KENTUCKY

AGRICULTURAL EXPERIMENT STATION

OF THE

STATE COLLEGE OF KENTUCKY.

BULLETIN NO. 83.

WHEAT.

1. Experiments with Fertilizers.
2. Variety Tests.
3. Notes and Descriptions.

LEXINGTON, KENTUCKY,
August, 1899.
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KENTUCKY

Agricultural Experiment Station.

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ADDRESS:

KENTUCKY AGRICULTURAL EXPERIMENT STATION,

LEXINGTON, KY.

Bulletin No. 83.

WHEAT.

1. EXPERIMENTS WITH FERTILIZERS.

The field experiments with fertilizers on wheat conducted at the experiment Station farm in 1898–9, as in the season before, gave only negative results, the yields from the fertilized plots being little, if any, greater than where no fertilizer was applied. Commercial fertilizers used on wheat on the soil of the station farm appear to yield no profitable result, as the slight increase that has occasionally been observed has not been sufficient to pay for the fertilizer used. The season was unfavorable to such experiments, as wheat was generally sown late and the stand was thin and irregular and this affected the co-operative experiments that were undertaken last season, as well as those at the station farm. Two of these experiments, however, it is thought proper to publish, as they show a marked increase from the use of fertilizers on very poor soil. The first of these experiments was made by Mr. E. G. Austin of Prentiss, Ohio county, Ky., upon soil similar to that on which he made the experiments last season, described in Bullitin 77, but not on the same field. The experimental plots were ⅒ acre each and the same system was followed as is used in fertilizer experiments at the station and already described in many bulletins except that Mr. Austin added two plots, on one of which he applied "floats" or very finely ground phosphate rock, and on the other bone meal. Each plot was harvested separately and the yields, calculated to the acre, are given in the following table, which shows also the fertilizer used on each plot and the rate per acre at which it was applied; the value of the crop per acre, estimated at 70 cts. a bushel; the cost of the fertilizer and the difference between cost of fertilizer and value of crop.

RESULTS OBTAINED WITH FERTILIZERS BY MR. AUSTIN.

Number of Plot.	Fertilizer Used and Rate Per Acre.	Yield of Wheat Bu. per Acre.	Value of Wheat @ 70c per bu.	Cost of Fertilizer.	Value of Wheat less cost of Fertilizer.
1	None	6⅔	$4.67	0	$4.67
2	Nitrate of Soda, 160 lbs.	10⅝	7.58	$3.60	3.98
3	Acid Phosphate, 320 lbs.	11½	8.05	2.25	6.80
4	Muriate of Potash, 160 lbs.	8⅝	6.18	3.60	2.58
5	None	7	4.90	0	4.90
6	Nitrate of Soda, 160 lbs. + Acid Phosphate, 320 lbs.	15⅙	10.62	5.85	4.77
7	Nitrate of Soda, 160 lbs. + Muriate of Potash, 160 lbs.	11⅓	7.93	7.20	0.73
8	Acid Phosphate, 320 lbs. + Muriate of Potash, 160 lbs.	14½	10.15	5.85	4.30
9	Nitrate of Soda, 160 lbs. + Acid Phosphate, 320 lbs + Muriate of Potash, 160 lbs,	12	8.40	9.45	(1.05)*
10	None	10⅙	7.12	0	7.12
11	Floats, 400 lbs.	10½	7.35	.....	.....
12	Bone Meal, 160 lbs.	10⅓	7.25	.....	.....

*Less than cost of Fertilizer.

The results bear a general similarity to those obtained by Mr. Austin last season. The greatest increase in yield from the use of any single constituent of fertilizers was given by the acid phosphate, and the use of nitrate of soda and acid phosphate more that doubled the yield. The results from floats and bone meal are not as good as from acid phosphate and acid phosphate with nitrate of soda. Mr. Austin says in his report: "The land upon which these tests were made is very old and

poor. It has been in meadow for a number of years; was broken up in the fall of 1897 and planted in corn the following spring. The yield of corn was about 20 bu. per acre, which was removed from the field and the same sown in wheat on October 21 and 22. The land being wet at the time, the heavy rains that followed caused the wheat to run together and to not all come up. The wheat made very little growth during the fall and winter, and the ground was almost bare at the approach of spring. Very little difference was noticed between the fertilized and the unfertilized plots until near harvest time, when a perceptible difference was observed in favor of plots 3, 6, 8 and 9, which made a slightly ranker growth and ripened a few days in advance of the other plots. Nos. 2, 7, 11 and 12 made a slightly ranker growth than Nos. 1, 4, 5 and 10, but ripened at the same time and were harvested the same day. Plot No. 9 was the nearest level of any in the test and possibly suffered worse than any of the others from winter-killing. The rest of the field was fertilized with 100 lbs. acid phosphate per acre and yielded 10 bu. per acre. Other land near by of about the same quality, sown two weeks earlier and fertilized with the same kind of fertilizer, made a better yield and showed a greater difference between the fertilized and the unfertilized portions. I am convinced that wheat should be sown in time to make some growth before winter sets in, to obtain the best possible results from the use of fertilizers."

It appears from the figures that the ground on which the experiment was made is somewhat richer near plot 10 than on plots 1 to 5, and the latter produced about 7 bu. of wheat to the acre without any fertilizer. If this is accepted as correct, it appears that the increase in yield caused by the use of acid phosphate, paid about $2.00 per acre over and above the cost of the acid phosphate. In the case of plot No. 6, on which the largest actual yield was obtained the increase barely paid the cost of the fertilizer. Comparing plots 11 and 12 with plot 10, it appears that "floats" and bone meal had very little, if any effect, on the yield. It was to be expected that plot 12, on which the complete fertilizer was used, would give the largest yield, and the deficiency may be due to some accidental cause, perhaps

winter-killing on this plot, due to its level situation, as suggested by Mr. Austin. The yield on the unfertilized plot No. 10 is higher than was to be expected, judging by plots 1 and 5 and by plots 11 and 12, which should have shown more contrast with the unfertilized plot. Plot No. 6, which produced the largest yield, did not give any profit on the money expended for the fertilizer because of the great cost of the nitrate of soda. If the nitrogen had been supplied in a more economical way, perhaps, by a crop of clover or by barnyard manure, it is quite likely that this plot would have given the largest profit, as well as the largest yield. It must be remembered, however, that the price of wheat has much to do with this calculation. If the wheat were worth $1.00 per bushel, the largest profit would come from plot 6, being about 40c more per acre than plot 3, where only acid phosphate was used.

The following described experiment was made by the late Mr. J. C. Bingham, of Russell, Greenup County, Ky., after the same plan as the one already described, and was reported by Mr. W. T. Bingham.

RESULTS OBTAINED WITH FERTILIZERS BY J. C. BINGHAM.

Number of Plot.	Fertilizers Used and Rate Per Acre.	Yield of Wheat, Bu. Per Acre.	Value of Wheat, @ 70c Per Bu.	Cost of Fertilizer	Value of Wheat Less Cost of Fertilizer.
1	None.....	4¼	$2.98	0	$2.98
2	Nitrate of Soda, 160 lbs	5⅛	3.62	$3.60	0.02
3	Acid Phosphate, 320 lbs.....	4½	3.15	2.25	0.90
4	Muriate of Potash, 160 lbs.....	6	4.20	3.60	0.60
5	None.....	5½	3.85	0	3.85
6	Nitrate of Soda, 160 lbs .. .. Acid of Phosphate 320 lbs.....	8½	5.25	5.85	(0.60)*
7	Nitrate of Soda, 190 lbs..... Muriate of Potash, 320 lbs.....	4⅝	3.38	7.20	(3.82)*
8	Acid Phosphate, 320 lbs..... Muriate of Potash, 160 lbs.....	7⅛	5.02	5.85	(0.83)*
9	Nitrate of Soda, 160 lbs ..... Acid Phosphate 320 lbs ..... Muriate of Potash, 160 lbs..	9½	6.36	9.45	(3.09)
10	None	5⅔	3.97	0	3.97

*Less than cost of Fertilizer.

Mr. Bingham says "The wheat was sown October 8th, before the fertilizer reached us, and had been in the ground 5 or 6 days when the fertilizer was sown. By October 14th the wheat was showing through the ground, and was well up on all the plots by the 20th. When the wheat was well up there was a marked difference in the appearance of the different plots. On No. 1 it was very short, and the plants seemed spindling and weak. It was still very short at harvest, with very poor heads, only partly filled with grain.

On No. 2 the wheat was somewhat better and seemed to have a better color. No. 3 made a still better showing than No. 2, although when the wheat was threshed, No. 2 turned out more grain. It did not appear to stand the winter as well

as No. 2. No. 4 did not appear much, if any, better than No. 3 in the fall, but seemed to stand the winter better and looked much better by the first of May. No. 5, for some reason unaccountable to me, turned out more grain than some of the fertilized plots. It is possible that the soil contained more natural fertility than some of the other plots, although I could not perceive that it did. No. 6 made a much better showing last fall than any of the other plots except Nos. 8 and 9, and stood the winter well. No. 7 did not seem to get as good a start as No. 6 in the fall, but stood the winter fairly well. The heads, however, were rather short. No. 8 seemed about equal to No. 6 last fall, but appeared to be damaged more by the cold weather. The grain was not as large and plump as in No. 6. No. 9 was much better than any of the other plots except No. 6. The wheat grew much better, stooled more and was in much better condition in the spring. The grain also seemed more plump and sound and weighed more, according to bulk, than that from any of the other plots. Plot No. 10 received more protection form snow than the others, being somewhat on the protected side of a hill while the other plots were on top of the ridge, which may account for the slightly better result obtained here than on the other unfertilized plots."

The experiment seems to have been conducted with great care by Mr. Bingham, but the results are unsatisfactory. A much larger increase from the use of fertilizers on such a poor soil was to have been expected. The complete fertilizer gave the largest increase in yield, but none of them produced increase enough to pay the cost of the fertilizer.

2. VARIETY TESTS.

The number of varieties tested during the season of 1898-1899, was increased to 33, the additions being mostly red wheats. They were all planted October 20, after having first been treated with copper sulphate, to prevent smut. As usual, they were sown in twentieth-acre plots. The stand was not good, but the quality of the grain was better than in either 1897 or 1898, and some of the new varities proved remarkably fine. It is with the desire of bringing some of these to the attention of our wheat growers that this brief bulletin is prepared. The wheat was harvested June 24.

The Season.—The following table shows the rainfall per month, highest, lowest and average temperature, and the amount of sunshine during the wheat season:

Months, 1898-1899.	Per Ct. Sunshine.	Clouds.	Amount of Rainfall in inches.	Temperature Degrees.		
				Mean.	Highest.	Lowest.
September	47.	53.	3.55	72.0	82.1	61.9
October	38.	62.	5.27	56.0	63.9	48.2
November	37.	63.	2.89	43.0	51.0	34.9
December	44.	56.	2.80	32.9	41.1	24.7
January	40.	70.	6.69	33.8	41.2	26.4
February	46.	64.	2.84	24.5	31.5	17.5
March	43.	69.	8.61	42.0	70.	1.
April	63.	54.	2.16	56.0	86.	24.
May	64.	55.	3.63	66.7	74.8	58.6
June	77.	37.	2.55	74.6	95.	51.

List of Varieties and Field Notes

The following field notes were made by Mr. Harper on June 16, and serve to give a list of the varities tested, as well to indicate the period at which they ripen. Varieties 1-19 inclusive, are red wheats.

No. 1. Jones's Winter Fife. Averages 10 stalks to a stool. 42 inches high. Still green.

No. 2. American Bronze. 9 stalks to a stool. 43 inches high. Still green.

No. 3. Beech-wood Hybrid. 11 stalks to a stool. 45 inches high. Ripe.

No. 4. Pride of Genesee. 9 stalks to a stool. 46 inches high. Still green.

No. 5. Indiana Swamp. 6 stalks to a stool. 40 inches high. Almost ripe.

No. 6. Rice Wheat. 11 stalks to a stool. 45 inches high. Ripe.

No. 7. Jones's Bearded. 11 stalks to a stool. 41 inches high. Green.

No. 8. Pride. 13 stalks to a stool. 45 inches high. Green.

No. 9. Kansas Mortgage Lifter. 14 stalks to a stool. 45 inches high. Almost ripe.

No. 10. Fultzo-Mediterranean. 12 stalks to a stool. 44 inches high. Almost ripe.

No. 11. Rudy. 15 stalks to a stool. 40 inches high. Beginning to ripen.

No. 12. Diamond Grit. 10 stalks to a stool. 42 inches high. Beginning to ripen.

No. 13. Turkish Red. 12 stalks to a stool. 44 inches high. Beginning to ripen.

No. 14. Lancaster Red. 13 stalks to a stool. 44 inches high. Almost ripe.

No. 15. Fulcaster. 10 stalks to a stool. 41 inches high. Almost ripe.

No. 16. Harvest King. 12 stalks to a stool. 40 inches high. Ripe.

No. 17. Fultz. 9 stalks to a stool. 44 inches high. Almost ripe.

No. 18. Jersey Fultz. 15 stalks to a stool. 42 inches high. Almost ripe.

No. 19. Extra Early Oakley. 9 stalks to a stool. 38 inches high. Almost ripe.

No. 20. Democrat. 12 stalks to a stool. 39 inches high. Beginning to ripen.

No. 21. Early White Leader. 8 stalks to a stool. 40 inches high. Green.

No. 22. Harvest Qneen. 10 stalks to a stool. 37 inches high. Beginning to ripen.

No. 23. Oatka Chief. 8 stalks to a stool. 39 inches high. Green.

No. 24. Longberry Amber. 7 stalks to a stool. 36 inches high. Green.

No. 25. Gold Coin. 8 stalks to a stool. 34 inches high. Beginning to ripen.

No. 26. Early Genesee Giant. 10 stalks to a stool. 35 inches high. Beginning to ripen.

No. 27. Early Arcadian. 7 stalks to a stool. 36 inches high. Green.

No. 28. Bearded Winter Fife. 10 stalks to a stool. 40 inches high. Beginning to ripen.

No. 29. Gold Coin? 6 stalks to a stool. 32 inches high. Green.

No. 30. White-seeded Golden Cross. 7 stalks to a stool. 34 inches high. Green.

No. 31. Jones's Longberry, No. 1. 5 stalks to a stool. 33 inches high. Green.

No. 22. Long Amber. 7 stalks to a stool. 32 inches high. Green.

No. 33. Dawson's Golden Chaff. 6 stalks to a stool. 30 inches high. Beginning to ripen.

Samples of the threshed wheat were submitted to Mr. A. B. Bleidt (with C. S. Brent, Seedsman, Lexington) and Mr. W. W. Patterson of the Lexington Roller Mills, who rated them as follows, the numbers of varieties being arranged according to milling quality.

RED WHEAT.

Mr. Bleidt: 13, 6, 9, 10.

Mr. Patterson: 5, 8, 6, 18, 9, 10, 3, 14, 19, 4, 12, 2, 3. Mr. Patterson considers No. 13 as "very fine, but too hard for this country."

WHITE WHEAT.

Mr. Bleidt: 29, best; 20, second.

Mr. Patterson: 28, best.

YIELD.

There is some difference of method among buyers in getting the weight of samples of wheat. A small measure containing a known portion of a bushel is sometimes filled loosely with wheat which is then weighed and the weight per bushel calculated from it. A test of this method makes our varieties

range from 53¾ to 62 pounds per bushel, whereas by the method always practiced at the Station our heaviest wheat this year weighed 66½ pounds and our lightest 57½ pounds per bushel. Some of this difference can, perhaps, be attributed to the time of weighing, our weights given below being obtained soon after harvest, while the others were obtained some time later, but it will be apparent that our method of settling the wheat in the measure by jarring will always give a greater weight than the other, other conditions being the same.

Number.	Name.	Yield Per Acre.		Weight Per bushel.
		Bush., Grain.	Lbs., Straw.	
1	Jones's Winter Fife	6.6	789	60
2	American Bronze	8.2	989	62
3	Beech-wood Hybrid	10.6	1034	64
4	Pride of Genesee	8.5	1011	62
5	Indiana Swamp	13.0	1443	66
6	Rice Wheat	13.2	1798	66
7	Jones's Bearded	7.9	1273	60
8	Pride	12.9	1267	62
9	Kansas Mortgage Lifter	14.6	1466	66½
10	Fultzo-Mediterranean	13.2	1023	64
11	Rudy	11.6	1074	62¾
12	Diamond Grit	12.	1239	64¾
13	Turkish Red	13.9	1557	66
14	Lancaster Red	11.7	1409	64
15	Fulcaster	10.1	1148	62¾
16	Harvest King	12.3	1023	64
17	Fultz	10.8	1079	66
18	Jersey Fultz	12.	1028	64½
19	Extra Early Oakley	9.3	1261	66
20	Democrat	11.8	1426	64½
21	Early White Leader	7.4	1148	60
22	Harvest Queen	8.2	1028	60½
23	Oatka Chief	5.2	801	58½
24	Longberry Amber	6.3	892	62
25	Gold Coin	6.1	716	61½
26	Early Genesee Giant	5.9	898	61½
27	Early Arcadian	4.7	761	59½
28	Bearded Winter Fife	8.9	489	64
29	Gold Coin ?	4.9	636	57½
30	White-seeded Golden Cross	4.7	966	57½
31	Jones's Longberry No. 1	6.1	898	63½
32	Long Amber	5.1	716	58
33	Dawson's Golden Chaff	5.9	761	61

3. NOTES AND DESCRIPTIONS.

BY H. GARMAN, ENTOMOLOGIST AND BOTANIST.

Numbers 3, 5, 6, 9—11, 13, 15—17, 22, 24 and 31 have not been described and figured in bulletins from the Station. Their characters are indicated in the descriptions and figures following. All the other varieties grown this season are described, and most of them figured, in Bulletins 69 and 77, the former published in 1897 and the latter in 1898.

On the whole the new varieties make a much better showing than those which have been grown for some years on the Experiment Farm. The wheat produced by them is as a rule harder, heavier and finer in appearance. Numbers 3, 6 and 9 produced exceptionally fine wheat. Number 13, perhaps the hardest wheat of all those grown this season, is not quite as attractive in appearance, partly because of the small size of its seeds, possibly to some extent because it was not as thoroughly ripe when cut. No. 9, while not by my tests as hard as either numbers 6 or 13, produces a large, deep brown, seed of very fine appearance, and ought to prove a valuable wheat in the hands of Kentucky growers.

But while the quality of the wheat is better on an average than that of wheat grown in 1897 and 1898, the stand was not so good, and for some reason, difficult to explain, the heads or spikes are this year small. The varieties mentioned below, taken at random, show how decidedly a variety may vary with season in the size of the head and consequent number of seeds produced:

Variety.	Year.	Average number of seeds from one head.	Average length of of head in inches.
Early Genesee Giant..	1897	72.5	3.18
	1899	41.25	2.375
Diamond Grit.....	1897	60.	4.19
	1899	40.5	2.875
Jones's Bearded.....	1897	85.75	4.53
	1899	38.5	3.00

It is probable, therefore, that the size of the heads of the new varieties described below is not what it would have been if the conditions had been more nearly those under which our wheat has commonly been grown.

No. 3. Beech-wood Hybrid.

Beardless. Seeds red. Spike (head) not pubescent, tapering to the tip, at which are a few bristles one-half inch long and less. Length of spike 3 inches; diameters equal, about 0.37 inch. Color of spike umber-brown. Stem a trifle purplish. Average number of seeds from a spike, 25.25. Average weight of seeds from a spike, .975 gram. Weight of 10 cubic centimeters of seed, 7.8 grams.

Rust frequent on stem. This is a handsome wheat recognizable in the field by the rather slender brown heads, the spikelets being loosely placed on the axis. The wheat produced is among the best, the seeds being moderately hard, of a deep brown color, and rather above medium size. The variety resembles very closely our number 16 (Harvest King) and may be the same.

The seed of this variety was received from the U. S. Department of Agriculture, and was grown in Ohio.

No. 5. Indiana Swamp.

Bearded. Seeds red and large. Spike of medium size, rather slender and tapering, not pubescent, its bristles as much as 3 inches long. Length 3.05 inches; greater diameter 0.50 inch; lesser diameter 0.375 inch. Spike yellow. Stem slightly purple. Average number of seeds from a spike, 26. Average weight of seeds from a spike, 1.3 grams. Weight of 10 cubic centimeters of seeds, 7.8 grams.

Rust rare. A good wheat, with rather slender head, the chaff disposed to separate so as to show the seed in ripening. Seeds large and of good color. Seed obtained from J. A. Everitt, of Indianapolis, Indiana.

No. 6. Rice Wheat.

Beardless. Seeds red and large. Spike not pubescent, rather small, tapering, with a few short bristles at tip. Length of spike, 2.5875 inches; diameters alike, .375 inch. Color of

spike and stem, pale yellow. Seeds from a spike, 24.5. Weight of seeds from a spike, 1.3 gram. Weight of 10 cubic centimeters of seeds, 8.1 grams.

Rust rare. While lacking in showiness in the field, this variety possesses many desirable qualities, and judging by the fine appearance and quality of its seeds, I am disposed to rate it as the best wheat grown on the Experiment Farm this year. The head is somewhat insignificant in appearance, resembling in this respect Fultz and Extra Early Oakley (Nos. 17 and 19). The seed was obtained from Hon. G. V. Green, of Hopkinsville.

No. 9. Kansas Mortgage Lifter.

Bearded. Seeds red and very large. Spike slender, tapering, not pubescent; average length 3.125 inches; greater diameter, 0.50 inch; lesser diameter, 0.375 inch. Chaff yellow. Stem purplish. Seeds from a spike, 29. Weight of seeds from a spike, 1.3 gram. Weight of 10 cubic centimeters of seeds, 7.95 grams.

Rust frequent on the stems. The Mortgage Lifter is a more showy wheat than No. 6, and might sell better because of the fine appearance of its very large seeds. It is not quite as hard as No 6, and has this year been more affected with rust. It yielded more by weight than any other wheat grown on the farm.

The seed was obtained from Hon. G. V. Green, of Hopkinsville, a member of the Board of Trustees.

No. 10. Fultzo-Mediterranean.

Beardless. Seeds red. Spike short and compact, sometimes a little widened at tip, not pubescent, spikelets crowded. Length of spike 2.3125 inches; diameters 0.50 and 0.37 inch. Color or spike yellow; of stem, purple. Number of seeds from a spike, 34.75. Weight of seeds from a spike, 1.275 gram. Weight of 10 cubic centimeters of seeds, 7.7 grams.

Rust common. Seed obtained from J. A. Everitt, of Indianapolis, Indiana.

No 11. Rudy.

Strongly bearded, Seeds red and large. Spike rather large, the spikelets loosely placed, not pubescent. Length of spike 3 inches; diameters 0.50 and 0.375 inch. Color of spike and stem yellow. Seeds from a spike, 24.25. Weight of seeds from a spike, 1.125 gram. Weight of 10 cubic centimeters of seeds, 7.75 grams.

Rust frequent. This is a showy wheat, with large brown seeds, but ripened later than some of the preceding varieties. Seed obtained from J. A. Everitt, of Indianapolis.

No. 13. Turkish Red.

Strongly bearded. Seeds red, small. Spike small and tapering decidedly to the tip, not pubescent, the spikelets somewhat loosely placed. Length of spike, 2.3125 inches; diameters 0.375 and 0.25 inch. Color of spike and stem pale yellow. Average number of seeds from a spike, 22. Average weight of seeds from a spike, 0.675 gram. Weight of 10 cubic centimeters of seeds, 8.25 grams.

Rust rare. This differs from all other varieties grown on the farm in the small size of its spikes, their noticeable contraction in diameter towards the tips, and the small size and extreme hardness of the seeds. Only No. 6 approaches it in the latter quality.

The seed was obtained from the U. S. Department of Agriculture.

No. 15. Fulcaster.

Bearded. Seeds red. Spike of medium size, flattened, tapering, not pubescent. Length of spike, 3 inches; diameters 0.50 and 0.375 inch. Color of spike obscure yellow. Stem purplish. Seeds from a spike, 26.5. Weight of seeds from a spike, 1.2 gram. Weight of 10 cubic centimeters of seeds, 7.7 grams.

Rust frequent. A good wheat, of rather large size. The sample shows some evidence of mixing with No. 16, in occasional brown heads among the others.

The seed was sent to the Station by the U. S. Department of Agriculture.

No. 16. Harvest King.

Beardless. Seeds red, of medium size. Spike moderately long, but slender, flattened and tapering, not pubescent. Length of a spike 3 inches; diameter 0.50 and 0.375 inch. Color of chaff, umber-brown; of stem, yellow. Seeds from a spike, 31. Weight of seeds from a spike, 1.225 gram. Weight of 10 cubic centimeters of seeds, 7.65 grams.

Rust frequent. A rather handsome wheat, closely like No. 3 (Beech-wood Hybrid), and possibly the same. Occasional pale heads interspersed among the sample indicate some crossing with No. 15, such heads even bearing occasional long bristles. Seed obtained from J. A. Everitt, Indianapolis.

No. 17. Fultz.

Beardless. Seeds red. Spike rather small and slight, tapering, not pubescent. Average length 2.6875 inches, diameters, 0.375 and 0.375. Color of chaff and stem, yellow. Number of seeds from a spike, 33.5. Weight of seeds from a spike, 1.125 gram. Weight of 10 cubic centimeters of seeds, 8. grams.

Rust frequent. One of the best of the varieties grown, closely resembling in every respect the Rice wheat already described, but not so hard. Seed obtained from J. A. Everitt, Indianapolis.

No. 22. Harvest Queen.

Beardless. Seeds white. Spike stout, and thickened at upper end, the spikelets crowded, not pubescent. Length of spike, 2.6875 inches; diameters 0.50 and from 0.37 to 0.50. inch. Color of chaff and stem yellow. Number of seeds from a spike, 36.5. Weight of seeds from a spike, 1.2 gram. Weight of 10 cubic centimeters of seeds, 7.6 grams.

Rust rare. The short, stout, whitish yellow head of this variety is characteristic. The seeds are large, but soft. Not to be recommended for this region, if judgment may be based on our sample. Seed obtained from J. A. Everitt, Indianapolis.

No. 24. Longberry Amber.

Beardless. Seeds white. Spike rather long and stout, flat, tapering, not pubescent. Length of spike, 3.3125 inches; diameters 0.50 and 0.375 inch. Color of stem and spike yellow. Number of seeds from a spike, 36.25. Weight of seeds from a spike, 1.125 gram. Weight of 10 cubic centimeters of seeds, 7.55 grams.

Rust very rare. This wheat was not well ripened in the sample, but I can see nothing in it calculated to place it in competition with such varieties as Fultz, Harvest King, Rice wheat, and others, for this region. Seed obtained from J. A. Everitt, Indianapolis.

No. 31. Jones's Longberry, No. 1.

Strongly bearded. Seeds white. Spike rather large, not thickened at extremity, not pubescent. Length of spike, 3.1875 inches; diameters, 0.50 and 0.375 inch. Color of chaff umber-brown where exposed, pale where covered. Stem yellow. Seeds from a spike, 29.25. Weight of seeds from a spike, 1 gram. Weight of 10 cubic centimeters of seeds, 7.7 grams.

Rust rare. Perhaps the best of the three new white wheats. Seed obtained from J. A. Everitt, Indianapolis.

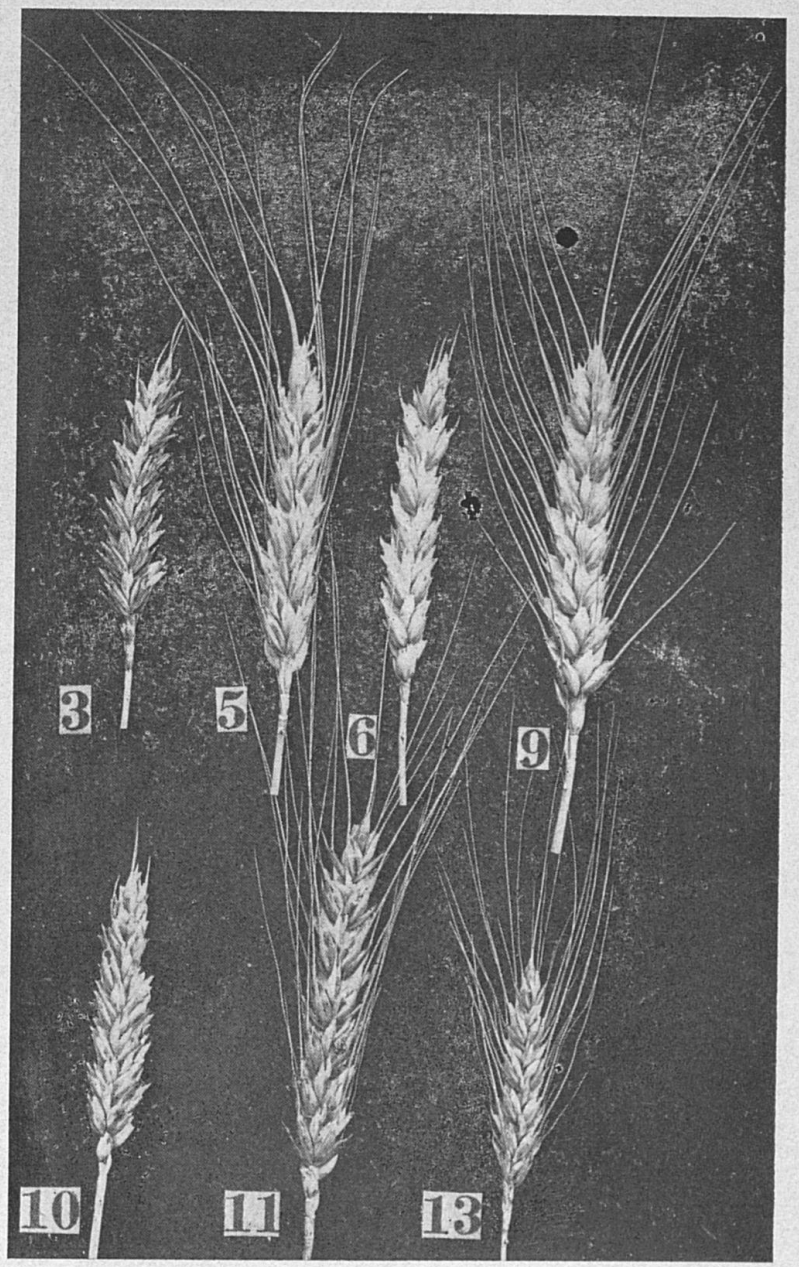

Fig. 1.— 3, Beech-wood Hybrid; 5 Indiana Swamp; 6, Rice Wheat; 9, Kansas Mortgage Lifter; 10, Fultzo-Mediterranean; 11, Rudy; 13, Turkish Red. ½ natural size. Photographed by H. Garman.

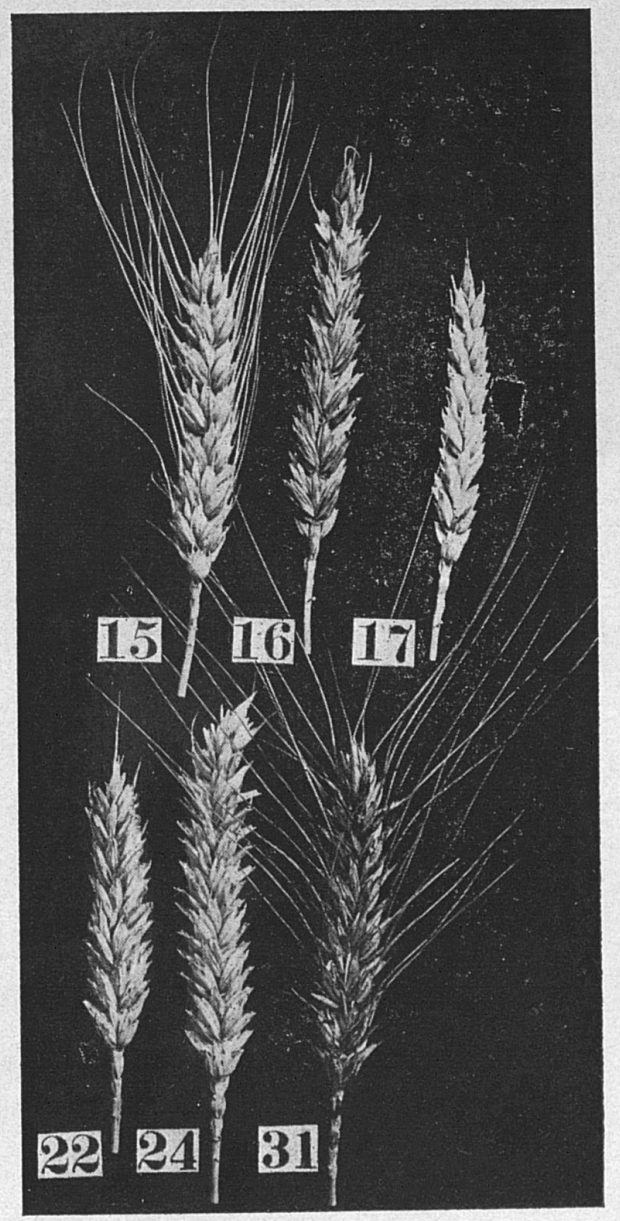

Fig. 2.— 15, Fulcaster; 16, Harvest King; 17 Fultz; 22, Harvest Queen; 24, Longberry Amber; 31, Jones's Longberry, No. 1. ½ natural size. Photographed by H. Garman.