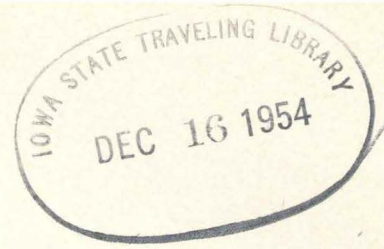


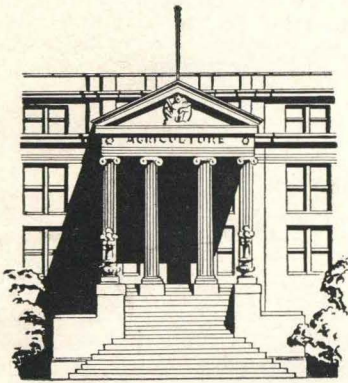
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1954



An Estimate of the Volume of Farm Dwelling Construction in Iowa

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AGRICULTURAL EXPERIMENT STATION, IOWA STATE COLLEGE

RESEARCH BULLETIN 414

SEPTEMBER, 1954

AMES, IOWA

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SUMMARY

Estimates made by a sample of retail lumber dealers indicate that in Iowa in 1948, about:

2,000 new farm dwellings were constructed
and

7,000 major farm dwelling repairs were made.

Farm families spent about \$48 million for dwelling construction in that year, consisting of about:

\$22 million for new dwellings,

\$14 million for major farm dwelling repairs
and

\$12 million for minor farm dwelling repairs.

Sales by retail lumber establishments for these three types of construction totaled about:

\$21 million for building materials,

which was about:

12 percent of total lumber yard sales.

While the average lumber dealer provided building materials for about:

2 new farm dwellings and

6 major farm dwelling repairs,

these sales were not distributed equally among all dealers. About:

40 percent of the dealers reported no new houses, and

10 percent of the dealers reported no major farm dwelling repairs.

At the other extreme, about:

10 percent of the dealers reported

40 percent of the new farm dwellings, and

15 percent of the dealers reported

50 percent of the major farm dwelling repairs.

In both cases, the number reported differed according to size of town.

The method described in this study for obtaining data on construction volume from retail lumber dealers to estimate the total volume and cost of dwelling construction has the advantage of relative ease in collecting the data from a few sources. It appears to yield a valid estimate of the number of new farm dwellings but not of the number of nonfarm dwellings.

The estimates which are probably least satisfactory are those based on a series of other estimates involving certain unverified assumptions—e. g., estimates of total expenditures by farm families for various types of dwelling construction.

The method could be improved by reducing the number of nonresponses, making sharper lines of differentiation between various kinds of construction, obtaining data on the total sales volume of reporting establishments, and making studies showing the breakdown of housing construction costs. In addition, supplementary data are needed on construction which does not involve the retail lumber yard. The method should be compared with alternative methods in terms of validity, reliability and cost.

An Estimate of the Volume of Farm Dwelling Construction in Iowa¹

BY EDNA DOUGLAS

Economic research in farm housing can be greatly facilitated by the development of a low-cost method of making reliable annual estimates of farm construction volume and by the accumulation of time series over a period long enough to reveal fluctuations in the type and volume of construction.

Methods of estimating residential construction volume in urban areas have been used long enough to yield much useful statistical data, although refinements continue to be made. However, there have been few estimates of farm dwelling construction volume.² The greater emphasis on urban housing has probably resulted from the greater volume of urban construction compared with farm construction. Also, statistics may be more easily secured from urban centers where building permits are used and where many large-volume builders can provide data. Geographic decentralization of farm dwelling construction, the general absence of building permits, and the probably small volume of construction per builder have made the collection of farm data expensive.

This bulletin summarizes certain estimates of the farm dwelling construction volume in Iowa and describes methods of making the estimates. The original purposes were:

- (1) To obtain estimates of the volume and cost of farm dwelling construction in Iowa in 1948; and
- (2) To obtain estimates of the distribution of building materials sales for farm dwelling construction among retail lumber establishments of the state and of certain relationships between these and other kinds of sales by the retail lumber establishment.

¹ Project 972, Iowa Agricultural Experiment Station. The author acknowledges with appreciation the considerable help given by Professors Raymond Jessen and Emil Jebe, Statistical Laboratory, Iowa State College, in the planning, interpretation and presentation of statistical aspects of this study. Professors Elisabeth Willis, Howard Hines, Donald Kaldor and Frank Robotka, Department of Economics and Sociology, Iowa State College, read the manuscript in its entirety and offered many constructive criticisms. Mr. James E. Toepel, Assistant Secretary, and Mr. Robert H. Laird, formerly Field Secretary, Iowa Retail Lumbermen's Association, gave encouragement and advice at various stages during the course of the study, but are not, of course, responsible for any errors of fact or of interpretation. The writer is particularly indebted to the 113 retail lumber dealers of Iowa for their intelligent and patient cooperation in answering detailed questions in the survey questionnaire.

² See Appendix A for a brief summary of the major sources of current and historical estimates of farm and nonfarm residential construction volume.

These two general types of estimates were used as part of a broader study of the housebuilding functions of the retail lumber yard.³ For this reason, the source, tabulation, and presentation of data are oriented to the lumber yard rather than to the farm or farm family. As the problem of estimation was explored, however, a third objective began to emerge:

- (3) To determine whether retail lumber dealers are a good source of information on the amount and cost of farm dwelling construction—i. e., can their answers to questions be used to obtain valid estimates of construction volume?

This third objective seemed worth even a preliminary consideration since lumber establishments are a more "concentrated" source of information than farmers are.

The original data were obtained through interviews with managers of 113 retail lumber and building materials establishments in Iowa and through a supplementary mail questionnaire to one-fourth of these dealers. The sample included about 10 percent of the total number of yards in the state in 1947-48. It was a random sample selected from an array by counties of all dealers in the state. Each lumber dealer was asked how many of his farm customers built new dwellings or made major dwelling repairs⁴ during 1948. He was also asked what the average cost of building materials was for these new structures and improvements.⁵ Data obtained by this method contain errors from sampling, nonresponse and wrong response. In the discussion below, sampling errors, confidence intervals and tests of significance are given for many averages so that estimates made from the sample may be stated with some given degree of confidence.

Problems of validity still exist, however. It was assumed that lumber dealers know the number of

³ Douglas, Edna. The structure of the Iowa retail lumber industry. Iowa Agr. Exp. Sta. Res. Bul. 395. 1953; and Douglas, Edna. The retail lumber establishment and farm dwelling construction in Iowa. Iowa Agr. Exp. Sta. Res. Bul. 415.

⁴ A "major farm dwelling repair" was defined as one in which the building materials purchased from the retail lumber yard cost the farmer \$500 or more.

⁵ See Appendix B for a description of the sample, the interview questionnaire, and the supplementary mail questionnaire.

TABLE 1. THE AVERAGE NUMBER OF AND THE AVERAGE COST OF BUILDING MATERIALS USED* IN NEW FARM DWELLINGS, MAJOR FARM DWELLING REPAIRS AND NEW TOWN DWELLINGS REPORTED BY A SAMPLE OF RETAIL LUMBER DEALERS OF IOWA; THE STANDARD ERROR OF THESE AVERAGES; AND ESTIMATES OF IOWA TOTALS, WITH CONFIDENCE INTERVALS, 1948.

Item	Number of lumber yards reporting† n	Per lumber yard		All lumber yards		
		Sample mean \bar{x}	Standard error of mean $s\bar{x}$	Estimate based on		
				$N\bar{x} = T$	$T - t_{.95} sT$	$T + t_{.95} sT$
New farm dwellings						
Number	99	1.783	0.192	2,045	1,608	2,482
Cost of building materials	99	\$7,694	\$966	\$8,824,662	\$6,626,185	\$11,023,140
Major farm dwelling repairs‡						
Number	70	6.021	0.931	6,906	4,776	9,036
Cost of building materials	70	\$5,982	\$821	\$6,861,056	\$4,983,073	\$ 8,739,039
New town dwellings						
Number	97	4.144	0.578	4,753§	3,438	6,069
		Per dwelling				
New farm dwellings						
Cost of building materials	176.5**	\$4,315	\$203††	—	—	—
Major farm dwelling repairs‡						
Cost of building materials	421.5**	\$ 993	\$122††	—	—	—

* "Cost of building materials used" refers to the cost to the buyer of only those building materials purchased from the retail lumber yard.

† Managers of 113 lumber yards were interviewed. In this column are the number of managers who were able and willing to make an estimate of the number of dwellings constructed or repaired with materials from their yards plus the number to whom an estimate was assigned (see Appendix C). Differences in the number reporting the three kinds of construction in this table are due to the fact that some managers who reported the estimated number of new farm dwellings were unable to estimate the number of town dwellings or the number of major farm dwelling repairs.

‡ A "major" farm dwelling repair was defined as one in which the building materials purchased from the retail lumber yard cost the farmer more than \$500.

§ This is probably understated (see text).

** Total number of dwellings reported. If materials were provided by a lumber yard for part of a house, the house was counted as 0.5 dwellings.

†† These figures are ratio estimates computed from the figures above. In this case, therefore, sampling errors are smaller than for the means above.

Source: Interviews with a sample of Iowa retail lumber dealers, 1948, and a supplementary mail questionnaire, 1949.

new farm dwellings and major repairs for which they provided materials during the last year and that most of them are able to make estimates of the average value of building materials used in this construction. However, this is not necessarily true. One problem encountered was that of the dealer who was unwilling, or was unable because of lack of information, to make an estimate of the amount of farm dwelling construction undertaken by his customers. Estimates were assigned to a few of these nonreporting yards so that state estimates might be computed.⁶ Another problem was the fact that the dealer was asked, when reporting on his construction sales, to rely upon his memory and, in some cases, his judgment. It is logical to expect these estimates to be better where he was asked:

"How many new farm houses have you supplied materials for this year?"

than where he was asked:

"Of your total building materials sales to farmers this year, approximately what percent was for farm buildings and what percent was for the family dwelling?"

For these and other reasons stated below, the findings by this method need to be checked against

⁶ See Appendix C for a statement of the number of yards for which such estimates were assigned and for a discussion of the method of assigning values.

those obtained by other methods before conclusions can be reached on validity.

Apart from questions of validity and reliability, the usefulness of the findings themselves are limited because the data are restricted to 1 year. Peculiarities of the building volume of 1948 which were mentioned by lumber dealers during the interviews were: (1) the total volume of farm dwelling construction—both new dwellings and repairs—in Iowa in 1948 was quite high (fig. 2 indicates that this was also true in the nation as a whole); (2) the amount of nonresidential farm construction was also quite high, not only because of increased income but also because of the large corn crop of that year with its accompanying storage problems; and (3) both residential and nonresidential farm construction were limited, in some cases, by shortages of building materials or labor. In these respects, therefore, the findings may not be representative of building volume in all years.

In this study, estimates are given of the number and cost of new farm dwellings and major farm dwelling repairs started in Iowa in 1948. Some comparative data on the number of new town dwellings are also included. In addition, estimates are given of the cost of building materials purchased from the retail lumber yard for all forms of farm dwelling construction and of the total expenditures by farm families for such construction. In each case, the method used for making the estimate is described. Since these data were derived from es-

timates reported by retail lumber dealers, they do not include expenditures by farm families for the cost and installation of materials not purchased from the lumber yard. The principal construction items excluded are plumbing, heating, and electrical materials and labor.⁷

NEW FARM DWELLINGS

NUMBER

The average retail lumber yard reporting provided building materials for 1.78 new farm dwellings in 1948.⁸ This means that approximately 2,000 (± 400) new farm dwellings were built in Iowa in that year⁹ (see table 1). Yet, nearly four out of every ten yards reported no farm dwellings, and an additional three out of ten reported only one or two dwellings per yard. The 12 percent of yards which reported an average of five or more homes provided materials for nearly 40 percent of all new farm dwellings (see table 2). There was, therefore, considerable concentration of building materials sales for new farm dwellings among certain lumber yards.

Yards in towns of less than 1,000 population provided materials for about four out of every ten

⁷ See Appendix E for an estimate of the number of farm dwellings to which these facilities were added.

⁸ If the yards from which this estimate was computed were a simple random sample of all yards in the state, we may be 95 percent confident that the true mean for a normal population is between 1.40 and 2.16. In table 1, $\bar{x} \pm t_{.95} (s\bar{x})$ is known as the 95 percent confidence interval. In the discussion, figures given in parentheses represent the amounts above and below the stated figure which mark the approximate 95 percent confidence interval for a simple random sample. The sample actually used was not, however, a simple random sample but was a stratified systematic sample with approximate random ordering (see Appendix B). One could expect that the confidence intervals for such a sample are actually smaller than those obtained by making the simple random sample assumption to calculate the confidence intervals given in table 1 and in the discussion.

⁹ This figure checks quite closely with census data based on a 20 percent sample which indicated that about 8,500 of all rural farm dwelling units were built in the period, 1945-50. Since wartime building restrictions were not relaxed until October 15, 1945, and since the census reported as of April 1, 1950, nearly all of these 8,500 houses were probably built during the 4 years, 1946-49. This would average about 2,100 per year. This compares with an estimated 1,800 per year for 1935-39 and 860 for 1940-44. See U. S. Census of Housing: 1950. Iowa Bul. H-A15. P. 15.8 and Douglas, Edna. An economic appraisal of Iowa farm housing. Iowa Agr. Exp. Sta. Res. Bul. 367. 1949.

new houses. Second in importance were yards in towns of 2,500 to 10,000 population with nearly three out of ten. But even though yards in towns of less than 2,500 population supplied materials for more than half of these new units, such sales were shared by a greater number of yards so that the number per yard was a little more than one, compared with three per yard for larger towns¹⁰ (see tables 3 and 4). Table 5 also shows that independent yards had a slightly greater average number of new farm dwellings (2.23) than did all yards as a whole (1.78).

COST OF BUILDING MATERIALS

Building materials provided by the lumber yard for each of these new farm dwellings averaged \$4,300 ($\pm \$1,300$) per dwelling unit. Since the average number of new units was 1.78 per lumber yard, the average volume per yard was \$7,700 ($\pm \$2,000$) (see table 1). Because more farm houses were constructed per yard in towns of 2,500 or more population, the average expenditure per yard in such towns was three to four times as much as in smaller towns (see table 3). But when yards were classified according to type of operation, there were smaller percentage differences between yards (see table 5).

These figures yielded a total estimated expenditure in the state of \$8.8 million ($\pm \2.2 million) for new building materials purchased through retail lumber yards for new farm dwellings in 1948 (see table 1). Nearly 40 percent of these purchases were in towns of less than 1,000 population; more than 10 percent in towns of 1,000 to 2,500; more than 30 percent in towns of 2,500 to 10,000 population; and nearly 20 percent in towns

¹⁰ Table 3 summarizes the sample findings for lumber yards in towns of four population sizes in terms of numbers of dwellings for which materials were supplied. Examination of the original observations for each yard indicates that the number of dwellings reported is a discrete variable and that the distribution is perhaps far from normal. Therefore, analysis of variance procedures might not be appropriate. For this reason, ranking methods were used to compare the four groups of yards. See Kruskal, William H. and W. Allen Wallis. Use of ranks in one-criterion variance analysis. Jour. Amer. Statistical Assn. XLVII:583-621. 1952. In the example cited above, their statistic H was found to be 13.30, which may be referred to a X^2 table with three degrees of freedom. When $X^2 = 13.30$ and $n = 3$, P is less than 0.01.

TABLE 2. PERCENTAGE OF A SAMPLE OF RETAIL LUMBER YARDS REPORTING WHICH PROVIDED BUILDING MATERIALS FOR VARIOUS NUMBERS AND PERCENTAGES OF NEW FARM DWELLINGS, MAJOR FARM DWELLING REPAIRS AND NEW TOWN DWELLINGS IN IOWA, 1948.

Number of dwellings built or repaired per lumber yard	New farm dwellings		Major farm dwelling repairs		New town dwellings	
	Percentage of		Percentage of		Percentage of	
	Total lumber yards reporting	Total dwellings reported	Total lumber yards reporting	Total dwellings reported	Total lumber yards reporting	Total dwellings reported
25 or more	0.0	0.0	4.3	24.9	2.1	12.5
10 to 24	1.0	5.7	12.9	28.2	9.3	34.3
5 to 9	11.1	33.9	27.1	28.7	17.5	31.1
1 to 4	49.5	60.4	47.1	18.2	40.2	22.1
0	38.4	0.0	8.6	0.0	30.9	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0

Source: Interviews with a sample of Iowa retail lumber dealers, 1948, and a supplementary mail questionnaire, 1949.

TABLE 3. NUMBER OF NEW FARM DWELLINGS, MAJOR FARM DWELLING REPAIRS AND NEW TOWN DWELLINGS, AND AVERAGE COST OF BUILDING MATERIALS USED* IN FARM DWELLINGS PER LUMBER YARD AND PER DWELLING REPORTED BY A SAMPLE OF RETAIL LUMBER DEALERS IN TOWNS OF FOUR POPULATION SIZES IN IOWA, 1948.

Population of town, 1940	Number of lumber yards reporting	Total number of dwellings†	Number of dwellings per lumber yard	Cost of building materials per lumber yard	Cost of building materials per dwelling
New farm dwellings					
10,000 and over	10	30.0	3.00	\$13,470	\$4,490
2,500 to 9,999	14	47.5	3.39	17,682	5,212
1,000 to 2,499	19	27.5	1.45	4,474	3,091
Less than 1,000	56	71.5	1.28	5,258	4,118
Total	99	176.5	1.78	\$ 7,694	\$4,315
Major farm dwelling repairs					
10,000 and over	7	45.0	6.43	\$ 4,804	\$ 747
2,500 to 9,999	10	134.0	13.40	9,685	723
1,000 to 2,499	13	83.5	6.42	5,968	929
Less than 1,000	40	159.0	3.98	5,267	1,325
Total	70	421.5	6.02	\$ 5,982	\$ 993
New town dwellings					
10,000 and over	10	138.0	13.80	—	—
2,500 to 9,999	14	98.0	7.00	—	—
1,000 to 2,499	18	89.0	4.94	—	—
Less than 1,000	55	77.0	1.40	—	—
Total	97	402.0	4.14	—	—

* "Cost of building materials used" refers to the cost to the buyer of only those building materials purchased from the retail lumber yard.

† Where the lumber yard supplied only part of the building materials used, the number of dwellings recorded was 0.5.

Source: Interviews with a sample of Iowa retail lumber dealers, 1948, and a supplementary mail questionnaire, 1949.

of more than 10,000 population (see table 4). Half of the expenditures were made in what can be called rural communities (2,500 or less population).

ESTIMATED TOTAL EXPENDITURE BY FARM FAMILIES

To estimate from these figures the total amount spent by farm families for new farm dwellings in 1948, it is necessary to know what percentage of the total cost of a new dwelling was for building materials purchased from the retail lumber yard.

The assumption was made that the cost of these materials represented about 40 percent of the total cost of the farm dwelling—excluding the cost of land and land improvements. This percentage is based on estimates made by 29 Iowa retail lumber dealers (see table 6) and on a study of the com-

position of housing costs by the National Housing Agency (see table 7).

The National Housing Agency figures are not wholly applicable to the farm housing situation in Iowa. They are based on construction costs in urban centers where contractors and subcontractors were important in building management, where costs were not necessarily the same as in rural areas and where trade channels for building materials sometimes included contractors in lieu of retail lumber yards.¹¹ It is assumed, however, that the contractors' and subcontractors' overhead and profit were absorbed in the Iowa farm housing market by whatever participant assumed their

¹¹ U. S. Housing Agency. Housing costs—where the housing dollar goes. Natl. Housing Bul. 2. p. 44. Natl. Housing Agency, Washington, D. C., 1944.

TABLE 4. THE NUMBER AND VALUE OF BUILDING MATERIALS SALES* FOR NEW FARM DWELLINGS, MAJOR FARM DWELLING REPAIRS AND NEW TOWN DWELLINGS REPORTED BY A SAMPLE OF IOWA RETAIL LUMBER YARDS IN TOWNS OF FOUR POPULATION SIZES, 1948.

Population of town, 1940	Lumber yards in sample		New farm dwellings				Major farm dwelling repairs				New town dwellings	
			Number†		Cost of building materials*		Number†		Cost of building materials*		Number	
	Number	Percentage of total	Total reported	Percentage of total	Total amount reported	Percentage of total	Total reported	Percentage of total	Total amount reported	Percentage of total	Total reported	Percentage of total
10,000 and over	12	10.6	30.0	17.0	\$134,700	17.7	45.0	10.7	\$ 33,630	8.0	138.0	34.3
2,500 to 9,999	18	15.9	47.5	26.9	247,550	32.5	134.0	31.8	96,850	23.2	98.0	24.4
1,000 to 2,499	21	18.6	27.5	15.6	85,000	11.2	83.5	19.8	77,580	18.5	89.0	22.1
Less than 1,000	62	54.9	71.5	40.5	294,425	38.6	159.0	37.7	210,662	50.3	77.0	19.2
Total	113	100.0	176.5	100.0	\$761,675	100.0	421.5	100.0	\$418,722	100.0	402.0	100.0

* "Value of building materials sales" and "cost of building materials" refer to the cost to the buyer of only those building materials purchased from the retail lumber yard.

† Where the lumber yard supplied only part of the building materials used, the number of dwellings recorded was 0.5.

Source: Computed from table 3.

TABLE 5. THE NUMBER OF NEW FARM DWELLINGS AND MAJOR FARM DWELLING REPAIRS AND ESTIMATED AVERAGE COST OF BUILDING MATERIALS* PER LUMBER YARD AND PER DWELLING REPORTED BY A SAMPLE OF IOWA RETAIL LUMBER DEALERS CLASSIFIED ACCORDING TO TYPE OF OPERATION, 1948.

Type of operation	Number of lumber yards reporting	Total number of dwellings†	Number of dwellings per lumber yard	Cost of building materials per lumber yard	Cost of building materials per dwelling
New farm dwellings					
Chain: four or more yards	49	75.5	1.54	\$7,204	\$4,675
Independent	31	69.0	2.23	8,821	3,963
Chain: fewer than four yards	12	22.0	1.83	6,833	3,727
Cooperative	7	10.0	1.43	7,607	5,325
Total	99	176.5	1.78	\$7,694	\$4,315
Major farm dwelling repairs					
Chain: four or more yards	38	288.5	7.59	\$7,417	\$ 977
Independent	20	89.0	4.45	3,961	890
Chain: fewer than four yards	7	25.0	3.57	4,740	1,327
Cooperative	5	19.0	3.80	4,900	1,289
Total	70	421.5	6.02	\$5,982	\$ 993

* "Cost of building materials" refers to the cost to the buyer of only those building materials purchased from the retail lumber yard.

† Where the lumber yard supplied only part of the building materials used, the number of dwellings recorded was 0.5.

Source: Interviews with a sample of Iowa retail lumber dealers, 1948, and a supplementary mail questionnaire, 1949.

functions and that these costs should be retained in the estimate of total costs for the Iowa farm house. If the farmer himself assumed some of the functions of the contractor and of the subcontractor, such costs would be real costs but not money costs to him.

On the basis of these two sets of data, the assumption was made that building materials sold by the retail lumber yard probably represented, on an average, about 40 percent of the total cost of a farm dwelling. This excludes the cost of unimproved land, which is not regarded as an explicit cost in farm housing.

Data from the United States Bureau of Agricultural Economics do not substantiate this conclusion, however. In their 1949 survey of farm construction, the distribution of cash expenditures for new farm houses completed in the United States was: 23 percent for specially hired labor, 58 percent for purchased materials and 19 percent for work done under contract. Since cash expenditures for contract construction include payments for both materials and labor, this figure should be excluded to secure a percentage comparable to that reported by Iowa lumber dealers and by the National Housing Agency. On the basis of total cash expenditures for labor and materials only, the United States Bureau of Agricultural Economics figures for 1949 show 71 percent for materials in the United States and 68 percent in the North and West. If the value of farm produced materials

TABLE 6. ESTIMATED PERCENTAGE OF THE TOTAL COST OF THE AVERAGE NEW FARM DWELLING WHICH WAS ACCOUNTED FOR BY THE COST OF BUILDING MATERIALS SOLD BY THE RETAIL LUMBER YARD AS REPORTED BY MANAGERS OF 29 RETAIL LUMBER YARDS IN IOWA, 1948.

Percentage of total cost for building materials	Number of lumber yards reporting*
55.0	2
50.0	9
45.0	1
42.5	2
40.0	2
35.0	4
32.5	4
30.0	5
Total reporting	29
Mean percentage	40.7
Median percentage	41.3

* Managers of 11 of the 29 yards reporting stated a range within which the percentage fell. These were classified in this table at the mid-point of the stated range.

Source: Interviews with a sample of Iowa retail lumber dealers, 1948.

TABLE 7. AVERAGE PERCENTAGE OF TOTAL COST OF "TYPICAL" NEW HOUSES IN EACH OF 10 SECTIONS OF THE UNITED STATES WHICH WAS ACCOUNTED FOR BY THE COST OF MATERIALS, LABOR, CONTRACTORS' MARGINS AND LAND.

Item	Percentage of total cost*	
	Including the value of unimproved land	Excluding the value of unimproved land
Materials		
Lumber, masonry, concrete, mortar, plaster, lath, wallboard, insulation, roofing, flooring, millwork, paint, finish hardware†	36.82	39.59
Plumbing, heating, electrical materials, miscellaneous	8.88	9.55
Total materials	45.70	49.14
Site labor	29.50	31.72
Contractor's and subcontractors' overhead and profit	12.30	13.23
Total cost of house, excluding land	87.50	94.09
Land		
Value of unimproved land	7.00	—
Land improvements	5.50	5.91
Total cost of house	100.00	100.00

* Based on a weighted average of building costs of a "typical" new house financed under a Federal Housing Administration guaranteed loan in each of 10 areas of the United States. Each of these "typical" houses was supposed to represent average building practices in that area. Estimated costs were derived from FHA appraisal data. Since such data were received by FHA offices monthly, it is probable that the figures given here were for the early 1940's.

† These are the materials most often handled by the retail lumber yard for new farm houses in Iowa.

Source: U. S. National Housing Agency. Housing costs—where the housing dollar goes. Natl. Housing Bul. 2, pp. 24-25. Natl. Housing Agency, 1944.

and labor is included, materials accounted for 63 percent of the total value of the two in the North and West. These figures suggest that materials accounted for a far higher percentage of total value than is indicated by the other two methods of measurement noted above.

However, reference to table 7 will indicate somewhat closer agreement among the three figures than the obvious differences would suggest; for all materials, including those sold by both lumber yards and other dealers, accounted for 52.2 percent of the total cost of the house, excluding land. There is still, however, a great difference between this and the 68 percent (or 63 percent, if farm produced labor and materials are included) figure of the Bureau of Agricultural Economics for the North and West.¹²

The discrepancy of 10 to 15 percentage points between the figures of the Bureau of Agricultural Economics and those reported by 29 Iowa retail lumber dealers could be due to (1) differences between the two in the materials included, (2) differences between Iowa and all states of the North and West in building practices and/or costs or (3) errors in either or both series of data. Because the data in the Bureau of Agricultural Economics study are not exactly comparable to those of the other two series, it would seem wiser to adhere in this study to the 40 percent median which the Iowa dealers reported as the percentage of total cost accounted for by building materials sold by the retail lumber yard. This 40 percent median also receives reasonable substantiation from the National Housing Agency study for urban housing. This is at best, of course, only a rough estimate.

If one assumes that building materials sold by the lumber yard represent about 40 percent of the total cost of the farm dwelling, the total cost of the average new farm dwelling in Iowa in 1948 was about \$11,000,¹³ and the total expenditure for all new farm dwellings in the state in that year was about \$22 million.¹⁴

MAJOR FARM DWELLING REPAIRS

NUMBER

The average retail lumber yard provided building materials for 6.02 (± 1.86) major farm dwelling repairs in Iowa in 1948. The total for the state was 6,900 ($\pm 2,100$). Only a little less than one-tenth of all yards reporting had no major repairs. At the other end of the scale, 17 percent had 10 or more major repairs per yard and accounted for more than half of all reported (see table 2).

¹² Burroughs, Roy J. Farm housing and construction during defense mobilization. Agr. Finance Rev. XIV:41, 1951; and U. S. Department of Agriculture, Bureau of Agricultural Economics. Farm housing and construction. p. 23. U. S. Dept. Agr. 1952. (Processed.)

¹³ Based on the assumption that the estimated cost of building materials purchased from the retail lumber yard per dwelling (\$4,315) was 40 percent of the estimated total cost per dwelling (\$10,788).

¹⁴ Based on the assumption that the estimated total cost of building materials purchased from retail lumber yards for all new farm dwellings in the state (\$8,825,000) was 40 percent of the estimated total cost of all new farm dwellings in the state (\$22,062,000).

Over half of all major farm dwelling repairs were made through yards in towns of less than 2,500 population (see table 4), but the greatest number of major repairs per yard (13.40) was in towns of 2,500 to 10,000 population. There was an average of 3.98 per yard in towns of less than 1,000 population, compared with a statewide average of 6.02 per yard. Differences in the number of major farm dwelling repairs reported by lumber yards in towns of four population sizes were not statistically significant¹⁵ (see table 3). The number per yard was greater in chains of four or more yards than in other types of yards (see table 5).

COST OF BUILDING MATERIALS

Building materials purchased from the retail lumber yard averaged \$990 (\pm \$400) per major farm dwelling repair, or \$6,000 (\pm \$1,600) per lumber yard. These sales were about 50 percent more per lumber yard in towns of 2,500 to 10,000 population than in towns of other sizes. They were also about 50 percent more per yard for four-or-more yard chains than for independents, co-operatives or small chains.

Projection of yard averages to a state level shows that \$6.9 million (\pm \$1.9 million) were spent for building materials for major farm dwelling repairs in Iowa in 1948. Yards in small towns reported a greater proportion of expenditures for major repairs than for new farm dwellings. About 50 percent of expenditures for materials for major farm dwelling repairs were in towns of less than 1,000 population, compared with about 40 percent for new farm dwellings. Only about 30 percent of the amount spent for repairs was in towns of 2,500 or more, compared with about 50 percent for new farm dwellings (see table 4).

ESTIMATED TOTAL EXPENDITURE BY FARM FAMILIES

To convert the average estimated expenditure for building materials for major farm dwelling repairs into an average estimated total expenditure for such repairs, it was necessary to estimate the relationship between material costs and total costs. Since 40 percent was the assumed relationship for new dwellings, 50 percent was used as a reasonable relationship for major repairs. This choice was based on two observations. The first was opinions expressed by a limited number of retail lumber dealers. The second was that cash expenditures for materials for major improvements to farm houses in the North Region in 1949 were reported by farmers as 73 percent of total expenditures for materials and labor combined. This excluded expenditures for contract construction.¹⁶ In the same study, the comparable percentage for new houses was 68. It appears, therefore, that materials represent a higher percentage of the total

¹⁵ $H = 7.23$. When $X^2 = 7.23$ and $n = 3$, P is greater than 0.05 and less than 0.10. See footnote 10.

¹⁶ U. S. Dept. Agr. Farm housing and construction. p. 25.

cost for major repairs than they do for new houses.

On this basis, the average expenditure per major repair was about \$2,000.¹⁷ For the state, the total expenditure was an estimated \$14 million.¹⁸

NEW TOWN DWELLINGS

Town dwellings reported per lumber yard in 1948 were 4.14 (± 1.15). This gave an estimated total for the state of 4,700 ($\pm 1,300$), more than twice the number of new farm dwellings in that year (see table 1). One-third of these were in towns of 10,000 or more population. Differences in the number of new town dwellings reported by yards in towns of four population sizes were significant.¹⁹ The number constructed per yard declined from 13.80 in towns of 10,000 or more population to 1.40 in towns of less than 1,000 population (see table 3).

It appears that these estimates are not close to the true figures. On the basis of 1950 census data, 19,340 rural nonfarm houses and 34,725 urban houses were built during 1945-50.²⁰ Assuming equal distribution of this construction over a 4-year period, one would estimate an average of 4,800 rural nonfarm and 8,700 urban houses per year, or a total nonfarm volume of about 13,500 per year. Estimates from the field study, however, indicate only about 2,000 rural nonfarm and 2,800 urban per year, or a total of 4,700.

It is reasonable to expect that estimates for cities of 10,000 or more population might be incorrect, for four of the ten yards for which estimates were made were given assigned figures.²¹ It is also probable that building volume in large cities accounted for much of the nonfarm construction and that building materials moved through trade channels which did not include the retail lumber yard. It is not so clear why the estimates for smaller towns and rural nonfarm areas differ so much from the census data. However, the data available indicate that the method of estimation described in this study did not yield valid figures for the number of new nonfarm dwelling units. But census data indicate that the method did yield valid figures for the number of new *farm* dwelling units.

ESTIMATED SALES BY RETAIL LUMBER ESTABLISHMENTS AND EXPENDITURES BY FARM FAMILIES FOR FARM DWELLING CONSTRUCTION

The purpose of this section is to summarize the statistical findings relevant to two questions:

¹⁷ Based on the assumption that the estimated cost of building materials purchased from the retail lumber yard per major repair (\$93) was 50 percent of the estimated total cost per major repair (\$1,986).

¹⁸ Based on the assumption that the estimated cost of building materials purchased from the retail lumber yards for all major repairs in the state (\$6,861,000) was 50 percent of the estimated total cost of such repairs in the state (\$13,722,000).

¹⁹ $H = 41.76$. When $X^2 = 41.76$ and $n = 3$, P is less than 0.01. See footnote 10.

²⁰ This is a minimum figure based on reporting dwellings. U. S. Census of Housing: 1950. Iowa Bul. H-A15. p. 15.8.

²¹ See Appendix C.

(1) What amount and percentage of the total sales of Iowa retail lumber yards in 1948 were building materials for new and improved farm dwellings?

(2) How much did Iowa farm families spend for farm dwellings—new dwellings, major repairs and alterations, and minor repairs in 1948?

Answers to these questions make it possible to compare farm housing expenditures with total farm income and to estimate the proportion of total sales of the retail lumber dealer which is accounted for by building materials purchases for farm housing.

METHOD

Two approaches were used in making these estimates. One was to secure from each lumber dealer interviewed an estimate of the average amount spent for building materials by those customers who built new farm dwellings or made major repairs. Each of these estimated dollar averages was multiplied by the number of new farm dwellings and major farm dwelling repairs reported by each dealer and projected to yield a total estimated expenditure figure for the state. On the basis of the assumption that x percent of the total cost of the average new farm dwelling and of the average major farm dwelling repair was represented by the cost of building materials, it is possible to estimate the total amount spent for new dwellings and major repairs in the state.²²

A second approach was used partly as a check and partly to secure estimates of expenditures for minor repairs, which were those in which building materials cost the farmer less than \$500. Lumber dealers were asked to estimate a series of percentages²³ all of which were later converted to a standard base so that they might be compared and a total state estimate computed. These estimates are summarized for the state as a whole and for yards in towns of four population groups (see tables 8 and 9). Both average and median percentages are included in table 8, since the simple averaging of percentages weights both large and small yards equally.

Table 10 takes these estimates one step further in their application to sales data by applying the mean and median percentages for each of three population groups to the estimated total sales of each of these population categories. This yields an estimate of total dollar building materials sales for farm housing made by yards located in towns of three population sizes. The dollar figures are totaled for the state. From these it is known, within a range, about how much was spent in Iowa in 1948 for building materials for new farm dwellings and for major and minor farm dwelling repairs. This method of estimation is based on the assumptions that the original percentage estimates by

²² See table 1.

²³ See questions 6 and 7 in the interview questionnaire, Appendix B.

TABLE 8. ESTIMATED PERCENTAGES OF TOTAL BUILDING MATERIALS SALES OF RETAIL LUMBER YARDS ACCOUNTED FOR BY BUILDING MATERIALS SOLD TO FARMERS FOR FARM DWELLING CONSTRUCTION REPORTED BY A SAMPLE OF RETAIL LUMBER DEALERS IN TOWNS OF FOUR POPULATION SIZES IN IOWA, 1948.

Population of town, 1940	Number of lumber yards reporting*	Sales of building materials as a percentage of total sales	Sales to farmers as a percentage of total building materials sales	Sales of materials for farm dwellings as a percentage of total building materials sales to farmers	Sales of materials for farm dwellings as a percentage of total building materials sales	Sales of materials for farm dwellings as a percentage of total sales
Mean percentage per lumber yard†						
10,000 and over	8	100.0	27.9	37.3	9.5	9.5
2,500 to 9,999	12	81.3	58.3	28.8	17.1	14.0
1,000 to 2,499	17	84.3	67.3	23.7	16.6	13.8
Less than 1,000	37	81.8	81.2	27.6	22.4	18.5
Total	74	84.3‡	68.5§	27.9**	18.8††	15.7‡‡
Median percentage per lumber yard						
10,000 and over	8	100.0	25.0	35.0	7.5	7.5
2,500 to 9,999	12	80.0	60.0	27.5	15.0	13.5
1,000 to 2,499	17	80.0	70.0	20.0	16.0	12.0
Less than 1,000	37	80.0	88.0	25.0	19.0	16.0
Total	74	80.0	75.0	25.0	16.0	14.0

* Excluding estimates of six dealers whose sales of building materials were less than 50 percent of their total volume.

† All figures based on ungrouped data.

‡ The corresponding figure reported in the 1948 census for large and multi-unit establishments in Iowa in 1948 was 84.5 percent. Such establishments accounted for 90.1 percent of total sales of all lumber yards in the state. U. S. Census of Business: 1948. Retail trade, merchandise line sales of lumber, building, hardware group. Bul. 2-R-22. pp. 22.07 and 22.14.

§ On the basis of grouped data, $s = 22.6$, $s\bar{x} = 2.6$.

** On the basis of grouped data, $s = 15.3$, $s\bar{x} = 1.8$.

†† On the basis of grouped data, $s = 11.6$, $s\bar{x} = 1.4$.

‡‡ On the basis of grouped data, $s = 10.0$, $s\bar{x} = 1.2$.

Source: Interviews with a sample of Iowa retail lumber dealers, 1948, and a supplementary mail questionnaire, 1949.

lumber dealers are accurate and that the method described here for summarizing these percentages yields proper weights.

From this figure (these figures, if one uses the range), it is possible to estimate (1) the total expenditure by farm families for farm dwellings, including new dwellings and major and minor repairs, in 1948, and (2) the percentage of total sales of lumber yards and building materials dealers in 1948 which were accounted for by materials sold for farm housing.

TABLE 9. NUMBER AND PERCENTAGE OF A SAMPLE OF RETAIL LUMBER DEALERS REPORTING SALES OF MATERIALS FOR FARM DWELLINGS AS VARIOUS ESTIMATED PERCENTAGES OF TOTAL LUMBER YARD SALES, 1948.

Percentage of sales*	Lumber yards	
	Number	Percentage
50 or more	1	1.4
40 to 49	3	4.1
30 to 39	9	12.1
20 to 29	13	17.6
10 to 19	31	41.9
0 to 9	17	22.9
Total reporting	74	100.0

* Range: 1 percent to 50 percent.

Source: Interviews with a sample of Iowa retail lumber dealers, 1948, and a supplementary mail questionnaire, 1949.

FINDINGS

Tables 8-12 summarize the method and findings on total farm dwelling construction volume.

THE VALUE OF BUILDING MATERIALS USED IN FARM DWELLING CONSTRUCTION AS A PERCENTAGE OF LUMBER YARD SALES

Sales of building materials by retail lumber yards in Iowa in 1948 for farm dwelling construction as a percentage of total sales of these yards were computed for each yard on the basis of the manager's estimate of building materials sales as a percentage of total sales, sales to farmers as an estimated percentage of total building materials sales, and sales for farm dwellings as a percentage of total sales of building materials to farmers. These percentages were combined to yield an estimate of the total percentage of building materials sales of each reporting yard which were made to farmers for farm dwellings. The mean and median of these estimates for each yard were determined for yards in three and four population groups (see tables 8, 9 and 10.)

Table 8 shows that, in the average retail lumber yard, sales of building materials for farm dwellings were about one-fifth of all building materials sales in 1948. This ranged from about 10 percent for yards in towns of 10,000 or more population to 22 percent in towns of less than 1,000 population. Median percentages were one to three percentage points lower for each population group. Since

building materials were only about 85 percent of total sales in 1948,²⁴ building materials for farm dwellings were about 14 percent (based on median) to 16 percent (based on mean) of the total sales of lumber yards. Table 9 shows the distribution of yards according to the estimated percentage of total sales accounted for by building materials for farm dwellings.

Since these mean and median percentages varied according to the population of the town, and since yards in large towns had a greater volume of sales per yard,²⁵ these mean and median percentages were applied to estimated total sales in each of three population groups (see table 10).²⁶ This procedure yielded an estimated volume of total building materials sales for farm dwellings of \$20

million to \$23 million, depending on whether the mean or median percentage was used as a basis. Since the average or median small town yard tended to have the highest percentage of total sales for farm housing, and since small town yards are usually smaller than those in larger towns, the median percentage is probably better to use in this computation than is the average percentage, which would tend to weight the small yard more heavily. Either, of course, gives only a rough approximation.

This very rough estimate suggests that around \$21 million were spent by farmers in 1948 for building materials purchased at the retail lumber yard for new farm dwellings and major and minor farm dwelling repairs. A little more than half of these building materials were sold through yards in towns of less than 2,500 population. The remainder were divided about equally between yards in towns of 2,500 to 10,000 and those in towns of 10,000 or more.

These estimates can then be related to total sales of retail lumber yards to show how important farm housing was to the lumber dealer in 1948 (see table 11). Figure 1 shows that lumber yards and building materials dealers in Iowa in 1948 did about 16 percent of their volume in nonbuilding materials; 47 percent in building materials for nonresidential farm buildings; 12 percent in materials for farm residences; and 25 percent in nonfarm building materials sales. This was only an average or median pattern. It did not neces-

²⁴ U. S. Census of Business: 1948. Retail trade, merchandise line sales of lumber, building, hardware group. Bul. 2-R-22, p. 22.07.

²⁵ U. S. Census of Business: 1948. Retail trade, city size. Bul. 2-R-5, p. 5.10.

²⁶ Sales distribution by population groups was reported for the West North-Central Division but not for Iowa. In table 10 the assumption was made that the \$170.5 million of sales by Iowa retail lumber yards and building materials dealers in 1948 were distributed among towns of three population categories in the same proportion as were total sales in the West North-Central Division, which includes North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa and Missouri. Application of divisional data to Iowa is not necessarily proper. However, Iowa data show that 20.8 percent of total sales of lumber and building materials establishments in Iowa in 1948 were made in the seven largest towns of Iowa. There were 16 other towns of more than 10,000 population in Iowa in 1950, and it seems possible that the 36.4 percent of total sales reported for this population group in the West North-Central Division could have been a rough indication of the percentage for Iowa. U. S. Census of Business: 1948. Retail trade, Iowa. Bul. 1-R-14; and U. S. Census of Population: 1950. Advance reports, population of Iowa; April 1, 1950. Series PC-8, No. 14.

TABLE 10. ESTIMATED BUILDING MATERIALS SALES BY IOWA RETAIL LUMBER YARDS FOR FARM DWELLING CONSTRUCTION, CLASSIFIED ACCORDING TO POPULATION OF TOWN, 1948.*

Population of town, 1950 (col. 1)	Sales in West North-Central Division† as a percentage of total sales in that division (col. 2)	Estimated distribution of sales in Iowa (add 000) (col. 3)	Sales of building materials as a percentage of total sales (col. 4)	Sales of building materials for farm dwellings as a percentage of total building materials sales (col. 5)	Sales of building materials for farm dwellings as a percentage of total sales (col. 6)	Estimated sales of building materials for farm dwellings (add 000) (col. 7)
Based on mean percentage						
10,000 and over	36.4	\$ 62,063	100.0	9.5	9.5	\$ 5,896
2,500 to 9,999	19.9	33,930	81.3	17.1	14.0	4,750
Less than 2,500	43.7	74,510	82.6	20.6	17.0	12,667
Total	100.0	\$170,503	84.3	18.8	15.7	\$23,313‡
Based on median percentage						
10,000 and over	36.4	\$ 62,063	100.0	7.5	7.5	\$ 4,655
2,500 to 9,999	19.9	33,930	80.0	15.0	13.5	4,581
Less than 2,500	43.7	74,510	80.0	18.0	14.0	10,431
Total	100.0	\$170,503	80.0	16.0	14.0	\$19,667‡

* Total sales by retail lumber yards, sales of building materials as an estimated average and median percentage of total sales of retail lumber yards, sales of building materials for farm dwelling construction as an estimated average and median percentage of total building materials sales and of total sales of retail lumber yards, and estimated dollar sales of building materials for farm dwellings, classified according to population of town in Iowa, 1948.

† West North-Central Division includes North Dakota, South Dakota, Nebraska, Kansas, Minnesota, Iowa and Missouri.

‡ These totals are computed as a total of the dollar figures above and not by applying the total percentage of column 6 to the total dollar sales of column 3. This method of computation produces a weighted dollar total.

Source: Column 2 was computed from U. S. Census of Business: 1948. Retail trade, city size, Bul. 2-R-5, p. 5.10. Column 3 was computed by applying the percentages in column 1 to the total Iowa sales for 1948, \$170,503,000, from the U. S. Census of Business: 1948, Retail trade, Iowa Bul. 1-R-14, p. 14.02. Since the distribution of sales by establishments in Iowa was not given according to population of town, it was assumed that figures for the West North-Central Division were applicable to Iowa. The only near-check on this assumption was the fact that cities of 10,000 or more population in the West North-Central Division accounted for 20.8 percent of total sales, while in Iowa, the seven largest cities of the state accounted for 20.8 percent of the state's total sales. There were 16 other cities in Iowa in 1950 with a population of 10,000 or more. Sales figures were from U. S. Census of Business: 1948, Retail trade, Bul. 1-R-14; population figures were from U. S. Bureau of the Census, 1950 Census of Population, Advance reports, population of Iowa; April 1, 1950, Series PC-8, No. 14. Columns 4, 5 and 6 are based on table 8 or on the primary data from which table 8 was drawn. Column 7 was computed by applying the percentage in column 6 to the sales total in column 3.

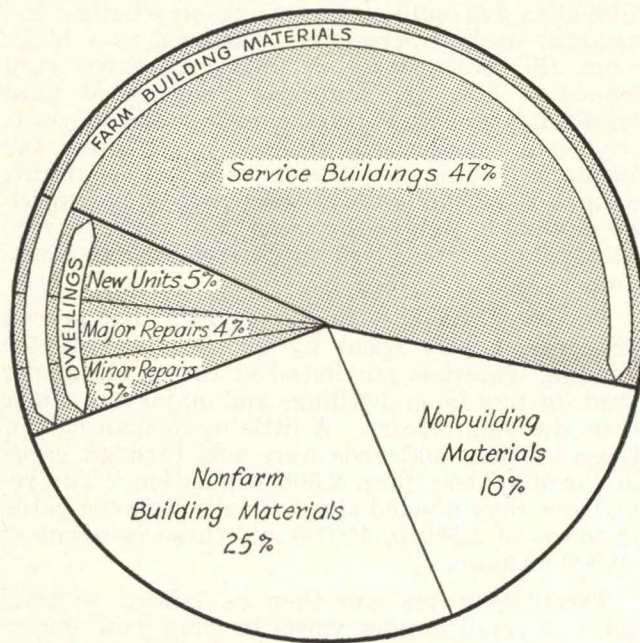


Fig. 1. Estimated percentage distribution of sales by retail lumber yards of Iowa among farm building materials, nonfarm building materials and nonbuilding materials, 1948. Source: Tables 11 and 12. Because of rounding, some of the figures above differ from those in tables 11 and 12 by a fraction of 1 percent.

sarily apply to any one dealer, and it varied according to size of city.²⁷ As an estimate, however, it shows the proportion of total sales made to farm customers by the lumber yards of Iowa. This pro-

TABLE 11. ESTIMATED DOLLAR SALES AND PERCENTAGE OF TOTAL SALES OF IOWA RETAIL LUMBER DEALERS ACCOUNTED FOR BY SALES OF BUILDING MATERIALS TO FARMERS FOR FARM DWELLINGS, 1948.

Type of sale	Sales	
	Amount (add 000)	Percentage of total
Total	\$170,503*	100.0*
Nonbuilding materials	26,428*	15.5*
Building materials	144,075*	84.5*
Building materials to nonfarmers	43,473†	25.5†
Building materials to farmers	100,602‡	59.0‡
Building materials to farmers for service buildings	79,112‡	46.4‡
Building materials to farmers for farm dwellings	21,490‡	12.6‡

* From U. S. Census of Business: 1948. Retail trade, Iowa. Bul. 1-R-14. p. 14.02; and Retail trade, merchandise line sales of lumber, building, hardware group. Bul. 2-R-22.

† Based on an average of mean and median percentages from table 8.

‡ Based on an average of estimated sales of building materials for farm dwellings computed from mean and median percentages from table 10. Comparable figures based on table 8 would yield an estimated volume of \$25,320,000 as sales of building materials to farmers for farm dwellings, or 14.8 percent of total sales.

²⁷ Note especially the standard deviations given in the footnotes of table 8 and also the differences in mean and median percentages according to size of city.

TABLE 12. ESTIMATED TOTAL EXPENDITURES BY IOWA FARMERS FOR NEW DWELLINGS AND MAJOR AND MINOR STRUCTURAL IMPROVEMENTS AND REPAIRS, 1948.

Type of structure, improvement, or repair	Estimated expenditure for building materials purchased from retail lumber yards (add 000,000)	Estimated total cost of building materials as a percentage of the total cost of the construction expenditure*	Estimated total expenditure for construction (add 000,000)
New farm dwellings	\$ 8.8	40	\$22
Major farm dwelling repairs	6.9	50	14
Minor farm dwelling repairs	5.8	50	12
Total	\$21.5	—	\$48

* See text for discussion of basis for choice of percentage.

Source: Computed from tables 1 and 11.

portion increased as the size of the town in which the yard was located decreased (see table 8). Figure 1 also demonstrates that, to yards as a whole, sales of materials for nonresidential farm construction in 1948 were nearly four times as large as were sales of materials for residential structures on farms.

It is important that differences in the amount of building among different yards be recognized, if these figures are to be used along with others to help lumber dealers of the state or to help the public determine the best allocation of resources, or if they are to be used as an indication of reasons for the pattern of functions performed or of possible areas for achieving greater productive efficiency in farm housing construction (see especially tables 2, 3, 5 and 9). Only one-third of all yards made as much as 20 percent of their total sales in 1948 in building materials for farm dwellings. Nearly one-fourth did less than 10 percent of their total volume in farm housing materials.

It is also important to recognize the variation in building volume in any community from year to year and the cyclical fluctuations in such construction. Figures 2 and 3 shows estimates of farm and nonfarm construction volume in the nation as a whole for the period 1915-50. These figures demonstrate the marked cyclical fluctuations in construction expenditures, the slightly greater relative stability of farm dwelling construction expenditures than of farm service building construction expenditures through the cycle, and the greater relative stability of expenditures for additions and alterations on nonfarm houses than for new nonfarm dwelling units. An average or median percentage for 1 year is not, therefore, indicative of all facts regarding farm dwelling construction volume needed to draw valid conclusions about production potentials.

THE ESTIMATED EXPENDITURE BY IOWA FARM FAMILIES FOR FARM DWELLING CONSTRUCTION

Table 12 gives a rough estimate of the total expenditure by Iowa farm families for new and improved farm dwellings in 1948. The estimated total expenditure of \$48 million is based on certain assumptions. It was assumed that the estimated cost of building materials for new farm dwellings was \$9 million and for major farm dwelling repairs, \$7 million (see table 1). If it is assumed that the total expenditure by Iowa farm families for building materials for new farm dwellings was between \$20 and \$23 million (see table 10), then the mid-point, \$21 million, may be used as a rough estimate of total expenditures for materials (see table 11). This shows that about \$6 million were spent for building materials for minor farm dwelling repairs (see table 12).

If it is further assumed that building materials purchased at the retail lumber yard represented 40 percent of the total cost of new farm dwellings to the farm family, excluding the cost of the site,

and that building materials represented 50 percent of the total cost of major and minor farm dwelling repairs,²⁸ the estimated total expenditure in 1948 was \$48 million, divided almost equally between new farm dwellings and all repairs.

The estimated \$22 million spent for new dwellings represent replacement of dwellings destroyed by fire or deterioration and new construction to take care of household growth or, more probably in rural Iowa, geographic redistribution of households²⁹ associated with geographic differentials in

²⁸ See pp. 24-27, where the choice of appropriate percentages is discussed.

²⁹ Iowa's rural population by the 1940 definition in the census (population of those places with less than 2,500 people, including both rural farm and rural nonfarm areas) decreased 4.5 percent between 1940 and 1950, while its urban population by the 1940 definition increased 12.9 percent. U. S. Department of Commerce, Bureau of the Census, 1950 census of population, preliminary counts. Series PC-3, No. 10, p. 7.

Data on rural dwelling vacancy rates indicate that vacancies increased from 3.5 percent of all farm dwelling units in 1940 to 6.5 percent in 1945 and then decreased to 5.0 percent in 1950. However, only 2.2 percent of all 1950 rural farm dwelling units were vacant, nonseasonal, habitable units. It should be noted that the basis of classification of rural farm dwelling units was not quite the same in 1950 as in earlier years. Douglas, An economic appraisal of Iowa farm housing, p. 282; and U. S. Census of Housing: 1950. Bul. H-A15. p. 15.7.

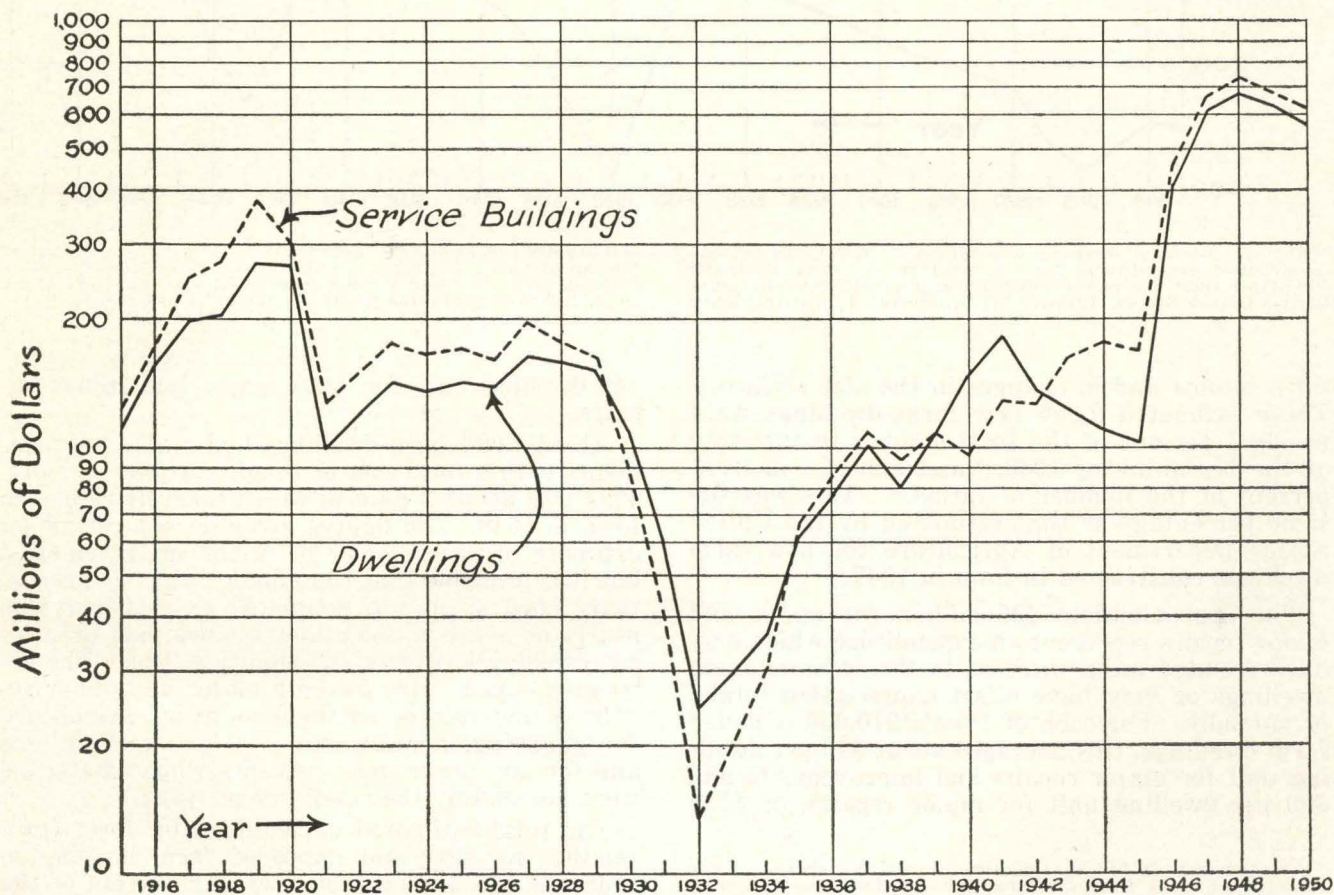


Fig. 2. Farm construction expenditures. Estimated private construction expenditures for new structures and for major additions and alterations on operators' farm dwellings and farm service buildings in the United States, 1915-50. Expenditures for maintenance and repairs are excluded. Source: Based on estimates made by the U. S. Department of Agriculture, Bureau of Agricultural Economics, as published in U. S. Department of Labor, Bureau of Labor Statistics, Division of Construction

Statistics. Expenditures for new construction, 1915-50, pp. 1-5. U. S. Dept. Labor, Washington 25, D. C., August 1951. (Processed.) Field data secured by the Bureau of Agricultural Economics for 1949 indicate that cash expenditures for new dwellings and major improvements were \$736 million (compared with \$621 million in the graph above) and for service buildings, \$558 million (compared with \$671 million in the graph above). (See table 13.)

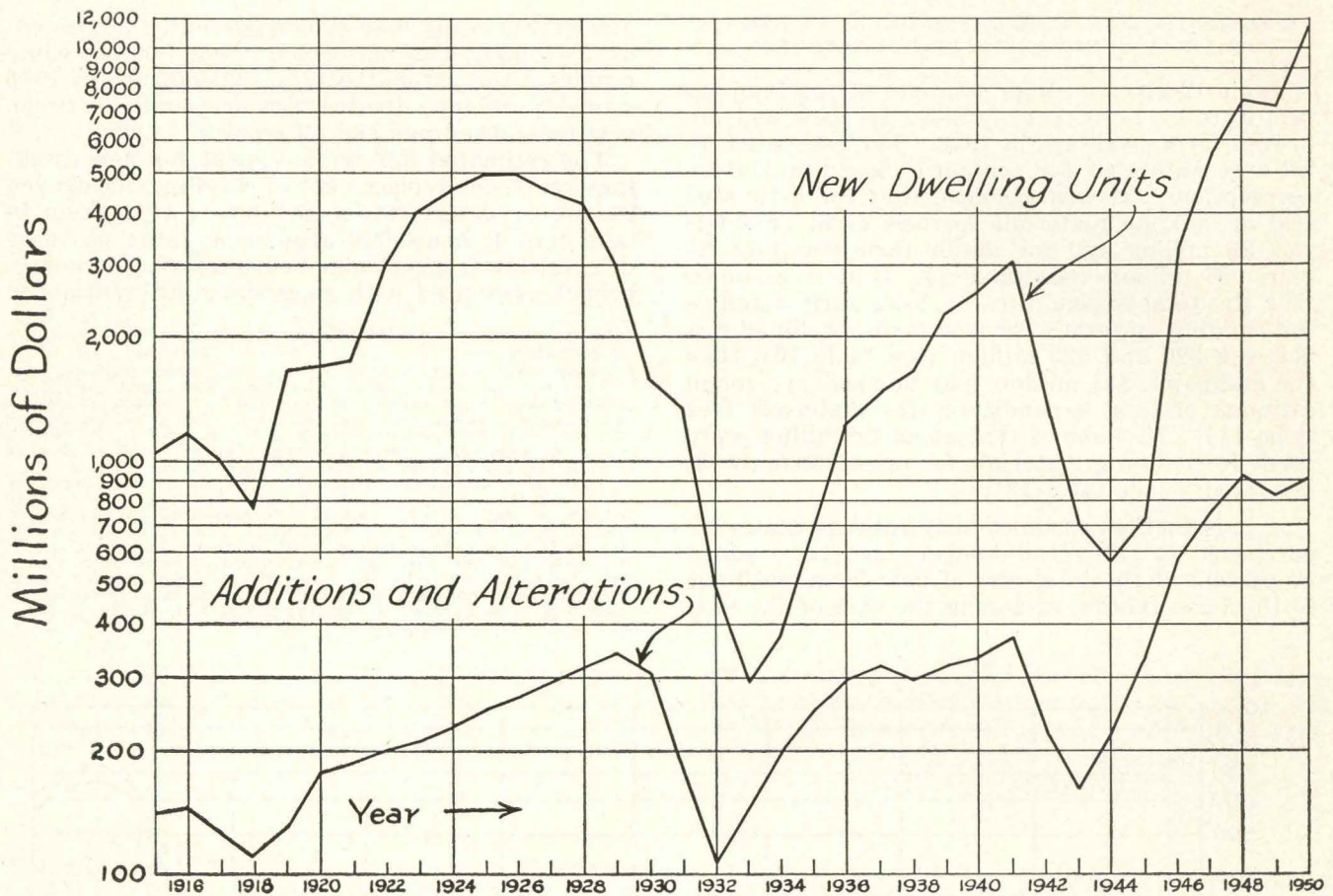


Fig. 3. Nonfarm dwelling expenditures. Estimated private construction expenditures for new nonfarm dwelling units and for major additions and alterations on nonfarm dwelling units in the United States, 1915-50. Expenditures for maintenance

and repairs are excluded. Source: U. S. Department of Labor, Bureau of Labor Statistics, Division of Construction Statistics, Expenditures for new construction, 1915-50, pp. 1-5. U. S. Dept. Labor, Washington 25, D. C., 1951. (Processed.)

farm income and in changes in the size of farms. These estimated 2,000 new farm dwellings were nearly 1 percent of the total number in the state at the beginning of 1948,³⁰ and almost exactly 1 percent of the number of farms.³¹ This was the same percentage as that estimated by the United States Department of Agriculture for new farm dwellings constructed in Iowa in 1947.³²

The approximately \$26 million for major and minor repairs represent an expenditure which may have resulted in an increase in the value of farm dwellings or may have offset depreciation totally or partially. For each of Iowa's 210,000 occupied farm dwellings, this averaged about \$70 per dwelling unit for major repairs and improvements and \$60 per dwelling unit for minor repairs, or \$130

per dwelling unit for both major and minor repairs.

About 7,000 farm dwellings had major improvements with a total cost of roughly \$1,000 or more. This was about 3 percent of all farm dwellings in Iowa in 1948. The figures given do not permit an estimate of the number of minor improvements, but it is probable that the number was far greater than 7,000 since the estimated expenditure was nearly as great as for major repairs, but the cost per dwelling unit was, by definition, less. The estimated expenditure for both major and minor repairs is understated by the amount of expenditure for plumbing, heating and electrical installations and for any other improvements whose materials were not sold by the retail lumber yard.

The total estimated expenditure by Iowa farm families for new and improved farm housing in 1948 was \$48 million, which was 2.2 percent of the estimated \$2,121 million gross cash receipts from farming in Iowa in 1948.³³

A comparison of estimated farm housing expen-

³⁰ See Appendix D for a tabulation of census reports of the number of rural farm dwelling units in Iowa in the period 1940-50.

³¹ Based on 1950 data, 1.1 percent. There were on January 1 of that year 203,159 farms in Iowa. U. S. Census of Agriculture: 1950. Iowa. Vol. I, Pt. 9, p. 3.

³² One percent of a sample of farms in Iowa reported houses were started or completed in 1947. U. S. Department of Agriculture, Bureau of Agricultural Economics. Survey indicates approximately 160,000 new homes built on farms in 1947. U. S. Dept. Agr., Washington, D. C., 1948. (Mimeo.)

³³ U. S. Department of Agriculture. Agricultural Statistics, 1950. U. S. Govt. Print. Off., Washington, D. C., 1951.

ditures in Iowa and in the United States for 1948 shows a few similarities but certain important differences. In both Iowa and the United States, estimated total farm construction cash expenditures represented about 7 percent of total cash receipts (7.2 percent in Iowa; 6.7 percent in the United States).³⁴ Expenditures for the farm dwelling were 2 percent of estimated total cash receipts in Iowa and 3 percent in the United States (2.2 percent and 3.4 percent, respectively). These two estimates suggest a third comparison: Nearly one-third of Iowa's cash expenditures for construction were for housing, compared with slightly more than one-half for the nation as a whole.³⁵ While it is possible that Iowa farm families actually did

allocate an unusually large share of their total housing expenditures for new housing, it is also possible that the method of estimating expenditures in Iowa may have resulted in an understatement of the total amount spent. This could have been due to the method of estimating repair expenditures or to the exclusion of expenditures for plumbing, heating and electrical equipment in the Iowa data.³⁶

The smaller percentage of farms on which new dwellings were constructed in Iowa may reflect the higher quality of farm dwellings in Iowa than in the nation as a whole. The differences between the two in percentage of farms on which major improvements were made and in the average cash expenditure is due, at least partly, to differences in definition.

³⁴ See table 14, especially footnotes, for an explanation of method and sources of data.

³⁵ This difference between Iowa and the nation is also apparent in another study. See Appendix F.

³⁶ See Appendix E.

TABLE 13. ESTIMATED NUMBER OF FARMS ON WHICH VARIOUS TYPES OF CONSTRUCTION TOOK PLACE, CASH EXPENDITURES FOR CONSTRUCTION, VALUE OF FARM PRODUCED MATERIALS AND LABOR USED, AND TOTAL VALUE OF FARM CONSTRUCTION IN THE UNITED STATES, 1949.

Type of construction	Number of		Cash expenditures					Value of farm produced materials and farm labor (add 000,000)	Total value (add 000,000)
	Farms	Buildings	Contract work	Ma-terials	Labor	Total			
	(add 000)					Amount‡	Per-centage of total		
			(add 000,000)					(add 000,000)	
Farm houses									
New dwellings	81	83	\$ 57	\$169	\$ 68	\$ 294	18.1	\$ 34	\$ 328
Major improvements*	796	807	136	234	72	442	27.2	40	482
Repairs†	2,069	2,146	—	—	—	199	12.2	—	199
Total	—	—	—	—	—	\$ 935	57.5	—	\$1,009
Service buildings									
New buildings	678	840	—	\$368	\$ 91	\$ 459	28.3	\$ 92	\$ 551
Major improvements*	286	323	—	77	22	99	6.1	33	132
Repairs†	803	1,187	—	99	33	132	8.1	25	157
Total	—	—	—	\$544	\$146	\$ 690	42.5	\$150	\$ 840
Grand total	—	—	—	—	—	\$1,625	100.0	—	\$1,849

* Major improvements include structural alterations and new facilities, such as lighting and plumbing.

† Repairs include replacements of existing structural parts or equipment.

‡ These figures were derived from a sample survey made in February, April and May, 1950, of 16,000 farms in 382 primary sampling units in the United States. They are representative of the 4,750,000 farms which had 3 or more acres, agricultural production of \$150 or more in 1949 or 1950 and a resident operator. They exclude 629,000 farms reported by the census. Correction to include these 629,000 farms can be made by multiplying the figures in this column of this table by 1.13242, in the case of farm houses, and 1.04414 in the case of service buildings. Total estimated cash expenditures for farm construction in 1949 would thus become, including fences, windmills and pumps, which are not included in the table above:

Type of construction	Millions
Farm houses	
New dwellings	\$333
Major improvements	501
Repairs	225
Total	\$1,059
Service structures	
Buildings	\$720
Fences	190§
Windmills and pumps	100§
Total	\$1,010
Grand total	\$2,069

§ Based on extrapolations of data collected prior to 1949.

Source: U. S. Department of Agriculture, Bureau of Agricultural Economics, Farm housing and construction, pp. 1, 2, 23. U. S. Dept. Agr., Washington, D. C. February, 1952. (Processed); and Burroughs, Roy J. Farm housing and construction during defense mobilization. Agr. Finance Rev. XIV:36-37, 48-49. November 1951. (Processed).

TABLE 14. A COMPARISON OF ESTIMATED FARM HOUSING CONSTRUCTION EXPENDITURES IN IOWA, 1948, AND THE UNITED STATES, 1949.

Characteristic	United States	Iowa
	(percentage)	
Total farm construction cash expenditure as a percentage of total cash receipts*	7	7
Total farm housing construction cash expenditure as a percentage of total cash receipts†	3	2
Total farm housing construction cash expenditure as a percentage of total farm construction cash expenditure‡	51	31
Percentage distribution of total farm housing construction cash expenditure among§		
New dwellings	32	46
Major improvements	47	29
Repairs	21	25
Percentage of all farms on which**		
New dwellings were constructed	2	1
Major dwelling improvements were made	17	3
Dwelling repairs were made	44	††
	(dollars)	
Average total cash expenditure for each‡‡		
New farm dwelling	3,500	11,000
Major farm dwelling improvement	550	2,000
Farm dwelling repair	92	††

* Computed from tables 11 and 12; United States Department of Agriculture, *Agricultural Statistics, 1950*. (Washington: Government Printing Office, 1951), p. 640; and Roy J. Burroughs, *Farm housing and construction during defense mobilization*. *Agricultural Finance Review*, Vol. XIV (November 1951), p. 37. The total expenditure for service buildings in Iowa was estimated from table 11 by assuming that the \$79 million spent for building materials represented 75 percent of the total cost of service facilities constructed, yielding a total estimated expenditure of \$106 million.

† Computed from table 12; and U. S. Department of Agriculture, *op. cit.*; and Burroughs, *op. cit.*

‡ Computed from tables 11 and 12 and Burroughs, *op. cit.*

§ Computed from table 12 and Burroughs, *op. cit.* "Major improvements" and "repairs" are not defined the same way in the Iowa and the national studies. In the Iowa study, "major improvements" (classified in the study as "major repairs") were those in which the cost to the farmer of building materials purchased from the retail lumber yard was \$500 or more. Excluded were improvements for which materials cost less than \$500 or for which materials did not come from the lumber yard, such as plumbing, heating and electrical equipment. Minor repairs were not enumerated by number in the Iowa study since dealers were unable to estimate numbers. The total dollar expenditure for such repairs was estimated by the method explained in the text. Repair expenditures estimated for Iowa were restricted to those involving materials purchased from the retail lumber yard.

In the national study, "major improvements" included structural alterations and new facilities, such as lighting and plumbing. Painting and replacements of existing structural parts or equipment were classified as repairs.

** See above, footnote §, for the differences in classification between the two studies. Based on the 4,750,000 farmers represented by the national survey and on the 203,000 farms in Iowa, 1950. U. S. Department of Agriculture, Bureau of Agricultural Economics, *Farm housing and construction*, p. 1. U. S. Dept. of Agr. Washington, D. C. 1952; and U. S. Census of Agriculture: 1950. Vol. I, Pt. 9. Iowa, p. 3.

†† No data.

‡‡ Computed from tables 11 and 13. See above, footnote §, for the differences in classification between the two studies.

CONCLUSIONS

This study has produced two types of findings: (1) observations on the *method* of obtaining data and of making estimates and (2) the *estimates* themselves. Since any conclusions resulting from the interpretation of the estimates are treated elsewhere,³⁷ this discussion summarizes only those conclusions related to the method of obtaining

data and of making estimates. Until further study, only tentative conclusions can be stated.

Perhaps the best alternative method for collecting construction data is to obtain them directly from farmers. The average farmer is in a better position than anyone else to know his total construction volume, the kinds of construction and the breakdown of costs. Moreover, he would have less to remember and report and would not be subject to the danger of mentally computing averages, as was the retail lumber dealer in the survey described above.

In contrast, the primary advantage of using the retail lumber dealer as a source of information is that it substitutes a single source for many sources and thereby simplifies the procedure for collecting data. However, since the cost of collecting, tabulating and interpreting the data were not computed in this study, the method must, at this stage, be judged on the basis of the validity and reliability of the findings—i. e., whether managers of retail lumber yards are able and willing to report data that will give unbiased estimates and what variability is exhibited by such estimates.

On the basis of evidence available, it appears that this method of estimation yields a valid estimate of the number of new farm dwellings constructed in a given year. It does not yield a valid estimate of the number of nonfarm dwellings.

A second conclusion is that the various series of findings are not of equal validity. One observation made during the field study was that lumber dealers demonstrated less hesitation in reporting the number of new farm dwellings among their customers than the number of major repairs. Because of the smaller number and greater cost of new houses, it is reasonable to assume that every dealer knew with reasonable accuracy the number of new houses. But it is not clear that he was able to report the number of major alterations and repairs with equal accuracy.

Also, it is reasonable to assume that the lumber dealers' estimates of the number of new dwellings are closer to the true figure than are their estimates of the average value of building materials used. The first is a clearer and simpler notion than the second. This is also probably true of the number and cost of major repairs.

Finally, the estimates of total expenditures are probably the weakest of those made, for they are based on a combination of estimated averages. The estimated total expenditure for minor repairs is especially subject to error, because it is based on a residual computed from a total sales figure obtained by weighting subsidiary figures.

The suggestions below indicate how the method described in this study might be improved, what additional information is needed and how the results might be checked.

1. As presented here, the estimates could be improved by:
 - a. Fewer nonresponses, thereby making it unnecessary to assign estimates to certain

³⁷ Douglas. The retail lumber establishment and farm dwelling construction in Iowa.

yards or to eliminate them from the final tabulation. Nonresponses due to lack of knowledge cannot, however, be eliminated.

- b. Sharper lines of differentiation between the definition of new houses; major alterations, additions and conversions; and major and minor repairs, to make the breakdown of data by type of construction precise and more meaningful.
 - c. Obtaining data on total sales of reporting dealers to increase the validity of the estimates of total expenditures. Cooperation from lumber dealers in reporting this information would greatly increase the accuracy of the final estimates.
 - d. Studies of the breakdown of total expenditures for various productive factors (labor, materials, etc.) as a basis for making better estimates of total expenditures from data on the sales of building materials alone.
2. It is also desirable that estimates of construction volume obtained by the method described here be supplemented with data on expenditures for minor repairs and for the purchase and installation of materials (e. g., plumbing, heating and electrical) not sold by the retail lumber yard.
 3. Before a final conclusion can be reached, the method described should be compared with alternative methods and evaluated in terms of relative (a) validity and reliability, and (b) costs of estimation. One criterion of evaluation is to determine whether a method yields estimates sufficiently close to the true figures to warrant the cost of making the estimate.

In general, observations on the method described in this study indicate that the procedure does best that which it was originally designed to do—i. e., provide those estimates of construction volume and of related building materials sales which are useful in estimating the relative importance of farm dwelling construction to the retail lumber industry and to different classifications of establishments within the industry. It is least satisfactory in providing estimates of such things as total expenditures for construction, much of which did not move through the retail lumber firm.

A useful future project would be the estimation of construction volume in a smaller area by two or more methods and comparison of the results and cost. Field studies among farmers, lumber yards and carpenters (or contractors) might be made.

APPENDIX A

ESTIMATES OF FARM AND NONFARM RESIDENTIAL CONSTRUCTION VOLUME

NONFARM

One of the most widely used residential series is the monthly estimates of the number of non-

farm dwelling units started which are made by the United States Department of Labor, Bureau of Labor Statistics, Division of Construction Statistics. These estimates are based on building permit data and field studies and are reported each month (or year) in official government publications: *Construction and Monthly Labor Review*, United States Department of Labor, Washington, D. C., monthly; *Survey of Current Business and Construction and Building Materials*, United States Department of Commerce, Washington, D. C., monthly; and *Housing Statistics*, United States Housing and Home Finance Agency, Washington, D. C., monthly.

Estimates of the value of construction work put in place since 1915 have been made jointly by the United States Departments of Labor and Commerce and are reported in *Construction and Building Materials, Statistical Supplement*, United States Department of Commerce, Washington, D. C., 1952, and in *Expenditures for New Construction, 1915-1950*, United States Department of Labor, Washington, D. C., 1951 (see fig. 3). Another current but more limited series is that of the F. W. Dodge Corporation, Statistical and Research Division, New York, *Contracts Awarded in 37 Eastern States*, computed monthly by the corporation.

Additional historical data are available in David L. Wickens and Ray R. Foster, *Non-Farm Residential Construction, 1920-1936*, Bulletin 65, National Bureau of Economic Research, New York, 1937; David L. Wickens, *Residential Real Estate*, National Bureau of Economic Research, New York, 1941; David M. Blank, *The Volume of Residential Construction, 1889-1950*, Technical Paper 9, National Bureau of Economic Research, New York, 1954; Lowell J. Chawner, *The Residential Building Process*, Housing Monograph Series 1, United States National Resources Committee, U. S. Government Printing Office, Washington, D. C., 1939; and Clarence D. Long, *Building Cycles and the Theory of Investment*, Princeton University Press, Princeton, 1940.

Two unpublished sources of historical data are John R. Riggelman, *Variations in Building Activity in United States Cities*, unpublished thesis, Johns Hopkins University, 1934, and Walter Isard, *The Economic Dynamics of Transport Technology*, unpublished thesis, Yale University, 1947. Data from these unpublished sources are available in Miles L. Colean and Robinson Newcomb, *Stabilizing Construction: The Record and Potential*, McGraw-Hill Book Co., Inc., New York, 1952.

Summaries and interpretations of published and unpublished statistical data are available in Blank, *op. cit.*; Colean and Newcomb, *op. cit.*, and Twentieth Century Fund, *American Housing*, Twentieth Century Fund, New York, 1944.

Data on nonfarm residential construction in Iowa are collected through cooperative efforts of the Iowa Department of Labor and the United States Bureau of Labor Statistics and are reported in *Iowa Business Digest*, State University of Iowa,

College of Commerce, Bureau of Business and Economic Research, Iowa City, monthly.

FARM

The only comprehensive annual estimates of farm dwelling construction volume are those of the United States Department of Agriculture, Bureau of Agricultural Economics. These were first reported in C. M. Purves and C. A. Gibbons, "Expenditures for and Depreciation of Permanent Improvements on Farms, 1910-14," *Income Parity for Agriculture*, Pt. II, *Expenses of Agricultural Production*, Sec. 5, United States Department of Agriculture, Washington, D. C., 1941, preliminary. Current monthly estimates are made by the United States Department of Commerce on the basis of the trend of farm income and known seasonal variations in construction volume. A summary of annual estimates of the Department of Agriculture and monthly estimates of the Department of Commerce are reported in United States Department of Labor, *Expenditures for New Construction, 1915-1950* (see fig. 2).

Certain farm construction data are summarized in Twentieth Century Fund, *op. cit.*, and in Colean and Newcomb, *op. cit.*

Results of a field survey to determine the volume of farm dwelling construction in 1947 are reported in United States Department of Agriculture, Bureau of Agricultural Economics, "Survey Indicates Approximately 160,000 New Homes Built on Farms in 1947," United States Department of Agriculture, Washington, D. C., 1948. A more comprehensive field survey among farm families for 1949 is reported in United States Department of Agriculture, Bureau of Agricultural Economics, *Farm Housing and Construction*, United States Department of Agriculture, Washington, D. C., 1952.

APPENDIX B

FIELD SURVEY METHODS

A field survey was made during the fall months of 1947 and 1948 among approximately 10 percent of the retail lumber dealers of Iowa. The purpose was to obtain information by interview on certain structural characteristics of the retail lumber industry, operating practices related to farm housing and the estimated volume of construction. The sections below describe the sample, the interview questionnaire and the supplementary mail questionnaire.

THE SAMPLE

The 1,147 retail lumber yards in Iowa, as reported in the Northwestern Blue Book for 1947,¹ were arrayed by counties, listed alphabetically; within counties, by towns, listed alphabetically; and within towns, by yards, listed alphabetically. A number was chosen at random between, and in-

¹ Northwestern Lumbermen's Association. Northwestern Blue Book for 1947. Minneapolis. 1947.

cluding, one and ten, and every tenth yard was identified on the list. These comprised the original sample of 113 yards. Substitutions were made during the field survey for 16 of these yards. This was done where the manager was not available for an interview, where the manager was so new that he had had no experience as a basis for answering questions, or where he refused to answer most or all questions. In 15 cases, a substitution was selected from the same town, if another yard was there, or from the nearest town of approximately the same size in the same county. In the sixteenth case, a yard was selected at random from among a group of four adjacent counties in south-central Iowa where no yard had come up in the sample because of the alphabetical basis for distribution. These 16 substitutions resulted in a slight increase in the percentage of yards classified as line yards but practically no change in distribution of sample yards among towns of various population sizes. Table B-1 shows certain characteristics of the total and sample populations.

THE INTERVIEW QUESTIONNAIRE

Questions were of both the specific, short-answer and the open-end types. Answers to questions 1, 2, 3 and 4 were used in studies of the structure of the Iowa retail lumber industry and of the industry's housebuilding functions. Questions 5, 6 and 7 were those relevant to this particular study.

TABLE B-1. TOTAL AND SAMPLE LUMBER YARD POPULATIONS IN IOWA, 1947, CLASSIFIED ACCORDING TO TYPE OF OPERATION AND POPULATION OF TOWN, 1940.

Characteristic	The state		Sample	
	Number	Percentage	Number*	Percentage
Type of operation, 1947	Lumber yards			
Chain	678	59.1	73 (10)	64.6
Independent	389	33.9	33 (7)	29.2
Cooperative	80	7.0	7 (1)	6.2
Total	1,147	100.0	113 (18)	100.0
Population, 1940	Lumber yards			
50,000 and over	47	4.1	5 (0)	4.4
25,000 to 49,999	30	2.6	3 (1)	2.7
10,000 to 24,999	38	3.3	4 (3)	3.5
5,000 to 9,999	66	5.8	6 (2)	5.3
2,500 to 4,999	101	8.8	12 (3)	10.6
1,000 to 2,499	201	17.5	21 (4)	18.6
Less than 1,000	577	50.3	57 (5)	50.5
Unincorporated	87	7.6	5 (0)	4.4
Total	1,147	100.0	113 (18)	100.0
	Counties			
Number of counties	99	—	90	—

* The number in parentheses indicates how many of the total number in the sample were surveyed by interview in 1947 and again by mail questionnaire to which they replied in 1949. For example, 73 chain yards were drawn in the sample. Managers of 10 of these granted an interview in 1947 and also replied to a supplementary mail questionnaire in 1949. The other 63 were interviewed in 1948 or are included among those not reporting the statistical data.

Source: Number of yards according to type of operation, 1947, from Northwestern Blue Book. Northwestern Lumbermen's Association, Minneapolis. 1947. Population data from U. S. Census of Population: 1940. Vol. I. pp. 379-382.

Statistical data collected during the 1947 interviews were made comparable to those collected in 1948 by a supplementary mail questionnaire sent on March 28, 1949, to the thirty-one 1947 interviewees. Eighteen dealers (58 percent) replied. These are indicated in table B-1. A copy of the mail questionnaire is included below.

QUESTIONNAIRE USED IN FIELD SURVEY AMONG 113 IOWA RETAIL
LUMBER AND BUILDING MATERIAL DEALERS,
1947 AND 1948

1. a. Which of the following items do you sell: (1) lumber; (2) millwork; (3) roofing; (4) bricks, tile; (5) building stone; (6) cement; (7) ready-mixed concrete; (8) lime, plaster; (9) builders' hardware; (10) paint, varnish; (11) glass; (12) wallpaper; (13) iron, steel building materials; (14) wallboard; (15) insulating materials; (16) coal, coke; (17) ice; (18) fuel oil; (19) fencing, gates, posts; (20) farm implements; (21) heating equipment; (22) plumbing equipment; (23) grain, feed, fertilizers; (24) other?
- b. What percent of your total sales this year would you estimate were building materials (excluding such things as coal, oil, farm implements, heating and plumbing equipment, grain and feed)?
2. a. Approximately what percent of your purchases of lumber this year were southern lumber?
- b. Would that percent hold for pre-war years also?
- c. Why do you prefer (northern, southern) lumber?
- d. (If line yard) Which of the products you handle do you buy, and which does the head office buy?
- e. (If line yard) Do you set your own prices, or are they set by the head office?
3. a. From what area do you draw your customers?
- b. What keeps your area within those limits?
- c. Is competition among lumber dealers in this area mainly in prices or services?
- d. What are the best ways you have discovered for meeting competition from other yards?
- e. Are your prices delivered prices or f.o.b.?
4. a. Suppose that a farmer near here decides to build a new house. How does he usually go about it?
- b. How is that different from the way a person here in town would build his house?
- c. What are the principal differences between the way a farmer gets his house built and the way he gets his other farm buildings built?
- d. How soon after he gets his building materials from you for a new house does the farmer (or carpenter or contractor) usually pay for them?
5. a. Approximately how many do you have here in town? (1) contractors; (2) carpenters (finish and rough); (3) masons; (4) electricians; (5) plumbers; (6) plasterers.
- b. (If lack) Where do you get from?
- c. Are any of them organized into unions?
6. a. How many new farm houses have you supplied materials for this year? (all; part)
- b. How many of those will be completed by December?
- c. What would you estimate is the average total cost of those new houses?
- d. On an average, about how much of that is for the materials from your yard?
- e. How many new houses have you supplied materials for here in town? (all; part)
- f. How many of those will be completed by December?
- g. What would you estimate is the average total cost of these new town houses?
- h. If we consider a major repair as one requiring \$500 worth or more of materials, approximately how many of your farm customers have made major repairs on their houses this year?
- i. What was the average amount spent for materials from your yard for one of these repairs?
7. a. Approximately what percent of your sales of building materials this year were made to farmers?
- b. About what percent were made to farmers before the war?
- c. Of your total building materials sales to farmers this year, approximately what percent was for farm buildings and what percent was for the family dwelling?
- d. Is that about what it was before the war?
- e. Of the total amount sold to farmers this year for the family dwelling, about what percent was for new housing and what percent was for repairs?
- f. Of the total amount of materials you sold here in town this year, what percent would you estimate was for housing?

1948 FARM AND TOWN
CONSTRUCTION ESTIMATES

1. How many *new farm dwellings* (residences) did you supply materials for in 1948? Number started.....
Number completed.....
What was the *average cost* of building materials purchased from your yard for each of these new farm dwellings? \$.....
2. Approximately how many of your farm customers made dwelling repairs in 1948 where the materials bought from your yard cost *more than \$500*? Number.....
What was the *average building materials bill for your yard* on these jobs? \$.....
3. Approximately how many of your farm customers made dwelling repairs in 1948 where the materials bought from your yard cost *less than \$500*? Number.....
What was the *average building materials bill for your yard* on these jobs? \$.....
4. How many *new town dwellings* did you supply materials for in 1948? Number started.....
Number completed.....
What was the *average cost* of building materials purchased from your yard for each of these new town dwellings? \$.....
5. Of your total *building material sales* in 1948, what percent would you estimate were made to farmers?% to farmers
6. Approximately how% for family dwellings (new and repairs)
were these building material sales to farmers in 1948% for other farm buildings (new and repairs)
divided between
family dwellings and other farm build-ings?% total building material sales to farmers

Please use back of sheet for any comments.

APPENDIX C

ESTIMATING THE NUMBER AND VALUE OF NEW FARM DWELLINGS AND MAJOR FARM DWELLING REPAIRS FOR NON- REPORTING YARDS

Not all of the 113 retail lumber dealers included in the original sample were able (in a few cases, willing) to estimate the number of, and value of building materials used² in, new farm dwellings and major farm dwelling repairs by their customers. It was apparently easier for them to report the number of new farm dwellings than the number of major improvements, and easier to report the number of new dwellings or major improvements than the estimated average value of materials sold by the lumber yard for such construction. For example, 98 yards reported the number of new farm dwellings, while 88.5³ reported the estimated value of materials used in these dwellings. Only 61 could estimate the number of major improvements and only 46 could estimate the value of materials used. However, 93 dealers were able to estimate the number of nonfarm dwellings constructed (see table C-1).

Since several dealers did not report construction volume, it seemed desirable to supply estimates for some of these missing figures. A preliminary analysis of data from reporting yards showed that the proportion of total yards reporting differed among towns of four different population sizes. It also showed that the volume and value of construction reported by yards differed according to the

² "Value of building materials used" refers in this and the discussion below to the cost to the farmer of only those building materials purchased from the retail lumber yard for use in the kind of farm dwelling construction under discussion.

³ See table 1, footnote **.

TABLE C-1. ACTUAL AND SYNTHETIC NUMBER OF RETAIL LUMBER YARDS IN IOWA REPORTING NUMBER OF NEW FARM DWELLINGS AND VALUE OF BUILDING MATERIALS USED,* NUMBER OF MAJOR FARM DWELLING REPAIRS AND VALUE OF BUILDING MATERIALS USED, AND NUMBER OF NEW TOWN DWELLINGS, 1948.

Population of town in which yard is located, 1940 (col. 1)	Number of yards in Iowa, 1947 (col. 2)	Number of yards reporting, 1948 (col. 3)	Proportion of total yards reporting (col. 4)	Number of yards for which estimates were assigned (col. 5)	Total number of yards for which estimates were reported or assigned (col. 6)	Proportion of total yards for which estimates were reported or assigned (col. 7)
Yards reporting number of new farm dwellings						
10,000 and over	115	9	1/12.8	1	10	1/11.5
2,500 to 9,999	167	14	1/11.9	0	14	1/11.9
1,000 to 2,499	201	19	1/10.5	0	19	1/10.5
Less than 1,000	664	56	1/11.9	0	56	1/11.9
Total	1,147	98	1/11.7	1	99	1/11.7
Yards reporting value of building materials used in new farm dwellings						
10,000 and over	115	9	1/12.8	1	10	1/11.5
2,500 to 9,999	167	14	1/11.9	0	14	1/11.9
1,000 to 2,499	201	17	1/11.8	2	19	1/10.5
Less than 1,000	664	48.5†	1/13.6	7.5	56	1/11.9
Total	1,147	88.5†	1/12.9	10.5	99	1/11.7
Yards reporting number of major farm dwelling repairs						
10,000 and over	115	5	1/23.0	2	7	1/16.4
2,500 to 9,999	167	10	1/16.7	0	10	1/16.7
1,000 to 2,499	201	13	1/15.5	0	13	1/15.5
Less than 1,000	664	33	1/20.0	7	40	1/16.8
Total	1,147	61	1/19.0	9	70	1/16.4
Yards reporting value of building materials used in major farm dwelling repairs						
10,000 and over	115	5	1/23.0	2	7	1/16.4
2,500 to 9,999	167	8	1/20.9	2	10	1/16.7
1,000 to 2,499	201	10	1/20.1	3	13	1/15.5
Less than 1,000	664	23	1/29.0	17	40	1/16.8
Total	1,147	46	1/25.0	24	70	1/16.4
Yards reporting number of new town dwellings						
10,000 and over	115	6	1/19.7	4	10	1/11.5
2,500 to 9,999	167	14	1/11.9	0	14	1/11.9
1,000 to 2,499	201	18	1/11.2	0	18	1/11.2
Less than 1,000	664	55	1/12.1	0	55	1/12.1
Total	1,147	93	1/12.3	4	97	1/11.8

* "Value of building materials used" refers to the cost to the farmer of only those building materials purchased from the retail lumber yard for the designated type of construction.

† One dealer, who supplied materials for two dwellings was able to estimate the value of materials for only one of the two dwellings.

Source: Column 1. U. S. Census of Population: 1940. Vol. I, pp. 379-382.

Column 2. Northwestern Blue Book. Northwestern Lumbermen's Association, Minneapolis, 1947.

Column 3. From interviews with retail lumber dealers, 1948, supplemented with a mail questionnaire, 1949.

Column 4. Column 3 divided by column 2.

Column 5. Number added to equalize sampling fractions (see text).

Column 6. Column 3 plus column 5.

Column 7. Column 6 divided by column 2.

size of town. Therefore, the first problem was to decide for how many nonreporting yards estimates of missing data would be assigned. The second problem was to make the estimates.

The method used to determine how many and in which population groups estimates of missing data should be made, was to equalize approximately the proportion of total yards in each of four population groups for which data were reported or estimates were to be assigned. The number of yards for which data were reported or estimates were assigned are shown in table C-1. Number of units constructed was reported more frequently than value of materials used. Since it seemed desirable to have the number of estimates equal for these two, more estimates were assigned for value than for number of units. The most serious correction that had to be made was for yards in towns of less than 1,000 population, especially in value of materials used in major farm dwelling repairs, where estimates were assigned

for nearly half of the total yards included in the final figures. The only other instance in which the proportion of assigned estimates was nearly so high was for the number of town dwellings in towns of 10,000 or more, where lumber yards were large and building construction so great that managers frequently were unable to estimate the number of houses for which they had sold materials. Estimates were assigned for four of the ten yards in this category.

Including these various assigned estimates for nonreporting yards increased the proportion of total yards for which some number or value was available, either from that reported by the dealer or from the estimate assigned by the investigator. Thus, estimates for the number and value of new farm dwellings were reported by or assigned to one-twelfth of all yards in the state; for the number and value of major farm dwelling repairs, one-sixteenth of all yards; and for the number of new town dwellings, one-twelfth of all yards. These

proportions were approximately the same for towns of each of the four population groups (see table C-1).

The second problem was to assign a proper figure for number of structures and/or value of building materials to each nonreporting yard for which an estimate was to be made. The assumption underlying the choice of an estimate was that nonreporting yards were most like reporting yards in towns of that same size. Therefore, information secured from reporting yards was used as the basis for arriving at an estimate. The methods employed in arriving at each of the five types of estimates for nonreporting yards are described below.

(1) *Number of new farm dwellings.* One method was used to estimate the number of new farm dwellings for which the nonreporting lumber yard provided materials. Four scatter diagrams were drawn, one for reporting yards in towns of each of four population groups, in which one variable was sales to farmers as a percentage of total building materials sales and the other variable was the number of new farm dwellings for which the lumber yard provided materials as a percentage of the total number (farm plus nonfarm) for which materials were provided. An estimating line was fitted by inspection. If a yard failed to report the number of new farm dwellings but did report the estimated percentage of total building materials sales to farmers and the number of new town dwellings, the regression line in the scatter diagram for the proper population group could be used as a basis for estimating by inspection the number of new dwellings (farm plus nonfarm) and, by subtraction, for estimating the number of new farm dwellings. This method of estimation was used for one yard.

(2) *The average value of building materials used in new farm dwellings.* Two methods were used to estimate this figure. (a) Scatter diagrams were made for each of the four population groups. These showed the relationship between sales by the lumber yard of building materials for farm dwellings as a percentage of total sales of building materials and the total dollar value of building materials sold for new farm dwellings and major farm dwelling repairs. The diagrams were then fitted by inspection with estimating lines. If the dealer reported sales of materials for farm dwellings as a percentage of total sales, the related total value of building materials used for new farm dwellings and major repairs could be read from the graph. Also, if the dealer reported the estimated number of and average expenditure for major farm dwelling repairs, the estimated total expenditure for major farm dwelling repairs could be determined and subtracted from the estimated total expenditure read from the graph to determine the amount spent for new dwellings. This amount, divided by the number of dwellings constructed, yielded an average expenditure per dwelling. This method of estimation was used for two yards.

(b) There were 7.5⁴ yards for which the value of materials used in major farm dwelling repairs was not reported. Therefore, the method described above could not be used. To each of these yards was assigned the average value for reporting yards of that population group.

One other yard had a value of \$0 assigned to it, since the method of estimating number of new farm dwellings described above indicated that none was constructed.

(3) *Number of major farm dwelling repairs.* One method was used to estimate missing data on the number of major farm dwelling repairs for which lumber yards provided materials. Four scatter diagrams were drawn showing the relationship between the number of new farm dwellings and the number of major farm dwelling repairs for reporting yards in each of four population groups. An estimating line was fitted to each by inspection. If the number of new farm dwellings was reported, the number of major farm dwelling repairs could be estimated from the graph. *Estimates derived by this method are probably the least satisfactory of any described in this section.* The correlation appeared to be low⁵ and, in the case of towns of less than 1,000 population, the estimating line was curvilinear. The method was used to estimate number of major farm dwelling repairs for nine yards, two in towns of 10,000 or more population and seven in towns of less than 1,000 population. In both of these population groups, the estimating line appeared to be a better fit than it was for towns of intermediate sizes.

(4) *The average value of building materials used in major farm dwelling repairs.* Three methods were used to estimate this figure:

(a) Scatter diagrams for each of the four population groups, showing the relation between sales of building materials for farm dwellings as a percentage of total sales of building materials and the total dollar value of building materials sold for new farm dwellings and major farm dwelling repairs, were fitted by inspection with estimating lines.⁶ If the dealer reported sales of materials for farm dwellings as a percentage of total sales, the related value of building materials used for new farm dwellings and major repairs could be read from the graph. Also, if the dealer reported the estimated number of and average expenditure for new farm dwellings, the estimated total expenditure for new dwellings could be determined and subtracted from the estimated total expenditure read from the graph to determine the total amount spent for major farm dwelling repairs. This amount, divided by the number of major farm

⁴ One dealer could estimate the value of materials for only one of two farm dwellings constructed.

⁵ This statement is based only upon inspection of the scatter diagram.

⁶ These were the same as the scatter diagrams described above as method (a) for estimating the average value of building materials used in new farm dwellings.

dwelling repairs, yielded an estimated average expenditure per major repair.

This method was used to make estimates for 11 yards. It was not used where data on new farm dwelling expenditures were not given, nor was it used where the results were illogical (for example, where the resulting expenditure figure was much bigger than that of most other yards of that population group).

(b) A second method was substituted where necessary data were given and where it produced more reasonable results than the method described above. In this case, the scatter diagrams and estimating lines fitted by inspection showed the relationship between sales to farmers for farm dwellings as a percentage of total building materials sales to farmers and the total dollar value of building materials for new farm dwellings and major farm dwelling repairs. If the dealer reported sales to farmers for farm dwellings as a percentage of total building materials sales to farmers, the values read from the graphs for total dollar value of building materials for new farm dwellings and major farm dwelling repairs were used, as above, to determine estimated average value of building materials for major farm dwelling repairs. This method was used for two yards.

(c) The remaining 11 yards for which value figures were sought, for which the two methods described above yielded illogical or inconsistent results, or for which necessary data for using these methods were lacking, were assigned the average value figure for yards in towns of that population group.

(5) *The number of new town dwellings.* One method was used to estimate the number of new town dwellings for which the lumber yard provided materials. Scatter diagrams were drawn showing the relationship between sales to farmers as a percentage of total sales of building materials and number of new town dwellings reported by yards in each of four population groups (see fig. C-1). Estimating lines were fitted by inspection. If sales to farmers as a percentage of total building materials sales were reported by the dealer, the estimated number of new town dwellings could be read from the graph. This was done for four yards, all in towns of 10,000 or more population.

The method of estimation described in this section may be illustrated by an examination of fig. C-1. Eight percent of the building materials sales of Yard 2 were to farmers. According to the estimating line of fig. C-1, yards in towns of 10,000 or more population whose sales to farmers were about 8 percent of total building materials sales (read on the X-axis) provided materials for about 23 new town dwellings, and this estimate was assigned to Yard 2. Figure C-1 is included as an illustration of this method of estimation because it is neither the best nor the worst example of the scatter diagrams used. Nearly all other scatter diagrams showed more observations (as many as 49 in one case), but most of them showed what

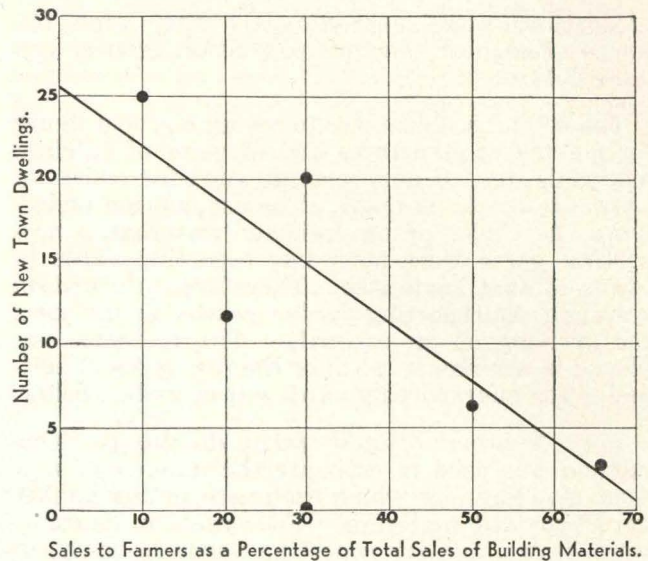


Fig. C-1. The relationship between sales to farmers as a percentage of total sales of building materials and number of new town dwellings reported by six Iowa retail lumber dealers in towns of 10,000 or more population, 1948. The estimating line was fitted by inspection. Source: Computed from basic data obtained through interviews with Iowa retail lumber dealers, 1948, and a supplementary mail questionnaire, 1949.

would appear to be lower correlations than that in fig. C-1.

The methods for making these estimates are not completely satisfactory. But since there was a problem of missing data, the assumptions and procedures described above for assigning estimates for some of these missing figures appeared to be reasonable. It seemed better to use even these crude methods than to ignore the problem.

APPENDIX D

THE NUMBER OF RURAL FARM DWELLING UNITS IN IOWA, 1940-50

Census data on the number of rural farm dwelling units in Iowa 1940, 1945 and 1950 are given in table D-1.

TABLE D-1. NUMBER OF RURAL FARM DWELLING UNITS IN IOWA, 1940, 1945 AND 1950.

Year	Number of dwelling units		Source
	Total	Occupied	
1940	236,741	228,354	U. S. Census of Housing: 1940. Vol. II, Pt. 3. p. 9.
1945	235,575	220,252	U. S. Census of Agriculture: 1945. Vol. I, Pt. 9. p. 2.
1950	218,141	206,980	U. S. Census of Housing: 1950. Bul. H-A15. p. 15.5.

Differences between the number of farm dwellings in 1940 and in 1950 would normally be due to: (1) additions from (a) completely new units constructed or (b) from conversions and (2) losses from (a) fire, wind, storm, (b) from demolitions or (c) from units moved to nonfarm areas or to another state.

In addition to these "usual" factors which affect the number of rural farm dwelling units reported was the fact that the method of identifying a rural farm dwelling unit in 1950 was not exactly the same as in earlier years. Therefore, this classification is not comparable for 1940 and 1950.

It is also known that units moved from farm areas played some part in the change in Iowa farm housing inventory between 1945 and 1950. Several lumber dealers reported that vacant rural farm dwellings were moved from farms to small towns in Iowa during the housing shortage following World War II.

TABLE D-2. THE NUMBER OF DWELLING UNITS IN IOWA, 1940 AND 1950.

Area	Number of dwelling units				
	Total		Increase 1940-50	Built 1940-50	Increase minus built
	1940	1950			
Urban	320,989	390,779	69,790	52,755	17,035
Rural nonfarm	168,924	202,992	34,068	25,576	8,492
Rural farm	236,741	218,141	-18,600	12,870	-31,470
Total	726,654	811,912	85,258	91,201	-5,943

Source: U. S. Census of Housing: 1940, Vol. II, Pt. 3, pp. 9 and 16; and U. S. Census of Housing: 1950, Iowa, Bul. H-A15, p. 15.8.

Table D-2 throws a little light on what happened during this period. The increase in the number of reported nonfarm houses was about 104,000, while only about 77,000 new houses were reported built during these 10 years. But about 19,000 rural farm houses "disappeared," even though 13,000 were reported as being built.

The 26,000 additional nonfarm houses not accounted for came from conversions, from the "disappearing" farm houses which were moved into town, or from a census reclassification of farm and nonfarm houses. The 31,000 "loss" on farms is so close to the 26,000 unaccounted for gain in nonfarm areas, it would seem reasonable to believe that a good share of this unaccounted for gain came either from reclassification or from an actual movement of farm houses.

None of these estimates includes fire losses or demolitions. These are known to have occurred

but are probably a small percentage of the total number of dwelling units.

APPENDIX E

ESTIMATED INSTALLATIONS OF PLUMBING, HEATING AND ELECTRICAL EQUIPMENT BY IOWA FARM FAMILIES, 1948

Table E-1 indicates the number and percentage of rural farm dwelling units in Iowa in 1940 and 1950 with five types of housing facilities. Since the basis for identifying rural farm dwelling units was not exactly the same for both years, and since the number reporting was never 100 percent of all units, absolute numbers are rounded to the nearest thousand.

This table indicates a marked increase in facilities between 1940 and 1950. The greatest increase was in electricity. Many of these new facilities involved expenditures for structural changes which were reported by retail lumber dealers. Most, however, involved greater dollar expenditures than were reported by dealers. For example, the estimated average expenditure for certain facilities installed during 1942-45 were:⁷

Bathtub	\$ 89
Water (pipe, bathroom fixtures excluding bathtub, or heater)	185
Furnace	372
Electric wiring	88

These estimates do not include the cost of lumber and similar building materials or labor.

Census figures for running water and electricity provide a basis for estimating the proportion of the decade's increase which occurred in 1948. The percentage of farm dwellings with running water increased as follows:

	Percentage
1940	21.5
1945	31.9
1950	52.9

⁷ Computed from U. S. Department of Agriculture, Production and Marketing Administration, Field Service Branch, Des Moines, Iowa, Construction permit records, 1942-45 and reported in Douglas, Edna, An economic appraisal of Iowa farm housing, Iowa Agr. Exp. Sta. Res. Bul. 367, p. 309, 1949.

TABLE E-1. THE NUMBER AND PERCENTAGE OF ALL REPORTING RURAL FARM DWELLING UNITS IN IOWA WITH SPECIFIED FACILITY, 1940 AND 1950.

Facility	1940		1950		Estimated increase in number	
	Number (add 000,000)	Percentage	Number (add 000,000)	Percentage	1940-1950	1948
					(add 000)	
Electricity	92	39.5	195	90.9	103	12
Running water in dwelling unit (hot or cold)	50	21.5	114	52.9	64	8
Bathtub or shower (private)	36	15.4	83	38.6	47	6
Flush toilet (private)	35	14.8	77	35.7	42	6
Central heating	60	26.5	77	37.7	17	2

Source: U. S. Census of Housing: 1940, Second series, general characteristics, Iowa, pp. 13, 14, 20; and U. S. Census of Housing: 1950, Iowa, Bul. H-A15, pp. 15.11 and 15.14.

Two-thirds of the increase took place in the last 5 years of the 1940's. If one-fifth of this is allocated to 1948, an estimated 8,000 farm dwellings added running water in that year.

The percentage of rural farm dwellings with electricity increased more rapidly:

	<i>Percentage</i>
1940	39.5
1945	62.5
1950	90.9

Only three-fifths of the growth took place during the last 5 years. Perhaps an estimated 12,000 rural farm dwellings added electricity in 1948. These houses are not mutually exclusive; in some houses more than one facility may have been added in that year.

APPENDIX F

A COMPARISON OF FARM HOUSING CONSTRUCTION ESTIMATES FOR IOWA AND THE UNITED STATES

Estimates of expenditures for farm construction in the United States in 1949⁸ are compared in the sections below with estimates from the Iowa study for 1948.

NEW FARM DWELLINGS: COST OF BUILDING MATERIALS

Building materials provided by the lumber yard for each new farm dwelling in Iowa averaged \$4,300 (\pm \$1,300) per dwelling unit.

This compares with an average cash expenditure of \$3,500 for materials in new farm houses completed in 1949 in the North and West Regions, which include the New England, Middle Atlantic, East and West North-Central, Mountain and Pacific states. The average for the United States was \$2,000. National estimates include all materials, not merely those purchased from retail lumber yards, but exclude materials sold under contract. Figures for Iowa include only materials sold by retail lumber yards.

NEW FARM DWELLINGS: TOTAL COST

The average new farm dwelling in Iowa in 1948 cost an estimated \$10,800 for labor and materials, excluding land and land improvements.

This compares with an average total cash expenditure of \$6,200 per new farm house in the North and West Regions in 1949, or an average total value of \$6,700, including both cash expenditures and the value of farm produced materials and farm labor. Comparable national figures were \$2,000 average cash expenditure for materials, \$3,500 average total cash expenditures and \$3,900 average total value. The estimated value of farm produced labor and materials represented 10.2 percent of the total value of new farm houses con-

structed in the United States in 1949. In the North Region, it was 8.4 percent, represented chiefly by farm produced labor, and in the South, 12.2 percent, represented chiefly by farm produced materials.

MAJOR FARM DWELLING REPAIRS: COST OF BUILDING MATERIALS AND TOTAL COST

Building materials purchased from the retail lumber yard averaged \$990 (\pm \$400) per major farm dwelling repair in Iowa in 1948. The estimated total cost per dwelling was \$1,986.

Data for the United States for 1949 are not classified exactly the same way as those in the Iowa study. National expenditures for farm housing are listed for new farm houses, major improvements (additions, remodeling and installation of facilities), and repairs (including painting). Total cash expenditures for major improvements in the North Region averaged \$710 per dwelling unit. Materials accounted for \$340, labor for \$130 and contract construction for \$240. Repairs averaged \$92 per dwelling in the North Region. Estimates of materials sales in Iowa for major repairs include only sales by lumber yards greater than \$500 per dwelling unit. Therefore, they exclude sales of less than \$500 and such materials as plumbing, electrical and heating equipment. Estimates of materials sales in the nation exclude materials sold under contract, which are included in contract sales.

The value of farm produced labor and materials represented a smaller percentage of the total value of major improvements nationally than was true for new houses. Such materials and labor were 8.2 percent of the total value of major improvements in the United States and varied among the three regions: 7.2 percent in the North, 8.3 percent in the South and 12.2 percent in the West.

Total estimated expenditures for major and minor repairs on all Iowa farm dwellings were used to estimate the average expenditure for each of the state's 210,000 occupied farm dwellings. For the state as a whole, the average per dwelling unit was \$70 for major repairs and improvements, \$60 for minor repairs or \$130 for both major and minor repairs.

The United States National Housing Agency estimated in 1944 that it would cost about \$100 per year to maintain a dwelling unit originally valued at \$5,000 for a lifetime of 40 years, depreciating at the rate of 2 percent per year, with a value at the end of 40 years of \$600.⁹ This was to include not only minor maintenance in the usual sense but also replacement of a refrigerator about three times during the period and the kitchen range about twice. However, these two appliances were not to be included in the \$5,000 original value. The \$100 was not to provide for major alterations or repairs which would raise the property value at the end of 40 years above \$600. The figure of \$100 per year for maintenance

⁸ U. S. Department of Agriculture, Bureau of Agricultural Economics. Farm housing and construction. U. S. Dept. Agr., Washington, D. C. 1952. (Processed). Except where indicated, national and regional data in the sections following are from this source.

⁹ U. S. National Housing Agency. Housing costs—where the housing dollar goes. Natl. Housing Bul. 2. pp. 18-19. Natl. Housing Agency, Washington, D. C. 1944.

costs was selected somewhat arbitrarily in the absence of adequate records on maintenance expenditure.

In another study,¹⁰ data for 1935-36 on owner-occupied dwelling units show that 35 percent of reporting households in Dubuque, Iowa, made repairs. The average expenditure for households making repairs was \$80; for all households reporting, \$28. Households reporting from Omaha-Council Bluffs indicated that 47 percent made repairs. The average expenditure for each repair was \$126, or \$59 for all households reporting. In 1941, the average expenditure for repairs on owner-occupied dwellings was \$56 in the North and \$52 in the West. Expenditures increased with increasing size of city.

RELATIVE EXPENDITURES FOR SERVICE BUILDINGS AND DWELLINGS

Estimated expenditures for farm housing construction in Iowa in 1948 were 31 percent of estimated total farm construction expenditures, compared with 51 percent in the United States in 1949.

For the period 1915-50, total expenditures for farm service buildings in the United States exceeded those for farm dwellings in all years except 1930-34 and 1940-42, when dwelling expenditures were greater. Expenditures for the two were the same in 1939¹¹ (see fig. 2).

A 1947 study¹² shows that in 22 out of 34 states or groups of states, the estimated percentage of farms which constructed new farm dwellings or repaired or remodeled old ones was greater than (in three states, equal to) the percentage which constructed or repaired service buildings. The 12 states in which service building construction was more frequent than dwelling construction were, with two exceptions, north-central states: Pennsylvania, Delaware and Maryland (reported as one state), Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, North Dakota, South Dakota, and Nebraska. In Iowa, 37 percent of the farmers reported service building construction (new buildings or repairs), compared with 25 percent which reported housing construction (new or repairs). Only in South Dakota were these two percentages so far apart: 38 percent for service buildings, 18 percent for houses.

¹⁰ Stephan, Frieda J. and J. Joseph W. Palmer. The pattern of expenditures for nonfarm residential repair and maintenance. Economic Series 55. pp. 8 and 11. U. S. Dept. Com., Bur. For. and Dom. Commerce, 1946.

¹¹ U. S. Department of Labor. Expenditures for new construction, 1915-1950. Washington, D. C. 1951.

¹² U. S. Department of Agriculture, Bureau of Agricultural Economics. Survey indicates approximately 160,000 new homes built on farms in 1947. Washington, D. C. 1948. (Mimeo.)

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