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# Taxation of Forest Land in South Missouri

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# Taxation of Forest Land in South Missouri

RICHARD C. SMITH<sup>1</sup>

Forest landowners and foresters feel that forest land is assessed higher than other classes of real property. This practice, they believe, frequently results in per-acre taxes which consume a substantial portion of the income potential of forest land as measured, for example, by the value of annual tree growth. Investigators not primarily concerned with forests also have recognized that forest land often is taxed unfairly.

The grower of timber is in an unusual position compared to most operators of manufacturing firms and other enterprises which use land. A grain farmer establishes, grows and sells his crop in less than a year's time. He ordinarily receives an income annually from which he can pay his taxes. A manufacturer buys raw material, processes it and sells a finished product in one to several months. His income is measured annually. A grower of timber may have to wait several years (or decades) before a major income is possible from his crop. Each year the tax bill must be met. Cumulative taxes on a stand of timber from the time it was established to the time of harvest may be equal to a large portion of its value.

Annual taxes are of great concern to most forest owners. Their land is not stocked or organized according to forest management principles to the point where major annual incomes from timber are possible. Once the forest owner regulates his growing stock so he can receive annual returns or frequent periodic returns from timber sales, taxes and other annual expenses become easier to plan for and finance. However, they still have an important bearing on the success of the enterprise.

By far the most important source of revenue to local governments is the property tax and an important segment of the property tax base consists of rural real property. In south Missouri, forest land provides a substantial source of tax revenue. This woodland is of low value but it occupies large areas, both in terms of acres and percentage of total county areas.

Whether or not present practices in taxation of forests are discouraging the practice of forestry in Missouri is not known. But with all kinds of taxes at high levels and with land taxes increasing each year, our present taxing practice for Missouri woodlands is of great importance to forest landowners. Forest taxation must ultimately exert a strong influence on

<sup>1</sup>David M. Click and Andrew J. Lamar assisted with collection of data.

expansion of employment for woods workers and the success of wood-using industries.

This study was initiated to determine present levels and trends of taxation on forest land and to learn what portion of timber income is consumed by real property taxes. Variation in taxes on properties within and among counties was studied, and taxes on forest land were compared with those on other classes of property.

Studies of forest taxation in other states and forest regions are numerous. The monumental work of Fairchild and associates (1935) listed 286 literature citations. Their report recognized existing methods of taxation as an obstacle to the practice of forestry which arises from three causes: (1) the high cost of local government, (2) faulty administration of the property tax whereby forest land owners may be charged more than a fair share of the cost of government and (3) the inherent disadvantage of the property tax. Past efforts to correct inequitable taxation, they stated, have been largely confined to various exemptions and substitution of a yield tax for a major portion of the annual tax, payable when timber is harvested. Modifications of the property tax as applied to forests were suggested. Marquis (1952) stated that the adverse effects of the *ad valorem* tax have been greatly exaggerated, but the tendencies to inequitable forest taxation must be recognized. Marquis concluded that the yield tax principle could help create a more favorable economic environment for the practice of forestry by postponing the heaviest tax payments to the time when income was received from forest crops, and by making one of the future costs associated with forest ownership and management relatively certain. He recognized problems which arise in financing county functions from a tax base which might fluctuate violently under a yield tax system, and he outlined general requirements for a good law.

Williams (1956 and 1956a), in discussing his report on state guides for assessing forest land and timber, commented that the special forest tax, giving promise of a rapid cure, has frequently had greater appeal. However, improvement in assessment administration or modification of existing practice within the framework of the *ad valorem* tax has been made and deserves continued attention.

In forest regions in which the merchantable timber stock is substantially depleted, annual harvests are small relative to their potential and tend to be irregular from year to year. A yield tax imposed under such a situation can work a severe hardship on county governments because tax revenues could fluctuate widely, with no means of control by the county. Accordingly, Williams' recommendation appears to have real merit, advantageous both to taxpayers and local government.



In Missouri a number of studies concerning taxation of real property have been made. Hammar (1935) traced the growth and causes of land tax delinquency. He suggested measures to reduce tax delinquency which at that time was widespread and often an acute problem. Hammar (1935a) also studied the factors which affect farm land values. Although concerned primarily with farm land, his work is applicable to both farm forests and non-farm forests. Land appraisal work has strong application to tax assessment and, conversely, taxes influence land appraisal. Hammar showed that there was a general rise in land taxes per acre between 1913 and 1929, thereafter a decrease to 1934. Because of the continued rise in cost of government, he anticipated a rising trend in taxes with the return of more normally prosperous years—a prediction which materialized.

Silkett (1940), in a comprehensive examination of land and fiscal problems in Reynolds County, 85 percent forested, attributed many of the problems to administration of the property tax. He clearly described the process of levying and collecting taxes in a county where tax delinquency was staggering during the depression of the 1930's. Both Hammar and Silkett recognized the inequity in taxation of low-value forest lands.

Chryst and Miller (1952) clearly showed that inequality in administration of the property tax was the rule rather than the exception. They found unequal assessment among individual properties and classes of property within a county and among counties. They attribute the abuse of the *ad valorem* principle to poorly trained assessors.

### TAXING REAL PROPERTY IN MISSOURI<sup>2</sup>

It is the purpose and intent of Missouri law that property should be taxed in proportion to its value. All taxable property is classified for tax purposes as: Class 1, real property; Class 2, tangible personal property; Class 3, intangible personal property.

Taxes are levied to support four government units: state, county, city, and school districts. The rate of levy is set for the state by the General Assembly, for counties by county courts, for cities by city councils, and for school districts by boards of directors or boards of education.

There are three factors which influence the amount of taxes paid: (1) assessed valuation, (2) amount of money to be raised, and (3) rate of levy. By May 31 of each year the assessor, ordinarily a county official, is required to submit to the county court a list of property within a county, properly assessed or appraised as to value. The court informs city councils and boards of education of the total assessed valuation of each class of property. The General Assembly sets a state-wide rate of levy expressed as a given number of cents per \$100 of assessed valuation. The county court,

<sup>2</sup>Source: Assessor's manual as amended January 1953, issued by the Missouri State Tax Commission, Jefferson City, Mo.

with assistance from county officials, prepares a budget for its functions; city councils and boards of education do likewise. A rate of levy is determined by each body by dividing the amount of money to be raised by the total assessed valuation. The county clerk applies each rate of levy to each taxpayer's assessed value. The sum is the total tax. The county collector is responsible for collection of taxes. The State Tax Commission has overall responsibility for supervising and approving the process.

The above account is far from complete. Restrictions, equalization procedures and tax delinquency processes are not mentioned. The essential mechanics of property taxation are given though, particularly as they apply to and influence the taxation of forested rural real property.

It is obvious that the assessor is the key man in the taxing process. The assessor's work is the very foundation of our property tax system. At best, with properly trained assessors who are well informed on appraisal and experienced in judging local conditions, assessment of property is a sensitive, difficult task. With given rates of levy, the amount of a taxpayer's bill is determined largely by the assessor. If a given property is valued higher than other similar properties, an inequity results. If all properties within a county are valued proportionately low, taxes should be fair and proportionate in support of county functions. However, the contribution to the state would be less than for counties in which similar properties were assessed at higher values. Certain benefits, such as state support of public schools, are based in part on assessed value of real property located in a school district. Under-valuation results in more than a fair share of state funds for schools and over-valuation results in less than a fair share. It is apparent that fair taxation requires that assessment be equal for similar properties both within and among counties.

Missouri law specifically states that real property shall be assessed at its true monetary value. This could mean market value. On the other hand, land—and other property—acquire value from their ability to produce income. These two concepts might differ markedly. For example, forest land might be capable of producing a substantial annual income. It would have a high value to the owner and other well-informed people. But perhaps the general public may not fully realize this productivity. A generally recognized market value would be considerably lower than income value. Over a long period of time such divergence of opinion tends to narrow. Therefore, it is probable that the law is intended to mean generally recognized market or cash value.

Assessment for taxes of land used for growing timber should be based on many factors, including location with respect to markets for wood, accessibility, and value for other kinds of land-use. But basically, its

value arises from two elements: trees currently merchantable and trees which will become merchantable in the future. Merchantable trees have a recognized market value because they can be converted into saleable products. Some currently unmerchantable trees, particularly young trees, do have a recognized market value arising from the fact that they will grow into sizes which are saleable. In a similar way, bare forest land possesses a recognized market value primarily because it is capable of supporting trees which will grow to marketable size. The value of forested property consists of the value of trees which are currently saleable and the value of existing young trees and all future trees discounted in some manner to the present time.

The cutting of merchantable trees reduces the value of forested land and tree growth increases its value. Both cutting and growth should enter into re-assessment of forested land for taxes in successive years or longer periods of time.



Fig. 1—Data were collected in 26 counties divided as illustrated into a *western* region and an *eastern* region.

### THE REGION STUDIED

Of the total forest area of 15,187,000 acres in Missouri, about 90 percent lies south of the Missouri River and 67 percent is in the Ozark region. In their study of forest resources King, Roberts, and Winters (1949) divided the Ozark area into eastern, southwestern and northwestern subregions. The forested portion in these subregions exceeds 50 percent of the total land area and it is here that forests and wood-using industries assume the greatest importance in the state's economy. In some counties, forests occupy as much as 89 percent of the land area. In the northwestern Ozark subregion, several counties have forests occupying less than 50 percent of the area. On this basis, a decision was made to study taxation of forests in the eastern Ozark subregion where forests occupy 73 percent of the land area and the southwestern Ozark subregion where they comprise 57 percent. These subregions, including 26 counties, are designated as the *eastern* and *western* regions (Fig. 1) in this study.

The entire Ozark region as reported by King, Roberts, and Winters, supports 54 percent of the merchantable timber volume and 58 percent of the volume of all forest trees in the state. A major portion of Missouri's 2,800 primary forest-products industries are located here.

Of the 10,123,000 acres of forest land in the Ozark region, 8,710,000 acres or 86 percent are privately owned and are subject to taxation as real property. No estimate of the number of forest land owners in this region is available. The Forest Service (1955) reported 201,025 owners of commercial forest land in the entire state of Missouri. More than 168,000 are farmers and almost 32,000 are non-farmers. These included wood-using industries, businessmen, heirs of estates, and many other classifications. It is safe to assume that the number of forest owners in the Ozark region constitutes a substantial segment of the tax-paying public.

### COLLECTING TAX DATA

Data were obtained on assessed value for taxation and total annual taxes for privately-owned forest land during a 10-year period. Similar data for agricultural land were collected for comparison. One of the main problems concerned the collection of data for land that was entirely or chiefly in forests, with little if any other value attached to it as distinguished from cleared agricultural land used currently for pasture, orchards or field crops with little or minor value arising from forests. For this purpose, aerial photographs issued by the Agricultural Stabilization and Conservation Office (formerly Production and Marketing Administration), U.S. Department of Agriculture, were examined in the state office at Columbia or the county office located at each county seat. The photograph index mosaic for each county was used as a basis for sampling. To avoid overlap, alternate flight lines flown north-south were taken. These were either the odd-numbered flight lines or the even-numbered flight lines, depending on their location with respect to east and west county boundary lines.

After listing all photograph numbers on each selected flight line, ten photographs were selected by taking numbers from a page of Tippett's Random Sampling Numbers. On short flight lines, the number of photographs taken was restricted to one or two, roughly in proportion to the length of flight line. Otherwise, the number of photographs selected per line was approximately the same for all lines. If there were six flight lines, for example, one photograph was selected from each line, and the lines from which an additional four photographs were selected were assigned by the use of random numbers. In case the required number of samples could not be found on these photographs, an additional ten photographs were selected by the use of random numbers.

If parts of a county consisted of small irregular forest areas or of cleared farms whose boundaries were not recognizable on the photographs, these portions were eliminated from the area sampled. When a sufficient number of samples could not be obtained from the 20 photographs selected, samples were taken from adjacent photographs.

In some counties 9 x 9-inch contact prints with a scale of 1:20,000 were available; in others, enlargements with a scale of 1:7,920 were used. Both sizes were labeled with township, range, and section numbers and had section corners designated on them. A transparent template showing 40-acre lines and section lines was laid over sample photographs. Areas which probably would appear as a separate tax unit on county records, such as 40 acres, 80 acres, and 160 acres, were examined to learn whether they would qualify as either forest land or agricultural land. Forest land was defined as being at least 80 percent forested with no visible evidence of physical improvements such as buildings or fences. Agricultural land was defined as being at least 80 percent cleared of forest, in pasture or crops, with no restrictions as to physical improvements. In practice, almost all of the areas sampled were either essentially all cleared and in active use for farming, or they were entirely forested.

Small areas, either forested or in crops, were avoided because of the probability that they would not appear as a separate tax unit on county records. Also, small forested areas often had other values associated with them such as a cabin not visible on the photograph. Because of the difficulty associated with surveyed lots of irregular area, sample locations in the north half of sections 1 to 6 and the west half of sections along the west edge of a township were avoided.

A sketch was made on tracing paper of sample photographs, showing forested areas and cleared areas. The sketch was labeled as to land description so it could be related to tax records.

In each county collector's office tax records for the current year were examined to learn which tracts of the land that had been classified and sketched as forest or agricultural land were reported as a complete but separate tax unit. For each property sampled, the owner's name, legal description of the land, size of area, total assessed valuation as approved by the State Tax Commission, and total taxes paid for the current year were recorded. The component parts of the tax were not studied and the differences in tax rates between school districts and road districts within a county were not considered. Each sample area was traced through the tax books for preceding years for which assessed value and total taxes were recorded. For counties in the eastern region, data were collected for the years 1944 through 1953 and for the western region for the years 1944



through 1954.

An attempt was made to obtain data for 35 forest properties and 15 agricultural properties in each county. Because of the difficulty in tracing individual properties from one year to another in county tax records, some sample tracts were eliminated. In addition, some samples were discarded when they exhibited distorted assessed values indicating the influence of minerals or other values in the assessment of the property for taxes. High values of forest land are occasionally encountered in the Lead Belt, including Washington, St. Francois, and Madison Counties.

Forest land taxed under the forest crop land program of the State Forestry Act of 1946 (House Bill No. 1006, 63rd General Assembly) was not included because it is assessed at a flat \$1.00 per acre to which prevailing rates of levy are applied.

In all, tax records were obtained in the 26 counties on 836 separate tracts of forest land, containing 123,208 acres, and 281 tracts of agricultural land, containing 20,803 acres. This is an average of 32 tracts of forest land per county, representing 4,738 acres, and 11 tracts of agricultural land, representing 800 acres. The number of samples and their total area in each county are given in Table 4 in the Appendix.

Because of the smaller sample size for agricultural land, the results are not of comparable accuracy to those for forest land. Aside from fewer numbers, a wide variation in agricultural values is usually encountered because of differences in the value of physical improvements and location with respect to public roads. Such factors seldom enter into the valuation of forest land because the assessing practice is relatively crude, often stated as a flat rate per acre within a county. Since the study was concerned chiefly with forest land and the collection of data was costly, a smaller sample of agricultural land for general comparisons appeared justified.

Because many of the aerial photographs available in county A.S.C. offices were taken 12 to 16 years prior to our examination of them, a source of error was distinctly possible in recording tax data for forest land which had been cleared and placed in cultivation since the photographs were made. A study revealed that 3.7 percent of the land sampled had been cleared (see Appendix). Clearing involved only small areas on farms which were already classified as agricultural land or areas that did not meet the definition of agricultural land-use. Clearing for electric power lines or pipe lines was evident in two places. The construction of power or pipe lines on a taxpayer's land should have no effect on the valuation of the property he retained. In one case a new road was observed. The construction of a road to an isolated area should result in an increased valuation, but revaluation of rural real estate commonly lags several years

after the addition of an improvement. Because land clearing was minor in both number of cases and area cleared, and because lands chosen for examination of tax records were relatively large and either entirely cleared or forested, it is concluded that the use of aerial photographs which were 10 to 15-years old introduced little or no error in the results.

### TAX LEVELS AND TRENDS

Average taxation levels for forest land and agricultural land are presented by counties, for eastern and western regions and for all counties combined. Assessed values are treated separately because they serve to indicate the degree of uniformity with which forest land is assessed within and among counties. They also furnish a basis for judging whether different classes of property are given equitable treatment. Taxes are reported separately because they provide an insight into the burden of taxes as a cost of doing business when related to incomes. Both assessed values and taxes are given for a unit area of one acre to eliminate confusion associated with size of property. The following data are for 1953. Since then, both assessed values and taxes have changed but probably in accordance with the trends reported below.

#### Assessed Value of Forest Land

In 1953 the average assessed value of the 836 tracts of forest land studied in 26 counties was \$4.08 per acre with 68 percent<sup>3</sup> of the samples assessed between \$1.76 and \$6.40 per acre (Fig. 2). Assessed value in the western region was 12 percent higher than in the eastern region.

Counties in the western region have a smaller percentage of forest land than those in the eastern region. Consequently, a small portion of their tax base accrues from forest land and more from higher-value agricultural land. A tendency may exist to value forest lands more closely to the values set for agricultural land to minimize the seeming disparity which appears from wide differences. However, wide differences in valuation between forest and agricultural land may be entirely valid.

County averages varied markedly, from a low of \$2.06 for Iron County to \$11.54 for Newton County. Of 26 counties, 15 had average assessed values between \$3.00 and \$5.00. The dispersion of assessed values varied widely from county to county. It was relatively small in Bollinger, Doug-

<sup>3</sup>One standard deviation above the mean and one standard deviation below the mean include 68 percent of a normal bell-shaped distribution. These data are moderately skewed which accounts for the unusually large standard deviation in a few cases. The standard deviation is, however, a useful measure of dispersion for such distributions.



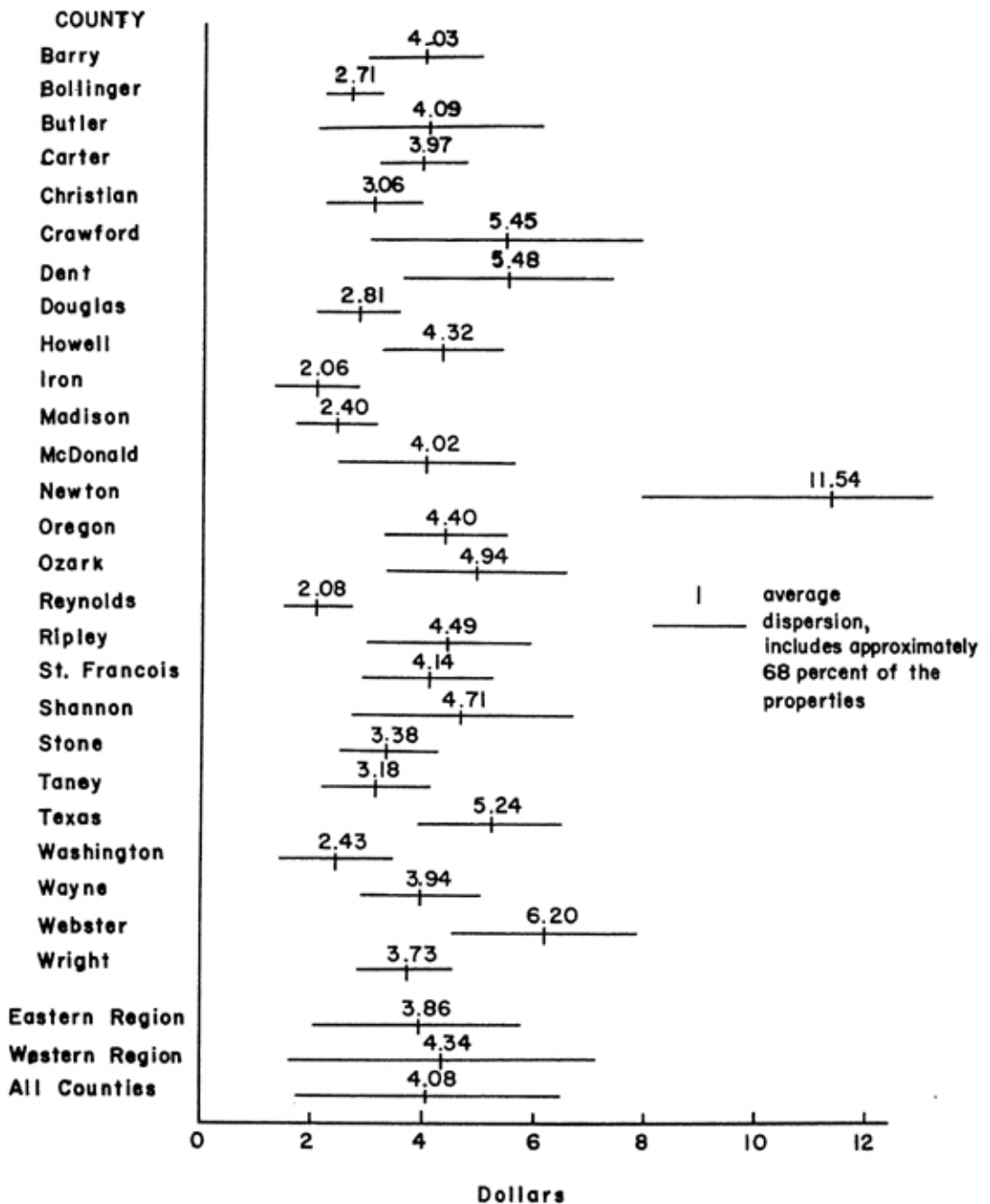


Fig. 2—Assessed value per acre of forest land, 1953.

las, Iron, Madison, Reynolds, and Wright Counties. These counties also had low average values. Conversely, counties with high average assessed values tended to have a wider dispersion of assessed values among individual properties. This was particularly evident in Crawford County and Newton County where the 68-percent dispersions were \$2.42 and \$3.65.

The dispersion of assessed values, expressed percentagewise (as coefficients of variation), was 30.6 for all observations (Table 9, Appendix). Dispersions among counties ranged from a low of 17 in Bollinger County, which approached a flat per-acre assessed value, to a high of 49 for Butler County.

The dispersion lines in Fig. 2 indicate that, contrary to popular opinion, assessment of forest land at a flat per-acre value does not exist in the counties studied. Whether a wide dispersion of assessed value within a county reflected accurate assessing practice, with recognition of such factors as the volume of standing timber, productivity of different soils and accessibility to roads; or whether it represented discrimination among different owners was not apparent.

### Assessed Value of Agricultural Land

In 1953, agricultural land was assessed at an average value of \$13.15 per acre, 3.2 times that for forest land. About 68 percent of the samples were assessed between \$5.14 and \$21.16 (Fig. 3). As in the case of forest land, agricultural land was assessed at a higher value (27 percent higher) in the western region than in the eastern region. However, in the eastern region the dispersion of individual values about the mean was somewhat wider.

County averages varied widely for agricultural land from a low of \$7.08 for Ripley County to a high of \$21.54 in Stone County. Neither of these counties had a large percentage of total area in productive agricultural soils. Ripley County was 71 percent forested so the effect of a low assessment on cleared farm land on the total amount of taxes raised was not so great as would be the case if more of the county were cleared and in crops. Stone County, 56 percent forested, evidently raised a greater share of its tax revenue from agricultural land. Of 26 counties, the average assessed value in 15 counties lay between \$10.00 and \$18.00 per acre.

The dispersion of individual assessed values about county means varied markedly. For Oregon, Ozark, Reynolds, Ripley, Shannon, and Taney Counties, which had low assessed values, the standard deviation was small. There was no evidence that counties with high average assessed values also had high dispersion of individual assessments. Carter County, for example, had a mean of \$18.70 per acre but the 68-percent spread was only \$2.70. Iron and Wayne Counties, with means below the mean for all counties combined, had a wide spread among individual properties. Newton County, which assessed forest land much higher than other counties was third in rank from the top for agricultural land. Newton County's dispersion for both agricultural and forest land was about 30 percent

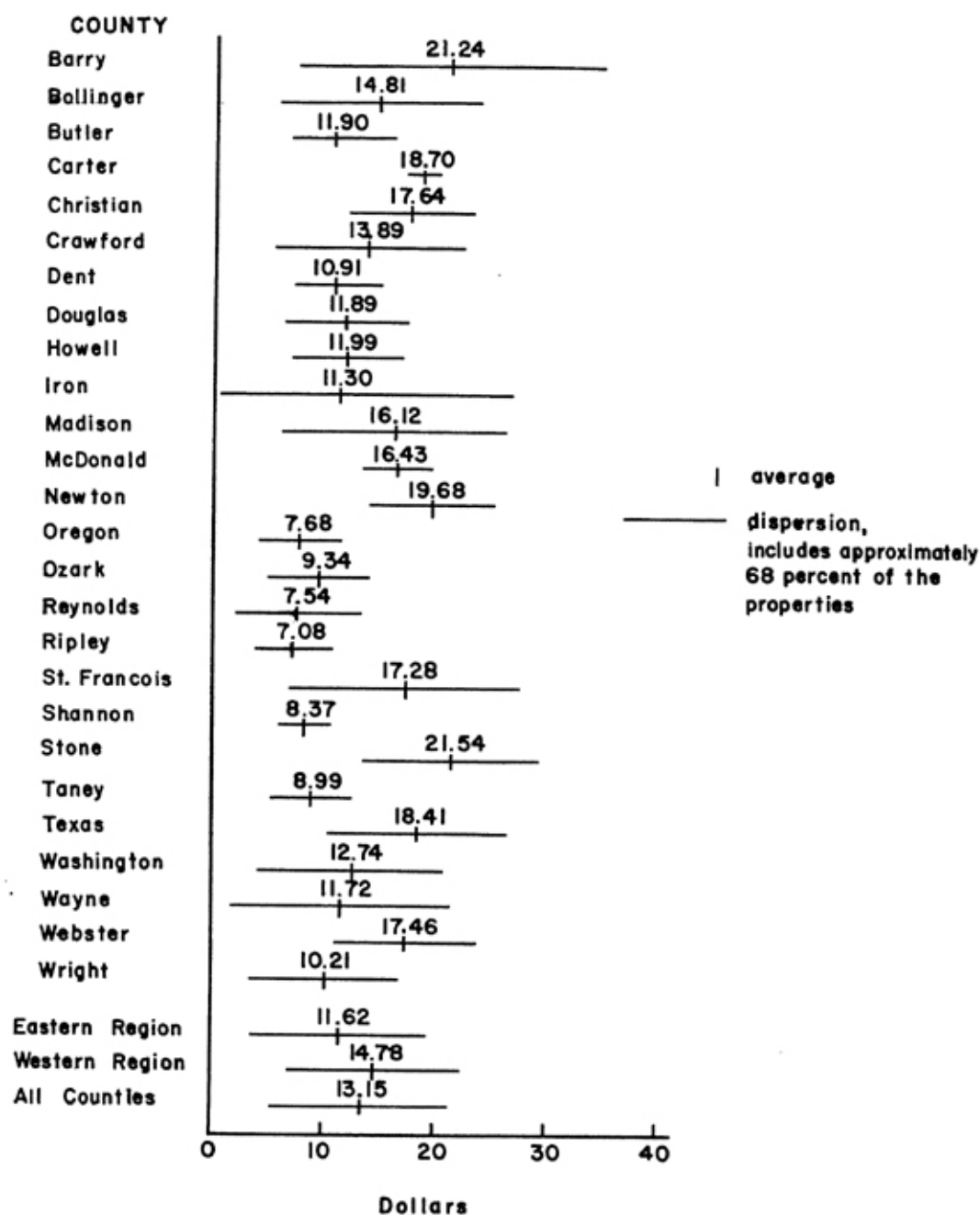


Fig. 3—Assessed value per acre of agricultural land, 1953.

(Table 9, Appendix).

A wide dispersion of individual values within counties is entirely proper for agricultural land because many more factors contribute to its value than to the value of forest land. Percentagewise, the dispersion for all agricultural land was 50.4, with a range among counties of 7 to 137 percent

(Table 9, Appendix). It should be remembered that wide dispersion values in the case of farm land result in part from the relatively small sample taken in some counties.

### Size of Property

To determine whether assessed value was correlated with the size of property, 1953 data for individual properties in all counties were grouped by area classes, averaged and plotted on cross-section paper. The results for forest land are shown in Fig. 4. It is readily apparent that small tracts of forest land were assessed at a higher value per acre than large ones. Forty-acre tracts were assessed, on the average, at \$4.75 per acre and 120-

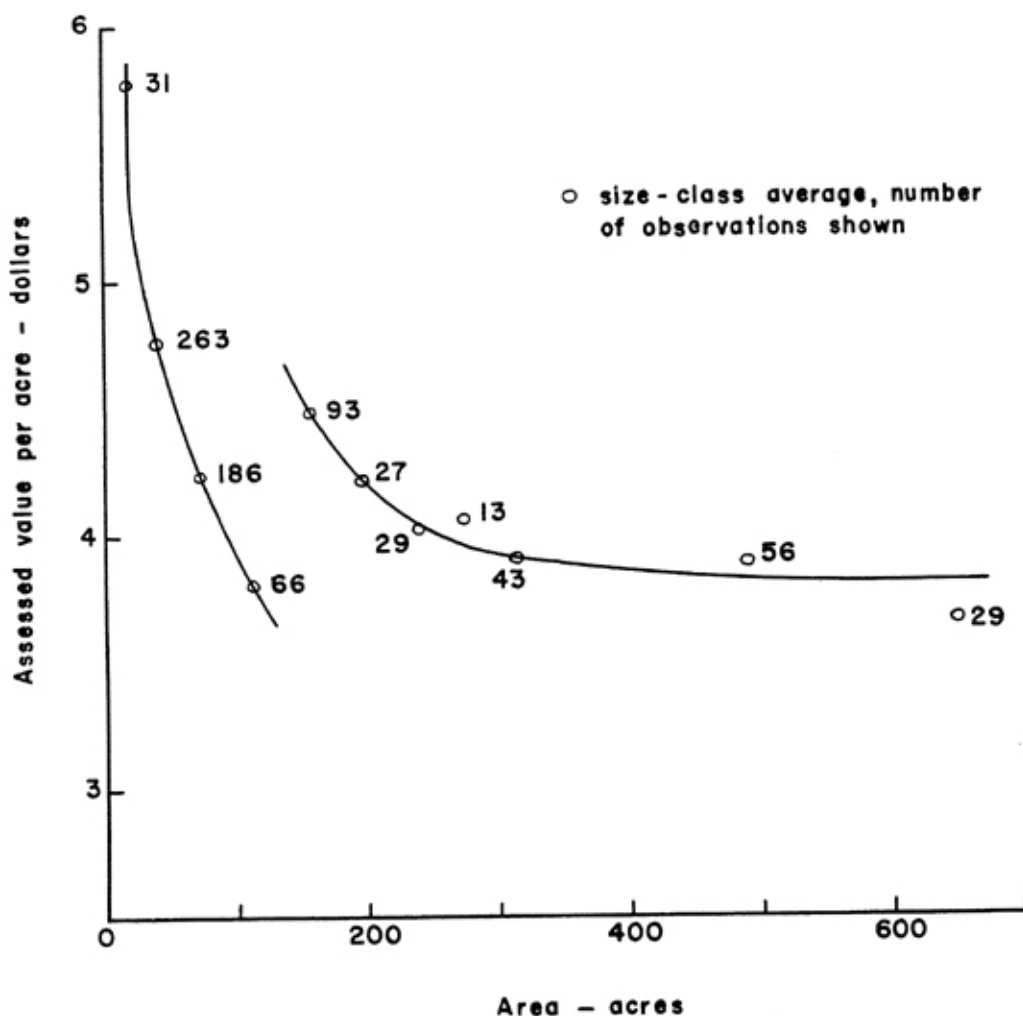


Fig. 4—Assessed value of forest land by size of property, 1953.

acre tracts at \$3.75. A definite break in the curve occurs between 120 and 160 acres, with the average assessed value rising to \$4.46. Again the curve declines, dropping to \$3.90 for 320-acre tracts and slightly more for tracts up to 640 acres in size. The differential valuation of \$2.00 between 40-acre tracts and 640-acre tracts appears significant.

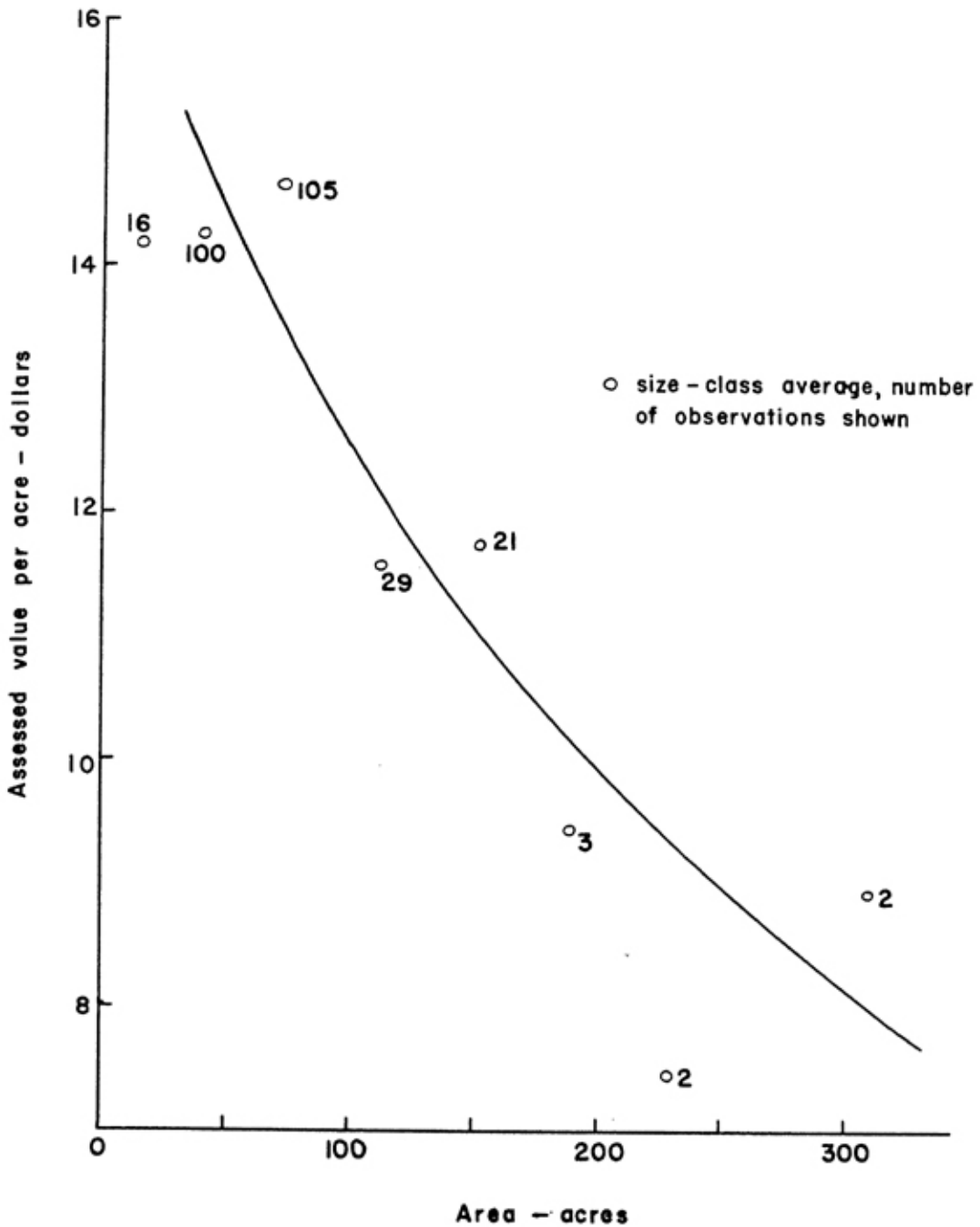


Fig. 5—Assessed value of agricultural land by size of property, 1953.

Assessed values appear on assessors' lists as a lump-sum figure for the total area. For example, the assessed value for 40 acres may be listed as \$200 and for a 120-acre tract as \$480. That the smaller tract was assessed at a rate of \$5.00 per acre and the larger one at \$4.00 per acre is obscured by the total figures which show only that the 120-acre tract carried a higher assessment than the smaller tract. The break in the curve is less readily explained. Tracts larger than 120 acres may be regarded more as investment properties, rather than "patches" of timber which are less valuable to an owner because of their relatively small size. Larger tracts may, in general, support a greater per-acre volume of standing timber if the owner is experienced and well informed concerning timber values and has an objective in holding the land, such as speculating on a future rise in stumpage prices or building up the growing stock for the purpose of making regular harvests over a long period of time. In areas where many large tracts are owned by non-residents it is possible that they are less interested in comparing assessed values of their properties with others.

Fig. 5 shows per-acre assessed values for agricultural land grouped by area classes. Although the trend between individual size classes was less apparent than for forest land, the curve (based on weighted averages for small, medium, and large properties) shows that small agricultural properties were assessed at a higher per-acre value than large ones. Forty-acre farms were assessed at an average of \$14.90 per acre. With increasing size, the per-acre value declined steadily, at a slightly diminishing rate, to \$8.15 an acre for 300-acre farms.

This does not necessarily reflect improper assessment practice. A small farm requires an investment in buildings of approximately the same size as those needed on a larger farm. When total assessed value is placed on a per-acre basis, it is spread over fewer acres on a small farm than on a large one; hence, the assessed value is higher. However, as in the case of forest land, a tendency may be present to assess small properties disproportionately high because their total assessed value is smaller than that of a large farm possessing similar characteristics.

### Per-acre Taxes

Assessed values comprise only a part of the taxation structure. The amount of taxes more aptly indicates the tax load which a property bears. Fig. 6 shows the average per-acre tax paid on forest land in 1953. For all counties the average tax was 10.6 cents per acre with 68 percent of the properties taxed between 2.2 cents and 19 cents. Taxes in the western region were 30 percent higher than in the eastern region and were more widely dispersed. The lowest average tax per acre was 3.3 cents in Bollinger County and the highest was 34.6 cents in Newton County. Averages

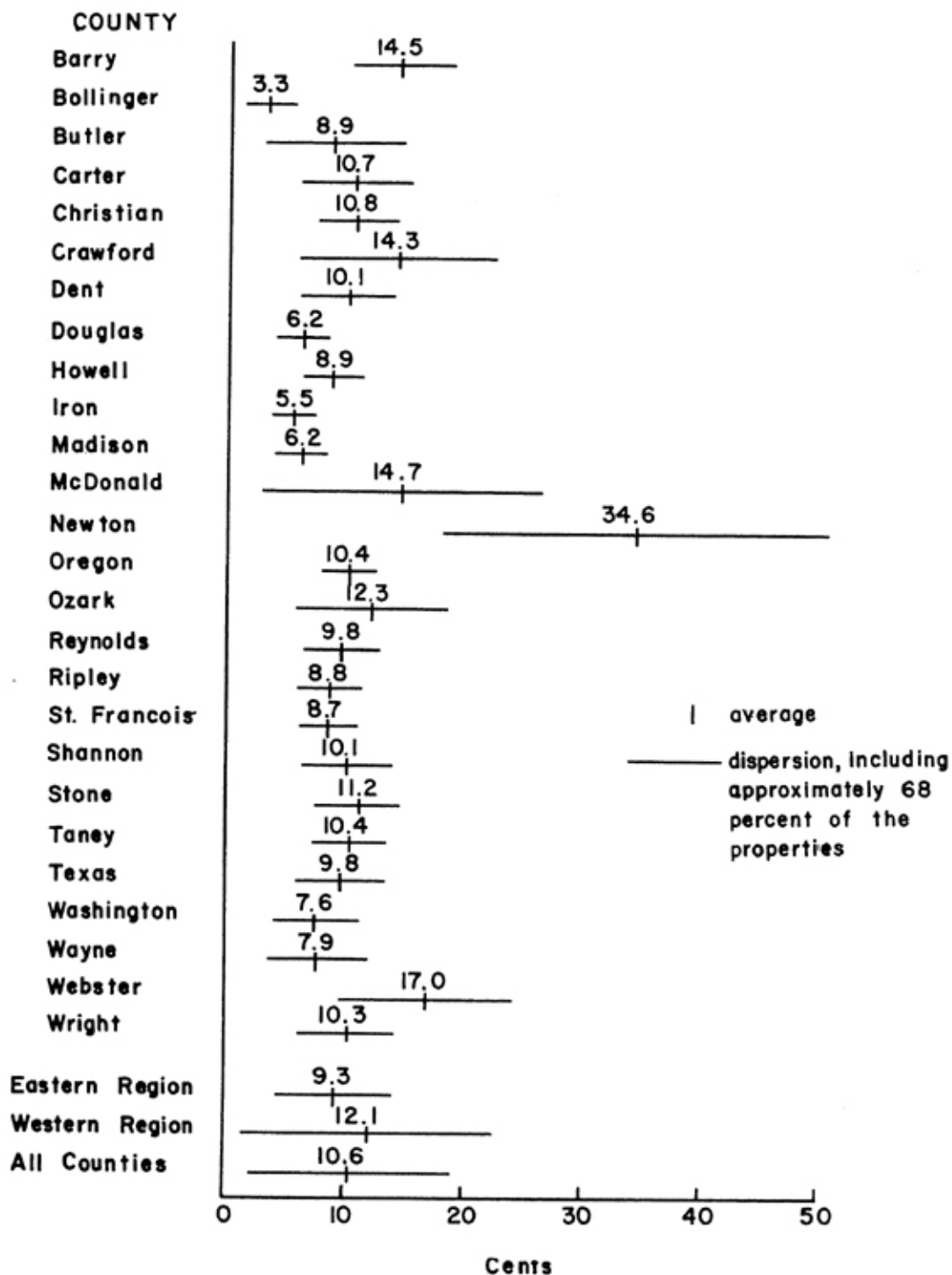


Fig. 6—Taxes per acre on forest land, 1953.

for 17 of the 26 counties were between 7 and 14 cents. The 68-percent dispersion was surprisingly narrow in most counties. Only in six counties did it exceed 4 cents above or below the mean, but in McDonald County it was  $\pm 11.8$  cents and in Newton County it was  $\pm 16.4$  cents.

Because given rates of levy, without regard to individual properties,

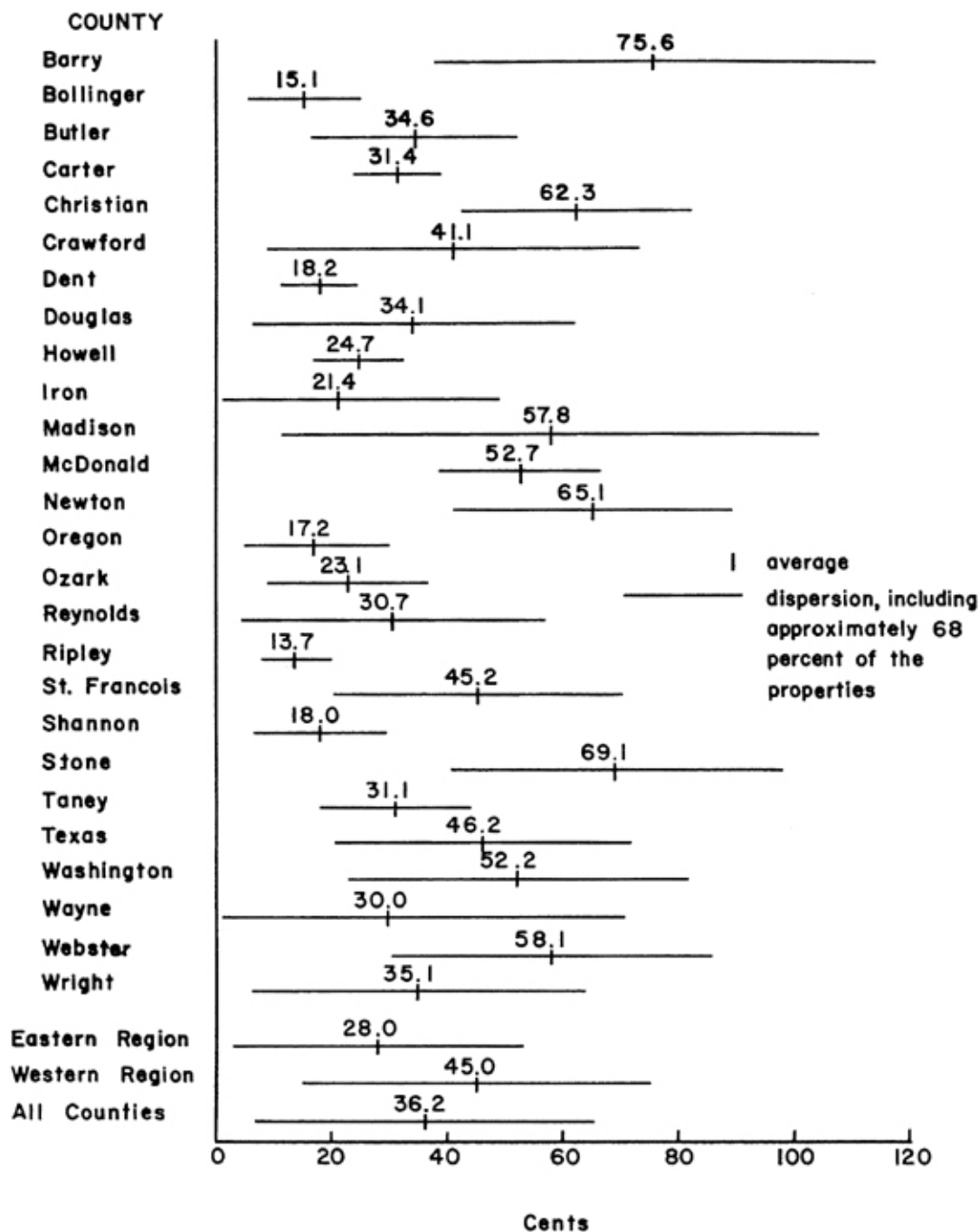


Fig. 7—Taxes per acre on agricultural land, 1953.

are applied to assessed values to obtain the tax, classification of taxes per acre by size of property would assume a curve of the same shape as Fig. 4.

Fig. 7 shows that the average tax per acre on agricultural land for 1953 was 36.2 cents with 68 percent of the properties taxed between 7.1 cents and 65.3 cents. Counties in the western region taxed farm land surprisingly higher than those in the eastern region—61 percent on the aver-



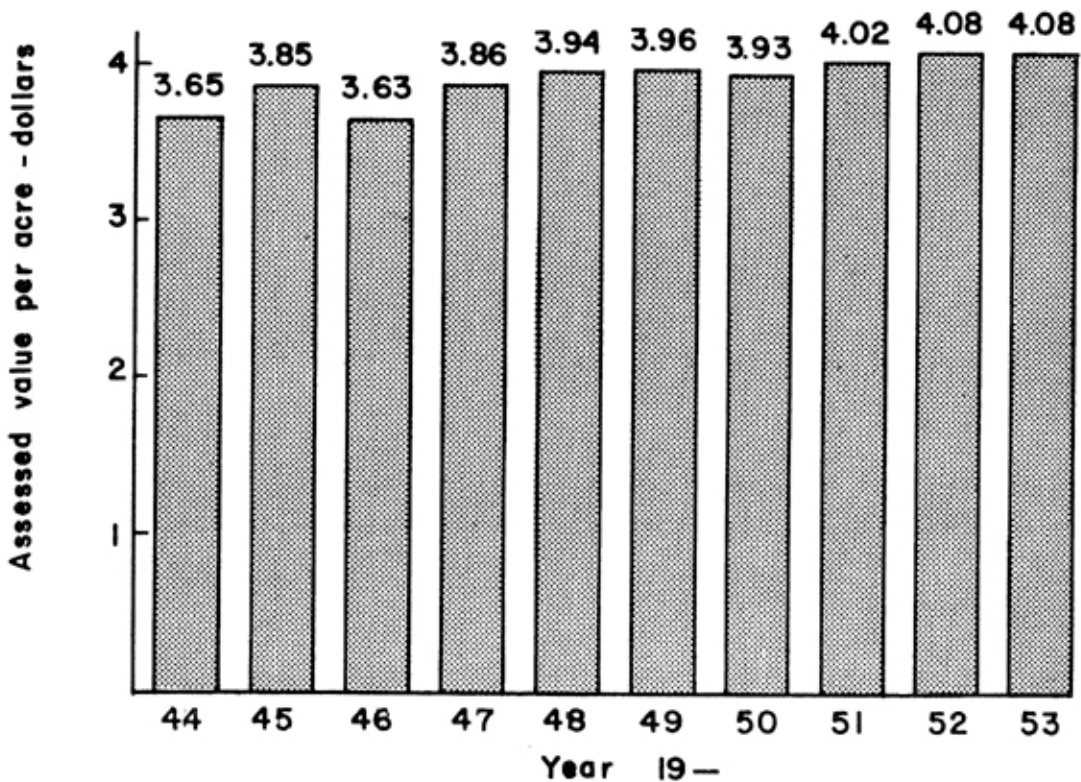


Fig. 8—Trend, average assessed value per acre of forest land, 1944-1953, all counties.

age. Both averages and measures of dispersion varied widely among counties. Barry County had the highest average tax, 75.6 cents per acre, with Stone County about 5 cents less. Low average taxes were found in the counties of Ripley (13.7 cents), Bollinger (15.1 cents) and Oregon (17.2 cents). However, one-half of the county averages were between 20 and 50 cents. The wide dispersion of per-acre taxes on cleared agricultural land within a county was to be expected because of the many factors which form the basis for assessment.

### Trends in Taxes

To the owner of land it is just as important to know the trend of taxes during recent years as to know the present level. A decision to purchase land or retain present holdings may depend largely on whether taxes are changing from year to year and, perhaps more important, the rate of change. If taxes are high, an increase may greatly affect profits from using land for a given purpose.

Data on assessed value per acre of forest land in all counties were averaged for each year from 1944 through 1953 and the results are shown graphically in Fig. 8. It is evident that the average assessed value on for-

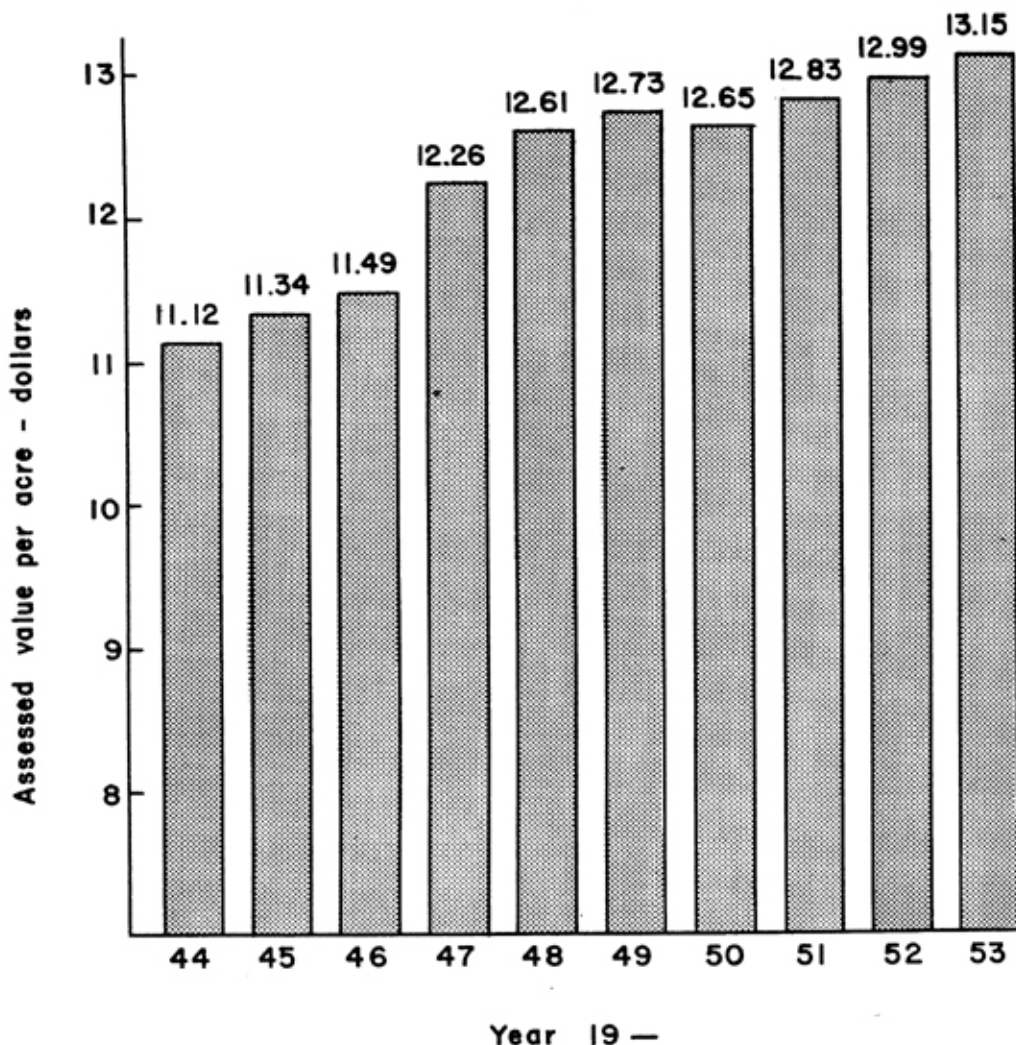


Fig. 9—Trend, average assessed value per acre of agricultural land, 1944-1953, all counties.

est land has increased steadily over the 10-year period but the increase of \$0.43, from \$3.65 per acre in 1944 to \$4.08 in 1953, has not been large.

Average assessed values per acre for agricultural land for the same years are shown in Fig. 9. The increase of \$2.03, from \$11.12 in 1944 to \$13.15 in 1953, was considerably greater than that for forest land. Assessed values for forest land and agricultural land during 1944-1953 may be more readily compared in Fig. 10 in which increases are expressed as a percentage of the assessed value in the base year 1944. By 1953 agricultural land had experienced an 18-percent increase but forest land had increased only

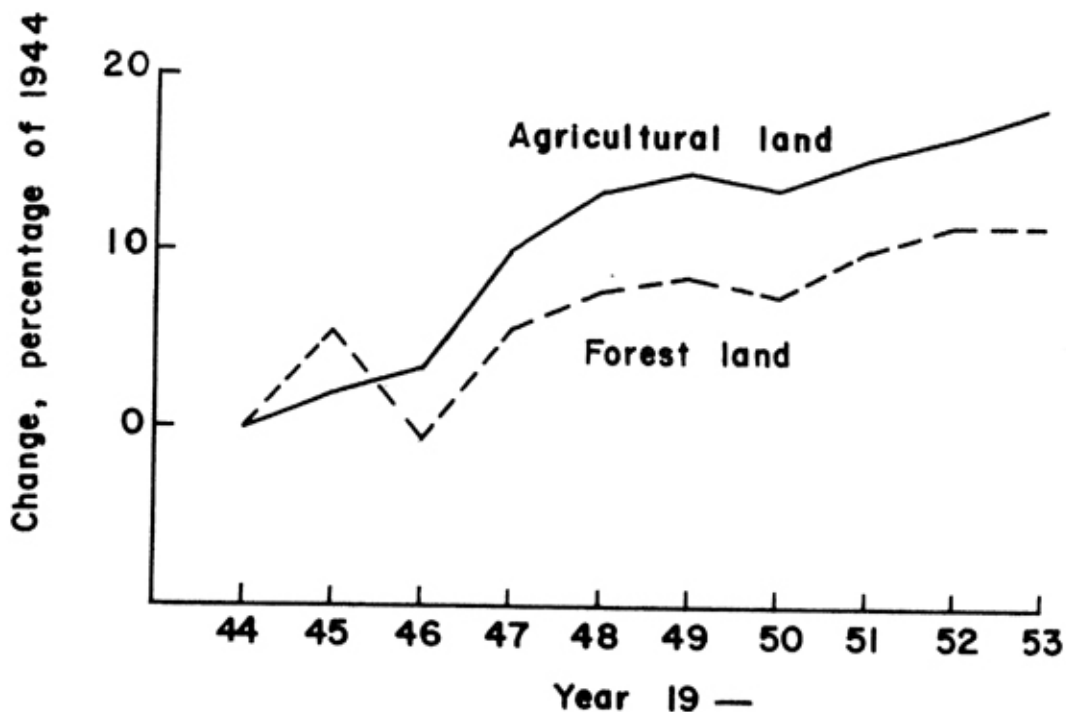


Fig. 10—Change in average assessed values per acre, 1944-1953, all counties.

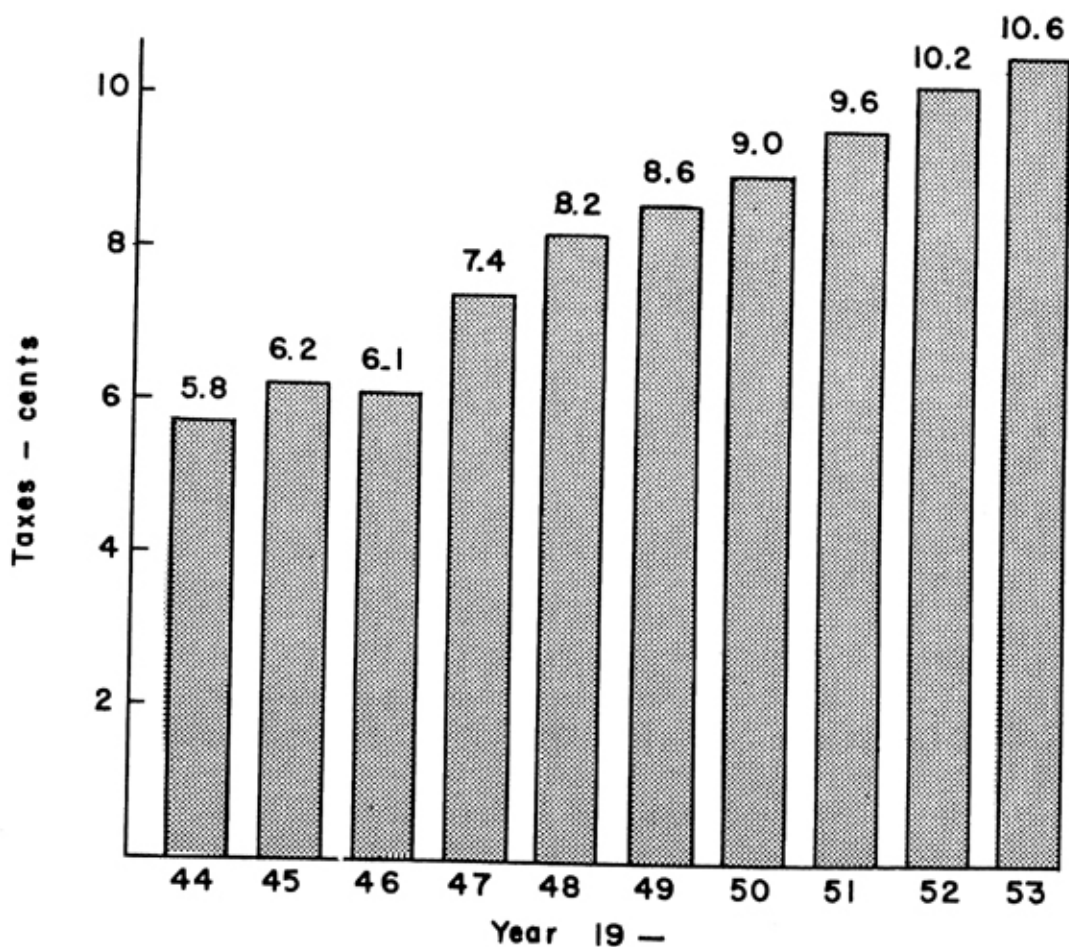


Fig. 11—Trend, average tax per acre on forest land, 1944-1953, all counties.

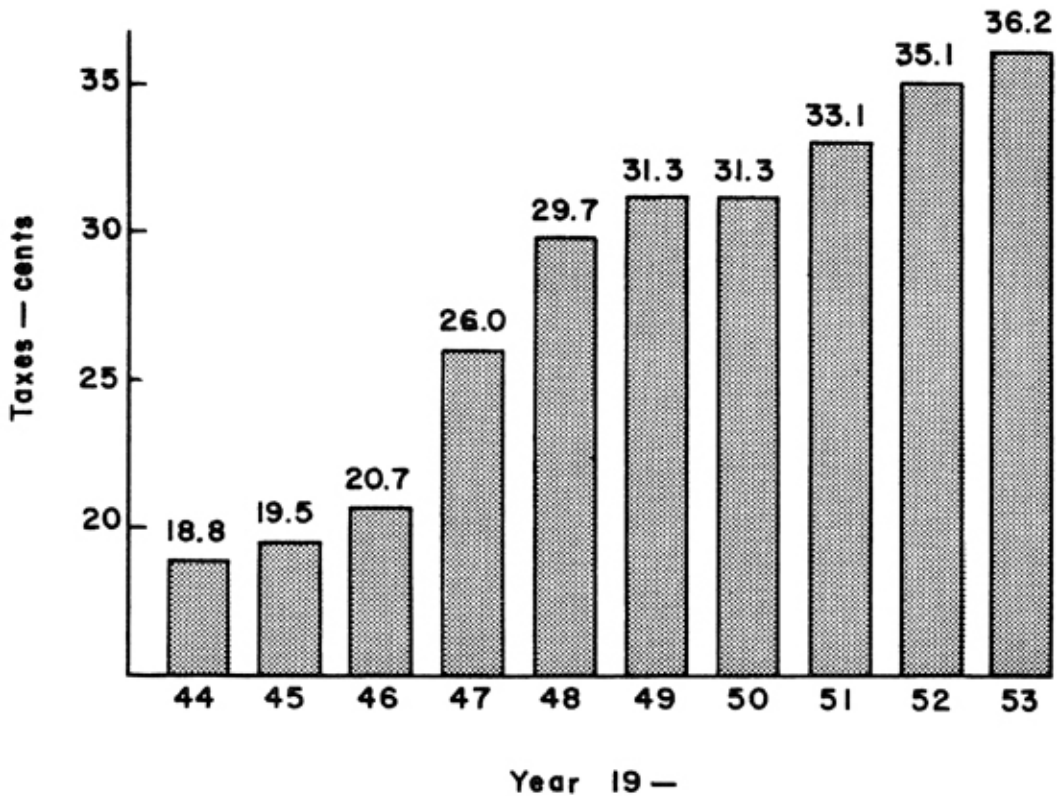


Fig. 12—Trend, average tax per acre on agricultural land, 1944-1953, all counties.

12 percent. However, the rate of increase for each, year by year, was very similar.

After removal of price controls on lumber and agricultural products which existed during World War II, prices increased steadily and rapidly. Sawtimber stumpage values almost doubled, as did prices for several agricultural crops. Accordingly, land became more valuable, both for operating units and for sale. A general increase in assessed value in both cases was entirely warranted.

Taxes also increased during the period 1944-53. Under conditions of price inflation in almost every segment of the country's economy the cost of local government rose markedly, often more rapidly than county officers could compensate for through changes in rates of levy. The rate of taxation on forest land resulted in larger taxes per acre for forest land in every succeeding year but one, 1946 (Fig. 11). From an average of 5.8 cents per acre in 1944, taxes increased to 10.6 cents in 1953. Taxes on agricultural land also increased steadily from an average of 18.8 cents per acre in 1944 to 36.2 cents in 1953 (Fig. 12). The increase from 20.7 cents in 1946 to

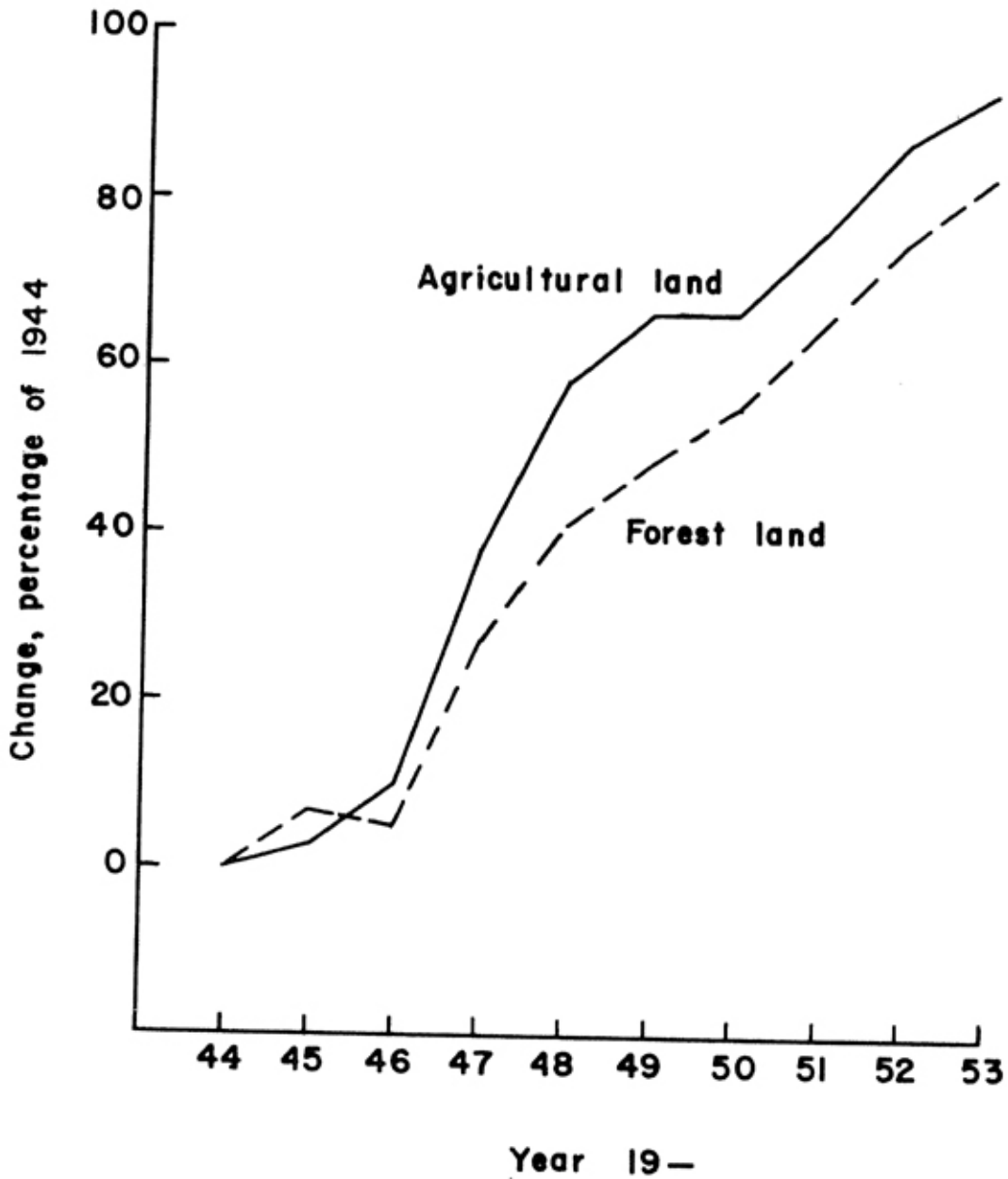


Fig. 13—Change in average tax per acre, 1944-1953, all counties.

26.0 in 1947 was sharp—exceeding 25 percent.

Tax increases for forest land and agricultural land are more readily compared in Fig. 13 in which increases are expressed as percentages with 1944 as the base. Taxes on farm land increased 93 percent over the 10-year period and taxes on forest land 83 percent. For farm land the most rapid increase occurred during 1947 and 1948. After two relatively stable tax years, farm taxes continued to increase beginning in 1951. Tax in-

creases on forest land have experienced a somewhat parallel but more steady rise. Through annual adjustment of the rates of levy, taxes on both farms and forests have increased sharply during this period but assessed values have risen moderately.

More detailed information on assessed value and taxes on farm land and forest land during 1944-1953 (1944-1954 for the western region) are given by counties in Tables 5, 6, 7, and 8 in the Appendix.

### TENURE OF FOREST LAND

In collecting tax data on forest land in the western region of the study area it appeared that with small additional effort a measure of the stability of forest land tenure could be obtained. Many tracts were held by different owners from year to year. Presumably, frequent sales of forest land had taken place.

A record was made of the name of each successive owner of 374 tracts of forest land containing 55,740 acres. The compilation, summarized in Fig. 14, indicates that private ownership in this region is far from stable. Only 48 percent of the land had the same owner over a 10-year period. About 19 percent had two owners, having been sold once during 10 years. Another 18 percent was sold twice or had three owners. Ownership of the remaining 16 percent changed three to eight times in 10 years.

From land ownership studies elsewhere, experience has shown that poor management usually accompanies frequent changes in ownership. Changes in owner objectives often occur with each transfer of ownership and a tendency to overcut or even strip the land of essentially all merchantable trees takes place before each sale. The growing of timber is a long-term process. To realize harvests of products in amounts which the land is capable of producing, forestry requires continuity of sound management for many years.

At best, in the western region of the study area we can expect continuity of owner policy on only one-half of the forest land. If forestry practices were being applied now to the stable ownerships, at least a creditable timber income potential might be realized. It is more probable that relatively few owners are using even simple forestry methods.

If changes in ownership continue at the frequencies indicated, the other one-half of the forest land probably will be subject to erratic and frequently changing timber policies. A remote hope will exist of producing timber products in increasing amounts as a result of building up the growing stock to a point where forests will support new wood-using industries in this region.

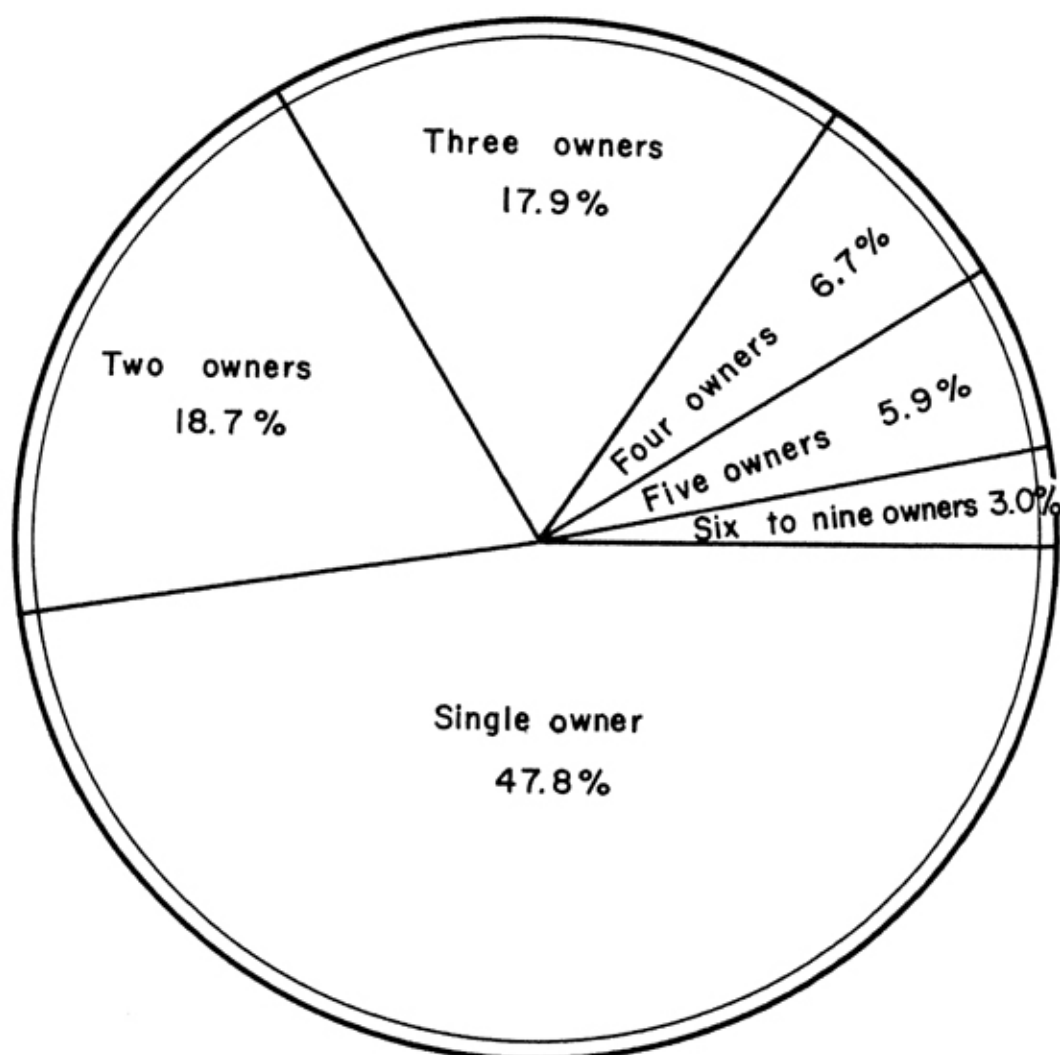


Fig. 14—Number of successive owners of forest land in the western region between 1944 and 1953 by percent of area.

### ACCURACY OF TAX ASSESSMENT FOR FOREST LAND

Under Missouri law real property is to be assessed at 100 percent of its value. In fair market sales, in which both buyer and seller are well informed and neither are under compulsion to deal, sales price is an indicator of value. In actual practice numerous factors (including opinions, prejudices, and bargaining strength of the parties concerned) enter into the determination of the final price agreed upon. Thus, market value in-



indicated by the sales price of a single transaction is seldom an accurate indicator of true value of a given class of property. Even in land appraisal work, when no actual sales transaction takes place, the task of determining value is so complex that skilled and experienced appraisers often arrive at differing estimates of value.

However, sales prices of a number of tracts of similar land that have been sold under fair market conditions do reflect a consensus of market value at a given time or over a stated period of time. To measure the uniformity of assessment for rural land in several Missouri counties, Chryst and Miller (1952) used an assessment-sales ratio which they defined as the assessed valuation expressed as a percentage of estimated sales price. This ratio can be applied to forest land to measure the accuracy of assessment for individual tracts of land within a county and to compare assessment among counties. It also may be used to compare assessment of different classes of real property such as forest, farm and urban land. In this study, actual sales price was used instead of estimated sales price.

During the years 1944 to 1952, the Forest Service, U. S. Department of Agriculture, purchased land in several counties for addition to the Clark National Forest. This area lies primarily in the eastern region. From records provided by the Forest Supervisor, data were obtained on 175 tracts of land purchased in 10 counties. The information included: (1) year land was purchased, (2) location, (3) area in acres, and (4) total amount of money paid to the seller. In each county the tax collector's record of the assessed value of individual properties which existed at the time of the sale were obtained. The assessment-sales ratio was then computed by dividing the assessed value by the purchase price and multiplying by 100.

The Forest Service operates under rather broad objectives in the public interest. They frequently recognize uses for forest land, such as for grazing and recreation to which most private individuals who own forest land for timber growing are unwilling to attach value. For comparative purposes, private individual owners of forest land were contacted to obtain information from which assessment-sales ratios could be computed. Data on 76 separate purchases were collected on land purchased in 7 counties of which 6 lie in the eastern region and one is in the western region. In most cases the owner was able to provide the assessed value at the time of purchase. Tax collector's records were used for others.

Table 1 shows the average purchase price by years. From 1944 to 1952 the Forest Service paid an average of \$3.91 cents per acre for 34,887 acres of land. Almost all of this land was forested but small isolated cleared areas were included in some of the tracts. They were particularly active in acquiring land during the period 1946-1949. Over the entire 9-year period



TABLE 1 -- AVERAGE SALES PRICE OF FOREST LAND IN THE EASTERN REGION, 1944-1955

Year	Purchased by U. S. Forest Service		Purchased by Individuals	
	Tracts (Number)	Price per acre* (Dollars)	Tracts (Number)	Price per acre** (Dollars)
1944	1	2.00		
1945	3	2.30		
1946	21	2.68		
1947	84	3.95		
1948	24	3.98	1	1.95
1949	20	4.47		
1950	6	4.34		
1951	7	7.31	16	5.92
1952	9	9.78	22	3.07
1953			22	3.45
1954			17	3.98
1955			4	6.82
Total	175		82	
Average		3.91		4.02

\*Weighted by area purchased, total area 34,887 acres.

\*\*Weighted by area purchased, total area 130,162 acres.

TABLE 2 -- ASSESSMENT-SALES RATIOS, FOREST LAND PURCHASED IN THE EASTERN REGION BY U. S. FOREST SERVICE, 1944-1952

County	Tracts (Number)	Area (Acres)	Ratio		
			Average*	Standard Deviation	Range
Bollinger	2	240	76.2	23.2	59.8- 92.6
Crawford	9	1,564	123.6	55.2	63.7-239.8
Dent	10	1,830	110.7	40.4	64.8-170.9
Carter	49	8,069	95.5	47.5	22.7-201.4
Iron	27	9,184	74.6	34.2	27.8-154.2
Madison	26	6,335	80.1	15.7	41.6-113.9
Oregon	7	1,008	88.1	51.3	30.0-175.0
Reynolds	12	1,261	45.1	21.2	19.0- 88.9
Shannon	24	2,731	92.9	39.6	41.0-200.0
Washington	9	2,447	58.0	51.0	33.8-205.1
All Counties	175	34,669	84.2	42.2	19.0-239.8

\*Weighted by area.

TABLE 3 -- ASSESSMENT-SALES RATIOS, FOREST LAND PURCHASED IN THE EASTERN REGION BY INDIVIDUALS, 1951-1954

County	Tracts (Number)	Area (Acres)	Ratio		
			Average*	Standard Deviation	Range
Carter	22	14,503	110.5	258.4	32.0-726.5
Iron	1	2,774	150.0	----	-----
Oregon	1	141	81.0	----	-----
Reynolds	45	12,548	81.6	68.7	32.5-295.0
Ripley	1	3,012	110.0	----	-----
Shannon	5	89,773	105.8	27.6	89.2-162.0
Texas	1	1,680	167.9	----	-----
All Counties	76	124,431	97.4	105.1	32.0-726.5

\*Weighted by area.

the average price increased from \$2.00 to \$9.78 per acre. The average price paid by individuals for 130,162 acres during the period 1948 to 1955 was \$4.02 per acre, with a somewhat similar increase in prices by years. In general, then, an average price of \$4.00 per acre for forest land has prevailed in recent years.

Assessment-sales ratios for land purchased by the Forest Service averaged 84.2 (Table 2). That is, the land and timber were assessed for taxation at 84 percent of the price at which they were sold during the same year or the following year.<sup>4</sup> Their standard deviation, including approximately 68 percent of the cases, was  $\pm 42.2$ . The range from lowest to highest was 19.0 to 239.8. Ratios among counties varied widely. In Crawford County (123.6) and Dent County (110.7) forest land was assessed for taxes on the average at more than 100 percent of the sales prices. Single properties were assessed as low as 64 percent of sales price and as high as 239 percent. In Reynolds County, the average ratio was unusually low—45.1. The small standard deviation in Madison County and Reynolds County indicates that assessment was consistent relative to market value.

For land purchased by individuals, assessment-sales ratios were higher and even more divergent (Table 3). The mean ratio indicates that land was assessed at 97.4 percent of market value. The standard deviation of  $\pm 105.1$  was caused by the wide spread in ratio values and their skewed distribution (see Fig. 15). The range was also extreme, from 32.0 to 726.5. Four out of 6 counties assessed forest land on the average in excess of 100 percent of market value. The ratios for Iron, Oregon, Ripley, and Texas counties have little significance in themselves because they represent only one sale each. For all properties, the average assessment-sales ratio was 94.5 when weighted by area purchased.

When the assessment-sales ratios reported in Tables 2 and 3 are grouped in 20-point ratio classes, a frequency distribution is formed (Fig. 15) which summarizes tax assessment practices for forest land in south Missouri. Of 251 tracts of land, the highest number, 54, lies in the 60 to 80 ratio class and 48 tracts are in the 80 to 100 class. Thus, it is apparent that about 40 percent of the total number were assessed at 60 to 100 percent of market value. However, because of the skewed distribution, the arithmetic average of 102.8 percent, based on number of properties (rather than their area) and shown as a vertical line, lies to the right of the two groups of greatest frequency. Its position shows that approximately one-third of the properties are assessed at more than 103 percent of market value. Twenty-five percent of the properties were assessed between 20 and 60 percent.

<sup>4</sup>The number of tracts and sizes of areas in Tables 2 and 3 are smaller than in Table 1 because samples for which complete data could not be obtained were excluded.

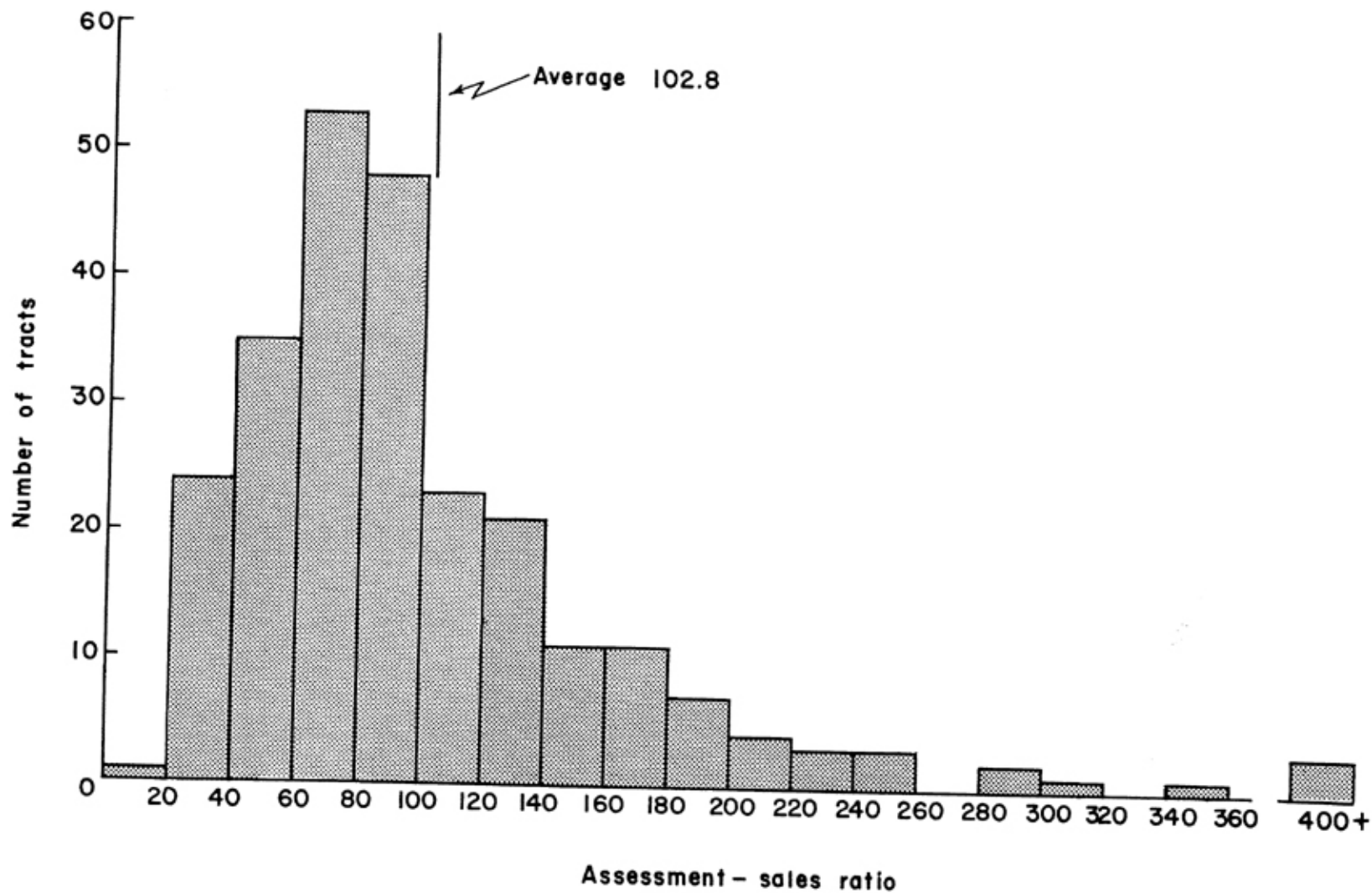


Fig. 15—Frequency distribution of assessment—sales ratios for 251 tracts of forest land purchased in the eastern region, 1944-1954.

In contrast, Chryst and Miller (1952) reported the following average assessment-sales ratios for farm land and urban real estate in 12 Missouri counties and for urban real estate in 3 metropolitan areas for 1947:

Farm land	51.31
Towns	26.06
Large cities	47.33
Average urban	30.31

Three of the counties in which Chryst and Miller collected farm data have extensive forest areas, some of which were probably included in farm woodlots, but the other counties were in the prairie region where forests comprise about 12 percent of the area. Though a portion of farm value consisted of forest land its relative contribution was probably minor. If we assume that the above assessment-sales ratio for farm land was based essentially on crop and pasture land, the disparity between assessment of forest land at 99 percent (mean of 95.4 and 102.8) is pronounced. Forest owners have paid considerably more than a fair share of taxes.

### INCOME AS AN INDICATOR OF EQUITABLE TAXATION

In a general way the income potential of forest land may be indicated by the amount of money received from it under sound forest management. The Forest Service has had forest land under management in south Missouri since the late 1930's. At first their efforts were extensive, largely devoted to fire control. Later, timber harvests became desirable to increase growth and improve stand quality. During the period 1944 to 1953, the gross income from the former Clark National Forest increased from 5.5 cents per acre to 21.1 cents per acre (Fig. 16)<sup>5</sup>. This income was derived largely from stumpage sales of timber but it included small amounts from grazing permits, special uses, and penalties for trespass. The receipts were the sum of those designated as "forest reserve fund" and "sale area betterment." Increased receipts during the period were due to both greater volume harvested and rising prices for stumpage. Had markets existed for smaller trees, such as those used for pulpwood, the incomes would have been much larger. This rapid and consistent rise in income was made without reduction of growing stock. In fact, the income of 21.1 cents per acre for 1953 was probably extremely conservative in that much of the current growth was not cut.

Another measure of income potential of forest land is the annual growth in value of trees. King, Roberts and Winters (1949) showed that the annual net growth of sawtimber was 38.4 board feet per acre in the

<sup>5</sup>From an area which increased through land acquisition from 842,000 acres to 883,000 acres during the period. Data from Forest Supervisor's office.

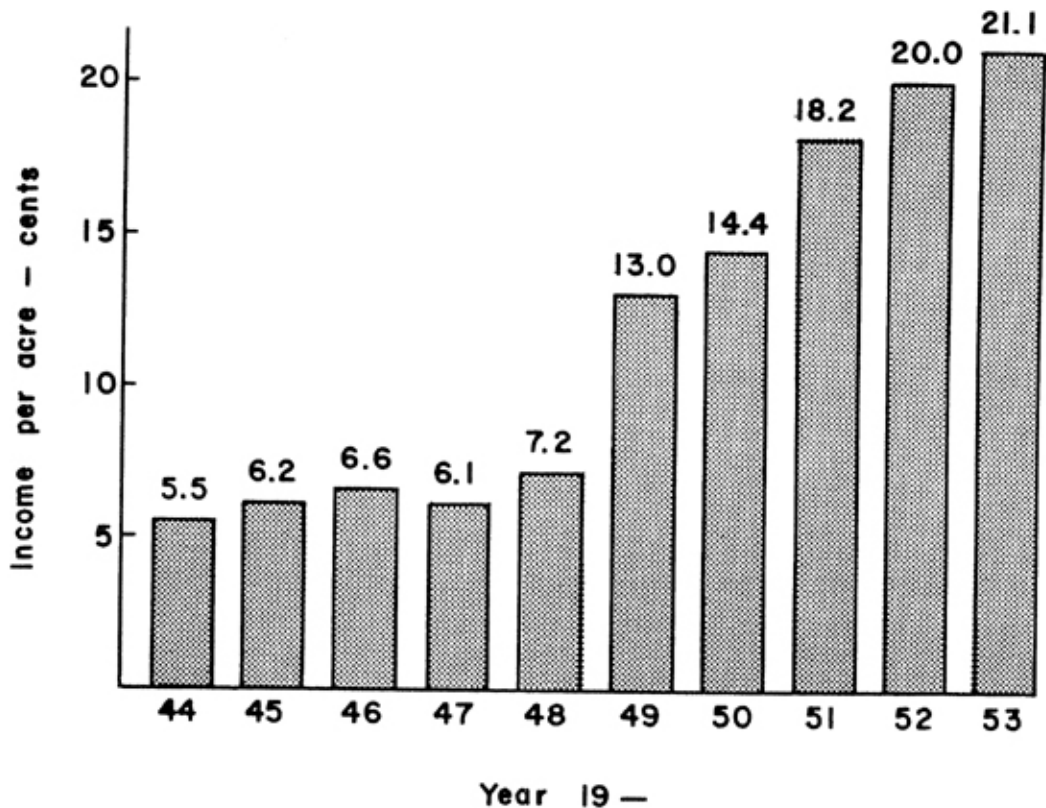


Fig. 16—Gross income per acre from Clark National Forest (now part of Missouri National Forests), 1944-1953.

Ozark region. This figure allows for additions through ingrowth of smaller trees which enter sawtimber size and for reduction because of tree mortality. If a reasonable value for standing timber of \$10 per thousand board feet is assumed, the value of annual growth was \$0.384 per acre. The ratio of taxes per acre to potential gross income would be  $0.106/0.384$  or 0.276. In other words, taxes amounting to 27.6 percent of gross income were collected. If it is assumed that fire protection and better woods practices in recent years have resulted in an annual growth of 50 board feet per acre per year, the ratio of taxes to potential income from forest land was 0.21.

For comparison, a measure of gross income for farms may be derived from data in the 1950 census of agriculture (Bureau of the Census, 1952). For the 26 counties in which taxation was studied the census reported the value of all products sold (except forest products) to be \$74,239,645 in 1949. The gross area in farms, less ungrazed woodlands, was 6,008,975 acres in 1950 but it included 2,136,449 acres of woodlands which were grazed. The latter figure was included in farm area because income from livestock raised in woodland pasture was included in the gross income.

The per-acre income of \$12.35 was accordingly low. The ratio of taxes to gross income for farms was  $0.362/12.35$  or 2.9 percent.

The ratio of taxes to gross income for forest land is seven to nine times larger than the ratio of taxes to gross income for farm land. This is supported by a comparison of assessed value with gross income. For farm land the average assessed value per acre in 1953 was \$13.15 (Fig. 3). The ratio of assessed value to gross income was  $13.15/12.35$  or 1.07. In the same year the average assessed value of forest land was \$4.08 (Fig. 2) and the corresponding ratio is  $4.08/0.50$  or 8.16. Based on gross income, it is apparent that forest owners are taxed about eight times higher than owners of cleared farm land.

### SUMMARY AND CONCLUSIONS

Taxation of forest land in 26 counties in the Ozark region was investigated. A total of 836 properties was sampled. All were forested and without improvements, as determined from aerial photographs. Data on assessed value and total taxes were traced over a 10-year period from 1944 to 1953. For comparison, similar data were obtained for 281 farms which were essentially cleared and used for crops and pasture. Average taxation levels for 1953 were:

	<i>Forest land</i>	<i>Agricultural land</i>
Assessed value per acre	\$4.08	\$13.15
Total taxes per acre	\$0.106	\$0.362

Both assessed value and taxes varied widely within counties and among counties for both forest and farm land.

Small forest properties were assessed for taxes at a higher value than large ones. On the average, a 40-acre forest property was assessed at \$4.75 per acre, a 640-acre tract at \$3.82.

From 1944 to 1953, assessed value increased 12 percent for forest land and 18 percent for agricultural land. Taxes increased 83 percent for forest land and 93 percent for agricultural land.

The tenure of forest land in southwestern Missouri was far from stable. One-half of 55,740 acres sampled was held by the same owners over a 10-year period. The balance changed ownership one to nine times.

Forest land was assessed for taxes at an average of 99 percent of market value, with a range from 19 to over 700 percent, as indicated by a study of 251 land purchases by the U. S. Forest Service and private individuals. Other studies indicate that farms are assessed at about 50 percent of market value and urban property at 30 percent.

Taxes on forest land in 1953 amounted to 21 percent of the value of timber growth and taxes on farms comprised 3 percent of the gross in-

come of products sold.

It appeared that forest land was assessed at a substantially higher percentage of market value than other classes of real estate. Accordingly, owners of forest land were bearing more of the tax load than they should. The degree of over-assessment varied among counties but this form of discrimination by tax assessors appears to be a general practice.

Taxes on forest land were not excessively high and they probably have not prevented land owners or potential land owners from growing timber as a crop rather than exploiting timberland. In view of the rapid rate at which taxes have risen and the fact that taxes now consume over one-fifth of the current possible income from forests, there is danger that continued increases in taxes will make forest ownership an unattractive business venture.

Within the present taxation structure it is possible for tax assessors to correct much of the inequity which exists by developing greater accuracy in assessing forest land for taxes.

Improvement in assessing practices probably will not materialize until assessors are adequately trained. Employment of technically trained appraisers by the State Tax Commission to assist assessors would be helpful in developing more accurate and uniform assessment among counties. The adoption of standardized assessment procedures would relieve the assessor of developing his own techniques, for which he may be poorly qualified. These procedures might include preparation of schedules of land and timber values by the State Tax Commission based on a rating of the productivity of soil types and the use of aerial photographs to measure timber areas and volume. And because of the wide disparity in assessing farm land and forest land, separate assessment of these classes of rural property should be required.

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## APPENDIX

ERROR CAUSED BY USE OF OLD  
AERIAL PHOTOGRAPHS<sup>6</sup>

A study was undertaken to determine the magnitude of error introduced by using A.S.C. aerial photographs which were 12 to 16 years old in selecting forested and cleared agricultural land. It was possible that land shown as forest on the photographs had been cleared for cultivation since the photographs were made. In three counties, two sets of aerial photographs were available:

Bollinger County, photographed in 1937 and 1952

Butler County, photographed in 1941 and 1952

Ripley County, photographed in 1941 and 1952

A comparison of identical sampling points on each set of photographs could serve to estimate the percentage of forest land that had been cleared in the interim between photographing the counties. Crow<sup>7</sup> reported a method for determining forest areas from aerial photograph index sheets which suggested that county index mosaics available in the State A.S.C. office could be successfully used for this purpose. An index sheet is a mosaic prepared by laying a set of overlapping individual aerial photographs, properly oriented as to position, so as to make a picture map of the entire county. Each 1941 county index sheet was divided into quarters to assure sampling in all major parts of a county. A grid sheet containing numbered 1-inch coordinates was placed over the index sheet. A pair of randomly-chosen numbers defined a horizontal line and a vertical one whose intersection determined a sampling point. Twenty-five such points were designated in each quarter, making a total of 100 points per county. The south one-half of Butler County lies outside of the Ozark upland so sampling points were confined to the north half of the county, that is, in the upland. Each sample point had to fall on forest land before it was accepted. To be classified as forest land an area had to contain at least 20 acres in trees and the trees had to have 50 percent or greater crown closure. Narrow strips of trees along streams were not accepted as forest land.

Each sampling point was marked on the index sheet with a pin prick and circled with red china-marking crayon for ease in subsequent identification.

On the 1952 index sheet each identical point was found and classified as forest or cleared. A 10-power hand lens was found to be useful in decid-

<sup>6</sup>By Howard L. Wolf.

<sup>7</sup>Crow, A. B. 1945. A method of determining forest areas from aerial photograph index sheets. *Jour. Forestry* 43: 812-813.

ing whether clearing had taken place. Although the scale of most index sheets is too small for accurate tree measurements or timber type mapping, their use for this purpose was simple, accurate and rapid. Some distortion was apparent near the outer edges of each individual photograph and the process of rephotographing to make the index caused blurs which made the differentiation of forest or non-forest land difficult occasionally.

The 1937 index sheet for Bollinger County was not available so a complete set of 434 contact prints taken in 1937 was substituted. The grid sheet was placed on every fourth print and one point was chosen, based on a pair of random numbers. This introduced an element of systematic sampling, but the process remained an unbiased one. The sampling points on the 1937 contact prints were compared to the same locations on the 1952 index sheet. It was observed that when the contact prints were substituted for the index sheet the time consumed in arranging prints and locating sample points was about doubled. Thus, much time can be saved in examining gross features of large areas by using aerial photograph index sheets.

The percentage of sampled forest land cleared during the 11 to 15-year period was:

Bollinger County	5
Butler County	2
Ripley County	4
All Counties	3.7

Of the 14 sample points which had been cleared, 10 were enlargements of existing fields or pastures, 2 clearings were new rights-of-way for electric transmission lines or pipe lines, 1 was for a new road, and 1 was for a homesite at the edge of a village.

TABLE 4 -- NUMBER OF TRACTS AND AREAS IN EACH COUNTY FOR WHICH DATA WERE COLLECTED

County	Forest Land		Agricultural Land	
	Tracts (Number)	Area (Acres)	Tracts (Number)	Area (Acres)
Barry	33	6,133	13	871
Bollinger	33	2,709	10	759
Butler	30	2,741	9	336
Carter	35	5,640	5	522
Christian	23	3,711	13	740
Crawford	34	5,534	12	757
Dent	33	6,500	14	1,440
Douglas	34	4,610	12	959
Howell	30	7,649	14	1,175
Iron	33	3,827	7	498
Madison	34	3,894	6	306
McDonald	31	4,995	11	654
Newton	30	1,932	11	580
Oregon	33	7,403	9	1,198
Ozark	32	2,550	12	1,251
Reynolds	34	6,776	15	902
Ripley	36	3,918	15	766
St. Francois	30	4,031	13	1,145
Shannon	32	6,874	10	1,064
Stone	32	4,689	11	560
Taney	32	4,800	6	592
Texas	31	6,076	12	948
Washington	32	4,606	10	630
Wayne	33	3,015	5	453
Webster	32	4,155	13	720
Wright	34	4,440	13	977
Totals				
Eastern region	462	67,468	140	10,776
Western region	374	55,740	141	10,027
All Counties	836	123,208	281	20,803

TABLE 5 -- AVERAGE ASSESSED VALUE PER ACRE OF FOREST LAND BY COUNTIES, 1944-1954

County	Year											Basis, no. of tracts
	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	
	Dollars											
Barry	3.68	3.76	3.64	4.00	3.95	3.95	3.95	4.03	4.03	4.03	4.03	33
Bollinger	2.71	2.82	2.85	2.80	2.79	2.72	2.72	2.71	2.71	2.71		33
Butler	3.08	3.08	3.05	3.04	3.22	3.43	3.23	3.30	4.01	4.09		30
Carter	2.79	2.66	2.66	2.73	2.82	2.98	2.98	4.24	3.47	3.97		35
Christian				3.00	3.03	3.07	3.07	3.07	3.07	3.06	3.76	20
Crawford	5.78	5.72	5.60	5.59	5.49	5.49	5.46	5.46	5.46	5.45		34
Dent	4.60	4.55	4.65	4.65	4.59	4.65	4.67	4.85	5.25	5.48		33
Douglas	2.79	2.52	2.50	2.69	2.71	2.71	2.71	2.71	2.79	2.81	2.81	34
Howell	3.73	3.71	3.71	3.91	4.47	4.36	4.39	4.33	4.34	4.32	4.38	30
Iron	1.94	1.94	1.87	1.91	1.74	1.66	1.72	1.73	2.08	2.06		33
Madison	2.17	2.19	2.19	2.40	2.36	2.36	2.36	2.43	2.43	2.40		34
McDonald	3.45	3.44	3.72	4.05	4.08	4.07	4.39	4.00	4.00	4.02	3.91	31
Newton				11.41	11.36	11.42	1.15	11.54	11.54	11.54	11.54	27
Oregon	4.31	4.31	4.33	4.34	4.33	4.32	4.34	4.44	4.45	4.40		33
Ozark	3.44	3.45	3.74	4.27	4.17	3.91	3.93	3.94	4.07	4.94	4.68	32
Reynolds	1.78	1.78	1.78	1.78	1.78	1.79	1.79	1.95	2.11	2.08		34
Ripley	4.25	4.21	4.28	4.67	4.39	4.31	4.38	4.47	4.48	4.49		37
St. Francois	4.08	4.08	4.08	4.08	4.08	4.08	4.14	4.14	4.14	4.14		30
Shannon	5.05	4.75	4.72	5.04	4.88	5.30	4.60	4.71	4.71	4.71		32
Stone	3.27	3.04	3.03	3.33	3.33	3.36	3.37	3.37	3.37	3.38	3.38	32
Taney	3.92	3.88	3.90	3.91	4.03	4.24	4.32	4.30	4.43	3.18	3.82	32
Texas					4.67	4.98	4.86	4.93	5.13	5.24	5.27	27
Washington	2.19	2.19	2.19	2.32	2.33	2.33	2.33	2.35	2.43	2.43		32
Wayne	3.67	3.69	3.74	3.80	3.87	3.89	3.93	3.97	3.95	3.94		33
Webster	6.30	6.28	6.25	6.24	7.01	6.19	6.10	6.08	6.35	6.20	6.03	32
Wright	3.11	3.13	3.32	3.39	3.26	3.43	1.11	3.58	3.73	3.73		34
All Counties	3.65	3.85	3.63	3.86	3.94	3.96	3.93	4.02	4.08	4.08	4.42	32.2

TABLE 6 -- AVERAGE ASSESSED VALUE PER ACRE OF AGRICULTURAL LAND, INCLUDING IMPROVEMENTS,  
BY COUNTIES, 1944-1954

County	Year											Basis, no. of tracts	
	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954		
	Dollars												
Barry	18.45	19.15	19.15	20.91	21.03	21.03	20.72	21.24	21.24	21.24	21.24	21.24	13
Bollinger	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.50	14.81		10
Butler	10.07	10.07	10.07	10.07	10.56	10.56	10.71	11.15	11.60	11.90			9
Carter	18.12	18.70	18.70	18.70	18.70	18.98	19.63	18.70	18.70	18.70			5
Christian				17.17	17.57	17.64	17.64	17.64	17.64	17.64		22.06	13
Crawford	14.35	14.35	14.35	14.35	14.35	14.35	14.35	14.28	13.89	13.89			12
Dent	8.77	8.86	9.29	9.29	9.29	9.29	9.29	9.29	10.43	10.91			14
Douglas	10.42	10.49	10.49	11.60	11.60	11.60	11.60	11.60	12.30	11.89	11.90		12
Howell	10.70	10.64	10.64	10.64	12.00	12.24	12.24	12.24	11.99	11.99	11.99		14
Iron	8.11	8.85	8.95	8.98	8.98	8.98	9.27	9.27	9.43	11.30			7
Madison	14.79	14.85	14.85	15.83	15.83	15.83	15.83	16.12	16.12	16.12			6
McDonald	13.30	13.34	14.45	15.68	15.68	15.68	16.35	11.63	16.43	16.43	16.43		11
Newton				20.75	20.75	20.75	20.95	20.68	19.68	19.68	19.68		11
Oregon	7.65	7.65	7.65	7.65	7.65	7.65	7.61	7.68	7.68	7.68			9
Ozark	5.81	5.83	6.41	8.06	7.93	8.32	7.69	7.91	7.91	9.34	9.14		12
Reynolds	6.40	6.40	6.40	6.40	6.40	6.40	6.40	6.52	7.87	7.54			15
Ripley	5.78	6.43	6.30	7.34	7.31	7.34	7.21	7.21	7.28	7.08			15
St. Francois	15.86	16.87	16.87	16.87	17.40	17.22	17.41	17.44	17.29	17.29			13
Shannon	7.09	7.10	7.10	7.38	7.38	8.12	8.20	8.44	8.37	8.37			10
Stone	18.91	1.87	18.66	20.52	20.52	20.52	20.52	21.54	21.54	21.54	21.54		11
Taney	5.38	5.38	5.71	5.71	6.28	7.45	7.54	8.03	8.03	8.99	10.78		6
Texas					18.03	18.90	17.83	18.81	18.48	18.41	17.69		12
Washington	13.45	13.45	13.45	13.45	12.83	12.74	12.74	12.58	12.58	12.74			10
Wayne	10.67	11.37	11.37	11.37	11.37	11.37	11.52	11.74	11.74	11.72			5
Webster	18.01	18.01	18.01	18.01	16.41	16.41	16.68	16.68	17.36	17.46	17.46		13
Wright	10.40	10.69	11.19	7.62	7.52	9.08	7.52	9.70	10.19	10.21	11.15		13
All Counties	11.12	11.34	11.49	12.26	12.61	12.73	12.65	12.83	12.99	13.15	15.22		10.8

TABLE 7 -- AVERAGE TAX PER ACRE ON FOREST LAND BY COUNTIES, 1944-1954

County	Year											Basis, no. of tracts
	1944	1945	1946	1947	1948	1949 Cents	1950	1951	1952	1953	1954	
Barry	6.1	6.1	6.3	8.3	10.0	10.1	12.4	11.7	12.6	14.5	14.0	33
Bollinger	2.8	2.8	2.9	3.1	3.1	2.9	2.8	2.7	2.8	3.3		33
Butler	6.2	6.1	6.3	6.7	7.6	8.0	7.4	7.4	8.7	8.9		30
Carter	5.2	5.0	5.4	5.6	6.4	6.4	6.8	9.8	8.3	10.7		35
Christian				6.5	8.0	8.2	8.6	10.6	10.7	10.8	13.2	23
Crawford	7.1	7.4	7.8	9.6	9.4	11.6	11.6	12.6	13.1	14.3		34
Dent	6.7	6.7	7.1	7.7	7.6	7.8	8.1	8.4	9.3	10.1		33
Douglas	4.5	3.7	4.1	4.5	5.9	4.9	5.3	6.0	6.1	6.2	6.2	34
Howell	5.7	5.5	5.7	6.3	7.8	7.3	7.7	9.1	9.5	8.9	10.4	30
Iron	3.7	3.7	3.5	4.5	4.2	4.0	4.4	4.5	5.5	5.5		33
Madison	2.7	2.9	3.1	4.4	4.6	4.7	4.9	5.2	6.1	6.2		34
McDonald	8.3	8.1	10.6	13.1	13.7	15.2	14.7	14.3	16.3	14.7	14.5	31
Newton				23.8	25.9	26.6	29.3	30.1	32.7	34.6	36.7	30
Oregon	6.8	6.7	6.3	7.0	6.9	7.0	9.1	9.8	10.1	10.4		33
Ozark	6.0	5.9	7.0	9.4	10.8	9.1	10.0	9.4	10.4	12.3	11.8	32
Reynolds	4.7	4.7	4.8	5.3	5.7	5.9	6.2	7.4	8.5	9.8		34
Ripley	6.9	6.9	7.2	8.8	8.7	9.3	9.2	9.4	8.6	8.8		36
St. Francois	5.9	6.1	5.2	6.8	8.1	8.1	8.1	8.6	8.6	8.7		30
Shannon	8.8	7.9	6.8	8.7	9.7	10.8	10.4	9.9	10.1	10.1		32
Stone	5.6	5.3	5.8	8.0	9.4	9.3	9.1	8.9	10.7	11.2	11.4	32
Taney	6.3	6.5	3.9	6.7	8.2	8.1	11.8	11.3	15.3	10.4	13.7	32
Texas					7.7	10.0	9.5	9.5	10.3	9.8	10.6	31
Washington	3.8	4.1	4.0	4.4	5.4	6.2	5.8	6.5	6.1	7.6		32
Wayne	4.8	4.7	5.6	5.9	6.8	7.4	7.2	7.6	7.8	7.9		33
Webster	8.5	9.7	11.2	12.6	15.4	14.7	15.0	15.5	15.6	17.0	17.3	32
Wright	4.6	4.7	5.5	6.9	7.2	8.9	8.3	9.5	11.2	10.3	12.2	34
All Counties	5.8	6.2	6.1	7.4	8.2	8.6	9.0	9.6	10.2	10.6	13.0	32.2

TABLE 8 -- AVERAGE TAX PER ACRE ON AGRICULTURAL LAND, INCLUDING IMPROVEMENTS, BY COUNTIES 1944-1954

County	Year											Basis, no. of tracts
	1944	1945	1946	1947	1948	1949	1950	1951	1952	1953	1954	
Barry	33.3	35.4	35.6	55.0	61.0	59.7	62.6	70.5	72.9	75.6	79.8	13
Bollinger	14.4	14.4	14.8	16.2	16.2	15.4	14.7	14.7	14.8	15.1		10
Butler	25.5	25.6	28.6	32.6	35.6	35.1	31.0	33.2	32.8	34.6		9
Carter	23.0	23.3	27.5	27.4	32.0	32.7	30.7	31.0	31.0	31.4		5
Christian				44.7	48.7	54.4	61.3	61.4	61.9	62.3	76.5	13
Crawford	17.1	18.6	20.7	25.5	25.9	29.3	33.7	37.4	37.2	41.1		12
Dent	12.8	13.1	14.2	15.3	15.2	15.6	15.5	15.5	17.7	18.2		14
Douglas	14.8	15.0	16.6	19.3	22.8	20.5	24.9	29.7	36.3	34.1	36.6	12
Howell	15.2	15.9	16.7	17.1	23.5	22.9	26.5	25.4	25.4	24.7	28.1	14
Iron	12.4	14.3	14.8	16.7	15.6	16.8	19.0	19.1	19.4	21.4		7
Madison	25.0	21.6	22.5	26.3	36.6	38.8	33.9	42.0	42.1	57.8		6
McDonald	28.9	30.4	37.4	46.2	50.7	52.8	51.7	51.5	54.5	52.7	52.7	11
Newton				45.4	50.7	54.6	53.5	61.3	62.2	65.1	71.4	11
Oregon	12.9	12.4	12.2	12.9	13.0	15.2	16.3	16.4	17.2	17.2		9
Ozark	10.9	10.6	11.9	17.4	20.9	20.1	18.8	19.8	20.4	23.1	22.9	12
Reynolds	15.9	16.2	17.3	17.2	18.9	19.8	20.5	21.8	27.6	30.7		15
Ripley	14.8	9.7	9.6	14.2	14.1	14.8	13.7	12.2	14.1	13.7		15
St. Francois	24.5	26.9	26.0	33.1	41.1	42.6	43.4	42.5	46.1	45.2		13
Shannon	14.6	14.6	13.1	15.0	16.0	17.5	17.8	17.4	17.5	18.0		10
Stone	34.9	33.4	35.9	48.1	58.0	64.1	59.1	63.3	68.2	69.1	70.0	11
Taney	9.2	9.6	11.5	12.2	12.7	17.2	19.9	16.2	23.0	31.1	36.6	6
Texas					43.3	55.4	43.9	51.6	53.6	46.2	54.2	12
Washington	28.0	31.9	30.3	30.4	36.0	37.4	35.8	38.5	38.5	52.2		10
Wayne	17.4	22.9	22.9	23.0	29.8	28.6	27.1	29.7	30.1	30.0		5
Webster	33.7	38.5	43.0	52.2	51.7	52.3	48.3	51.7	55.8	58.1	59.1	13
Wright	19.3	20.1	23.5	25.0	26.7	29.0	30.2	32.6	34.4	35.1	40.1	13
All Counties	18.8	19.5	20.7	26.0	29.7	31.3	31.3	33.1	35.1	36.2	49.1	10.8

TABLE 9 -- VARIATION OF ASSESSED VALUE PER ACRE AND TAXES PER ACRE, FOREST AND AGRICULTURAL LAND, 1953

County	Assessed Value		Taxes	
	Forest	Agriculture	Forest	Agriculture
	(Coefficient of Variation*)			
Barry	26	64	29	50
Bollinger	17	61	61	63
Butler	49	39	66	52
Carter	20	7	43	25
Christian	28	32	31	32
Crawford	44	62	58	78
Dent	34	36	40	36
Douglas	27	47	37	82
Howell	25	42	29	32
Iron	37	137	33	129
Madison	30	63	37	80
McDonald	39	19	80	26
Newton	32	29	47	36
Oregon	24	47	22	74
Ozark	32	49	53	60
Reynolds	29	74	33	85
Ripley	32	45	32	45
St. Francois	30	60	28	55
Shannon	42	28	37	63
Stone	26	37	32	41
Taney	30	40	31	42
Texas	25	44	38	55
Washington	41	64	47	56
Wayne	27	84	53	137
Webster	27	36	42	47
Wright	22	65	40	82
All Counties	30.6	50.4	41.5	60.1

\*A measure of dispersion related to the mean expressed in percentage form. It permits easier comparison of distributions whose means expressed in absolute units differ widely. The coefficient of variation is found by dividing the standard deviation by the mean and multiplying by 100.