	6
South	1,003,586	41	1,309,108	41	1,472,828	42	1,196,483	36	1,258,205	35	1,073,220	33	646,263	30	312,626	30	422,403	38
Rocky Mountain and Prairie States	56,946	2	79,267	2	87,812	3	114,156	4	98,089	3	99,891	3	79,558	4	31,963	3	27,005	2
Pacific Coast States	193,122	8	561,266	18	650,705	18	870,241	27	1,290,774	36	1,208,446	37	885,095	41	452,284	43	430,316	38
Imports	378,750	15	600,692	19	582,437	16	471,335	14	495,482	14	515,352	16	338,795	15	125,974	12	75,882	7
Total	2,454,527	100	3,199,560	100	3,544,333	100	3,289,509	100	3,626,265	100	3,259,260	100	2,162,498	100	1,047,748	100	1,119,338	100

TABLE 42.—*Source of lumber consumed in Middle Atlantic region for specified years, 1920–34*

Source	1920		1922		1923		1924		1926		1928		1930		1932		1934	
	M ft. b. m.	*Per-cent*	*M ft. b. m.*	*Per-cent*	*M ft. b. m.*	*Per-cent*	*M ft. b. m.*	*Per-cent*	*M ft. b. m.*	*Per-cent*	*M ft. b. m.*	*Per-cent*	*M ft. b. m.*	*Per-cent*	*M ft. b. m.*	*Per-cent*	*M ft. b. m.*	*Per-cent*
Middle Atlantic States	1,021,278	18	774,959	11	809,090	10	655,231	9	578,803	8	438,899	6	280,565	6	159,211	7	216,779	9
New England States	81,163	1	53,150	1	51,386	1	48,853	1	62,461	1	15,153	1	32,366	1	17,236	1	26,851	1
Lakes and Central States	822,180	15	807,516	11	1,022,608	13	711,863	10	705,570	9	499,269	7	325,390	7	147,188	7	170,072	7
South (South Atlantic, East Gulf, and Lower Mississippi)	2,660,471	47	3,737,104	52	4,150,337	52	3,819,129	52	3,579,583	46	3,109,696	45	1,805,526	39	834,922	38	1,071,122	44
Rocky Mountain (North and South) and Prairie States	136,348	2	197,772	3	223,900	3	258,159	3	236,412	3	209,835	3	171,348	4	79,507	3	72,221	3
Pacific Coast States	450,199	8	810,587	11	991,741	12	1,221,610	17	1,785,132	23	1,907,653	28	1,516,497	33	778,700	36	786,056	32
Imports	487,272	9	772,802	11	748,506	9	607,835	8	757,226	10	735,996	10	482,896	10	167,043	8	90,643	4
Total	5,598,911	100	7,183,890	100	7,997,568	100	7,325,710	100	7,705,187	100	6,916,501	100	4,614,588	100	2,183,807	100	2,433,744	100

Differences in soil and climatic conditions in the several forest regions of the country result in certain natural advantages of one region over another when it comes to growing timber, even as it does in the case of all things that grow. Douglas fir veneer stock or Douglas fir logs from which vertical-grain flooring can be manufactured cannot be produced as economically in New York or Pennsylvania as they can in western Washington or Oregon if they can be produced there at all. Nor can redwood or cypress be grown in commercial quantities in Maine or Minnesota. But it has not been proven that a western hemlock or a southern pine 2 by 4 or western red cedar or Douglas fir siding can be manufactured from trees in their natural habitat in forests under some form of forest management, shipped thousands of miles, and sold to the consumer in regions where eastern hemlock and northern white pine can supply the same products, at prices which preclude the successful competition of the locally grown and locally manufactured product. These factors should be considered from the long-time point of view. It cannot logically be assumed that lumber producers of the far West can forever continue to sell their product in eastern markets at less than the cost of production or that the virgin forests of the West are inexhaustible.

If forest products are to be used in large quantities they must be bought and paid for by the rank and file—the great mass of salaried people and wage earners whose incomes are not high. Mass production and low prices must be the objectives of those engaged in commercial forestry. In accomplishing these objectives, the problem must be approached, and solved, primarily from a regional standpoint. Under no other set-up will commercial forestry be a practical proposition nor will forest products be used in the quantities that can be produced by our forest land under a Nation-wide plan of scientific forest management.

SUMMARY AND CONCLUSIONS

The purpose of this investigation was to compile, analyze, and draw conclusions from available data on the prices paid for privately owned timber in the past, with a view to throwing light on the price level which can reasonably be expected in the future and hence on the economic practicability of forestry. Although future prices cannot be accurately determined, past prices indicate what may be expected, and it can reasonably be assumed that price relationships between stumpage and various other commodities in the past will be maintained in the future. The discussion has been confined, in the main, to a presentation of the original data, derived from reports of actual sales and purchases of standing timber, and in comparing these data with price records of logs, lumber, and other commodities.

The trends and relationships that have been developed do not show the prices of stumpage and logs in as favorable a light as would have been the case if it had been possible to obtain better basic data and if certain factors had remained more nearly constant during the period covered by this investigation.

In the first place, 64 percent of the 490 billion feet of standing timber reported sold during the period 1900–1934, was in the form of flat-rate or lump-sum sales. This accounts for some of the irregularities in the record of stumpage prices which would probably not have

occurred if the percent of individual sales had been higher. In the eastern United States only 20 percent of the log sales reported during this period were in the form of flat-rate sales. Price records of individual species are based, therefore, on 36 percent of the total volume of reported sales of standing timber and on 80 percent of the total reported sales of logs.

In the second place, the factors of quality and accessibility of the standing timber reported sold during the period under consideration have constantly and increasingly become less favorable. One result of these conditions is that stumpage prices have been lower in recent years than they would have been if quality and accessibility of timber recently sold had been comparable with that of the timber sold shortly after the turn of the century.

In the third place, standards of merchantability and units of measurement have changed in such a way as progressively to lower the level of average stumpage prices per unit of measurement.

Lastly, average yearly stumpage prices cannot be based on the same or completely equivalent stands of timber. This must be considered in comparing stumpage-price levels and trends with those of other commodities, which are based on equivalent materials from year to year.

In spite of these limitations, which are inherent in the type of data available and result in large measure from the nature and development of forest-products industries, it is felt that the data presented are not only as accurate and representative as can as be obtained but also warrant the drawing of sound conclusions. The fact that the record of stumpage prices for the period 1900–1934 is based on more than 50,000 transactions involving nearly 500 billion board feet of timber with a value of almost 1.5 billion dollars gives the resultant tabulations a considerable degree of stability. Although the record is unavoidably fragmentary for some States and species, it is adequate with regard to the more important timber-producing regions and the principal species.

The actual price paid for standing timber has increased in periods of inflation and decreased during periods of deflation and economic depression; but the long-time trend of stumpage prices since 1900, when adjusted for the purchasing power of the dollar, has been distinctly upward in the country as a whole.

Actual average stumpage prices increased rapidly from 1900 until the middle 1920's, decreased until 1932, and then started up again. The level of average prices when weighted for the purchasing power of the dollar has, however, been maintained or increased since 1920. Hardwood stumpage prices have shown a greater appreciation during the past three decades than have those of softwood, and have more nearly maintained the actual price level of the middle 1920's. These trends are true for the country as a whole, for the several regions, and for the more important species—although there is, of course, a considerable amount of variation between the several regions and species.

The general uses of softwood and hardwood forest products, particularly lumber, and a consideration of the demand and supply factors, offer a reasonable explanation of the higher price level maintained by hardwoods. Softwoods are used principally in building and general construction work, fields in which the rivalry of substitutes is particularly keen. The decline in softwood stumpage, log, and

lumber prices from the middle 1920's to 1932 resulted from interregional competition, the reduction in building and construction activities, and the use of substitutes. Hardwoods, on the other hand, are in much greater demand for the manufacture of furniture, interior finish, cooperage, high-grade veneer, and other specialized wood products than they are for common building and construction purposes. This demand has been met principally from the eastern hardwood forests; these are certainly not increasing in volume, and there is no reservoir of hardwoods in the West to fall back on. This higher price level of hardwoods indicates that it might be well to reexamine our appraisal of the relative merits of softwoods and hardwoods to determine whether forestry measures, including reforestation, show possibilities of greater returns from hardwoods.

Throughout the period, stumpage prices have been more stable than have log and lumber prices, although they have followed nearly parallel trends. The basic difference in the conditions under which stumpage and logs are sold, which has an important effect on price, is that while standing timber can be held for several years, or even decades, without serious deterioration, logs must be manufactured fairly promptly or serious damage from insects, stain, or fungi will result. Seasoned lumber can also be held under proper storage conditions for relatively long periods without deterioration.

Two physical factors which affect stumpage prices are accessibility and quality. The price paid for standing timber increases, other things being equal, in direct proportion to the nearness to wood-using centers. Small second-growth timber from which only the poorer grades of lumber can be manufactured, but which has grown near the place of consumption, commands a higher price than does virgin stumpage in the more remote regions.

In 1928 (a "normal" year) and 1933 (an "abnormal" one) the lowest prices were paid for timber stands of the far West and the extreme South, which are farthest from the regions of the heaviest lumber consumption. The highest prices were received for second-growth timber in the States having the smallest supplies of standing timber, yet using the largest quantity of lumber and other wood products. These price differentials, which are largely caused by the cost of transporting lumber and other wood products to the place of consumption, do not indicate that timber growing as a commercial enterprise is unattractive in the far West and extreme South. When the constantly diminishing supplies of standing timber in the country as a whole and the exceedingly rapid rate of tree growth in those regions are considered, the exact contrary is more apt to be true. The record of stumpage prices, especially that of recent years, indicates, however, that on reasonably good soils timber growing should be most attractive in the regions of large consumption of lumber and other wood products near the big centers of population. In these regions there are millions of acres of idle land admirably suited to the production of timber.

The reports available for this investigation clearly show that higher prices were paid not only for the more accessible stumpage but also for stumpage of high quality. Stumpage suitable for manufacture into veneers or other high-class products had commanded top prices even in periods of depression. The tendency of the majority of tim-

berland owners is to sell an entire body of standing timber as soon as a market develops. This practice results frequently in a monetary loss when the return that might have been realized from the same timber a few years later is considered. Thinnings or improvement cuttings can often be made at a profit, and the more valuable and rapidly growing trees which are left should increase in value as well as in volume and quality, under improved silvicultural conditions.

The accepted method of selling standing timber in individual sales during the period covered by this investigation has been to sell all the timber of one species at a given price per thousand feet, regardless of varying size and quality, and on the basis of its utilization as lumber. This practice has been maintained in the majority of instances in spite of the decreasing consumption of lumber, the increasing use of specialty wood products, and the fact that high-grade timber of many species is worth considerably more for the manufacture of specialty products than it is for the manufacture of lumber. This is particularly true in the case of hardwoods. Log and timber buyers for concerns requiring high-grade hardwoods for the production of specialty products are combing the country for suitable raw material with increasing intensity. If the owner of standing timber, or the producer of logs is to obtain the full value of the material he has for sale under present conditions or under those which will certainly obtain in the immediate future, it is not sufficient that he be familiar with the demand for and the price and cost of production of lumber. Loss in value of stumpage can be prevented only by a careful and thorough study of the potential and most valuable uses of the material to be sold, of all available markets, and of the costs and returns of industries that produce products other than lumber. It is common for veneer and other high-grade logs to be shipped hundreds of miles to the place of manufacture. It is, in fact, of record that logs of native species have been shipped over 2,000 miles to manufacturing plants.

The timberland owner has a choice of methods—either treating a body of timber as a mine to be completely exhausted for the maximum returns from what (as far as he is concerned) is one final cutting; or, after a thorough investigation of markets, values, and practical silvicultural measures, handling his timber as a renewable crop and making the land continuously produce the maximum yield of timber products of highest quality which will insure the largest return and, in the case of large holdings, permanence of operation.

An analysis of the data discloses that flat-rate sales were made on the average at lower prices than were individual sales of comparable material. All other factors considered, the vendor of standing timber will be more apt to receive the true value of his merchandise if he takes a careful inventory of the different kinds of material that he has for sale and markets them as individual parts of a transaction rather than in one lot.

An interesting development in timber-sale technique which has been practiced in recent years by a few alert timber owners has distinct possibilities in increasing stumpage prices to owners and in promoting the more efficient use of timber resources. This practice consists of selling standing timber according to the most valuable potential use in view of the available markets. Not only are the individual species sold at different rates, but different prices are

fixed for different grades of each species according to the potential use of highest value for each grade. In one particularly noteworthy instance, veneer hardwoods, comprising approximately 20 percent of the stand, were sold at a price averaging better than three times the price received for saw timber, and the sawlog material was sold for prices that were at least average for the region and for the species included in the sale. This instance is not exceptional and is indicative of the results to be obtained by a more intensive study of markets for and potential uses of timber, and the adoption of a more intelligent technique in making timber sales.

The possibilities of obtaining adequate prices for standing timber based on its most valuable use in available markets have only just begun to be realized. They are fraught with opportunities for the more intelligent use of timber resources and the realization of higher prices for standing timber which will in turn make more intensive methods of forest management economically practicable.

Stumpage prices have followed the same general trends since 1900 as have farm products, other commodities, and basic raw materials. They have, however, been more stable and have not gone as high during periods of inflation nor as low during periods of deflation and depression.

The all-commodity index compiled by the Bureau of Labor Statistics and the trends of stumpage, log, and lumber prices for the period 1900–1934 are distinctly similar. This was to be expected, for the same basic economic conditions must affect the price of forest products and materials as of other commodities. Stumpage and log prices have, however, been maintained at higher levels since 1920 than have average prices of all commodities.

Prices received by farmers for farm products as compiled by the Bureau of Agricultural Economics and wholesale prices of farm products as compiled by the Bureau of Labor Statistics, when compared with stumpage and log prices as compiled and developed by this investigation, reveal that stumpage and log prices have been the more stable. This is particularly true of log prices in the eastern United States since 1900, both generally and with regard to specific species of timber and single important agricultural crops. Log prices did not descend to the pre-war level during the depression, whereas the average price of all farm products was below the 1910–14 average in 1931–34.

These comparisons clearly indicate the desirability of supplementing farm incomes, particularly in the eastern United States, through the production of forest products as a regular part of farm economy. Such a program would, of course, require the keeping of farm woodlands in a productive condition.

A similar comparison between the wholesale prices of groups of commodities and stumpage prices indicates that stumpage prices have been more stable particularly during the period 1919–34 than have prices of other groups of commodities. This relationship is especially evident in regard to the class "raw materials" in which standing timber is not included. These comparisons are not presented as final evidence that the business of producing standing timber will bring greater financial returns than will other lines of economic activity. If, however, the price relationships of the past shall continue to hold in the future the producer of standing timber will obtain at least as stable a price for his product as will producers of most other com-

modities, and a more stable price than will producers of agricultural products and of the average raw material.

It is believed that the evidence presented herewith is sufficiently conclusive to warrant its consideration in formulating private, State, and Federal land-use programs for areas with possibilities for either forestry or agriculture.

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