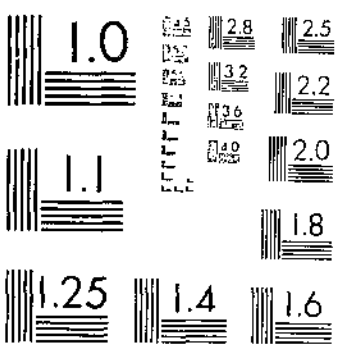
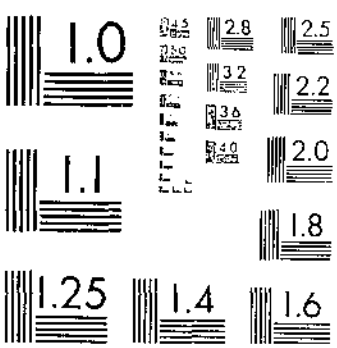
START



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A



MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS 1963-A

TECHNICAL BULLETIN No. 347 FEBRUARY, 1933

UNITED STATES DEPARTMENT OF AGRICULTURE
WASHINGTON, D. C.

AN ECONOMIC STUDY OF BROOMCORN PRODUCTION[1]

By R. S. WASHBURN, *Assistant Agricultural Economist, Division of Farm Management and Costs, Bureau of Agricultural Economics,* and J. H. MARTIN, *Senior Agronomist, Division of Cereal Crops and Diseases, Bureau of Plant Industry.*

The Bureau of Agricultural Economics and Bureau of Plant Industry in Cooperation with the Agricultural Experiment Stations of Illinois and Kansas

CONTENTS

INTRODUCTION

Broomcorn is unique among our agricultural products in that the brush has practically only one use—the making of brooms. A surplus of broomcorn brush can not be used as food for livestock and is not utilized in other industries. More extensive use of brooms is not stimulated by lower prices, and the export market is decidedly limited. The consumption of broomcorn brush therefore has almost a fixed limit. A short supply of broomcorn brush often results in a very high price, and an oversupply forces the price down to a point that is disastrous to growers.

Broomcorn probably can be grown in nearly every State. Violent fluctuations in production and prices and the heavy cash expense necessary in harvesting and preparing the brush for market frequently make broomcorn one of the most speculative of farm crops.

[1]Acknowledgment is due H. C. M. Case, head of the department of farm organization and management, Illinois Agricultural Experiment Station, and W. E. Grimes, head of the department of agricultural economics, Kansas Agricultural Experiment Station, for cooperation in planning the study in their respective States. Credit is also due Peter Nelson, formerly of the Illinois Agricultural Experiment Station, and R. D. Nichols, formerly of the Kansas Agricultural Experiment Station, for assistance in collecting the basic field data.

151527°—33——1

TREND OF BROOMCORN PRODUCTION

ORIGIN AND INTRODUCTION OF BROOMCORN

The origin of the broomcorn plant has never been determined. It belongs to the group of plants known as sorghums (*Holcus sorghum L., Andropogon sorghum, Brot., Sorghum vulgare Pers.*) but differs from other sorghums in that the branches of the head are produced in the form of a brush. Broomcorn has not been found growing indigenously in Africa nor in Asia, except in Russian Turkestan, although some of the types of sorghums from China and India have brushy heads which can be used for brooms.

Broomcorn probably has been grown in Europe for more than 300 years. Heuze states that it was introduced into Europe in 1596 (*9, v. 1, p. 293*).[2] Possibly it was grown in Europe previous to that date. Apparently the earliest definite report of broomcorn growing in Europe was that of Caspar Bauhin, who states that it was grown in Italy in 1658 (*6, p. 510–516*). At present, broomcorn is grown to a considerable extent in northern Italy, southern France, Hungary, and, to a limited extent, in many other foreign countries.

The introduction of broomcorn into the United States has been credited to Benjamin Franklin according to the following story:

> Doctor Franklin chanced to see an imported corn whisk in the possession of a lady, and whilst examining it as a novelty, he espied a grain of it still attached to the stalk. This he took and planted, and so we at length have got it in abundance among us (*16, v. 2, p. 487*).

The date of introduction is not definitely known.

Another writer has given a somewhat different version of its introduction; he indicates that the plant came from India.

> The seed of broomcorn is a native of the East India, and it is said that Benj. Franklin, while in England, in the year 1725 acquired a seed from a whisp he notice a lady using. He brought it to America, planted and propagated it (*7, p. 8–9*).

This latter origin is doubtful as broomcorn is not now, and apparently never has been, grown in India except experimentally.

According to Thomas Jefferson, broomcorn was grown to some extent in Virginia as early as 1781: "Besides these plants, which are native, our *farms* produce wheat, rye, barley, oats, buckwheat and broomcorn" (*11, p. 42*).

The growing of broomcorn on a commercial scale in this country began in the Connecticut Valley at Hadley, Mass. "According to the Hampshire Gazette, Samuel Hopkins of Hadley was the first to raise broomcorn in this vicinity, about 1778" (*12*).

> Rev. Enoch Hale of Westhampton, in his Diary, May 19, 1785, records that he "sowed broomcorn;" and a few hills may have been planted in several gardens before 1797. Levi Dickinson of Hadley, however, is entitled to the credit of conceiving the plan of raising broomcorn abundantly, and of supplying the country with brooms. * * *.
>
> Levi Dickinson, a native of Wethersfield, Conn., obtained a little broomseed, and planted some hills in his garden, on the upper part of the old back-street of Hadley, in 1797. From the seed of this he planted half an acre of broomcorn in 1798,—the first half acre cultivated for brooms in America. In 1799 he planted an acre, and more in succeeding years. * * *
>
> In 1855, assessors of Hadley returned 906 acres of broomcorn, producing 700 lbs. per acre, worth at 10 cents per pound, 63,420 dollars; and 60 bushels of seed

[2] Italic numbers in parentheses refer to Literature Cited, p. 41

per acre, worth at 40 cents per bushel, 21,744 dollars. They returned brooms made in Hadley, 541,120 valued at 118,550 dollars, and 35,000 brushes worth 2,625 dollars (*13, p. 368–369*).

There were 41 places in Hadley making brooms.

SHIFTS OF BROOMCORN GROWING

Shortly after broomcorn had become established in Massachusetts the production began to shift westward. Soon broomcorn became an important crop in the Mohawk Valley of New York. It was grown extensively by Shakers. "The Shaker community at Watervliet, N. Y., are said to have first made brooms for sale in 1798" (*5, p. 11*). Production later moved westward from New York and had assumed considerable importance in the Scioto Valley of Ohio by 1846.

* * * Mr. Eaton, of Chillicothe, who I understand has this season grown the same crop [broomcorn] near Circleville and Chillicothe, in all to the amount of 1000 acres, which has been very nicely prepared, put in bales and pressed, and has already gone forward to be shipped to England, where the owner has workmen employed in manufacturing it into brooms (*10*).

During the late fifties the crop became established in Illinois. One farmer near Rockford, Ill., was reported to have grown 800 acres of broomcorn in 1859 (*2*). John Cofer, of Arcola, Ill., a member of the Illinois Legislature, was reported to have begun the cultivation of broomcorn in east-central Illinois in 1861, where it is still grown extensively. He obtained the seed in Tennessee (*15*).

During the seventies, considerable broomcorn was grown west of the Mississippi. In Kansas, where the crop is still important, production began in 1870.

McPherson County is given credit for having produced the first broomcorn in Kansas. It was in the year 1869 that a Swedish family by the name of Hawkinson came to McPherson County from Illinois. They brought with them quite a lot of broomcorn seed. Knowing that it was a paying sod crop, in the spring of 1870 they planted 80 acres on their claim which they had staked out near Marquette in McPherson County (*3*).

The Smoky Hill and Arkansas Valleys were the chief centers of broomcorn production in Kansas for many years.

The first census reports on broomcorn are for production in the year 1879. Broomcorn was grown to some extent in New York, Ohio, Nebraska, Iowa, Missouri, and California, but even at this early date about 60 per cent of the production was in Illinois and Kansas. The shifts westward were into sections of higher temperatures more favorable for the production of high-quality broomcorn. The following quotation mentions some causes of the shift in production, which occurred more than 75 years ago:

About 1850 the farmers upon the western prairies began the raising of broom corn, exclusively for the brush. It was of larger growth, long and straight, cut while green, and kiln-dried [probably shed cured], and was much better than the brush raised in this [Connecticut] valley, and soon occupied the market. The brooms made from the western brush were of handsome color, the brush having been cut before ripening, they were stronger and a better broom in every way, the outside being covered with the hurls of the brush and no broom made from the native brush could compete with them.

Sixty years has made a great change; the broom-corn industry has left the Connecticut Valley, never to return, and the raising of tobacco and onions seems to have taken the place of broom corn, as the crops relied upon by the farmer for bringing him ready money (*12*).

By 1889 Nebraska was third in importance as a broomcorn State and was exceeded only by Kansas and Illinois. Broomcorn had largely disappeared from New York and Ohio. The crop in Illinois had become more concentrated in the east-central portion of the State and had shifted westward both in Kansas and Nebraska.

Acreage in 1899 showed some increase in Missouri, while acreage in Nebraska had declined. Illinois had become the most important of the broomcorn States, while the increase in acreage in Kansas was only moderate. The crop had made its appearance in Texas, Colorado, and Oklahoma. In the decade 1889–1899 the increase in total broomcorn acreage in the United States was approximately 90 per cent.

By 1909 broomcorn had largely disappeared from Iowa, Missouri, and Nebraska. The crop in Illinois had declined materially, whereas there was a marked increase in acreage in Oklahoma. In 1909 Oklahoma was the leading broomcorn State. Broomcorn had advanced into New Mexico and had moved toward the southwest in Kansas. In Oklahoma the broomcorn acreage of greatest density was in the northwestern part of the State, although the industry became established in the Lindsay district of south-central Oklahoma about this time. The crop in Illinois was confined to the east-central part of the State. During the decade 1899–1909 the increase in total United States broomcorn acreage was approximately 83 per cent.

Broomcorn had become firmly established in the semiarid region of the Southwest by 1919. It had largely disappeared from central Kansas, but had become important in the southwestern part of the State, and was of considerable importance in New Mexico and Colorado. South-central Oklahoma, including the Lindsay district, as well as western Oklahoma were sections of heavy production. A new broomcorn district appeared in the lower Rio Grande Valley in Texas.

By 1929 broomcorn acreage with the exception of that in east-central Illinois was practically all concentrated in the Southwest. Broomcorn acreage in the lower Rio Grande Valley of Texas had largely disappeared, while that of Colorado and New Mexico had increased materially. Southeastern Colorado and northeastern New Mexico were important broomcorn regions. The most recent expansion of broomcorn growing has been in southeastern Colorado and northeastern New Mexico.

As broomcorn is drought resistant, it is adapted to the semiarid conditions of the Plains States, where the choice of cash crops is limited. East-central Illinois and the Lindsay district of Oklahoma are the only humid sections in this country in which broomcorn is grown extensively at present. There the farmers produce a high quality of brush and have a well-established market. Broomcorn has been more profitable for them than have most other crops because of good yields and relatively high prices.

QUANTITY OF BROOMCORN PRODUCED

With the exception of a slight production in Texas and Missouri, broomcorn at present is concentrated in Oklahoma, New Mexico, Colorado, Kansas, and Illinois. The reported production in the United States, according to the census, reached a total of 14,736 short tons in 1879. Census reports by 10-year periods, show an increase to 56,515 short tons in 1919. The first reports on acreage devoted to

broomcorn production are for 1889, in which 93,423 acres were grown as compared with 337,806 acres in 1919. (Table 1.) Starting with 1919, acreage and production are shown in Table 2 as estimated by the United States Department of Agriculture.

TABLE 1.—*Broomcorn acreage and production by States, census years 1879–1929*

State and division	Acreage [1]					Production					
	1889	1899	1909	1919	1929	1879	1889	1899	1909	1919	1929
	Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Massachusetts	1	11	2	-------	-------	27	[2]	[2]	1	-------	-------
Connecticut	1	[3]	[2]	[4]	2	2	[2]	[2]	1	[2]	[2]
New York	993	356	2	3	-------	1,403	225	101	1	1	-------
New Jersey	6	11	11	14	-------	14	2	2	3	5	-------
Pennsylvania	57	221	108	946	47	126	18	57	22	147	9
North Atlantic	1,058	599	123	963	49	1,632	245	160	28	153	9
Ohio	1,574	802	170	735	52	752	401	269	46	173	18
Indiana	413	815	323	613	166	215	79	192	77	123	34
Illinois	34,340	95,137	38,452	16,409	21,403	5,822	7,966	30,333	9,655	4,622	5,378
Michigan	11	51	4	27	-------	31	3	12	1	5	-------
Wisconsin	157	64	28	11	-------	101	46	19	7	3	-------
Minnesota	90	149	13	7	12	34	21	38	5	2	2
Iowa	1,108	2,220	156	168	19	585	283	589	38	52	7
Missouri	2,618	10,219	5,339	3,072	987	1,580	526	1,847	887	350	146
North Dakota	-------	3	18	-------	-------	1	-------	1	4	-------	-------
South Dakota	237	239	64	89	11	-------	59	50	18	14	2
Nebraska	16,792	6,627	458	506	159	676	3,257	1,367	79	85	42
Kansas	30,717	34,383	41,064	11,447	49,872	2,842	5,405	5,907	4,384	1,763	6,973
North Central	88,047	150,709	86,089	33,084	72,681	12,839	18,046	40,624	15,201	7,192	12,602
Delaware	14	4	13	9	-------	4	1	2	2	2	-------
Maryland	8	93	19	234	2	20	2	18	10	40	[2]
Virginia	140	1,702	107	360	39	64	22	332	23	58	17
West Virginia	31	82	45	125	1	63	7	16	15	20	[2]
North Carolina	15	67	15	71	17	-------	3	15	3	12	3
South Carolina	54	21	2	2	1	-------	7	6	[2]	1	[2]
Georgia	33	31	22	160	20	-------	4	9	4	26	4
Florida	171	34	-------	-------	-------	-------	98	2	-------	-------	-------
South Atlantic	466	2,004	223	961	80	151	144	400	57	159	24
Kentucky	195	839	342	353	50	-------	46	192	78	59	11
Tennessee	1,439	3,444	1,348	2,247	380	-------	205	508	174	392	57
Alabama	61	152	52	295	28	-------	13	28	9	20	5
Mississippi	41	214	154	309	35	-------	12	72	30	44	9
Arkansas	135	879	332	911	190	-------	27	152	53	141	62
Louisiana	24	107	320	207	47	-------	6	21	46	34	10
Oklahoma	[5] 59	[5] 12,763	216,350	232,733	124,990	-------	[5] 8	[5] 1,783	21,371	35,706	17,938
Texas	500	3,743	9,448	39,748	10,069	-------	158	819	1,184	7,142	1,482
South Central	2,550	22,141	228,346	276,803	135,801	-------	475	3,575	22,945	43,638	19,574
Idaho	13	1	-------	17	11	[2]	2	[2]	-------	4	5
Wyoming	-------	-------	-------	15	-------	-------	-------	-------	-------	3	-------
Colorado	301	1,241	5,031	10,588	64,248	2	30	113	594	2,314	9,200
New Mexico	102	14	4,470	13,113	38,636	-------	12	3	322	2,638	6,150
Arizona	-------	30	14	50	23	[3]	-------	11	3	10	4
Utah	16	19	-------	23	-------	8	7	2	[3]	6	-------
Washington	65	67	183	4	-------	8	11	10	23	1	-------
Oregon	-------	-------	-------	7	-------	-------	-------	-------	-------	1	-------
California	875	1,609	1,023	2,178	114	96	300	573	307	396	24
Far Western	1,302	3,041	11,321	25,995	103,032	114	368	712	1,249	5,373	15,380
United States	93,423	178,584	326,102	337,806	311,643	14,730	19,278	45,471	39,480	56,515	47,598

United States census reports.

[1] Not reported in 1879.
[2] Less than 1 ton.
[3] Not reported.
[4] Less than 1 acre.
[5] Includes Indian Territory.

TABLE 2.—*Broomcorn acreage and production for principal producing States, 1919–1931*

State	1919		1920		1921		1922		1923	
	Acreage	Production	Acreage	Production	Acreage	Production	Acreage	Production	Acreage	Production
	Acres	*Short tons*	*Acres*	*Short tons*	*Acres*	*Short tons*	*Acres*	*Short tons*	*Acres*	*Short tons*
Illinois	16,000	4,800	20,000	5,000	16,000	4,400	21,000	7,100	40,000	10,200
Missouri	3,000	400	3,000	500	3,000	600	3,000	700	4,000	900
Kansas	11,000	1,800	11,000	2,100	10,000	1,700	16,000	3,100	70,000	13,000
Oklahoma	233,000	35,800	178,000	22,200	140,000	24,100	195,000	20,500	273,000	32,800
Texas	40,000	7,100	33,000	3,800	25,000	3,900	16,000	3,000	51,000	9,300
Colorado	11,000	2,300	7,000	1,500	9,000	1,900	10,000	1,800	48,000	8,800
New Mexico	13,000	2,600	14,000	2,700	13,000	2,600	14,000	2,000	50,000	6,400
Total	327,000	54,600	266,000	37,800	222,000	39,200	275,000	38,200	536,000	81,400

State	1924		1925		1926		1927	
	Acreage	Production	Acreage	Production	Acreage	Production	Acreage	Production
	Acres	*Short tons*	*Acres*	*Short tons*	*Acres*	*Short tons*	*Acres*	*Short tons*
Illinois	49,000	11,300	30,000	8,700	40,000	8,000	28,000	5,700
Missouri	4,000	600	3,000	400	2,000	200	1,000	200
Kansas	45,000	6,600	22,000	3,100	33,000	5,100	29,000	5,100
Oklahoma	246,000	45,400	120,000	12,600	169,000	29,000	106,000	19,000
Texas	23,000	4,800	12,000	1,800	16,000	3,100	11,000	1,300
Colorado	19,000	2,500	15,000	1,900	30,000	3,400	35,000	5,800
New Mexico	48,000	6,500	24,000	2,700	29,000	4,400	22,000	2,500
Total	434,000	77,700	226,000	31,200	319,000	54,700	232,000	40,200

State	1928		1929		1930		1931	
	Acreage	Production	Acreage	Production	Acreage	Production	Acreage	Production
	Acres	*Short tons*	*Acres*	*Short tons*	*Acres*	*Short tons*	*Acres*	*Short tons*
Illinois	20,000	4,800	21,000	5,300	28,000	7,800	28,000	8,100
Missouri	1,000	200	1,000	200	1,000	100	1,000	200
Kansas	47,000	9,600	50,000	7,000	60,000	7,400	24,000	3,500
Oklahoma	128,000	23,000	125,000	17,900	164,000	17,100	144,000	18,000
Texas	12,000	1,400	10,000	1,500	10,000	1,400	10,000	1,500
Colorado	53,000	9,500	64,000	9,200	77,000	10,400	45,000	5,600
New Mexico	38,000	5,300	39,000	6,200	51,000	5,600	43,000	7,400
Total	299,000	53,800	310,000	47,300	391,000	49,800	295,000	44,300

Estimates of Division of Crop and Livestock Estimates, U. S. Department of Agriculture.

There is considerable variation in the yield of broomcorn from year to year. (Fig. 1.) Yields in Kansas have been lower in recent years than in the early years of the industry in that State. This lower yield is due, in a large measure, to the fact that the acreage of broomcorn is being more nearly confined to the less productive semiarid sections of the State. During the last two decades the trend in yields in Illinois has been downward. This may be partly the result of soil exhaustion and partly of more careful sorting of the brush at harvest. The tendency during recent years has been to leave unharvested the brush of poor quality and that of lodged crops. The average yield for the United States during the years 1915–1931

was 325 pounds per acre. The range was from 254 pounds (in 1930) to 449 pounds (in 1915). The two factors, varying yield and variation in the acreage planted, have caused wide fluctuations in yearly production.

PRICE AND SUPPLY OF BROOMCORN

EARLY PRICES

Almost from the beginning of production in the United States broomcorn has been subject to considerable price fluctuation, largely as a result of varying supply. In earlier days the growers made the brush into brooms. Soon broomcorn became of greater commercial importance and was marketed directly. Accurate data on the prices paid for broomcorn during the nineteenth century are not available, but newspapers and periodicals occasionally contained statements of prices. In 1825 broomcorn standing in the field was

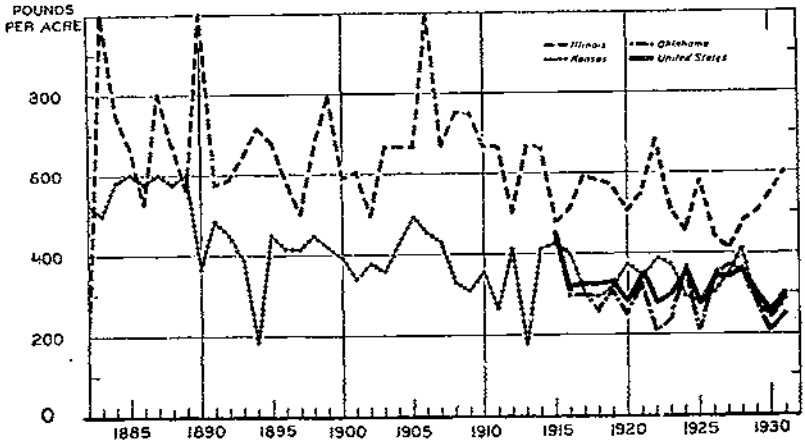


FIGURE 1.—YEARLY YIELD OF BROOMCORN PER ACRE

In general, the yield of broomcorn in recent years has been lower than in the early years of the industry.

valued at $25 to $50 per acre for yields of 300 to 700 pounds of brush per acre. In 1832 the price of broomcorn at Hadley, Mass., was about $100 per ton; in 1835 it advanced to $250 per ton for some of the best-quality brush. During the spring of 1836 the price had advanced to $300 per ton (*1*).

In the years following 1836 the price of broomcorn varied from $60 to $320 per ton, depending upon the quality and the supply. From about 1850 to 1870 the price varied from $100 to $200 per ton in Massachusetts and New York. A large crop in northern Illinois sold for $85 per ton in 1859.

Even in the years previous to 1873 price fluctuations often made broomcorn a very speculative crop.

> The broomcorn interest is a very fluctuating one. The price for the last few years has been about 6 cents for the common kind, and 8 for the other. This last at the close of the [Civil] War brought as high as 18 cents per pound (*8*).

In 1877, the average price of broomcorn in Kansas was reported as $75 per ton. (Table 3.) During the 38 years 1877 to 1914 the

price in Kansas ranged from $32 in 1896 to $138 in 1909. In only 3 of these years, 1909, 1911, and 1913, did the price exceed $90. In 28 of the 38 years the price ranged from $60 to $90 and in 7 years the price was less than $60 per ton. The 10 years from 1890 to 1899 was a period of relatively low prices.

Prices in Illinois, reaching $198 per ton in 1909 (Table 3), were for the most part higher than those in Kansas. From 1877 to 1914, inclusive, the price exceeded $90 per ton during 14 years, and was less than $60 during 7 years. The lowest price was $38 per ton in 1895.

TABLE 5.—*Broomcorn: Average price per ton received by producers in Kansas and Illinois, 1877–1914*

Year	Kansas	Illinois	Year	Kansas	Illinois	Year	Kansas	Illinois	Year	Kansas	Illinois
	Dollars	*Dollars*		*Dollars*	*Dollars*		*Dollars*	*Dollars*		*Dollars*	*Dollars*
1877	75.00	71.20	1887	70.00	69.00	1897	41.46	53.06	1907	66.46	91.00
1878	75.02	49.50	1888	70.00	57.00	1898	44.68	55.00	1908	64.26	89.00
1879	70.00	86.75	1889	70.00	68.00	1899	64.98	171.00	1909	138.27	198.00
1880	69.98	77.40	1890	60.00	64.00	1900	70.18	79.00	1910	81.12	116.00
1881	89.80	128.50	1891	65.00	117.00	1901	80.00	105.00	1911	120.50	177.00
1882	89.98	80.00	1892	65.00	94.00	1902	59.76	79.00	1912	63.38	98.00
1883	69.98	90.00	1893	49.50	57.00	1903	74.36	91.00	1913	99.30	122.00
1884	50.56	72.00	1894	63.90	89.00	1904	61.16	77.00	1914	65.54	87.00
1885	76.12	94.00	1895	40.40	38.00	1905	62.70	86.00			
1886	70.00	78.00	1896	32.40	54.00	1906	61.84	96.00			

Compiled from biennial reports of the Kansas State Board of Agriculture and from the statistical report of the Illinois State Board of Agriculture for Dec. 1, 1914, p. 6.

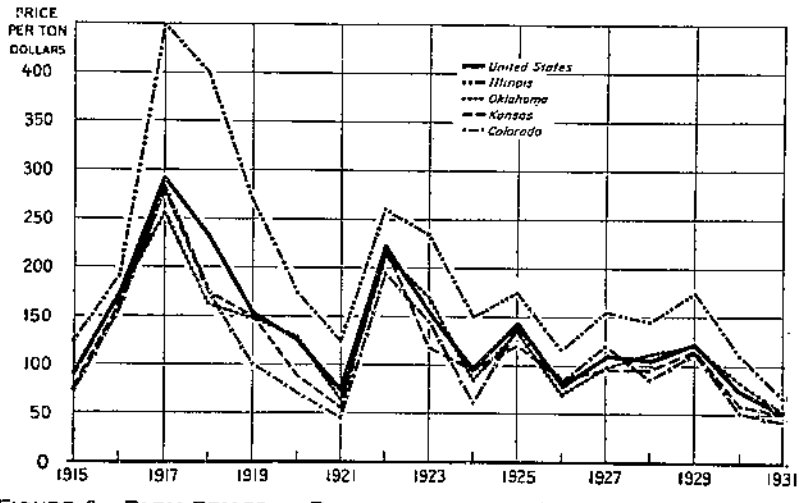


FIGURE 2.—FARM PRICES OF BROOMCORN IN THE UNITED STATES, 1915-1931

The price of broomcorn advanced over the period 1915–1917, but unlike that of most other agricultural commodities it did not advance during the remainder of the World War period

RECENT PRICES

There are no definite daily price quotations on broomcorn such as are available for most other farm commodities. Prices announced by buyers are usually stated in general terms and are not based on a definite grade or quality (*4*). Sales of broomcorn brush by growers at present are usually made on the farm through individual bargaining. Growers who have only a few bales of brush, or those rather remote

from other growers, often have difficulty in getting buyers to come out to look at their broomcorn. For this reason broomcorn for the general market is grown more advantageously in established districts where it can be more readily marketed.

The United States farm price and that in four individual States are shown graphically in Figure 2. For the period 1915–1931 prices for the country as a whole ranged from about $72 per ton in 1921 to about $293 in 1917. Prices in Illinois were considerably higher than those in the other States, particularly Colorado. Since 1915, in all but two years, the Illinois price has been at least $50 higher than the Colorado price. This price differential is mainly due to the better quality of broomcorn in Illinois, but to some extent it is due to the advantage in Illinois of lower freight rates to eastern consuming centers. Broomcorn in Illinois is less subject to drought injury and in most instances is grown, harvested, cured, and stored with more care than in Colorado.

Monthly prices for broomcorn for five States, are shown for the years, 1910 to 1925, in Table 4. These prices are not complete for all months, but they tend to show how prices fluctuated during the different years and from year to year. In many years rather violent changes in the price of broomcorn occurred between June and August during the time that the new crop was coming on the market.

TABLE 4.—*Farm price per ton for broomcorn in Illinois, Kansas, Missouri, Oklahoma, and Texas, by months, 1910–1925* [1]

State and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Illinois:	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1910	211	217	217	222	209	154	196	161	168	116	104	103
1911	87	87	86	85	88	79	77	96	126	145	177	158
1912	142	125	125	110	120	108	100	100	95	100	105	84
1913	83	77	77	84	60	92	93	105	140	131	140	113
1914	110	135	120	110	110	105	110	100	-------	100	90	85
1915	82	85	85	95	105	97	120	97	-------	100	125	136
1916	140	130	140	124	125	122	128	-------	130	190	192	220
1917	225	250	300	325	-------	-------	-------	-------	-------	350	450	400
1918	-------	383	425	350	-------	340	-------	-------	368	400	400	250
1919	150	-------	260	200	200	-------	-------	-------	290	330	270	313
1920	288	245	150	200	-------	-------	-------	-------	141	250	175	150
1921	105	140	136	146	110	105	101	103	105	112	125	120
1922	100	120	100	-------	-------	-------	-------	-------	250	200	260	300
1923	-------	-------	-------	375	-------	300	-------	300	-------	255	235	230
1924	210	195	195	195	175	175	150	155	210	200	150	125
1925	130	125	125	120	115	115	140	155	235	235	195	207
Kansas:												
1910	150	153	173	170	190	150	140	103	92	96	82	76
1911	70	02	65	50	55	50	53	60	85	132	130	90
1912	104	75	74	115	75	68	70	80	69	75	76	57
1913	45	57	75	45	39	50	45	55	76	85	93	82
1914	70	79	76	75	71	-------	85	70	70	65	50	50
1915	59	60	73	70	63	67	67	80	66	75	75	95
1916	105	92	95	110	90	-------	110	115	130	175	164	190
1917	174	180	183	220	275	-------	-------	-------	225	250	279	242
1918	225	235	187	183	223	250	200	190	275	210	175	162
1919	131	103	82	120	85	78	86	82	100	120	150	127
1920	123	158	133	104	105	115	124	130	140	112	80	51
1921	56	58	63	50	57	40	40	58	50	66	55	70
1922	78	85	62	76	85	-------	-------	-------	100	198	221	250
1923	260	292	300	331	300	250	300	-------	-------	198	118	124
1924	118	90	90	85	-------	-------	-------	-------	-------	-------	95	95
1925	-------	81	-------	76	47	57	108	130	136	188	179	124
Missouri:												
1910	190	186	200	225	200	175	200	135	109	115	103	100
1911	90	87	78	80	75	75	60	72	78	123	75	110
1912	105	121	92	115	125	105	95	90	90	90	82	127
1913	72	80	72	90	75	75	70	70	80	70	120	95
1914	72	95	90	90	80	90	90	90	-------	88	80	-------
1915	80	74	-------	-------	-------	85	85	90	-------	90	85	90

[1] Monthly prices since 1925 are not available.

TABLE 4.—*Farm price per ton for broomcorn in Illinois, Kansas, Missouri, Oklahoma, and Texas, by months, 1910–1925*—Continued

State and year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Missouri—Con.	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*	*Dolls.*
1916	154											
1917											332	
1918			315						450	400	312	
1919				210	195				220	215		200
1920	205								150	150	145	140
1921	150	125	125	125	125	135	135	125	125	125	125	125
1922	125	125	125	125	125	125	125	125	125	150	225	200
1923	200		237	200	225	270	300	225	200	185	188	200
1924	210	185	190	170	175	170	160	170	175	175	160	150
1925	125		150	60	75	75	80	100	140	235	226	200
Oklahoma:												
1910	156	174	180	181	156	125	144	114	85	76	71	65
1911	65	61	65	59	55	52	71	71	89	113	113	102
1912	90	78	100	95	75	73	84	80	75	60	58	54
1913	40	51	48	55	55	58	50	100	110	102	93	90
1914	98	93	89	89	84	95	85	95	78	60	65	55
1915	65	73	65	67	72	75	75	80	77	87	90	97
1916	97	102	100	90	100	100	98	122	128	164	173	161
1917	175	195	197	200	250	225	192	310	242	253	255	259
1918	260	220	210	200	196	170	250	250	260	248	162	158
1919	176	133	154	145	93	119	130	164	164	160	149	149
1920	160	121	121	144	157	150	113	163	153	124	129	75
1921	55	54	54	50	55	76	80	50	84	64	64	85
1922	61	85	78	75	82	90	93	135	177	190	213	218
1923	230	250	246	208	218	205	200	160	170	180	170	185
1924	100	80	80	85	85	85		180	140	120	85	82
1925	80	78	68	102	81	77	93	147	132	153	166	112
Texas:												
1910	153	187	190	188	198	150	116	115	87	98	86	73
1911	70	74	69	73	72	68	72	68	77	114	100	96
1912	70	89	100	96	86	105	100	88	75	77	76	64
1913	55	50	48	48	55	50	65	67	70	85	81	82
1914	80	76		75	83		83	83	86	90	90	98
1915	60	58	60	62	65	75	65	80	75	78	85	90
1916	96	98	94	85	87	90	88	90	108	125	131	150
1917	160	183	189	199	173	157	244	242	285	255	265	285
1918	270	315	260	220	200	310	274	260	267	270	260	235
1919	190	172	218	160	230	117	135	126	128	128	140	137
1920	130	79	150	147	143	157	134	105	129	90	118	99
1921	90	75	76	79	70	75	70	71	60	68	75	78
1922	72	80			83	82						
1923	190		158	156	111	200	175	125	150	150	150	225
1924		200	200					150	150		100	120
1925			88	125	97	83	78	82	148	90	117	111

Division of Crop and Livestock Estimates.

Table 5 gives the average farm price received for broomcorn on the farms visited during the cost study discussed later. In the majority of instances these prices for standard broomcorn are higher than the average State price as shown in Figure 2. This is to be expected since the broomcorn produced on these selected farms was probably of better quality than that for the State as a whole. In addition, the prices shown in Table 5 for Oklahoma are for standard broomcorn only, while the State averages for Oklahoma and Kansas are for standard and dwarf broomcorn combined. Illinois produces standard broomcorn only.

TABLE 5.—*Average price per ton of broomcorn received by producers on selected farms, 1924–1928*

District and kind of broomcorn	1924	1925	1926	1927	1928	Average
	Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
East-central Illinois: Standard	196	188	135	147	149	163
Southwestern Kansas:						
Dwarf	95	139	86	97	107	105
Standard	119	118	125	117	111	118
South-central Oklahoma: Standard	212	183	130	165	148	168

COMPETITION OF OTHER PRODUCTS

Broomcorn competes only slightly with any other commodity, whereas a number of products, such as vacuum cleaners and brushes and brooms made of other materials, seriously compete with broomcorn brooms.

The number of broom factories gradually increased from the earliest estimate of 303 for 1849 to a maximum of 1,034 in 1919. Since 1919 there has been a material reduction in the number of broom establishments and a considerable decline in the value of the manufactured product. (Table 6.)

TABLE 6.—*Number of establishments, number of wage earners, and cost and value of the product of the broom industry, in stated years*

Year	Establishments [1]	Average wage earners	Wages paid	Cost of materials	Value of product	Value added by manufacture [2]
	Number	*Number*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
1849	303	1,184	266	529	941	412
1859	228	1,184	288	874	1,428	554
1869 [3]	635	5,206	1,269	3,673	6,622	2,949
1909 [4]	808	5,199	2,363	8,391	14,432	6,041
1914	868	5,642	2,624	7,884	[5] 14,085	6,201
1919	1,034	6,313	5,709	17,365	[5] 30,205	12,840
1921	459	4,302	3,872	10,417	[5] 18,188	7,771
1923	444	4,736	4,482	14,933	26,262	11,329
1925	421	4,725	4,654	11,213	21,714	10,501
1927	397	4,459	4,275	9,176	18,445	9,269
1929	404	4,542	4,169	9,648	19,166	9,518

[1] U. S. Census of Manufactures, 1921, 1927, and 1929. The establishments classified in the broom industry are engaged primarily in the manufacture of brooms, whisk brooms, etc., made from broomcorn, but some are made of bristles, and others, such as street or push brooms, are made of heavier material.
[2] Value of product minus cost of materials.
[3] Monetary items in depreciated currency worth in gold approximately 80 per cent of its nominal value.
[4] The census for 1909 and subsequent years does not include a considerable number of small establishments that reported products valued at less than $5,000.
[5] In addition, the manufacture of brooms valued as follows was reported by establishments in other industries: For 1914, $167,466; for 1919, $225,705; for 1921, $220,697.

Although many of the small and the less efficient broom factories have ceased operation, nearly as many brooms are made now as in previous years. Much of the decline in the total annual value of brooms manufactured is the result of lower prices.

The decline, or lack of expansion, in the broom industry is primarily due to the increasing competition of other products. Perhaps the chief competitor is the vacuum cleaner. According to the census of manufacture the value of electric vacuum cleaners manufactured in 1914 amounted, in round numbers, to $2,000,000 and in 1929 to $34,000,000, or an increase for the period of approximately sixteen times the value of the product in 1914. (Table 7.)

TABLE 7.—*Number of electric vacuum cleaners manufactured and value of product in the United States, in stated years*

Year	Number manufactured	Value of product [1]	Year	Number manufactured	Value of product [1]
	Thousands	*1,000 dollars*		*Thousands*	*1,000 dollars*
1914		2,050	1925	1,108	39,971
1919	[2] 977	[2] 21,842	1927	1,128	36,222
1921	740	19,753	1929	[3] 1,382	[3] 34,480
1923	1,241	35,981			

U. S. Census of Manufactures, 1921, 1927, and 1929.

[1] Does not include establishments that reported products valued at less than $5,000.
[2] Figures not strictly comparable with other years because of inclusion of vibrators, clippers and cutters.
[3] In addition, vacuum cleaners to the value of $627,545 were made by manufacturers who did not report the number.

Another contributing factor in the decline of the broom industry is the increasing importance of that portion of the brush industry having to do with the manufacture of clothes, bonnet, and hat brushes and brushes for household purposes. A majority of these compete directly with whisk brooms made from broomcorn. They are made mostly from fibers and bristles imported from the Tropics or from Asia. The value of brushes of this type manufactured in 1927 amounted to approximately $11,000,000. The brush industry as a whole had so expanded, that the value of the product in 1929 amounted to $46,000,000 (Table 8) in comparison with a value for the broom industry of $19,000,000. Carpet sweepers, dust mops, and hair push brooms also reduce the consumption of broomcorn brooms. Because of the keen competition of other products the outlook for any material expansion of the broom industry does not appear very favorable. Broomcorn brooms are still found in nearly all homes, hotels, and offices, but are used less than in former years and consequently are not worn out so quickly. Despite the increase in population in the United States, the consumption of broomcorn appears to have declined slightly since about 1924. Broomcorn brooms, however, will be used for many more years because they are more satisfactory for many purposes than is any other product yet devised.

TABLE 8.—*Number of establishments, number of wage earners, and cost and value of the product of the brush industry, in stated years*

Year	Establishments [1]	Average wage earners	Wages paid	Cost of materials	Value of product	Value added by manufacture [2]
	Number	*Number*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*	*1,000 dollars*
1849	140	2,405	533	638	1,574	936
1859	121	2,378	594	904	2,097	1,193
1869 [3]	157	2,425	691	1,313	2,695	1,382
1909 [4]	384	6,954	3,041	7,187	14,694	7,507
1914	350	7,213	3,401	9,327	[5] 17,894	8,567
1919	379	7,968	7,113	19,598	[5] 39,006	19,408
1921	277	5,460	6,415	18,665	35,545	16,880
1923	306	8,719	9,208	25,570	50,511	24,942
1925	302	7,836	8,452	22,021	45,824	23,803
1927	302	7,673	8,244	22,553	47,844	25,291
1929	303	7,261	7,963	21,698	45,549	23,861

U. S. Census of Manufactures, 1921, 1927, and 1929.

[1] The establishments classified in the brush industry are engaged primarily in the manufacture of brushes other than rubber, such as tooth, toilet, paint, varnish, clothes, bonnet and hat brushes, household, and industrial brushes.

[2] Value of product minus cost of materials.

[3] Monetary items in depreciated currency worth in gold approximately 80 per cent of its nominal value.

[4] The census for 1909 and subsequent years does not include establishments that reported products valued at less than $5,000.

[5] In addition, the manufacture of brushes valued as follows was reported by establishments in other industries: For 1914, $946,283; for 1919, $274,702; for 1921, $491,227.

EXPORT DEMAND FOR AMERICAN BROOMCORN

Except in Canada and Cuba there does not seem to be much prospect of expanding the foreign demand for American broomcorn. Among the factors affecting the demand is the wide use of other broom and brush-making material, competition of broomcorn from other nearer sources of supply, tariff barriers, and in many cases a deep-rooted prejudice against the American style of broom.

The United States exports of broomcorn for the 6-year period 1925–1930 have averaged about 4,400 long tons annually. (Table 9.) Canada, using about 3,000 long tons annually, provides the most important market for American broomcorn. Canada produces very

little broomcorn, and unless some other fiber is adopted as a substitute, will probably continue to be dependent on the United States for the limited quantity used in the manufacture of broomcorn products in that country. Cuba, taking an average of about 850 long tons annually, is the second largest user of American broomcorn. Exports to all other foreign countries, including Mexico and Panama, usually amount to less than 500 long tons annually.

TABLE 9.—*Exports of broomcorn from the United States, by countries, 1925–1930*

Country to which exported	Calendar year					
	1925	1926	1927	1928	1929	1930
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
Canada	4,083	3,343	3,405	3,798	2,806	3,860
Cuba	950	821	822	1,021	1,183	934
Mexico	353	214	174	96	56	68
Panama	31	58	59	34	102	39
Other countries	84	136	74	105	749	39
Total	5,501	4,572	4,534	5,054	4,896	4,931

Compiled from reports of Foreign Commerce and Navigation of the United States.

Italy, Hungary, and France are the principal foreign countries in which broomcorn is produced in commercial quantities; Italy, Hungary, and the United States are the only countries producing broomcorn in excess of domestic needs. Practically all of the domestic crop in France is consumed in that country and is supplemented by imports. But there is no market in France for American broomcorn or brooms as the Italian and Hungarian product is cheaper.

In addition to broomcorn, limited quantities of brooms are exported, principally to Honduras, Panama, the Dutch West Indies, Colombia, and the Philippine Islands. Such exports in 1930 amounted to 17,167 dozens, valued at $81,384. (Table 10.) It would require less than 250 tons of broomcorn for the manufacture of this number of brooms.

TABLE 10.—*Exports of brooms from the United States, by countries, calendar years, 1928–1930*

Country to which exported	1928		1929		1930	
	Quantity	Value	Quantity	Value	Quantity	Value
	Dozen	*Dollars*	*Dozen*	*Dollars*	*Dozen*	*Dollars*
United Kingdom	202	863	242	1,091	159	701
Canada	820	5,164	596	3,546	600	3,418
Honduras	2,584	9,414	3,259	11,361	3,153	10,732
Panama	1,638	8,613	2,252	10,222	2,103	10,034
Mexico	428	3,333	556	4,078	549	3,659
Cuba	902	5,659	986	7,141	429	3,375
Dominican Republic	742	4,782	229	1,564	328	1,840
Dutch West Indies	897	4,250	1,047	4,517	907	4,147
British Honduras	494	1,611	660	2,071	601	2,494
Costa Rica	226	1,394	274	1,013	107	559
Guatemala	596	2,826	615	2,708	463	2,119
Nicaragua	476	1,857	396	1,814	322	1,306
Other British West Indies	214	1,212	240	1,269	211	1,051
Haiti	118	1,282	112	469	76	400
Bolivia	402	1,799	1,009	5,082	795	4,105
Chile	134	1,260	431	2,871	333	2,234
Colombia	1,405	6,961	1,372	6,317	1,046	5,354
Peru	127	1,213	433	2,229	470	2,580
Venezuela	362	2,310	438	2,950	607	3,371
China	322	1,424	186	746	81	296
Philippine Islands	1,074	4,550	1,593	6,291	2,144	8,899
French Oceania	443	1,505	433	1,469	390	1,441
Union of South Africa	496	6,428	55	627	170	1,985
Other countries	834	4,779	1,381	7,805	995	5,194
Total	15,942	84,585	18,705	89,312	17,107	81,384

Foreign Commerce and Navigation of the United States and official records of the Bureau of Foreign and Domestic Commerce.

RELATION OF SUPPLY OF BROOMCORN TO PRICE RECEIVED

Broomcorn prices are not controlled by world conditions of supply and demand. The United States is by far the principal producer of broomcorn, exports are fairly constant, and imports are of little importance as they have seldom exceeded 100 short tons per year during recent years. For these reasons the supply within the United States is the controlling factor determining the price received by American producers. Broomcorn supply and distribution for the last few years are shown in Table 11.

TABLE 11.—*Supply and distribution of broomcorn in the United States, 1923–24 to 1931–32*

Crop year (June 1 to May 31)	Supply						Distribution			
	Stocks on hand June 1			Production	Imports	Total	Export	Domestic use	Stocks on hand May 31	Total
	Manufacturers	Dealers [1]	On farms							
	Short tons	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*	*Short tons*
1923–24	8,018	2,421	(2)	81,400	550	92,389	5,009	50,499	36,791	92,389
1924–25	15,169	15,489	6,133	77,700	136	114,627	5,580	[3] 57,020	52,027	114,627
1925–26	20,960	25,043	6,024	31,200	(2)	83,227	4,688	49,367	29,172	83,227
1926–27	16,201	9,706	3,265	54,700	(2)	83,872	4,701	46,791	32,380	83,872
1927–28	18,173	11,498	2,709	40,200	193	72,773	4,367	42,518	25,888	72,773
1928–29	18,744	5,938	1,206	53,800	(2)	79,688	4,931	46,848	27,909	79,688
1929–30	19,591	7,495	823	47,300	(2)	75,209	4,985	47,534	22,690	75,209
1930–31	14,980	6,667	1,043	49,800	(2)	72,490	4,557	43,953	23,980	72,490
1931–32	17,088	4,566	2,326	[4] 44,300	(2)	68,280	3,713	39,367	25,200	68,280

Division of Hay, Feed, and Seeds.

[1] Storage stocks reported by dealers include manufacturers' stocks held by dealers at country shipping point.

[2] Less than 100 tons. Not counted in total supply.

[3] Includes waste and broomcorn destroyed by warehouse fire.

[4] Nov. 1 estimate.

Figure 3 shows the relation of the total United States available supply to the price received for broomcorn. Since the uses of broomcorn are almost entirely limited to the making of brooms and since the demand for domestic use is satisfied at about 45,500 short tons, a supply greater or less than these requirements, plus an annual export demand of approximately 4,500 short tons, results in a decided change in the price received.

The change in price from the preceding year, that has occurred over the period 1923–1931, as a result of a production above or below the average domestic requirement in recent years of about 45,500 short tons, plus exports of about 4,500 short tons, or a total of about 50,000 short tons is illustrated in Figure 4. In this chart the change in adjusted price from the preceding year is represented in the vertical scale, and the production of broomcorn above or below a 50,000 short-ton requirement is represented in the horizontal scale. The price changes and production data have been plotted on the chart for each crop year, and the heavy diagonal line of average relationship has been drawn in free hand. For most of these years there is a rather marked correlation between the production above or below the 50,000 short-ton requirement and the change in price. In 1926 and 1930 the quality of much of the broomcorn was poor.

The line of average relationship shows that in years of a production of approximately 10,000 short tons below average requirements broomcorn has sold at a price about $15 per ton higher than during the pre-

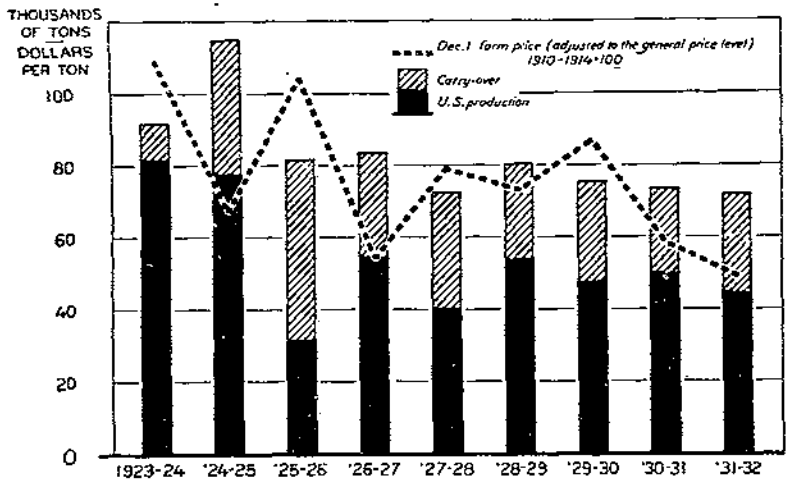


FIGURE 3.—UNITED STATES SUPPLY AND ADJUSTED FARM PRICE OF BROOMCORN, 1923-24 TO 1931-32

Over the period 1923 to 1931, both total supply and price have shown a slight downward trend.

vious year. Likewise the price of brush has been about $15 per ton lower than that for the previous year for a production of 10,000 short tons above average requirements. This relationship may not hold

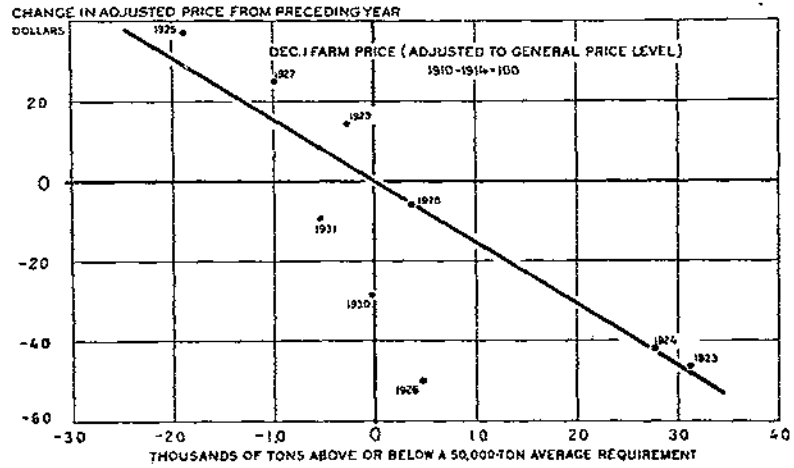


FIGURE 4.—BROOMCORN PRODUCTION ABOVE OR BELOW THE AVERAGE REQUIREMENT OF 50,000 SHORT TONS AND THE CHANGE IN ADJUSTED PRICE FROM THE PRECEDING YEAR, 1923–1931

For these years the heavy diagonal line indicates that low prices have accompanied above-average production and vice versa.

with exactness in the future, but its general nature is evident and serves to point out the quick response in prices downward as a result of overproduction and the danger of unprofitable returns to broom-

corn growers whenever supply exceeds average requirements. In years when the quality of the brush is exceptionally good or poor, greater or smaller price changes may be expected than the normal

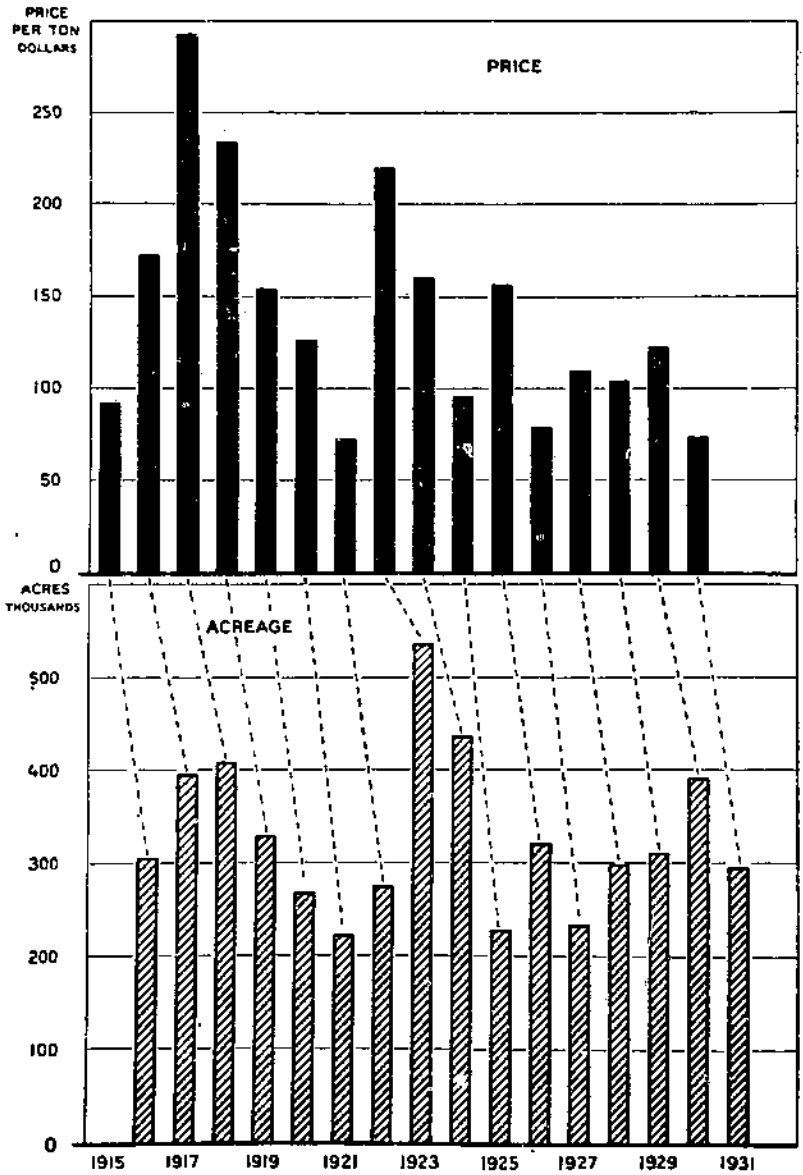


FIGURE 5.—UNITED STATES FARM PRICE OF BROOMCORN, 1915–1930, AND ACREAGE, 1916–1930

Broomcorn acreage is influenced, from year to year, largely by the price received the preceding year.

relationship would indicate. Also these reactions to price may undergo a degree of change owing to changes in the general price level, as will happen in the case of other commodities.

ACREAGE OF BROOMCORN NEEDED TO PRODUCE AN ADEQUATE SUPPLY

Allowing for a yield of approximately 314 pounds of broomcorn per acre, the average yield for the five years, 1927–1931, about 320,000 acres are required for domestic use and exports, or a total of 50,000 short tons, in recent years. (Table 11.) Allowance, of course, must be made for variation in yields, but an acreage greater than that is likely to result in unfavorable prices to broomcorn growers.

The acreage planted to broomcorn in a given year is influenced largely by the prices received for the previous crop. Figure 5 shows that during the 17-year period, 1915 to 1931, in all years except two, a decrease in price over that of the previous year was followed by a reduction in the acreage of broomcorn planted the following year and an increase in price was followed by an increase in acreage. The exceptions were 1921 and 1928. The tendency to increase acreage following a year of increasing prices works to the material disadvantage of the broomcorn grower.

COST OF PRODUCTION AND RETURNS FROM BROOMCORN AND COMPETING CASH CROPS

To obtain data relative to methods and costs of producing broomcorn, growers were interviewed in three representative broomcorn districts and detailed facts were obtained concerning methods and costs of producing broomcorn in 1928. In addition, enough information was obtained to afford a basis for comparison of the net returns from broomcorn and the major competing cash crop as determined by natural conditions and different price relationships in each of the important districts. The districts surveyed were: (1) Coles and Cumberland Counties in east-central Illinois; (2) Seward and Stevens Counties in southwestern Kansas; and (3) Garvin and McClain Counties in south-central Oklahoma. Coles and Cumberland are the principal broomcorn-producing counties in Illinois. Seward and Stevens Counties are typical broomcorn-producing sections of southwestern Kansas, the Oklahoma panhandle, southeastern Colorado, and northeastern New Mexico. Garvin and McClain Counties are representative of broomcorn production in south-central Oklahoma.

The study is based on 189 farm records. The number of farms studied in each district, together with the average acreage of the various crops grown on these farms, is shown in Table 12.

TABLE 12.—*Distribution of crop acreage on selected farms, by State and district, 1928*

State and district	Farms studied	Crop acreage per farm									
		Broomcorn	Corn	Oats	Wheat	Barley	Cotton	Grain sorghum	Hay	Miscellaneous	Total
	Number	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
Illinois, east central	100	36	84	32	2	1	----	----	10	1	166
Kansas, southwestern	53	68	25	....	63	....	----	135	11	1	303
Oklahoma, south central	36	48	21	9	4	....	45	4	12	....	143

In all three districts the growing of cash crops, rather than mixed farming or the production of livestock, represents the prevailing farming system. At least one important cash crop in addition to broomcorn was grown on every farm visited. The major competing cash crop in east-central Illinois is corn (maize); in southwestern Kansas it is grain sorghums, mainly milo, and in south-central Oklahoma it is cotton. Broomcorn is not the leading cash crop in any district, although in south-central Oklahoma the acreage of broomcorn in usually slightly greater than that of cotton on the farms on which broomcorn is grown. There is considerable variation from year to year in the acreage of broomcorn grown in each district, owing largely to the competition between broomcorn and the major competing cash crop. Broomcorn competes directly with corn, sorghums, and cotton for labor previous to harvest and is a crop of especial financial risk whenever production exceeds the normal requirement.

Most of the broomcorn farmers keep only enough cows to supply milk for home use. The Illinois farmers had an average of 3 brood sows, the Kansas farmers had 1, and the Oklahoma farmers had 2 per farm. Sheep are not common in any of the districts. About 100 chickens are kept on most of the farms in each of the three districts. In addition, on a few farms turkeys, guinea fowls, and geese are found.

In the following sections, cost of production and the returns from broomcorn and the major competing cash crops are presented by districts.

ILLINOIS

East-central Illinois has been an important broomcorn district for many years. Standard broomcorn only is grown. The average annual precipitation is about 38 inches. As rains frequently occur during the harvesting period, all of the brush is cured in sheds. Most of the broomcorn is grown on dark prairie soils. It is usually grown in a rotation following corn, wheat, or oats, except where it follows broomcorn. Winter wheat occasionally winter kills, and when this occurs part of the land may be planted to broomcorn.

USUAL FIELD PRACTICE IN GROWING BROOMCORN AND THE MAJOR COMPETING CASH CROP

In general the methods of growing broomcorn are nearly identical with those of growing corn. On the other hand, the methods of harvesting and curing broomcorn are peculiar to that crop.

The initial soil preparation in seed-bed preparation for broomcorn consists mainly of plowing. Ninety-three of one hundred broomcorn growers plowed their land, and seven double disked twice without plowing. Most of the land that was not plowed for broomcorn had been plowed in the fall previous to seeding to wheat which was subsequently winterkilled. Most of the plowing in Illinois is done with 2-bottom tractor plows. The plowed land is usually disked and harrowed before planting. The growers plant broomcorn with ordinary 2-row corn planters equipped with special broomcorn-planting plates. Broomcorn requires replanting more frequently than does corn because the seeds and young plants are more tender and because uniform stands are more necessary. Corn is usually given one more cultivation than broomcorn. In other respects the preharvest work

on corn is almost identical with that on broomcorn. The usual rate of planting broomcorn is 1 bushel to 20 acres; that for corn is 1 bushel to 8 acres. Most of the planting is done in May and the remainder in April or June.

The methods of harvesting broomcorn depend upon the height of the stalks and the local custom. Broomcorn harvest usually begins in August and continues through September. All of the crop is tabled and cut. Tabling is done by men who walk backward between two rows, break the stalks over about waist-high, and overlap the upper portion of the stalks at an angle across the rows to form a flat so-called table with two rows. The heads of one row then extend horizontally out beyond the edge of the adjoining row in a convenient position for cutting. (Fig. 6.) The stem is cut at an angle with a special knife at

FIGURE 6.—Field of broomcorn, partly tabled, showing the harvested heads lying in piles on the table

a point 6 to 8 inches from the base of the brush. The brush is bunched or piled in convenient armfuls on alternate tables. This operation of tabling and cutting broomcorn alone requires nearly twice the total man labor involved in harvesting, cribbing, and delivering to the local elevator the corn produced on an acre of land, if, as is usual, the corn is husked from the standing stalks and delivered to the elevator in double box wagons.

The brush is hauled on special dump racks about 12 to 16 feet long. (Fig. 7.) The wagons straddle the empty table and are loaded by two men working on opposite sides. The bunches are laid in two tiers on the rack with the seed ends of the brush outside. The brush is hauled to the broomcorn seeder where the rack, known as a dump or float, is tipped down and then pulled out from under the load, which slips to the ground.

The process of removing the seed from the brush is known as threshing, seeding, or scraping. The threshing is done before the brush is cured. Most of the broomcorn is threshed with large power seeders (fig. 8) that require crews of 10 to 30 men.

Curing sheds are usually built in the form of stalls or bins, 7½ feet wide and any desired length. The stalls in most of the sheds run lengthwise of the shed. A stall 7½ feet wide, 24 feet long, and 10 feet high holds 1½ tons of cured brush piled 3 inches deep on the slats. The slats are 1 by 2 inch strips laid across the cleats, which are 1 by 4 inch boards spaced 2 inches apart.

The brush is taken directly from the seeder to the slats in the shed. Seeding before curing results in a better quality of brush than seeding done after curing because fewer of the fine fibers are removed. The large amount of labor necessary in seeding broomcorn is due mainly to the care devoted to keeping the brush straight, even, and untangled. Several men are occupied in carrying the brush in small armfuls to the feeding table and several in carrying it from the machine to the

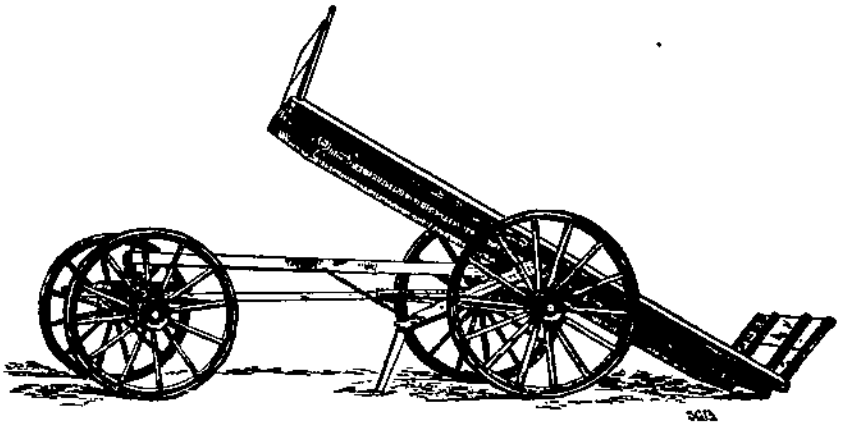


FIGURE 7.—Broomcorn dump rack used in Illinois

shed and placing it on the slats. The remaining men sort and untangle the brush and even up the ends to facilitate uniform threshing. A tractor is the usual source of power to operate the seeder; but in some instances the seeder is mounted on motor trucks, and the power is taken from the truck motor.

Broomcorn is usually baled immediately after it is cured or as soon thereafter as possible. Curing usually requires 10 to 14 days. About one-half of the crop is "bulked down" before being baled. Bulking down consists in removing the brush from the slats and piling it on the floor of the shed. This prevents appreciable shrinkage from further drying, reduces the number of men necessary for baling, and makes room for additional brush. Each bale is tied with five strands of Nos. 9, 10, or 11 size wire. The bales vary in weight from 250 to 400 pounds, averaging about 333 pounds.

PRACTICES THAT SHOULD INCREASE PROFITS

Broomcorn has been grown for many years and good practices have been generally adopted. There appears to be little opportunity for improving on the methods followed by the better growers.

Some saving in labor would probably result from the more general use of tractor plows and disks and of 2-row cultivators. (Table 15.) Baling brush directly from the slats without bulking down will reduce the total man-labor requirement by about 15 hours per ton and will save some cash expense when hired labor is employed for bulking. Prompt baling will eliminate the necessity for bulking to avoid shrinkage and still make shed space available for more brush.

COST OF PRODUCTION

Producing broomcorn on an extensive scale requires more capital than does the major competing cash crop in each district. Some special broomcorn equipment is necessary, and a relatively large cash outlay for labor to harvest the crop is essential to successful production of broomcorn.

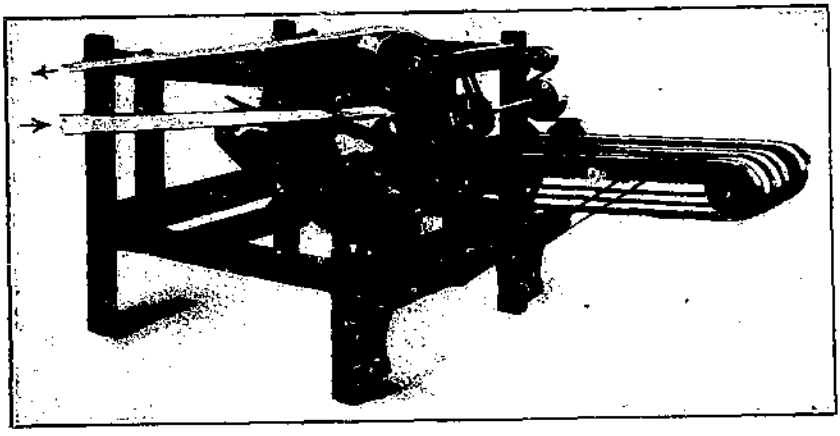


FIGURE 8.—Side view of a self-feed broomcorn seeder

The principal items entering into the cost of broomcorn production are man labor, horse and tractor work, seed, taxes, use of equipment, and land. The cost of producing broomcorn is summarized in Table 13. These cost estimates are based on the usual field practice and cost rates as in 1928.

Under the usual field practice of using tractors for plowing and disking, with a yield of 600 pounds of brush per acre, farmers produce an acre of broomcorn with about 42 hours of man labor, 17½ hours of horse work, and 2½ hours of tractor work. These requirements amount to 141 hours of man labor, 59 hours of horse work, and 8 hours of tractor work per ton.

Materials such as seed and baling wire are a relatively small item of expense, amounting to 48 cents per acre, or $1.60 per ton of brush.

Other costs, including taxes, fire insurance on the brush, use of machinery, use of broomcorn shed, losses due to abandoned acreage, replanting, and overhead expenses, amount to about $7.50 per acre.

In 1928 broomcorn land in east-central Illinois was valued at about $150 per acre. Interest charges are frequently considered a part of production costs, and when figured at 5 per cent of this land valuation, amount to $7.50 per acre.

TABLE 13.—*Cost of producing standard broomcorn brush, according to the usual field practice and at cost rates prevailing in 1928* [1] *in east-central Illinois*

Item	Size of crew			Rate of work per day	Times operation is performed	Quantity and cost [2]							
						Per acre				Per ton			
	Men	Horses	Tractors			Man-hours	Horse-hours	Tractor-hours	Cost	Man-hours	Horse-hours	Tractor-hours	Cost
Labor and power:													
Preharvest—				*Acres*									
Plow (2-bottom 14-inch)	1		1	7	1	1.4		1.4	$1.50	4.7		4.7	$5.03
Disk (tandem 8-foot)	1		1	20	2	1.0		1.0	1.07	3.3		3.3	3.53
Harrow (3-section 15-foot)	1	4		30	1	.3	1.2		.22	1.0	4.0		.74
Plant (2-row corn planter)	1	2		20	1	.5	1.0		.24	1.7	3.4		.82
Cultivate (1-row riding)	1	2		7	3	4.3	8.6		2.06	14.3	28.6		6.86
Miscellaneous						1.0	.8		.32	3.3	2.4		1.04
Harvest [3]—													
Table and cut (contract) [4]	21			13	1	18.5			6.80	61.7			22.67
Haul to shed	4	4		11	1	3.6	3.6		1.91	12.0	12.0		6.36
Seed and shed—				*Tons*									
Farm crew	25			18.5	1	4.1			1.64	13.7			5.48
Contract [5] (power seeder)	1					.2			1.00	.7			3.33
Bulk down	3			4	1	2.2			.88	7.3			2.92
Bale—													
Farm crew	9			11	1	2.4	.6		.96	8.0	2.0		3.20
Contract [6]	1	2				.3			.36	1.0			1.20
Haul to market (5 miles with wagon)	1	2		3	1	1.0	2.0		.66	3.3	6.6		2.18
Supervision [7]						1.0			1.00	3.3			3.33
Miscellaneous						.5			.20	1.6			.64
Total						42.3	17.8	2.4	20.82	140.9	59.0	8.0	69.33
Materials:													
Seed, 2½ pounds, at 12 cents per pound									.30				1.00
Baling wire									.18				.60
Total									.48				1.60
Other costs:													
Taxes									1.75				5.83
Fire insurance on brush (2 months)									.45				1.50
Use of machinery									.65				2.17
Use of broomcorn shed									1.64				5.47

Loss on abandoned acreage									.49				1.63
Overhead									2.54				8.47
Total									7.52				25.07
Total exclusive of interest									28.82				96.00
Interest on land, at 5 per cent									7.50				25.00
Total cost, including interest									36.32				121.00

[1] Man labor previous to harvest charged at 22 cents per hour, harvest labor except that done on a contract basis, at 40 cents per hour, horse work at 13 cents per hour, and tractor work at 85 cents per hour.
[2] Based on a yield of 600 pounds per acre.
[3] All work done on a contract basis has been reduced to hours of man labor and horse and tractor work, but is charged at the contract rate for such work.
[4] Charged at the custom rate of $5 per acre plus value of board.
[5] Charged at the custom rate of $1 per acre.
[6] Charged at the custom rate of 20 cents per bale of 333 pounds.
[7] Charged at the custom rate of $1 per acre.

Including interest on land, the total cost in 1928 amounted to $36 per acre. The cost per ton amounted to about $121 on the basis of a yield of 600 pounds per acre. This yield is somewhat higher than the average for the State but is representative of average yields obtained on the better broomcorn soils in Illinois. Excluding interest charges, the cost per acre amounted to about $29.

The cost analysis just presented considered all legitimate items of cost, including the labor of the farmer and members of his family. It should be kept in mind, however, that many of the cost items are noncash. A division of the cost of broomcorn production into cash and noncash items may explain why some men are able to continue in the business of broomcorn growing for a time when producing at a total cost that is higher than the market price. In many instances much of the labor is performed by the farmer and his family, and where his land, machinery, and work stock are free of indebtedness a large part of the expense that correctly enters into cost of production is not an actual cash outlay. Growers who had no indebtedness, hired no preharvest labor, hired no field boss, exchanged labor for baling, and hauled the crop to market themselves could produce broomcorn in 1928 for an actual cash outlay of approximately $19 per acre or 53 per cent of the total cost of production. (Table 14.) This applies more particularly to farmers with medium acreages who did not need to hire preharvest labor.

TABLE 14.—*Estimated cash and noncash cost per acre of producing broomcorn in east-central Illinois, 1928* [1]

Item	Cash cost per acre		Noncash cost per acre	
	Dollars	*Per cent*	*Dollars*	*Per cent*
Preharvest:				
Man labor			1.87	5.1
Horse work			1.51	4.2
Tractor work	2.03	5.6		
Harvest:				
Table and cut	6.80	18.7		
Haul to shed [2]	1.44	4.0	.47	1.3
Seed and shed	2.64	7.3		
Bulk down	.88	2.4		
Bale [3]	.36	1.0	.96	2.6
Haul to market			.66	1.8
Supervision			1.00	2.8
Miscellaneous			.20	.6
Materials:				
Seed	.30	.8		
Baling wire	.18	.5		
Other costs:				
Taxes	1.76	4.8		
Fire insurance on brush	.45	1.2		
Use of machinery	.43	1.2	.22	.6
Use of broomcorn shed	.82	2.3	.82	2.3
Loss on abandoned acreage			.49	1.3
Overhead	1.27	3.5	1.27	3.5
Interest on land			7.50	20.6
Total	19.35	53.3	10.97	46.7

[1] On the basis of the grower owning his land and equipment free from indebtedness and hiring no help previous to harvest. If 1 man is hired previous to harvest, the cash cost of preharvest labor would be approximately 93 cents per acre.
[2] On the basis of a cash expense for all of the man labor.
[3] On the basis of a custom charge of 20 cents per bale.

No farmer wishes to produce commodities at prices so low as to return him only his cash costs. He wants the best pay he can get for his labor and use of land and equipment. However, if he does not have anything better to do, he may continue to raise broomcorn if it

will return anything over cash costs, even though it is less than a reasonable return on his noncash cost elements. Farmers who had particularly efficient harvest crews or who produced their own seed reduced their cash costs still more. Farmers who employed one hired man during the cropping season increased their preharvest cash costs by approximately 93 cents per acre.

Of the expenses in broomcorn production harvesting constitutes by far the greatest proportion of the cash costs. According to the standards set up in Table 14, tabling and cutting alone, which is entirely a cash cost, amounted to 19 per cent of the total cost of producing broomcorn in 1928. Because of the large amount of labor required for the harvest operations and the necessity for their timely performance it is difficult to reduce the cash cost of these operations.

In the case of broomcorn, if a considerable acreage is grown the large cash expense involves a large total farm expenditure and hence a greater element of risk than in the case of corn, for in the case of corn the cash cost of production per acre, as well as the total cost, is materially less. Assuming a yield of broomcorn of 600 pounds per acre and a price of $150 per ton, approximate averages on the farms visited in 1928, the net return above total costs was approximately $8.50 per acre and above cash costs about $26.

ANNUAL BROOMCORN YIELDS

The yield of broomcorn is influenced by a number of factors such as soil fertility, weather, insects, fungous diseases, stand, crop management, etc., and is a factor of great importance in determining the profits from broomcorn production. Yields of broomcorn on the 100 farms visited in east-central Illinois averaged 583 pounds to the acre for the 5-year period 1924–1928. The average yield per acre on these selected farms was 636 pounds in 1924, 618 pounds in 1925, 520 pounds in 1926, 507 pounds in 1927, and 632 pounds in 1928. In most years they were somewhat higher than the corresponding yield for the State as a whole. The average of the 100 farms for 1928 (632 pounds) reflects a wide range in yield as follows:

Yield group, pounds per acre:	Number of farms
100 and under	0
101–200	1
201–300	3
301–400	5
401–500	13
501–600	19
601–700	33
701–800	17
Over 800	9

On the basis of the average price of $149 per ton received for standard broomcorn in 1928 on the farms visited, the quantity of broomcorn required to cover cost of production, including interest charges, was 488 pounds per acre. If interest charges are excluded, about 386 pounds per acre would cover total costs. About 260 pounds would cover the cash costs as shown in Table 14.

VARIATION IN LABOR AND POWER REQUIREMENTS

There is considerable variation in the labor and power requirements in producing an acre of broomcorn. On 100 broomcorn farms the preharvest man-labor requirements varied from 1.7 to 13.3 man-hours per acre. Horse-hour requirements varied from 3.8 to 36 hours per acre. The majority of the farms studied showed man-labor require-

ments of from 8 to 10 hours per acre; also a considerable number of farms were represented in the class having man-hour requirements of 4 to 6 and 6 to 8 man-hours per acre. A considerable part of this variation is due to differences in land preparation and cultivation and, more particularly with reference to hours of horse work, to whether tractor or horse-drawn implements are utilized. Replanting, where necessary, required considerable extra labor. On a majority of the farms tractor power was used for plowing and disking and on approximately one-fourth of the farms 2-row cultivators were used. The use of a 2-row cultivator, as compared with the 1-row machine, resulted in the saving of slightly more than 1.5 man-hours and nearly 1 horse-hour per acre. The average man hours for plowing with tractor-drawn plows were 1.1 less per acre than when this operation was performed with horse-drawn plows, and 1.3 hours of tractor power were required as against 9.9 hours of horse work. A similar relation with regard to man labor and horse work exists when tractor-drawn disks were used. (Table 15.)

TABLE 15.—*Comparison of requirements per acre of major field operations when done with horse and when done with tractor power in east-central Illinois*

Operation	Man and horse			Man and tractor		
	Reports studied	Hours per acre		Reports studied	Hours per acre	
		Man	Horse		Man	Tractor
Plowing	28	2.4	9.9	66	1.3	1.3
Disking	27	1.8	7.4	72	1.0	1.0
Cultivating, 1-row	73	3.4	6.8	1	2.0	2.0
Cultivating, 2-row	25	1.8	6.0	1	.6	.6

By far the greatest amount of man labor is used in harvesting and marketing broomcorn. The man labor required for this work constituted 80 per cent of the total labor involved in producing and marketing the crop. The harvest man-labor requirements varied from 17.4 to 60.5 man-hours per acre. Horse-hour requirements varied from 1.9 to 14.9 hours per acre. The majority of the farms had man-labor requirements of 30 to 35 hours per acre. Nearly as much time is required to harvest an acre of low-yielding broomcorn as to harvest a high-yielding crop. Stalks must all be tabled in order to facilitate the bunching and hauling of the brush, but in high-yielding fields less sorting and discarding of poor heads is necessary. If broomcorn lodges badly the labor in harvesting is so great that the crop often is abandoned.

Yield per acre is the factor exerting the greatest influence on the man-labor required per unit of product. The influence of yield on the man-hours per ton required to harvest broomcorn is illustrated in Figure 9. In general, as the yield per acre increased, the man-hours per ton decreased. The range in yield was from 130 to 880 pounds per acre. The average yield was 583 pounds per acre. The labor for harvesting broomcorn by growers who had yields of less than 300 pounds per acre varied from 176 to 261 man-hours per ton. Those who had yields of over 700 pounds per acre required only 45 to 150 man-hours per ton, or an average of less than 100 man-hours to harvest the crop.

KANSAS

Southwestern Kansas, typified by Seward and Stevens Counties, produces both standard and dwarf broomcorn. The standard varieties vary in height from 7 to 11 feet; dwarf varieties usually attain a height of from 4 to 6 feet. The annual precipitation in this section is about 18 to 20 inches. Usually very little rainfall occurs during the broomcorn harvesting period, and most of the broomcorn is cured in ricks in the open.

Broomcorn is produced principally on soils that are too sandy for successful wheat production. It usually occupies part of the acreage that would otherwise be devoted to grain sorghums, the major competing cash crop, and is usually grown in rotation with sorghums, corn, or wheat but is sometimes grown on the same land for two or more consecutive years. It is usually produced on land that grew grain sorghums the previous year.

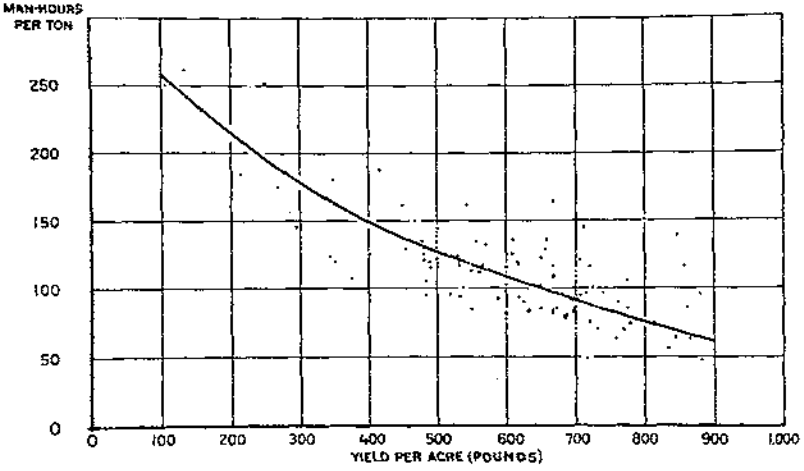


FIGURE 9.—YIELD PER ACRE AND MAN-HOURS PER TON REQUIRED TO HARVEST BROOMCORN IN EAST-CENTRAL ILLINOIS

Each dot represents one farm and its position indicates the yield per acre and the man-hours per ton required to harvest broomcorn on that farm. Those farmers with high yields handled their broomcorn with far less labor per ton than did those with low yields.

USUAL FIELD PRACTICE IN GROWING BROOMCORN AND THE MAJOR COMPETING CASH CROP

The methods of growing broomcorn in southwestern Kansas are similar to those used in growing grain sorghums. Practically the same implements are used in preparing the seed bed, in planting, and in cultivating; and the preharvest cost of the sorghums is essentially the same as that of broomcorn. Thirty-two of the fifty-three growers interviewed in Kansas listed their land when preparing for broomcorn, 8 plowed, and 13 disked without plowing. Most of the listing is done with horse-drawn machines and most of the plowed land is disked and harrowed before planting. The listed land is commonly listed again and planted at the same time by using the planting attachment on the lister. Most of the growers use 2-row lister planters. Most of the broomcorn is planted during the first half of June and the remainder at any time between May 1 and early July.

The usual rate of planting both broomcorn and milo is 1 bushel per 20 to 24 acres.

Broomcorn harvest begins about the last of August and continues through September and most of October. When standard broomcorn attains a height of 8 or 9 feet, it is tabled, as it is in Illinois and Oklahoma. Usually the Black Spanish variety, the one generally grown under limited moisture conditions in Kansas, does not attain a height sufficient to form a good table. The most common method of harvesting standard broomcorn therefore, is to break the upper part of the stalk at a height of about 5 feet. This leaves the brush suspended downward at a convenient height for cutting the stem. The usual practice is to walk along the row and break the stalks forward. When the end of the row is reached the harvester turns around and cuts back along the row. When the stalks do not exceed 7 feet in height the brush is frequently cut from the standing stalks without breaking. Only rarely is standard broomcorn pulled from the stalk. The corn binder is used only when the labor available is not sufficient to harvest the brush before it is overripe. The brush is later cut from the stalk by hand.

Dwarf broomcorn is practically all pulled or "jerked" from the standing stalks. This method is possible because of the weak attachment at the base of the brush handle or peduncle. In pulling broomcorn the worker grasps the top or "flag" leaf of the stalk in one hand and the brush in the other hand and pulls outward with each hand. The hands thus separate with a quick jerking motion and at the same time give a sharp pull on the brush. As the handle of the brush snaps free from the stalk at the base, the brush is separated from the sheath with the proper length of handle attached. When the brush does not mature uniformly the fields are gone over two or three times.

In western Kansas shed curing is not common, and the brush usually is piled directly from the wagon in ricks about 4 feet wide, 3 to 5 feet high, and of any convenient length. As a protection to the brush, which otherwise might absorb ground moisture, timbers, fodder, or straw usually are placed on the ground on which the brush is ricked. The brush is laid with the seed ends outward to the sides in two tiers running the length of the rick with the butts or handles overlapping slightly. Some brush is laid lengthwise in the center of the rick to keep the middle full. The rick is topped out by increasing the lap of the butts to fill the middle and draw in the sides and finally by laying a single tier. The brush is allowed to cure in the rick two to three weeks before it is threshed and baled.

Threshing and baling is done with the same kind of machines as in Illinois, but the brush is cured with the seed attached. Threshing and baling are done at the same time, the bunches of brush being carried directly from the thresher to the baler.

The harvesting of milo, the chief competing cash crop in this area, is accomplished with far less labor than is required for broomcorn. The common method of harvesting milo consists of cutting the heads from the standing stalks and hauling to ricks, from which it is later threshed; then the grain is hauled to market. This method of harvesting milo requires approximately one-fourth the man labor required to harvest an acre of broomcorn. The labor in harvesting milo can be further reduced by the less common practice of using a header or combine.

PRACTICES THAT SHOULD INCREASE PROFITS

In most instances broomcorn growers would profit by the use of better seed. At the time of this study many of the fields were not pure, or they contained smutty broomcorn. Broomcorn seed should be fully mature and should be obtained from a field of a pure and uniform variety grown at some distance from any other sorghum field. All seed should be treated for smut unless it is known to be free from this disease.

Experiments conducted at the Oklahoma Dry Land Field Station at Woodward show that Scarborough broomcorn produces a better quality of brush and yields better than the Evergreen Dwarf (Oklahoma dwarf variety). Either of these dwarf varieties will outyield the Black Spanish standard variety except under conditions of drought or early frost but may be inferior in quality. (*14*)

Prompt harvesting would result in a better quality of brush than is frequently obtained in western Kansas but necessitates the hiring of additional labor and increases somewhat the cash cost of harvesting.

In most seasons shed curing and threshing before curing will result in a price for the brush more than sufficient to cover the additional expense.

Sheds suitable for broomcorn storage can be built at an expense ranging from $30 to $40 per ton capacity. Slats necessary for a ton of brush at 7 cents each cost about $18.50. Allowing for insurance, depreciation, repairs, replacements of slats, interest on the investment, and about three man-hours per ton additional labor to shed the brush, the additional cost of shed-cured over rick-cured brush should not exceed $4.50 to $5 per ton, if the shed is filled twice each season. In an ordinary season shed-cured brush usually sells at $5 to $10 per ton higher than rick-cured brush because of less bleaching and better threshing of the shed-cured crop. In wet seasons such as 1930, however, the brush may be so damaged from exposure in either the rick or bale that the price is cut $20 to $40 per ton. In such years the saving as a result of shed curing the brush would pay for the additional cost of shed curing for several seasons. In a very favorable harvesting season shed-cured brush sells for about the same price as rick-cured brush. Only 9 of the 53 growers interviewed in Kansas shed-cured any of their broomcorn in 1928.

COST OF PRODUCTION

In southwestern Kansas, where it is not the general custom to shed-cure the brush and where less tillage and less cultivation are required, the requirements of man labor and horse work are somewhat less than in the more intensive standard broomcorn sections. For a yield of 333 pounds of standard broomcorn per acre about 24 hours of man labor and 17 hours of horse work per acre are required. These requirements amount to 145 hours of man labor and about 104 hours of horse work per ton. (Table 16.) The labor in harvesting dwarf broomcorn is about 15 man-hours less per ton than for standard broomcorn.

Materials such as seed and baling wire cost about 25 cents per acre or $1.50 per ton.

Other costs, including taxes, use of machinery, loss on abandoned acreage, and overhead expense, amount to about $2 per acre.

In 1928 broomcorn land was valued at $25 per acre in southwestern Kansas. Interest charges are frequently considered a part of production costs, and when figured at 5 per cent of this land value they amount to $1.25 per acre.

TABLE 16.—*Cost of producing standard broomcorn brush, according to the usual field practice and at cost rates prevailing in 1928* [1] *in southwestern Kansas*

Item	Size of crew		Rate of work per day	Times operation is performed	Quantity and cost [2]					
					Per acre			Per ton		
	Men	Horses			Man-hours	Horse-hours	Cost	Man-hours	Horse-hours	Cost
Labor and power:										
Preharvest—			*Acres*							
List (2-row lister)	1	6	16	1	0.6	3.6	$0.48	3.6	21.6	$2.88
Plant (2-row lister)	1	6	16	1	.6	3.6	.48	3.6	21.6	2.88
Throw out (2-row curler)	1	4	16	1	.6	2.4	.36	3.6	14.4	2.16
Harrow (2-section 9-foot)	1	4	20	1	.5	2.0	.30	3.0	12.0	1.80
Throw in (2-row curler)	1	4	16	1	.6	2.4	.36	3.6	14.4	2.16
Miscellaneous					.8	.8	.24	4.8	4.8	1.44
Harvest [3]—										
Break and cut [4]	7		5	1	14.0		5.60	84.0		33.60
Haul and rick (wagon)	2	2	9	1	2.2	2.2	1.10	13.2	13.2	6.60
Seed and bale—			*Tons*							
Farm crew	18		9½	1	3.2	.3	1.28	19.2	1.8	7.68
Contract [5] (power seeder)	2	2			.3		.90	1.8		5.40
Haul to market (contract, 12 miles with truck) [6]	1			1	.3		.40	1.8		2.40
Miscellaneous					.5		.20	3.0		1.20
Total					24.2	17.3	11.70	145.2	103.8	70.20
Materials:										
Seed 2½ pounds at 6 cents per pound							.15			.90
Bailing wire							.10			.60
Total							.25			1.50
Other costs:										
Taxes							.30			1.80
Use of machinery							.22			1.32
Loss on abandoned acreage							.12			.72
Overhead							1.35			8.10
Total							1.99			11.94
Total cost exclusive of interest							13.94			83.64
Interest on land, at 5 per cent							1.25			7.50
Total cost including interest							15.19			91.14

[1] Man labor, previous to harvest, is charged at 20 cents per hour, harvest labor except that done on a contract basis at 40 cents per hour, and horse work at 10 cents per hour.

[2] Based on a yield of 333 pounds per acre.

[3] All work done on a contract basis has been reduced to hours of man labor and horse work, but is charged at the contract rate for such work.

[4] Dwarf broomcorn is pulled from the standing stalk which requires about 70 man-hours per ton for a 333 pound per acre yield, or in 1928 a cost of $28 per ton, as against $33.60 for breaking and cutting. In other respects the cost of producing dwarf broomcorn is practically the same as for standard broomcorn.

[5] Charged at the custom rate of 90 cents per bale of 333 pounds.

[6] Charged at the custom rate of 40 cents per bale of 333 pounds.

Including interest on land the total cost in 1928 was about $15 per acre. On the basis of a yield of 333 pounds per acre the cost per ton amounted to $91. Excluding interest charges the cost per acre amounted to about $14. The 5-year average yield (1924–1928) for

the 53 farms visited was 295 pounds per acre. The average for 1928, 329 pounds per acre, reflects a wide range in yields as follows:

Yield group, pounds per acre:	Number of farms	Yield group, pounds per acre—Continued.	Number of farms
100 and under	1	401–500	7
101–200	4	501–600	1
201–300	18	Over 600	3
301–400	19		

About one-third of these growers had yields of from 300 to 400 pounds per acre in 1928. Where yields are the same, because of less labor in harvesting, the cost of producing dwarf broomcorn is about $6 per ton less than that of standard broomcorn. Costs in southwestern Kansas are similar to those in Colorado, New Mexico, and northwestern Oklahoma.

Growers who have no indebtedness, hire no preharvest labor, hire no field boss, exchange labor for seeding and baling and haul the crop to market themselves could produce broomcorn in 1928 for an actual cash outlay of approximately 49 per cent of the total cost of production. (Table 17.) This applies more particularly to farmers with medium acreages who do not have to hire preharvest labor. Farmers who had particularly efficient harvest crews or who produced their own seed reduced their cash costs still more. Farmers who employed one hired man during the cropping season increased their cash costs by about 37 cents per acre.

TABLE 17.—*Estimated cash and noncash cost per acre of producing broomcorn in southwestern Kansas, 1928* [1]

Item	Cash cost per acre		Noncash cost per acre	
	Dollars	*Per cent*	*Dollars*	*Per cent*
Preharvest:				
Man labor			0.74	4.9
Horse work			1.48	9.7
Harvest:				
Break and cut [3]	4.80	31.6	.80	5.3
Haul and rick [3]	.44	2.9	.66	4.4
Seed and bale [3]	.90	5.9	1.28	8.4
Haul to market			.40	2.6
Miscellaneous			.20	1.3
Materials:				
Seed	.15	1.0		
Baling wire	.10	.7		
Other costs:				
Taxes	.30	2.0		
Use of machinery	.11	.7	.11	.7
Loss on abandoned acreage			.12	.8
Overhead	.67	4.4	.68	4.5
Interest on land			1.25	8.2
Total	7.47	49.2	7.72	50.8

[1] On the basis of the grower owning his land and equipment free from indebtedness and hiring no help previous to harvest. If 1 man is hired previous to harvest the cash cost of preharvest labor would be approximately 37 cents per acre.
[2] On a basis of a cash expense for ¾ of the harvest labor.
[3] On the basis of a cash expense for ½ of the man labor.
[4] On the basis of a custom charge of 90 cents per bale and exchange labor for the farm crew.

Breaking and cutting constitute by far the greater proportion of the cash costs of producing broomcorn. According to standards set up in Table 17 this item amounted to nearly two-thirds of the cash cost of producing broomcorn in 1928.

On the basis of the average 1928 price of $111 per ton received for standard broomcorn on the farms visited in Kansas, the quantity of broomcorn required to cover total cost of production, including interest charges, was 274 pounds per acre and, excluding interest charges, 251 pounds per acre. One hundred thirty-five pounds per acre would cover the cash costs as shown in Table 17.

Where a considerable acreage of broomcorn is grown the large expense for harvesting entails a large total farm expenditure and involves a greater element of risk than in the case of milo. With milo the cash cost of production per acre as well as the total cost is materially less than in the case of broomcorn. Assuming a yield of broomcorn of 333 pounds per acre and a price of $111 per ton, which were approximate averages on the farms visited in 1928, the net returns above total costs were about $3.30 per acre and above cash costs $11.

OKLAHOMA

The so-called "Lindsay district" in Garvin and McClain Counties, south-central Oklahoma, has long been recognized as a source of high-quality standard broomcorn brush. The average annual precipitation is about 33 inches. Rains during the broomcorn-harvest season are frequent enough to necessitate the use of sheds for storing and curing the brush. The soils in the river valley near Lindsay are mostly a dark sandy loam with some gumbo. Gray loam soils predominate on the uplands.

Broomcorn is usually grown in a rotation with corn and cotton, although it is sometimes grown on the same land for two or more consecutive years.

USUAL FIELD PRACTICE IN GROWING BROOMCORN AND THE MAJOR COMPETING CASH CROP

Of 36 growers interviewed, 26 plowed, 9 listed, and 1 disked as the first step in preparing the seed bed for broomcorn. Two-bottom horse-drawn plows are common. Following plowing, most of the land was disked and harrowed before planting. A majority of growers use 1-row lister planters, but on some farms 2-row corn planters with disk furrow opener attachments are used for planting broomcorn.

The preharvest work in preparing the seed bed, and planting and cultivating cotton is essentially the same as for broomcorn except that cotton is usually given two more cultivations and is generally hoed twice. These added operations result in a preharvest cotton labor and power requirement per acre that is about 13 man-hours and approximately 5 horse-hours greater than for broomcorn.

The usual rate of planting broomcorn is 1 bushel of seed to 12 to 16 acres on the bottom lands. Planting begins the last of March and continues until July, most of the planting being done in April.

The method of harvesting broomcorn is very similar to that employed in Illinois. Harvesting begins in July and continues through September. All of the crop is tabled and cut and hauled from the field. The brush is seeded before being cured and is placed in curing sheds as in Illinois. Baling begins 10 to 21 days after the brush is put in the shed. Curing sheds are built with the stalls running crosswise of the shed, whereas the stalls in most of the sheds in Illinois

run lengthwise of the sheds. The crop is all baled directly from the slats even though the sheds are filled two or three times.

The total man labor and horse work required to produce and market an acre of cotton yielding 200 pounds per acre is approximately 55 man-hours and 38 horse-hours. In the case of cotton the preharvest man-hours are considerably greater than for broomcorn, whereas the harvest man-hours are slightly fewer.

PRACTICES THAT SHOULD INCREASE PROFITS

Farmers generally recognize that planting with a corn planter is conducive to better stands than is lister planting. Much of the broomcorn is planted in the Lindsay district in April and early May. Experiments have shown that higher yields are usually obtained from planting after than before May 15 (*14*).

Black Spanish broomcorn usually produces a rather short brush and yields less than the standard Evergreen variety. Growers should consider carefully the question whether the lower yields of the Black Spanish variety are compensated by a sufficiently higher selling price.

The price of $10 per bushel for broomcorn seed in 1928 was a considerably higher cost expenditure than was necessary. Pure locally grown certified seed could be obtained at not more than one-half the price paid for seed shipped in from Illinois. More Oklahoma farmers should specialize in the growing of high-quality broomcorn seed for planting in their State.

Man labor previous to harvest could be materially reduced by the use of larger implements, as is shown by lower labor requirements in Illinois and Kansas, where the use of 2-row planters and other large implements is common. (Tables 13 and 16.) Another practice conducive to economical production of broomcorn would be the paying of harvest labor by the acre, as is common in Illinois, instead of by the hour. A considerable saving in the cost of harvesting broomcorn may easily be effected by the increased output per man when payment is made on the contract-acre basis.

COST OF PRODUCTION

In south-central Oklahoma, where the yield is slightly less than in Illinois and where it is not the usual practice to use tractor power, the man labor per acre amounted to about 44 hours and the horse work to about 38 hours for a yield of 500 pounds per acre. On a ton basis it takes about 175 hours of man labor and 152 hours of horse work. (Table 18.)

TABLE 18.—*Cost of producing standard broomcorn brush according to the usual field practices and at cost rates prevailing in 1928,*[1] *in south-central Oklahoma*

Item	Size of crew		Rate of work per day	Times operation is performed	Quantity and cost [2]					
					Per acre			Per ton		
	Men	Horses			Man-hours	Horse-hours	Cost	Man-hours	Horse-hours	Cost
Labor and power:										
Preharvest—			*Acres*							
Plow (2-bottom 14-inch)	1	4	4	1	2.5	10.0	$1.44	10.0	40.0	$5.75
Disk or single list (7-foot double disk or 1-row lister)	1	4	8	1	1.3	5.2	.75	5.2	20.8	2.99
Harrow (2-section 9-foot)	1	4	20	1	.5	2.0	.29	2.0	8.0	1.15
Plant (1-row lister)	1	4	8	1	1.3	5.2	.75	5.2	20.8	2.99
Cultivate (1-row riding)	1	2	8	3	3.5	7.6	1.42	15.2	30.4	5.70
Miscellaneous					1.0	.8	.25	4.0	3.2	1.02
Harvest [3]—										
Table and cut	24		12	1	20.0		7.00	80.0		28.00
Haul to shed	4	4	13	1	3.1	3.1	1.40	12.4	12.4	5.58
Seed and shed—			*Tons*							
Farm crew	25		15	1	4.2		1.47	16.8		5.88
Contract [4] (power seeder)	1				.2		1.50	.8		6.00
Bale—										
Farm crew	11		10	1	2.8	.4	.98	11.2	1.6	3.92
Contract [5]	1	2			.2		.60	.8		2.40
Haul to market (5 miles) with wagon	1	2	3	1	.8	1.6	.44	3.2	6.4	1.76
Roustabout	1	2			1.0	2.0	.55	4.0	8.0	2.20
Supervision	1				.8		.40	3.2		1.60
Miscellaneous					.4		.14	1.6		.56
Total					43.9	37.9	19.38	175.6	151.6	77.50
Materials:										
Seed 3½ pounds at 21 cents per pound							.70			2.80
Baling wire							.15			.60
Total							.85			3.40
Other costs:										
Taxes							2.00			8.00
Fire insurance on brush [6]							.41			1.64
Use of machinery							.54			2.16
Use of broomcorn shed							1.30			5.56
Loss on abandoned acreage							.73			2.92
Overhead							2.39			9.56
Total							7.46			29.84
Total cost exclusive of interest							27.69			110.74
Interest on land at 5 per cent							6.25			25.00
Total cost, including interest							33.94			135.74

[1] Man labor previous to harvest charged at 17½ cents per hour, harvest work, except that done on a contract basis, at 35 cents per hour, supervision at 50 cents per hour, and horse work at 10 cents per hour.
[2] Based on a yield of 500 pounds per acre.
[3] All work done on a contract basis has been reduced to hours of man labor and horse work but is charged at the contract rate for such work.
[4] Charged at the custom rate of $1 per bale of 333 pounds.
[5] Charged at the custom rate of 40 cents per bale of 333 pounds.
[6] Based on a premium rate of $1.10 per $100 of valuation for the first month and at 55 cents per $100 of valuation for the second month.

Materials such as seed and baling wire amount to 85 cents per acre or $3.40 per ton.

Other costs, including taxes, fire insurance on the brush, use of machinery, use of broomcorn shed, losses due to abandoned acreage, and overhead expenses, amount to about $7.50 per acre.

Including interest on land value, the total cost in 1928 was $34 per acre. Excluding interest charges, the cost per acre amounted to about $27.70. The cost per ton amounted to about $136 on the basis of a yield of 500 pounds per acre. This yield is somewhat higher than the average for the State but is representative of average yields obtained on the better broomcorn soils. The yields obtained on the 36 farms visited averaged 419 pounds per acre in 1928. The 5-year average yield (1924–1928) was 484 pounds per acre. In 1928 about one-third of the growers had yields of from 400 to 500 pounds per acre. The range in yield on these farms was as follows:

Yield group, pounds per acre:	Number of farms	Yield group, pounds per acre—Continued.	Number of farms
100 and under	0	401–500	11
101–200	1	501–600	6
201–300	7	Over 600	2
301–400	9		

Broomcorn growers who have no indebtedness, hire no preharvest labor, hire no field boss, exchange labor for baling, and haul the crop to market themselves could produce broomcorn in 1928 for an actual cash outlay of approximately 50 per cent of the total cost of production. (Table 19.) This applies more particularly to farmers with medium acreages who do not have to hire preharvest labor. Farmers who had particularly efficient harvest crews or who produced their own seed reduced their cash costs. Farmers who employed one hired man during the cropping season increased their preharvest cash costs in Oklahoma by about 91 cents per acre.

TABLE 19.—*Estimated cash and noncash cost per acre of producing broomcorn in south-central Oklahoma, 1928* [1]

Item	Cash cost per acre		Noncash cost per acre	
	Dollars	*Per cent*	*Dollars*	*Per cent*
Preharvest:				
Man labor			1.82	5.4
Horse labor			3.08	9.1
Harvest:				
Table and cut	7.00	20.6		
Haul to shed [2]	1.09	3.2	.31	.9
Seed and shed	2.97	8.7		
Bale [3]	.60	1.8	.98	2.9
Haul to market			.44	1.3
Supervision			.40	1.2
Roustabout			.55	1.6
Miscellaneous			.14	.4
Materials:				
Seed	.70	2.1		
Baling wire	.15	.4		
Other costs:				
Taxes	2.00	5.9		
Fire insurance on brush	.41	1.2		
Use of machinery	.27	.8	.27	.8
Use of broomcorn shed	.70	2.1	.69	2.0
Loss on abandoned acreage			.73	2.2
Overhead	1.10	3.5	1.20	3.5
Interest on land			6.25	18.4
Total	17.08	50.3	16.86	49.7

[1] On the basis of the grower owning his land and equipment free from indebtedness and hiring no help previous to harvest. If 1 man is hired previous to harvest the cash cost of preharvest labor would be approximately 91 cents per acre.

[2] On the basis of a cash expense for all of the man labor.

[3] On the basis of a custom charge of 40 cents per bale.

Of the cash expense in broomcorn production, that of tabling and cutting constitutes by far the greater part of the cash costs. According to the standards set up in Table 19, this item amounted to about 40 per cent of the cash cost of producing broomcorn in Oklahoma in 1928.

Although the total labor requirements for growing cotton are somewhat higher than those for growing broomcorn, the large cash expenditure at harvest time, when a considerable acreage is grown, makes the element of risk greater than in the case of cotton, where harvesting work can be extended over a relatively longer period and affords a greater opportunity for the use of family labor.

On the basis of an average farm price of $150 in 1928, the quantity of broomcorn required to cover cost of production, including interest charges, was 453 pounds per acre. Excluding interest charges, about 369 pounds per acre would cover total costs, and about 227 pounds per acre would cover the cash costs.

CHOICE OF COMPETING CASH CROPS

In each of the three districts studied there is another major cash crop which is in direct competition with broomcorn for the farm acreage. In Illinois this major competing cash crop is corn, in Kansas it is kafir and milo, and in Oklahoma it is cotton. (Table 12.) The comparative acreage devoted to broomcorn and the competing cash crop in each district changes materially from year to year; it depends mainly on the farmer's judgment as to which one will return the greater profit.

In selecting his crop enterprises a broomcorn grower should carefully consider the conditions under which he works, such as his financial resources, equipment for growing broomcorn and other crops, keeping his labor and power profitably employed, feed requirements for his livestock, and the like. He should attempt to adjust his crop acreage in such a manner as to realize the greatest net returns for his labor and management.

Relative net return per acre is only one of several factors that should be considered, but in the case of broomcorn and the major competing cash crop in each district, net return per acre as a measure of the choice of crop enterprises has many things in its favor. Broomcorn and its rivals are intertilled crops and, prior to harvest, require the attention of the farmer at the same time of the year, require the same tillage implements, and there is little difference in effects in increasing or decreasing the productiveness of the soil. Another factor that influences choice of crops is the personal likes or dislikes of farmers. Many farmers dislike to grow broomcorn because of a skin irritation caused by the fine hairs which are separated from the broomcorn chaff in threshing. Most farmers can overcome personal preference, however, if by so doing they can make more money.

NET RETURNS PER ACRE FROM BROOMCORN AND COMPETING CASH CROPS

The net returns per acre with different yields and prices for broomcorn and the major competing cash crop in each district are shown in Tables 20, 21, 22, 23, 24, and 25. The costs as shown are those of 1928; costs have receded somewhat since that time. The prices shown include those in 1928 as well as those in effect at present. The estimated net returns per acre were determined by subtracting

from the gross returns at the prices indicated, the cost of producing the different crops. The preharvest cost of growing broomcorn and the competing cash crop in each district is nearly the same. The differences in production costs are chiefly due to the influence of yield on the cost of harvesting and marketing the several crops. For each crop, costs up to harvest have been held constant regardless of yield. As an example of the application of these data, the comparative net returns from broomcorn and the major competing cash crop in each district will be examined.

TABLE 20.—*Net returns per acre from broomcorn, computed at stated yields and prices and at cost rates prevailing in 1928 in east-central Illinois*

Farm price per ton	Net returns per acre when yield is—					
	300 pounds costing $32.93	400 pounds costing $34.06	500 pounds costing $35.19	600 pounds costing $36.32	700 pounds costing $37.45	800 pounds costing $38.58
Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
60	−23.93	−22.06	−20.19	−18.32	−16.45	−14.58
80	−20.93	−18.06	−15.19	−12.32	−9.45	−6.58
100	−17.93	−14.06	−10.19	−6.32	−2.45	1.42
120	−14.93	−10.06	−5.19	−.32	4.55	9.42
140	−11.93	−6.06	−.19	5.68	11.55	17.42
160	−8.93	−2.06	4.81	11.68	18.55	25.42
180	−5.93	1.94	9.81	17.68	25.55	33.42
200	−2.93	5.94	14.81	23.68	32.55	41.42

TABLE 21.—*Net returns per acre from corn, computed at stated yields and prices and at cost rates prevailing in 1928 in east-central Illinois*

Farm price per bushel	Net returns per acre when yield is—						
	25 bushels costing $22.76	30 bushels costing $23.53	35 bushels costing $24.29	40 bushels costing $25.05	45 bushels costing $25.81	50 bushels costing $26.57	55 bushels costing $27.43
Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
0.20	−17.76	−17.53	−17.29	−17.05	−16.81	−16.57	−16.43
.30	−15.26	−14.53	−13.79	−13.05	−12.31	−11.57	−10.93
.40	−12.76	−11.53	−10.29	−9.05	−7.81	−6.57	−5.43
.50	−10.26	−8.53	−6.79	−5.05	−3.31	−1.57	.07
.60	−7.76	−5.53	−3.29	−1.05	1.19	3.43	5.57
.70	−5.26	−2.53	.21	2.95	5.69	8.43	11.07
.80	−2.76	.47	3.71	6.95	10.19	13.43	16.57
.90	−.26	3.47	7.21	10.95	14.69	18.43	22.07
1.00	2.24	6.47	10.71	14.95	19.19	23.43	27.57

TABLE 22.—*Net returns per acre from broomcorn, computed at stated yields and prices and at cost rates prevailing in 1928 in southwestern Kansas*

Farm price per ton	Net returns per acre when yield is—						
	200 pounds costing $13.90	250 pounds costing $14.37	300 pounds costing $14.84	350 pounds costing $15.31	400 pounds costing $15.78	450 pounds costing $16.25	500 pounds costing $16.72
Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
40	−9.90	−9.37	−8.84	−8.31	−7.78	−7.25	−6.72
60	−7.90	−6.87	−5.84	−4.81	−3.78	−2.75	−1.72
80	−5.90	−4.37	−2.84	−1.31	.22	1.75	3.28
100	−3.90	−1.87	.16	2.19	4.22	6.25	8.28
120	−1.90	.63	3.16	5.69	8.22	10.75	13.28
140	.10	3.13	6.16	9.19	12.22	15.25	18.28
160	2.10	5.63	9.16	12.69	16.22	19.75	23.28
180	4.10	8.13	12.16	16.19	20.22	24.25	28.28

TABLE 23.—*Net returns per acre from milo, computed at stated yields and prices and at cost rates prevailing in 1928 in southwestern Kansas*

Farm price per bushel	Net returns per acre when yield is—								
	10 bushels costing $8.29	15 bushels costing $8.86	20 bushels costing $9.45	25 bushels costing $10.40	30 bushels costing $10.98	35 bushels costing $11.56	40 bushels costing $12.68	45 bushels costing $13.26	50 bushels costing $13.84
Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
0.20	−6.29	−5.86	−5.45	−5.40	−4.98	−4.56	−4.68	−4.26	−3.84
.30	−5.29	−4.36	−3.45	−2.90	−1.98	−1.06	−.68	.24	1.16
.40	−4.29	−2.86	−1.45	−.40	1.02	2.44	3.32	4.74	6.16
.50	−3.29	−1.36	.55	2.10	4.02	5.94	7.32	9.24	11.16
.60	−2.29	.14	2.55	4.60	7.02	9.44	11.32	13.74	16.16
.70	−1.29	1.64	4.55	7.10	10.02	12.94	15.32	18.24	21.16
.80	−.29	3.14	6.55	9.60	13.02	16.44	19.32	22.74	26.16
.90	.71	4.64	8.55	12.10	16.02	19.94	23.32	27.24	31.16

TABLE 24.—*Net returns per acre from broomcorn, computed at stated yields and prices, and at cost rates prevailing in 1928 in south-central Oklahoma*

Farm price per ton	Net returns per acre when yield is—					
	200 pounds costing $28.60	300 pounds costing $30.38	400 pounds costing $32.16	500 pounds costing $33.94	600 pounds costing $35.72	700 pounds costing $37.50
Dollars	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
60	−22.60	−21.38	−20.16	−18.94	−17.72	−16.50
80	−20.60	−18.38	−16.16	−13.94	−11.72	−9.50
100	−18.60	−15.38	−12.16	−8.94	−5.72	−2.50
120	−16.60	−12.38	−8.16	−3.94	.28	4.50
140	−14.60	−9.38	−4.16	1.06	6.28	11.50
160	−12.60	−6.38	−.16	6.06	12.28	18.50
180	−10.60	−3.38	3.84	11.06	18.28	25.50
200	−8.60	−.38	7.84	16.06	24.28	32.50

TABLE 25.—*Net returns per acre from cotton, computed at stated yields and prices and at cost rates prevailing in 1928 in south-central Oklahoma*

Farm price per pound	Net returns per acre when yield is—								
	100 pounds costing $21.06	150 pounds costing $22.17	200 pounds costing $23.28	250 pounds costing $24.39	300 pounds costing $25.50	350 pounds costing $26.61	400 pounds costing $27.72	450 pounds costing $28.83	500 pounds costing $29.94
Dollar	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*	*Dollars*
0.06	−15.06	−13.17	−11.28	−9.39	−7.50	−5.61	−3.72	−1.83	0.06
.07	−14.06	−11.67	−9.28	−6.89	−4.50	−2.11	.28	2.67	5.06
.08	−13.06	−10.17	−7.28	−4.39	−1.50	1.39	4.28	7.17	10.06
.09	−12.06	−8.67	−5.28	−1.89	1.50	4.89	8.28	11.67	15.06
.10	−11.06	−7.17	−3.28	.61	4.50	8.39	12.28	16.17	20.06
.11	−10.06	−5.67	−1.28	3.11	7.50	11.89	16.28	20.67	25.06
.12	−9.06	−4.17	.72	5.61	10.50	15.39	20.28	25.17	30.06
.13	−8.06	−2.67	2.72	8.11	13.50	18.89	24.28	29.67	35.06
.14	−7.06	−1.17	4.72	10.61	16.50	22.39	28.28	34.17	40.06
.15	−6.06	.33	6.72	13.11	19.50	25.89	32.28	38.67	45.06
.16	−5.06	1.83	8.72	15.61	22.50	29.39	36.28	43.17	50.06
.17	−4.06	3.33	10.72	18.11	25.50	32.89	40.28	47.67	55.06
.18	−3.06	4.83	12.72	20.61	28.50	36.39	44.28	52.17	60.06
.19	−2.06	6.33	14.72	23.11	31.50	39.89	48.28	56.67	65.06
.20	−1.06	7.83	16.72	25.61	34.50	43.39	52.28	61.17	70.06

In east-central Illinois, with a yield of 600 pounds of broomcorn per acre and a price of $160 per ton and a yield of 40 bushels of corn selling at 70 cents per bushel (which are approximate averages on the

farms visited), the net per-acre advantage of broomcorn over corn amounts to approximately $8.73 per acre. With these yields, corn at 90 cents per bushel would give approximately the same net returns per acre as broom corn at $160 per ton. On the basis of yields of 600 pounds of broomcorn and 40 bushels of corn, prices of approximately $125 per ton for broomcorn and 65 cents per bushel for corn were required in order to show any profit in 1928.

In southwestern Kansas, with a yield of 300 pounds of standard broomcorn per acre and a price of $120 per ton, and a yield of 20 bushels of milo per acre, selling at 70 cents per bushel (approximate averages on the farms visited), the net per-acre advantage of milo over broomcorn amounts to approximately $1.39 per acre. With these yields, broomcorn at $140 per ton would give approximately the same net returns per acre as milo at 80 cents per bushel. On the basis of yields of 300 pounds of broomcorn and 20 bushels of milo, approximately $100 per ton must have been realized for broomcorn and 50 cents per bushel for milo in order to show any profit in 1928.

In the Lindsay district of south-central Oklahoma, with a yield of 500 pounds of broomcorn and a price of $170 per ton and a yield of 200 pounds of cotton selling at 15 cents per pound (approximate averages on the farms visited), the net per-acre advantage of cotton over broomcorn amounts to approximately $1.84 per acre. With these yields, broomcorn at $180 per ton would give approximately the same net returns per acre as cotton at 17 cents per pound. On the basis of a 500-pound yield of broomcorn and a 200-pound yield of cotton, $140 per ton must have been realized from broomcorn and 12 cents per pound from cotton in order to show any profit in 1928.

The cost per acre of producing broomcorn is considerably greater than that of producing corn, milo, or cotton. Broomcorn must be harvested promptly, which involves a large cash expense when production is on a large scale. On the other hand, the harvesting of corn, milo, and cotton can be extended over a considerable period of time and gives a better opportunity than broomcorn for the use of family labor. In addition, on the basis of the average yield that can be expected and with prices any lower than those required to show some profit, the losses from broomcorn would be greater than that from corn, milo, or cotton.

From the management standpoint, broomcorn has an advantage in that it can be harvested in ample time for seeding wheat on the same land and earlier than can corn. From the marketing standpoint corn and milo may be sold or fed to livestock whereas broomcorn and cotton must be sold directly. Because of heavy expenditures for hired labor at harvest time and wide fluctuations in broomcorn prices, broomcorn is more speculative than the competing cash crop in the districts under consideration. On the basis of average yields and prices, broomcorn appears to have had a slight advantage over corn in Illinois, whereas in western Kansas and in the Lindsay district of Oklahoma, the relative net returns from milo and cotton, were slightly greater than from broomcorn.

As is well known, costs vary on individual farms, owing to differences in yields and other contributing factors, and no formula can be set up which will be applicable to all farms. Yield per acre, however, is the principal factor causing variations in costs, and the net returns per acre have been adjusted for the yield factor as well as for price

differences. Having a fair idea of the yield that can be expected and using a price based on the price outlook for the two competing crops, individual farmers should be able to use the data to advantage in adjusting their crop acreage between broomcorn and the competing cash crop.

SUMMARY

The growing of broomcorn on a commercial scale in this country began in the Connecticut Valley at Hadley, Mass., in 1798. Since that time broomcorn production, with the exception of that in east-central Illinois, has gradually shifted westward until, at present, it has become practically concentrated in the Southwest. As broomcorn is drought-resistant, it is adapted to the semiarid conditions of the Plains States, where the choice of cash crops is limited.

The average yield of broomcorn brush in the United States is about 322 pounds per acre. During the 17-year period 1915–1931 the yearly production of broomcorn has fluctuated from 29,500 to 81,000 tons.

Broomcorn competes only slightly with any other commodity whereas a number of products—such as vacuum cleaners and brushes and brooms made of materials other than broomcorn—severly compete with broomcorn brooms. The lack of expansion in the broom industry is primarily due to the increasing competition of these other products, chiefly vacuum cleaners. Since the uses of broomcorn are almost entirely limited to the making of brooms and since the demand for domestic use is satisfied at about 45,500 tons, a supply greater or less than these requirements, plus the annual export demand of approximately 4,500 tons, results in a decided change in the price received. Violent fluctuations in production and prices frequently make broomcorn one of the most speculative of farm crops.

In each district in which cost-of-production studies were made there is a major competing cash crop. In east-central Illinois it is corn (maize); in southwestern Kansas it is grain sorghums, mainly milo, and in south-central Oklahoma it is cotton.

Broomcorn produced on an extensive scale requires more capital than does the major competing cash crop in each of these districts. Some special broomcorn equipment is necessary and a relatively large cash outlay for labor to harvest the crop is essential to successful production of broomcorn.

Costs of producing broomcorn in 1928 in Illinois, Kansas, and Oklahoma ranged from $91 to $136 per ton, of which cash costs represented approximately 50 per cent.

The principal item of cost is man labor. The 5-year average yields for the districts studied ranged from 295 to 583 pounds of brush per acre, while the yields required to pay costs, including interest charges, ranged from 274 to 488 pounds per acre.

On the basis of average yields and prices, broomcorn appears to have had a slight advantage over corn in Illinois whereas the relative net returns from milo in Kansas and cotton in Oklahoma were slightly greater than from broomcorn.

LITERATURE CITED

(1) ANONYMOUS.
1836. A BROOM CORN MANIA. Genesee Farmer and Gard. Jour. 6 (17):135.

(2) ———
1859. BROOM CORN IN ILLINOIS. Genesee Farmer (2) 20:336.

(3) ———
1930. MCPHERSON COUNTY FARMER BROUGHT BROOM CORN TO KANSAS. Broom-corn Rev. 19 (5):9.

(4) ALGUIRE, G. B.
1922. MARKETING BROOM CORN. U. S. Dept. Agr. Bul. 1019, 32 p., illus.

(5) AMERICAN AGRICULTURIST.
1894. BROOM-CORN AND BROOMS. Written and compiled by the editors of the American Agriculturist. New and Rev. ed., 59 p. New York.

(6) BAUHIN, K.
1658. THEATRI BOTANICI SIVE HISTORIAE PLANTARUM EX VETERUM ET RECENTIORUM PLACITIS PROPRIAQ. OBSERVATIONE CINCINNATÆ. 683 col., [36] p., illus. Basileæ.

(7) [FLEMING, S. P.]
1929. ANCIENT LORE ON BROOM CORN. Broom and Broomcorn News 18 (22):8–9.

(8) G., F.
1873. CULTURE OF BROOM CORN. Cult. and Country Gent. 38:643–644.

(9) HEUZE, G.
1893–1895. LES PLANTES INDUSTRIELLES. Ed. 3, 4 v. Paris.

(10) HOWARD, J. R.
1846. FARMING IN OHIO. BROOM CORN. Cultivator (n. s.) 3 (1):21.

(11) JEFFERSON, T.
1853. NOTES OF THE STATE OF VIRGINIA. 275 p., illus. Richmond, Va.

(12) JONES, C.
1905. THE BROOM CORN INDUSTRY IN THE COUNTIES OF FRANKLIN AND HAMPSHIRE, AND IN THE TOWN OF DEERFIELD IN PARTICULAR. *In* History and Proceedings of the Pocumtuck Valley Memorial Association, 1899–1904. v. 4, pp. 105–111. Deerfield.

(13) JUDD, S.
1863. HISTORY OF HADLEY, INCLUDING THE EARLY HISTORY OF HATFIELD, SOUTH HADLEY, AMHERST, AND GRANBY, MASSACHUSETTS. pp. 1–440. Northampton.

(14) SIEGLINGER, J. B.
1928. BROOM CORN EXPERIMENTS AT THE UNITED STATES DRY-LAND FIELD STATION, WOODWARD, OKLA. U. S. Dept. Agr. Tech. Bul. 51. 32 p., illus.

(15) TARBOX, G. S.
1923. A BROOM CORN STORY. Broom and Broom Corn News 12 (1):8.

(16) WATSON, J. F.
1859. ANNALS OF PHILADELPHIA AND PENNSYLVANIA. v. 2, p. 487.

ORGANIZATION OF THE UNITED STATES DEPARTMENT OF AGRICULTURE WHEN THIS PUBLICATION WAS LAST PRINTED

Secretary of Agriculture	ARTHUR M. HYDE
Assistant Secretary	R. W. DUNLAP.
Director of Scientific Work	A. F. WOODS.
Director of Regulatory Work	WALTER G. CAMPBELL.
Director of Extension Work	C. W. WARBURTON.
Director of Personnel and Business Administration.	W. W. STOCKBERGER.
Director of Information	M. S. EISENHOWER.
Solicitor	E. L. MARSHALL.
Bureau of Agricultural Economics	NILS A. OLSEN, *Chief.*
Bureau of Agricultural Engineering	S. H. MCCRORY, *Chief.*
Bureau of Animal Industry	JOHN R. MOHLER, *Chief.*
Bureau of Biological Survey	PAUL G. REDINGTON, *Chief.*
Bureau of Chemistry and Soils	H. G. KNIGHT, *Chief.*
Office of Cooperative Extension Work	C. B. SMITH, *Chief.*
Bureau of Dairy Industry	O. E. REED, *Chief.*
Bureau of Entomology	C. L. MARLATT, *Chief.*
Office of Experiment Stations	JAMES T. JARDINE, *Chief.*
Food and Drug Administration	WALTER G. CAMPBELL, *Director of Regulatory Work, in Charge.*
Forest Service	R. Y. STUART, *Chief.*
Grain Futures Administration	J. W. T. DUVEL, *Chief.*
Bureau of Home Economics	LOUISE STANLEY, *Chief.*
Library	CLARIBEL R. BARNETT, *Librarian.*
Bureau of Plant Industry	WILLIAM A. TAYLOR, *Chief.*
Bureau of Plant Quarantine	LEE A. STRONG, *Chief.*
Bureau of Public Roads	THOMAS H. MACDONALD, *Chief.*
Weather Bureau	CHARLES F. MARVIN, *Chief.*

This bulletin is a joint contribution from

Bureau of Agricultural Economics	NILS A. OLSEN, *Chief.*
Division of Farm Management and costs	C. L. HOLMES, *Principal Agricultural Economist, in Charge.*
Bureau of Plant Industry	WILLIAM A. TAYLOR, *Chief.*
Division of Cereal Crops and Diseases	M. A. MCCALL, *Principal Agronomist, in Charge.*

U. S. GOVERNMENT PRINTING OFFICE: 1933

For sale by the Superintendent of Documents, Washington, D. C. - - - - - - - - - - Price 5 cents

END