PRODUCTION AND MARKETING OF DRY BEANS

Thesis for the Degree of M. S.

Lewice L. Covocool

1927

THESIS

3 1293 10064 7795

A

12 pg. 11
2 = pg. 12

MSU
LIBRARIES

RETURNING MATERIALS:
Place in book drop to remove this checkout from your record. FINES will be charged if book is returned after the date stamped below.

AUG 12 '89

300 A215

Beans
Farm produce — Marketing

PRODUCTION AND MARKETING OF DRY BEANS

PRODUCTION AND MARKETING OF DRY BEANS

THESIS

Submitted to the Faculty of the Michigan State College in partial fulfillment of the requirements for the degree of Master of Science.

by

LEWICE L. SOVOCOOL

1927

THESIS

ACKNOWLEDGMENT

The author takes great pleasure in acknowledging his sincere appreciation of the hearty and helpful interest of Mr. J. T. Horner, Professor of Economics, in the compilation of this thesis.

103859

TABLE OF CONTENTS

PRODUCTION AND MARKETING OF DRY BEANS

INTRODUCTION

Much has been accomplished as a result of studies made concerning the bean industry, particularly with respect to technical problems of production. This is mainly because agricultural education and research have until recent years been conducted almost wholly on the assumption that an increase in volume of products sold from the farm determines the profit earned. The idea seems to have become firmly grounded in the minds of agricultural writers and speakers. One college has issued a circular in which the opening sentence is, "The amount of milk and butter fat produced per acre is, generally speaking, the final test of profitable dairying when all feed is raised on the farm". (1)

During the last two decades studies concerning managerial and marketing problems have become increasingly extensive, since it has come to be recognized that the greatest continuous profit involves the balance of the farm business from the standpoint of the total net value of its product.

Pertinent to the bean industry in this respect, particularly in Michigan, is its tremendous increase in production per capita since the Civil War. (Appendix A, Table VII.) The industry cannot remain profitable indefinitely if this condition continues to exist unless production costs decrease or the market can be made to absorb more at a price sufficiently high, with existing costs, to insure a profit.

It is in the latter connection that a gap in verified knowledge has continued to exist. Is it reasonably possible to effect an increase in the per capita consumption of beans? If so, how can this be brought about?

(1) Trueman, J. M., "Records for a Dairy Herd for Five Years", Connecticut Agricultural Experiment Station Bulletin #73.

REGIONS OF PRODUCTION

By Countries

Among the world's principal bean-producing countries, the United States ranks sixth in acreage and fifth in production. India, Japan, Italy, Roumania, and Spain each have a total bean acreage greater than that of the United States, and these same countries, with the exception of Roumania, exceed the United States in production. Roumania's low yield is due to the practice followed of producing beans and corn together. (Appendix A, Table II.)

With one possible exception, this relationship has not changed since before the war. Hungary formerly occupied fourth place in acreage, thus lowering the United States to sixth place. Since the war no figures have been published that are comparable with the pre-war figures because of difficulties caused by the great changes in Hungary's national boundaries.

Due mainly to a decrease of bean acreage in India between the 1909-1913 and the 1919-1921 periods, the world's acreage decreased from 30,373,000 to 25,232,000, or 17 per cent. During the same period world production decreased from 300,365,000 bushels to 223,748,000 bushels, or 26.1 per cent. India's decreased acreage, together with a decreased world

yield per acre from 9.9 bushels to 8.8 bushels, or 11.1 per cent, were chiefly responsible.

In the United States during this time there was an increase in dry bean acreage, but yield per acre decreased sufficiently to more than counteract its effect on production. For the six principal producing States the acreage averaged 788,000 during the former period, and 880,000 during the latter period, showing an increase of 10.5 per cent. Decrease in yield per acre from 14.2 to 11.8 bushels, or 16.9 per cent, however, resulted in a decrease in production from 11,186,000 to 10,428,000, or 6.6 per cent. This decrease, it should be noted, is considerably less than the decrease of world production, and therefore, increases the relative importance of this crop in the United States.

No published reports are available showing accurately what varieties of beans are produced in different foreign countries. The following brief description, while but an approximation, gives a general idea as to the most important varieties of edible beans raised in the leading countries.

In India small white beans occupy first place, followed by red beans and large whites. (1) Japan's principal variety is the kotenshai (resembling closely our small whites). Other important varieties are green peas, azukis (small reds), round reds, pintos, and white kidneys.(2) In Korea soy beans have a greater acreage than do the kotenshais, but the latter are more important commercially since very few of the soy beans are edible. (3) (4)

Beans of the red kidney variety predominate in Italy, although a type similar to our limas are also produced. (5) Roumania produces white and black marrows, white and red kidneys, and many other varieties, mainly of the kidney type. To a limited extent pea beans are also important. (6) Other European countries confine most of their production to the kidney varieties. (7)

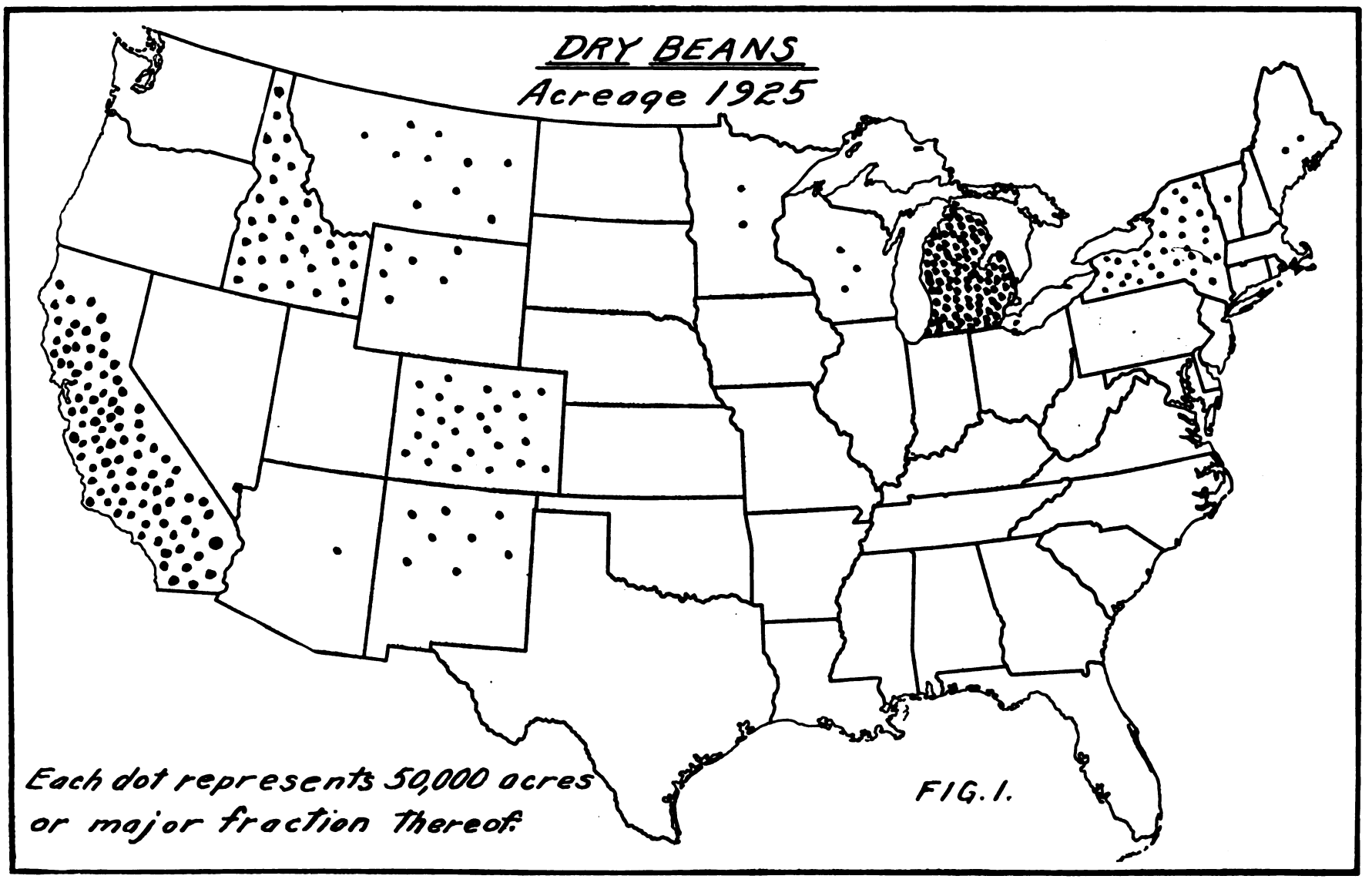
Madagascar and Chile produce large quantities of lima beans. (8) Canada's production which is restricted to the Province of Ontario is almost wholly of pea bean varieties.

By States

According to data gathered and compiled by the United States Bureau of Agricultural Economics, the dry bean acreage in the United States for the years 1925 and 1926 was 1,606,000 and 1,659,000 with crops amounting to 19,928,000 and 17,138,000 bushels respectively. (9) Acreage and production figures commencing with 1899 indicate a fairly steady increase, except during 1916 to 1919, the war period.

In the years 1924, 1925 and 1926 six States produced 94.1, 94.9, and 95.8 per cent respectively of our total crop of beans. Michigan led in production during these respective years with 43.4, 42.3, and 38.6 per cent of the total crop. California, Colorado, New York, Idaho, and New Mexico follow in production in the order named. Other important States are Montana, Wyoming, Minnesota, Wisconsin, Maine, and Arizona.(10) (Figure 1.)

Small and medium beans occupy by far the largest place in the bean production, amounting in 1924 to 8,430,000 and in



Map showing the distribution of dry bean acreage in the United States 1925.

1925, 10,516,000 bushels, or 43.1 and 42.2 per cent respectively of the entire crop. (Appendix A, Table III.) Michigan is the leading State, raising 5,4.6,000 bushels in 1924 and 6,797,000 bushels in 1925, or 84.5 and 86.3 per cent respectively of the total. The other important States are New York and California. In 1924 these three States raised 96.0 per cent and in 1925 96.5 per cent of all small and medium white beans in this country. (Figure 2.)

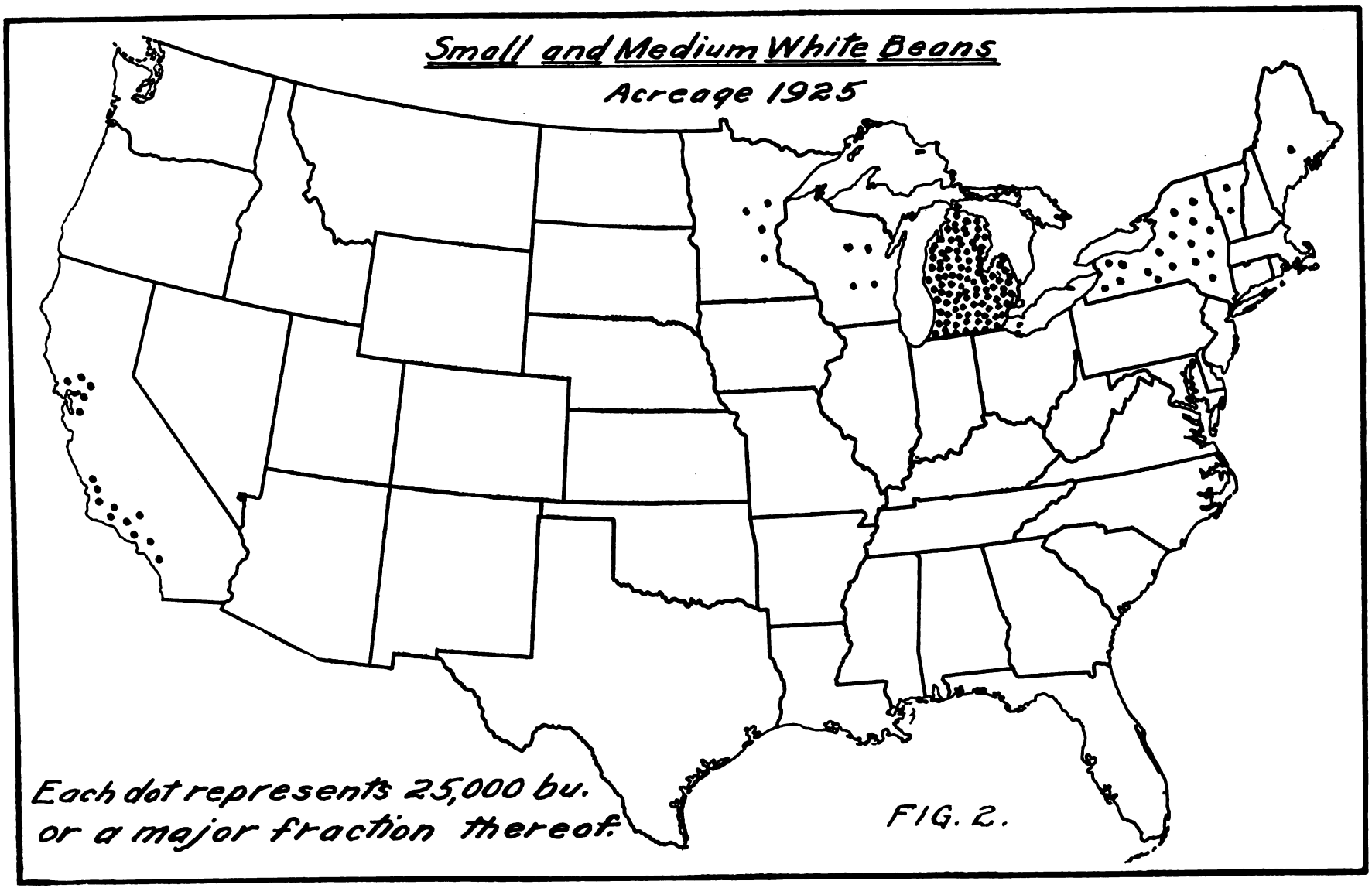
Next in order of production is large white beans. Their production was 13.5 per cent of the total in both 1924 and 1925. Idaho raised 47.2 per cent of the crop in 1924 and 50.5 per cent in 1925. For these two years the States of Idaho, Montana, New York, and Michigan raised 93.2 per cent of these beans in the United States.

The pinto bean is third in production, amounting to 11.8 per cent of the 1924 bean crop and 12.8 per cent of the 1925 crop. Its production is confined almost wholly to the States of Colorado, and New Mexico.

California produces all of our lima beans, which amounted to 8.5 per cent of the total production in 1924 and 9.5 per cent in 1925.

In 1924 New York produced 51.5 per cent of all red kidneys, and Michigan produced 45.9 per cent. In 1925 the corresponding percentages were 25.3 and 70.8 respectively. The remaining three to four per cent are grown in California and Maine.

New York and Main produced all of our yellow eyes



Map showing distribution of the acreage of small and medium white beans in United States 1925.

FIG. 3.

DRY BEANS

Acreage 1924-1926

Map showing distribution of dry bean acreage in Michigan - 27 leading counties. Each dot represents 1,000 acres or major fraction thereof.

and white kidneys. The production of blackeyes and cranberry beans is confined to California, and only pinks are produced in other States.

In Michigan

Except for the war period Michigan has been for years first in both acreage and production of dry beans. In 1924 she produced 6,447,000 bushels, or 43 per cent of the nation's crop of 14,856,000 bushels, and in 1925, 8,289,000 bushels, or 42.3 per cent of the nation's crop of 19,590,000 bushels. (11) The per acre value of this crop is high among the staple crops of the state, ranking next below potatoes and sugar beets. (12)

The heavy acreage of beans in Michigan is found in the east central and and central of the lower peninsula. Of the 615,333 acres, the State average from 1924 to 1926, 85 per cent or 526,383 acres were in twenty-seven counties in these sections, and of the state's production of 7,291,000 bushels, these counties raised 88.3 per cent or 6,439,664 bushels. (Appendix A, Table IV.)

Bean acreage and production are increasing. There is also a considerable tendency towards concentration in the district where growing conditions are most favorable. From the 1913-1915 period to the 1924-1926 period acreage for the 27 leading counties increased 37.1 per cent and production increased 58.7 per cent, while for the state as a whole the acreage increased only 30.0 per cent and production 49.0 per cent. (Figure 4)

For the years 1924 to 1926 white peal beans constituted an average of 83.6 per cent of Michigan's total crop. (13)

Beans Produced in Michigan.

27 leading counties

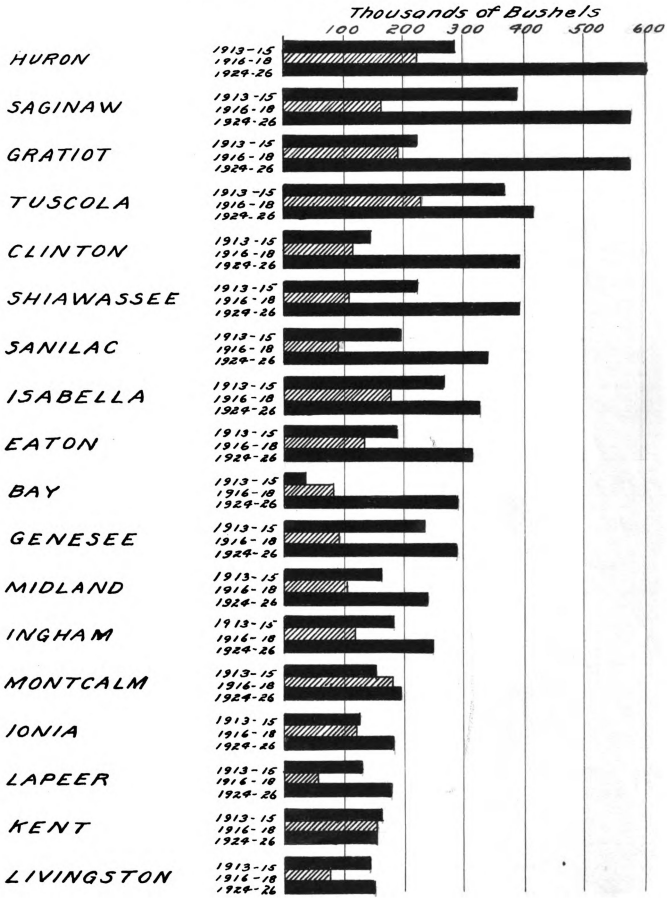
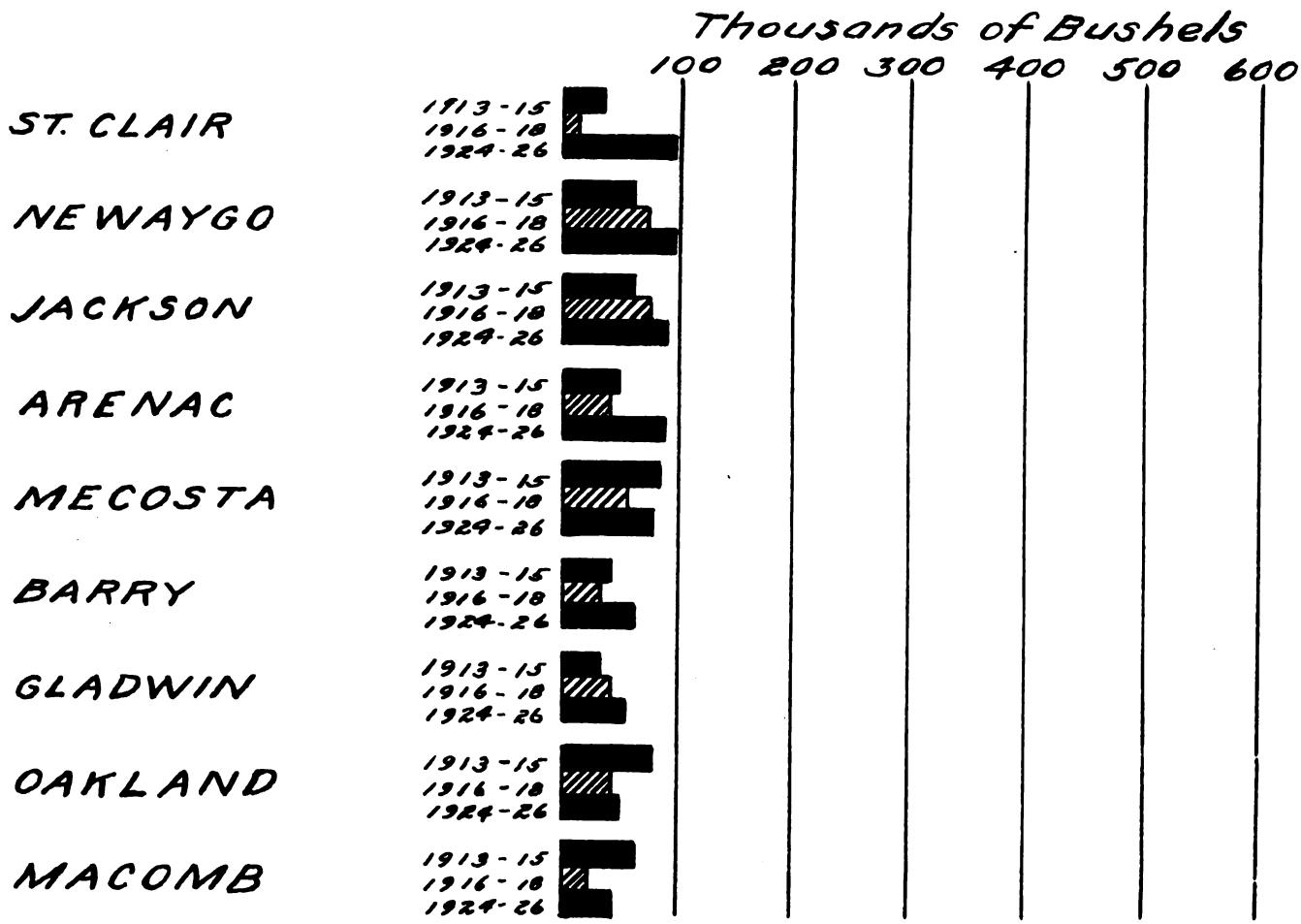


FIG. 4 Continued.



This is practically the only variety grown in the Thumb District and the counties west and south of Saginaw Bay. Red Kidneys were second in importance, amounting to 11.0 per cent. They are produced mainly in the western counties of the bean area and in Oceana county on Lake Michigan. About 4 per cent were white kidneys, the acreage being quite widely scattered; and the remaining 2 per cent were mostly Brown Swedish and Yellow Eyes.

(1) "Bean Bag", December, 1918; p. 27.

(2) Ibid: pp. 22-23.

(3) Ibid.

(4) Personal letter received on August 4, 1926 from Mr. W. G. Jamison, Specialist, Perishable Products, United States Department of Commerce.

(5) Ibid.

(6) "Bean Bag", October, 1924; p. 9.

(7) See footnote 4.

(8) Ibid.

(9) Yearbook, United States Department of Agriculture,1925; p.400

(10) "Crops and Markets", Supplement for December, 1926; p.423.

(11) Yearbook, United States Department of Agriculture,1925; p.400

(12) Publication, "Statistical Analysis", Part II, p.18, Michigan Department of Agriculture.

(13) "Crops and Markets", Supplement for December, 1926; p.423

DEVELOPMENT OF THE INDUSTRY

In New York

In Census years prior to 1899 New York was the leading bean State, and was the only State producing more than 1,000 bushels. The quantity produced in 1879 was 42.2 per cent of the entire production, and in 1889, 35.1 per cent of the total crop. (Appendix A, Table V.)

Commercial production began in that State by about 1840. Western New York, the "granary of the workd", found that the pea bean could be used as a catch crop after winter-wheat failures due to Hessian fly injury. Increased demand of beans as a food for the armies of the Civil War stimulated the production of this crop, and since that time it has been one of New York's major cash crops. (1)

Because of increased production in Michigan, however, New York dropped to second place in 1899. In 1909 a marked decrease in acreage, together with increased acreage in other States, reduced its production to third place, being led by Michigan and California. (Figure V.)

During the years following the World War, adverse production and marketing conditions have discouraged growers until in 1926 the State produced only 1,145,000 (2) bushels, or 38 per cent of the production as reported by the 1909 Census.

In Michigan

In the earlier days beans provided the principal cash income for farmers in the southern part of Michigan in an

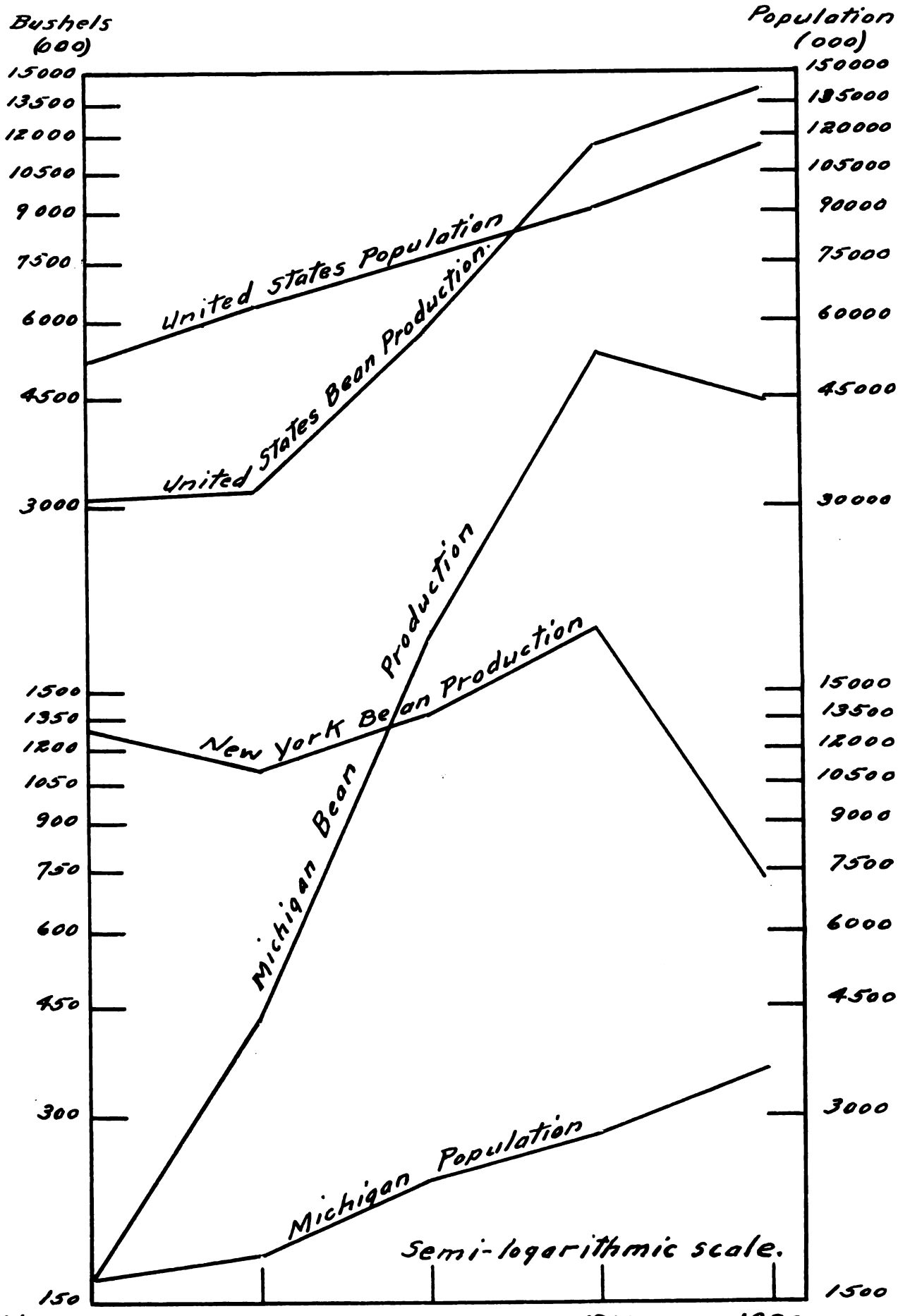


FIG. 5 : Relation of bean production to growth of population by census periods : 1880-1920.

area of which Jackson was approximately the center. (3) Gradually the growing area expanded and moved to the north and northwest until now a district extending from Lake Huron and Saginaw Bay, nearly across the State, about the middle of the lower peninsula, shows the greatest production.

Michigan bean production, like that of New York, received a great impetus from the new demands created by the armies of the Civil War. The 1869 production of 349,365 bushels exceeded that of the previous decade by 112.0 per cent. (Appendix A, Table V.) In 1879 it had nearly returned to its pre-war level, but in 1889 it jumped again, reaching 434,014 bushels or an increase of 61.4 per cent during the decade. This constituted 35.7 per cent of the total United States crop and placed Michigan in the lead as a producing State, a position which was held from that time until 1916.

From 1916 until 1923, excepting 1920, California, stimulated by the big demand during the war, took the lead away from Michigan. Record low average yields for Michigan in 1916 and 1917 of 6.6 and 6.1 bushels per acre respectively made California's lead still greater. In 1917 that State produced virtually half (51.1 per cent) of all beans raised in the United States. During this period, however, Michigan continued to hold the lead in production of pea beans. (4)

(1) Cornell Extension Bulletin, 98; 1924; Hardenburg, E. V., "The Production and Marketing of Field Beans" pp.6-8

(2) "Crops and Markets" Supplement for December 1926; p.423.

(3) "Bean Bag" June 1921; p. 68.

(4) California Crop Report, 1925; Crop Report for Michigan,1925; "Bean Bag" June 1919; p. 19.

FACTORS AFFECTING COMMERCIAL PRODUCTION

Acreage, yield, and the percentage of "pick" determine how large the commercial production of beans will be in any given year. Over a period of years, however, these are regulated by a combination of economic and physical factors.

Acreage

Anticipated profits are reflected in the acreage of beans planted and the care which they receive. Several factors determine whether or not such profits are likely to be large enough to make this the most efficient employment of the land, labor, and capital available.

At this point, however, the question should be examined from a more fundamental point of view. Consideration should be given to the basic principles involved, first in the location of bean production, and second in the choice and combination of the bean enterprise in a given farm business.

As to the first consideration, the localization of bean production, this depends upon the principle of comparative advantage and the law of first choice. Black states the principle of comparative advantage as follows:

> "Each area tends to produce those products for which its ratio of advantage is greatest as compared with other areas, or its ratio of disadvantage is least, up to the point where the land may be needed by some products less advantaged in the area in order to meet the demand for them at such prices as will come to prevail under such circumstances." (1)

The collorary of this is the law of first choice.

"Any product for which only a limited amount of suitable land is available, relative to the demand for it, will have first choice of this area".(2)

Applying these principles to the localization of bean production in Michigan, we find that in several border counties in the producing area no other cash crop can well be substituted. Hence it may be well to raise beans in these areas, even in view of an unfavorable price outlook, since even then the ratio of disadvantage is likely to be less than it would for other enterprises.

In the center of the bean producing district sugar beets compete with beans for the place they hold in the crop rotation. If the price outlook for one of these products in a given year is promising, its acreage will tend to increase and the acreage of the other tends to decrease correspondingly.

The second basic principle, the choice and combination of enterprises affecting bean production in relation the organization of a farm business involves supplementary, complementary, joint cost, and by-product relationships.

A supplementary relationship is defined by Professor John D. Black of the University of Minnesota as "one which uses elements of production not needed by other products". (3) In sections referred to above where no other crop can well be substituted for beans, their production may be advisable in order to maintain an efficient balance, particularly in the use of labor and equipment.

The complementary relationship, according to Black, "occurs when one enterprise contributes some element of

production to another in the form of supplies".(4) In bean production this relationship holds in connection with the use of bean straw and cull beans, valuable for growing or fattening livestock. Frequently the existence of such an arrangement is responsible for the profitableness of these latter enterprises.

In discussing joint-cost, Professor Eliot Jones of Stanford University says, "The prices of articles produced at joint-cost tends to equal their combined cost of production." (4) Black, in referring to by-product combinations says,

> "In deciding whether or not to organize a producing unit, consider the possible income from by-products as well as from main and supplementary products. The by-products may warrant starting new unit when the main product would not alone." (5)

Important in the application of these principles to bean production is the return of nutrients to the soil. The bean plant is leguminous, and as such, has the property of nitrogen fixation, thereby aiding in the production of future crops.

In view of the application of the principles as here discussed, it is clear that anticipated net income, which for the most part determine acreage of beans, cannot be measured alone by the selling price of the product in excess of the costs of production as determined in ordinary cost accounting practice.

Yield

The number of bushels of beans an acre of ground will yield depends first upon the physical factors present, including climatic and soil conditions, and upon the cultural methods employed in growing and harvesting the crop.

Physical Factors

Climate With regard to physical factors, climate is of greater importance than soil. Beans require a relatively warm climate for maximum production. The common varieties are, however, grown very little in the area of the United States that lies south of the Potomac, Ohio, and Columbia rivers because in the Southern States the bean weevil is a serious pest. A relatively short season crop, it natures in from 110 to 130 days, depending upon the variety and other conditions affecting growth. It is, however, especially susceptible to frost injury.

Ample rainfall and high humidity provide most favorable conditions during the growing season, provided, however, that its distribution is such that fair weather will exist for proper curing and harvesting.

Soil Soil type is of greater importance than soil fertility in bean production. Very heavy soils are unsatisfactory since excess water does not drain away readily. Light soils are not likely to be moisture retentive unless improved by the application of manure or the use of green manure crops. Well drained silt-loams usually are most desirable since they are not objectionable in either of these respects.

While a fairly rich soil is desirable beans will yield fairly well on relatively poor soils under proper management. A moderate amount of nitrogen is necessary, but an excess encourages vine growth and prolongs maturity.

Cultural Factors

Proper selection of seed, both as to variety and

quality, and crop management are the important cultural factors to consider as influences upon yield.

Seed For highest dependable yields adaptation of the particular variety planted in necessary. Red Kidney beans, for example, yield less under optimum conditions than do pea beans. However, they are considered more dependable in some of the western counties of the Michigan bean district, due to their greater resistance to weathering during the hot summer months. Because of the prevalence of bean diseases it is of utmost importance that disease resistant varieties be planted.

In recent years considerable progress has been made in this respect, notably in the development of the Michigan Robust Pea Bean, developed at the Michigan Experiment Station and the Wells Red Kidney, developed on a Western New York farm. The ordinary pea bean is highly susceptible to mosaic, but the Michigan Robust strain has almost completely overcome this objection, and at the same time increased the productivity considerably. (6) It differs materially in no other way from other strains of the pea type except that it requires about ten days longer to mature. The strain known as Wells Red Kidney was developed successfully to resist anthracnose, a disease prevalent in the red kidney type. (7)

These new disease resistant strains, particularly the Michigan Robust, as well as others are coming into wide use and without doubt are largely responsible for preserving the bean industry in Michigan.

Only the highest quality of seed can be depended upon to result in maximum yield. If diseased beans are planted the crop will be infected from the start. If beans infested with weevils are planted, germination is likely to be poor. Good beans from clean, high-yielding fields are at all times desirable from the stand point of high yield of a quality product.

Crop Management In the determination of yield this is the only cultural factor that is wholly within control of the farmer. The certainty of obtaining a good yield of marketable beans depends very largely upon the care the crop receives.

A well prepared seed-bed is essential to the securing of uniform growth and maturity. To obtain best conditions for germination it must be warm and moist. Planting before the average date of the last killing frost is hazardous, and too late planting endangers the crop in the fall.

Shallow but clean and frequent cultivation is necessary in the early stages. The roots are fibrous and so near the surface that there is danger of their being injured if cultivated late in the season. Fields should not be cultivated when wet because the spores of the organism causing anthracnose are readily carried to healthy plants at such times.

Harvesting must take place after the plants are mature, but if delayed until they are too ripe, shattering is likely to occur. After pulling the possibility of damage from wet weather is greater, and hence the beans must be housed or threshed as soon as they are properly cured in order to avoid the risk of mold. In threshing care must be taken to have the

machinery so speeded that its work will be thorough and at the same time avoid splitting the beans.

If the moisture content of the beans exceedes 17 per cent known to trade as the point of "tolerance", they are considered dangerous for storage and should be dried artificially. (8) Storage in a cool dry place is necessary to avoid mold and to prevent infestation by weevils.

"Pick"

Michigan's bean crop is marketed very largely on what is called the hand-picked basis. The beans are ordinarily threshed and taken to a local elevator where they are run through a mill for recleaning. A sample is then hand-picked for the purpose of determining the "pick" for the lot. Dirt, stones, broken and discolored beans and beans of other varieties generally are removed in the "pick". To the extent that undesirable beans constitutes the "pick" the amount of the marketable product is decreased.

From 1914 to 1928 the "pick" for Michigan bean crops has averaged 9.7 per cent. In poor bean years there is a tendency for it to be larger than in good years. For example, in 1917 when weather conditions were highly unfavorable a yield of 6.1 bushels, the lowest for the period, is recorded, and the per cent of "pick" was 22.6, the highest for the period. On the other hand, in 1919 the yield was 13.8 bushels, or the highest recorded, and the pick was only 4.5 per cent, which was next to the lowest recorded. (9) However, it is the belief of many in the bean trade that in years when production is high,

the less favorable market conditions that generally result effect more strict adherence to the requirements of official grades. If this is true, there is a tendency in years of high production towards a heavy "pick" and on years of low production for a light "pick".

(1) "Production Economics", p. 137.

(2) Black, P 147.

(3) Black, p. 325.

(4) Black, p. 319.

(5) "Principles of Railroad Transportation", p. 244.

(6) Spragg, F. A. and Down, E. E. "The Robust Bean" Michigan Agricultural Experiment Station Bulletin 108, 1931

(7) Hardenburg, E. V., Cornell Extension Bulletin, 98, P.16

(8) Cox, J. F. and Pettigrove, H. R., "Bean Growing in Michigan" Michigan Agricultural Experiment Station Bulletin 139, 1924, p. 30

(9) Crop Report for Michigan, 1936.

MARKETING

Outlets

To a large extent the important markets for beans are near the centers of production. This is particularly true with Michigan. Except for a small quantity of red Kidneys which are exported, largely to Cuba, the crop is consumed almost entirely in the eastern and middle western centers of population. Kidney beans are in particular favor with the Italian and Negro elements in our large cities, and with their increase in the past few decades, a market for these varieties has been built up rapidly. (1)

An average of about 35 per cent of Michigan's bean crop is used for canning purposes. Some of these beans are red kidneys, but by far the greater portion is pea beans which are packed as baked beans and pork and beans.

Channels

The farmer's work in preparing beans for market usually ends with threshing. Most of the product leaves the farm in the fall months, although some is usually sold every month throughout the year. This is indicated by a record of monthly shipments as reported by the common carriers. Of the average carlot shipments from Michigan of 4,730, 2,634 cars, or 55.7 per cent (Appendix A, Table VI.) were made during the months of October to January inclusive. (Figure 6)

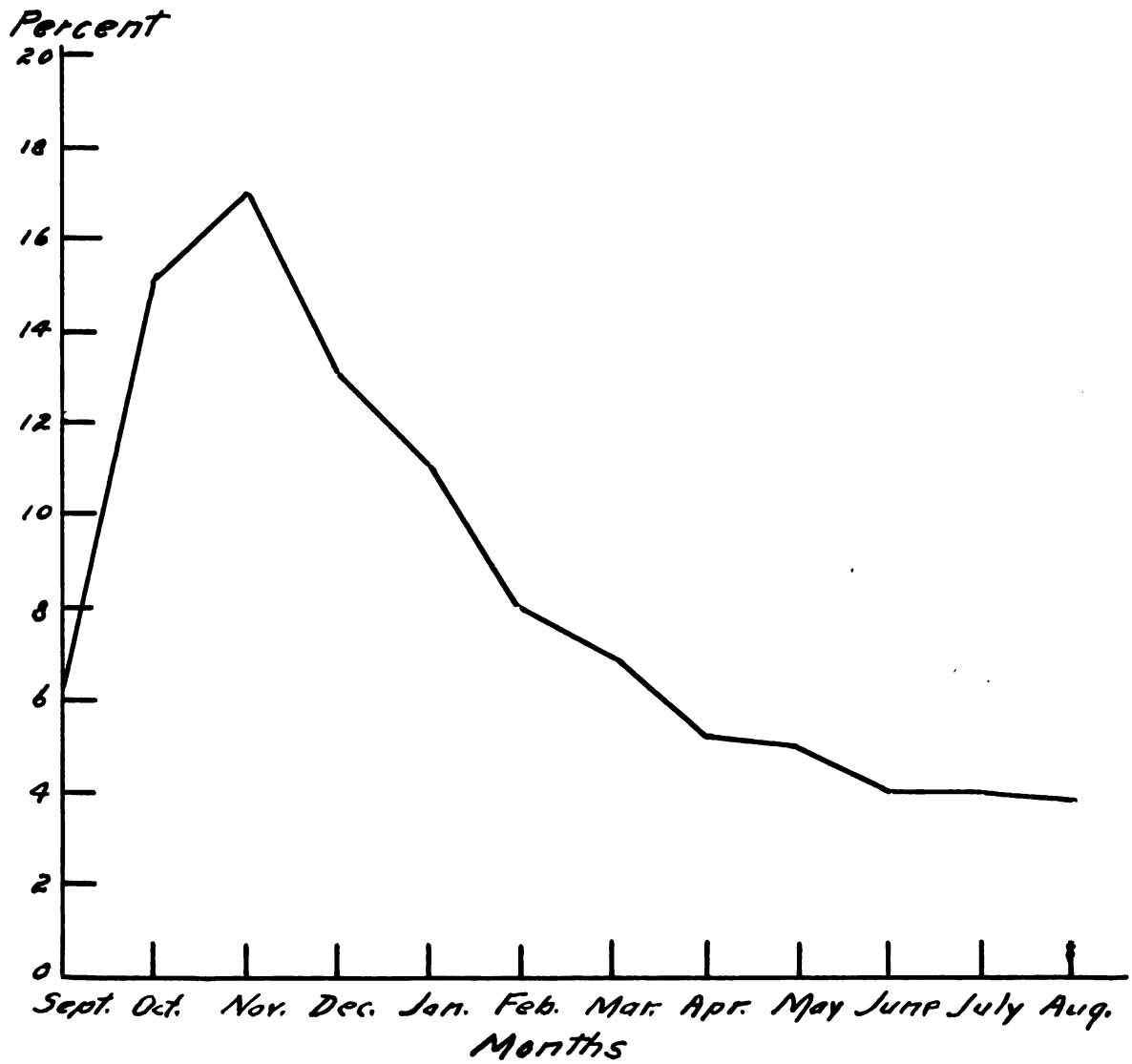


FIG. 6 : Average carlot shipment of Michigan dry beans : Percentage by months : 1920-1923 : Total per-cent for 12 months = 100.

Local buyers receive the beans, clean them by fanning, and usually store them in elevators until picking can be done. There are in Michigan about 400 such elevators. A large portion of the "pick", particularly stones and dirt, is removed by machines. Unless they are received unusually free from cull beans they are next hand-picked. This requires considerable hand labor, and is facilitated by small machines which are operated by foot or motor power. These machines carry the beans from hoppers on endless belts over slowly moving rollers to the pickers Women and girls are generally employed to do the picking, and are paid on the basis of the number of "pick" removed, the rate per pound usually varying from 5 to 7 cents, depending on the type of beans being picked. Some dealers, however, prefer to pay their pickers a flat day rate. Sometimes beans, particularly white ones, are run through a polishing machine which removes much surface discoloration.

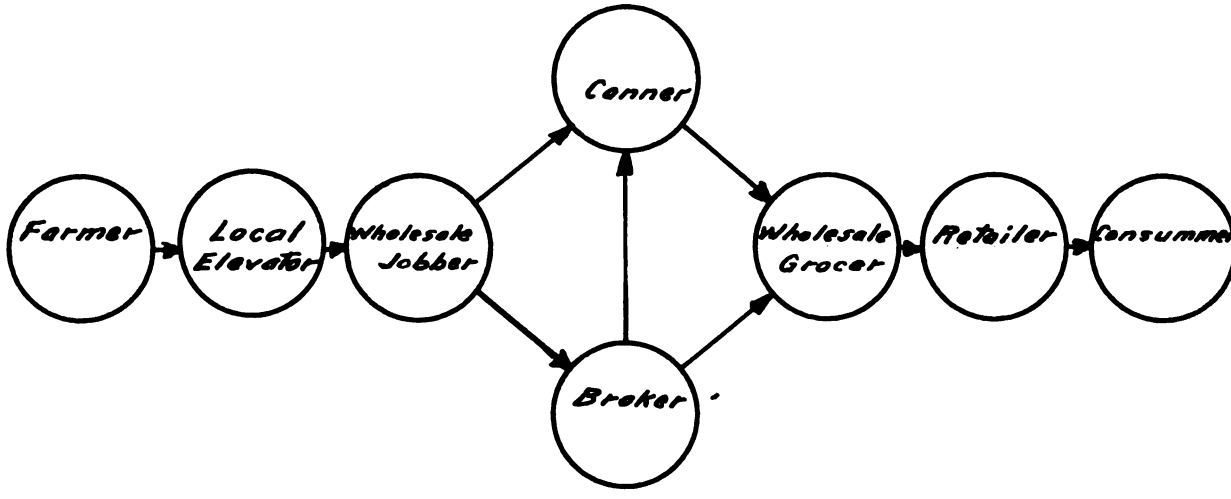


FIG. 7: Common routes followed by beans from farmer to consummer.

Sometimes beans are bought by so-called "many-stationed dealers", and are shipped directly to wholesale elevators where picking is done.

Michigan beans are very generally handled in specially made burlap sacks, holding 100 pounds. Four hundred bags of beans ordinarily constitutes a carload.

Grading is almost universal in the bean trade, for dealers have for several years recognized that it aids in the reduction of marketing cost. However, uniform grades for all sections have not as yet come into use, although much progress has been made towards that end, through grades established by the United States Bureau of Agricultural Economics. In 1897 the Michigan Bean Jobbers Association promulgated a set of bean grades, which, with a few revisions, is now in effect throughout Michigan, subject to inspection, as a part of that organization's official sales contract. (Appendix B.)

From the local dealer the beans are usually purchased by a wholesale jobber, of whom there are about 400 in Michigan. After a shipment has been received, it is occasionally stored for more opportune market conditions. Usually, however, it is kept "on track", until time for reshipment.

In Michigan this service is carried on by relatively few concerns. Mr. B. A. Stickle of Chatterton & Son, Lansing, estimates that that company handles 45 per cent of the crop, that the Michigan Elevator Exchange handles about 23 per cent, and that 90 per cent of all beans raised in Michigan are handled by seven jobbers.

The next marketing agency is that of the broker. His function is to find market outlets for the jobbers, either to wholesale grocers, canners, or exporters, as well as to locate sellers for those on the buying end. This is done almost entirely by wire, and instructions for direct are sent to the jobber.

The wholesale grocer stores the beans received in warehouses, located at points where distribution in small lots is convenient.

Retailers purchases are small, generally one or two bags. Their individual sales to consumers average less than three pounds. This means that a standard size bag is divided among more than 33 customers, and that a standard carlot must be split up into 13,333 or more individual packages.

Costs

When the direct route described above is taken, the following estimates are given as percentage of the comsumer's dollar that each agency ordinarily gets:

1.	Local elevator	12 per cent
2.	Wholesale jobber	3 per cent
3.	Broker	1 per cent
4.	Wholesale grocer	10 per cent
5.	Retailer	25 per cent (as a minimum)

This is as good an estimate as can be obtained of what marketing costs usually average.

Price

In normal years the price of beans is relatively low during and immediately following the harvest season, when the bulk of movement from the farms takes place. As soon as most of the crop has left the farmers' hands the price ordinarily begins to rise and reaches its peak during the summer months. (Figure 8)

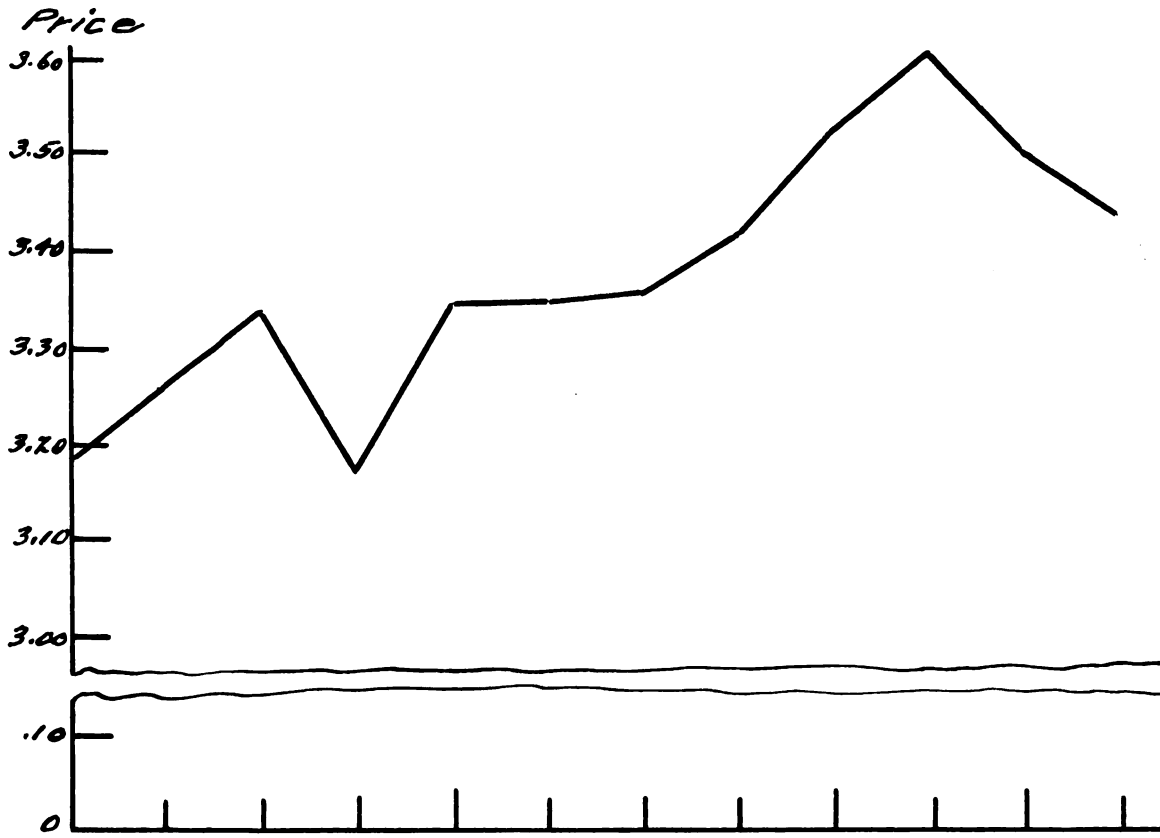
Risk

Coincident with the merchandising of beans is the element of risk. Heat damage, fire, and price fluctuations are among the hazards that exist from the time the beans are produced until they reach the consumer.

Agencies holding large quantities of beans for a period of more than a few days assume the risk of their deteriorating. This is particularly true in years when the moisture content is high, since this frequently results in heat damage. As a rule this risk is considerably greater in the fall, for farmers generally market their wet beans as soon after harvesting as possible. Danger of loss from fire is usually protected through insurance.

Although the price the consumer pays for beans varies but little, wholesale price fluctuations are frequently very wide. Irregularity of the visible supply, uncertainty of quality (particularly in years when the harvest season is wet), and speculation are important reasons why this is true.

Hedging, the only common practice followed in protecting a transaction against fluctuations in price, is not



Month	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.
Price	3.17	3.25	3.33	3.16	3.34	3.34	3.35	3.41	3.52	3.60	3.49	3.44

FIG. 8: Average monthly prices per bushel paid to producers for beans in Michigan: 1909-1925. (Data obtained from crop report for Michigan 1926.)

used in bean marketing. To hedge, there must be dealing in futures; and for future trading to be practical, there must be sufficient volume of business to provide a wide and continuous market. In this connection Professor James E. Boyle of Cornell University says:

> "The validity of hadging as insurance may be accepted as an established fact. The real controversy now is, how wide a future market is needed to provide ample hedging facilities? By a wide market is meant a market with enough traders participating on each side so that millions of bushels of grain can be bought or sold, at any moment, without bulling or bearing the market. This is exactly the condition which differentiates the Chicago futures market from the futures markets of St. Louis, Kansas City, Minneapolis or Winnipeg. An order to buy a million bushels of grain in the Kansas City pit would raise prices there sharply. The same order would have little effect on the Chicago pit. Hence large future orders arriving at these secondary markets are first placed in the Chicago pit, and then gradually worked back into the secondary market, a fraction at a time." (2)

(1) Hardenburg, E. V. Cornell Extension Bulletin 98,P.29
"Bean Bag", May 31, 1926, P. 18

(2) Speculation and the "Chicago Board of Trade", PP 176-177

PROBLEMS

Per Capita Consumption

Except for the influence of foreign trade in beans, figures showing the growth of per capita production indicate approximately a corresponding rate of increase of per capita consumption.

During the period since adequate records have been kept, every decade except the first has shown a tremendous increase in the number of pounds of beans produced per person. (Figure 5) This growth was greatest in 1910, changing since 1900 from 4.0 pounds to 7.3 pounds, or 45.5 per cent. By 1920 it increased to 8.0 pounds, or 8.1 per cent above the 1910 figure. (Appendix A. Table VII.)

If the census years from which the above figures were obtained are anywhere near typical of their respective periods, the production per capita is not increasing as rapidly as it was a few years ago. Years since 1920, however, indicate that the situation is likely to continue for some years. Figures from the United States Bureau of Agricultural Economics show that in 1926 the country's bean production was 17,138,000 bushels. (1) Population for 1926, according to estimates by the Bureau of the Census, was 117,136,000. This means that 8.8 pounds of beans were produced per person, or an increase of 9.1 per cent over 1920.

Tariff

The World War probably had an important bearing on the importation of Oriental Beans. Heavy buying by the United States Grain Corporation in 1916 and 1917 for prosecution of the war first brought about the importation of Oriental beans into this country. This in part explains the existing market for the Oriental product. Japanese Kotenashis (Oriental small whites), comparatively unknown in the United States prior to 1914, have come to be a staple in the trade. (2) Its existence on the market has given severe competition to the domestic product. Imports of foreign beans into the United States totaling 4,343,000 bushels for 1917, jumped to 15,265,000 bushels for 1918 and 18,416,000 bushels for 1919. (3) For the two latter years imports exceeded domestic porduction in volume.

The United States Tariff Act of 1922 was probably responsible for saving the industry in the United States from almost total destruction. Previously the tariff of only 25 cents per bushel on foreign beans, provided by the Underwood Tariff Act of 1913, was sufficient to give the American grower very little protection against the tremendous influx of Kotenashis. The new tariff act provided a tariff of one and three-fourth cents per pound, or $1.05 per bushel on dry beans. (4)

This has afforded the American growers a considerable degree of protection, although it has by no means eliminated foreign competition. Imports, while varying greatly from year to year, amount to from one-twelfth to one-fourth of the production. Japanese beans as a rule constitute around half of the product brought into this country. (5)

Grades

At the present time in the bean industry there are six regional association grades, all of which are fundamentally different. As to factors of quality affecting their wholesomeness for food, a wide difference in limits is justified by local methods of producing and preparing for market. In their fundamental principle and construction, however, it is confusing and illogical that they should continue to remain distinct. Uniformity in interpreting grade factors and standardising of expression of grades is essential in the reduction of marketing costs. It is not essential that under different conditions grades be arrived at in similar ways. It is essential, however, to the buyer that a given lot of beans meets the requirements of the grades desired.

In 1923 the Federal Bureau of Agricultural Economics began to make studies concerning the feasibility of establishing standard grades and inspection service. It was the aim, insofar as possible, to retain the desirable features of all present systems and still arrive at a method that would designate all grades alike. A very thorough study was made of growing conditions and practices in all bean producing sections of the country. On September 1, 1926 the set of standards which this bureau promulgated (Appendix B) became effective, and Federal inspection service was provided for.

Protests against Federal standards, both before and since their adoption, have been encountered in several sections. The Michigan Bean Jobbers Association is particularly strong in denouncing them. It is felt that Michigan bean grades have

proven satisfactory to the industry and have been a powerful influence in developing the State's reputation among buyers for beans that are dependable. To depart from the old grades, they believe, would tend to destroy the trade's confidence in Michigan beans. The sentiment of growers and jobbers was expressed by Congressman Bird J. Vincent at a hearing conducted by the Bureau of Agricultural Economics in April 1925 when he said:

> "Seventy-five per cent of the navy beans are produced in Michigan. The transactions in handling this great crop have been satisfactory all the way from the producer to the consumer insofar as satisfaction is possible. It is my opinion that, so long as conditions are satisfactory, the least government we can have the better it is for all concerned. If Federal bean grades are to be imposed, there must be a definite benefit receiveable, and this has not been shown to me as yet. It is true that in some industries definite benefit has resulted from Federal grading. If such benefit to to the bean industry can be definitely shown I will favor the Federal grading of beans." (1)

Like sentiment has been expressed by the bean dealers' associations in New York, California, and Colorado. To date Idaho and Montana are the only states in which there is favorable disposition towards the idea. Among Michigan dealers it is the concensus of opinion that Federal grades cannot be made sufficiently elastic to meet the needs of all states and at the same time be conducive to the production of high quality beans. Since the changing of an established order is usually slow, it is doubtful whether standard grades will come into use for several years.

Quality

Of greatest importance in the reduction of marketing costs and the maintenance of consumer demand is the question of quality. Aside from cleaning and hand-picking, costs for each marketing service are approximately the same for inferior beans as for beans of high quality. This means that when the housewife buys beans of inferior quality she gets proportionately less for her money than when she buys beans of high quality. Furthermore, beans of questionable quality are ~~conclusive~~ conducive to dissatisfaction in dealings between buyers and sellers, thus invariably resulting in a less efficient marketing system.

More important than this, however, is the need of confidence in cleanliness, wholesomeness and palatability of beans on the part of the consuming public. In this connection the canned bean industry has already accomplished much, with the result that canners have been amply rewarded. W. R. Roach & Co., Packers of Hart Brand Canned Foods, states as the main cause for the increassd consumption of canned beans, in common with other commercially canned food products,

> "The confidence in commercially canned foods on the part of the consuming public because of the general knowledge as to the wholesomeness, cleanliness and food value of commercially canned fruits and vegetables" (8)

This company further says:

> "Needless to say the canning industry appreciates that we have yet a long way to go in having canned foods utilized to the fullest extent in every home. That is one of our objectives. The ground, of course, for this was laid a number of years ago and the canning industry caused laws to be enacted prescribing cleanliness in handling food products, honest labeling, full weight, and by establishing its own laboratories in Chicago, the Northwest, and recently in California. The industry demands the best, safest, and most scientific methods of canning." (7)

It is the belief of most of those familiar with the bean trade that in a program similar in principle to that carried on by the canners lies also the greatest opportunity for improvement in the marketing of dried beans.

(1) Crop Report for Michigan, 1936

(2) "Bean Bag", March 1936, P. 44

(3) Yearbook, United States Department of Agriculture, 1930

(4) Cornell Extension Bulletin 98, PP 9-10

(5) "Bean Bag", November 1935, P. 9.

(6) Personal letter received from Mr. W. P. Hartman of W. R. Roach & Co. on May 11, 1937

(7) Ibid.

Appendix A.

Table I--Population of U. S. and Michigan Compared. (1).

Year	U. S. Population	Per cent of Increase	Michigan Population	Per cent of Increase
1860	31,445,321	35.6	749,113	88.4
1870 (2)	39,818,449	26.6	1,184,059	58.1
1880	50,155,783	26.0	1,636,937	38.2
1890	62,947,714	25.5	2,093,890	27.9
1900	75,994,575	20.7	2,420,982	15.6
1910	91,972,266	21.0	2,810,173	16.1
1920 (3)	105,710,610	14.9	3,668,412	30.5
1925	115,578,000	6.3	4,284,000	14.4

(1) 1920 U. S. Census.

(2) Ad justed figure.

(3) Estimated.

Table II—Average Dry Bean Production in the Principal Producing Countries. (1)

Country	1909-1913			1919-1921		
	Acreage (000)	Yield per Acre (bushels) (000)	Production (bushels) (000)	Acreage (000)	Yield per Acre (bushels) (000)	Production (bushels) (000)
India	16,805	8.5	143,360	11,120 (2)	8.9	99,156 (2)
Japan	2,906	12.8	37,072	4,051 (3)	11.6	47,071
Italy	2,025	10.4	21,058	2,322	6.5	15,148 (3)
Hungary (4)	1,515	5.0	7,516	---	---	---
Roumania (4)	1,294	3.2	4,135	1,500	3.1	5,967
Spain	1,152	10.5	11,908	1,240	10.4	12,916
United States	788 (5)	14.2	11,166 (5)	890 (5)	11.8 (7)	10,515 (6)
World	30,373	9.9	300,365	25,232	8.8	222,748

(1) Rearranged and computed from Yearbook, United States Department of Agriculture, 1922; pp. 752-754.

(2) 1919 and 1920 only.

(3) 1919 only.

(4) Old boundaries.

(5) Six States only.

(6) Seven States only.

(7) Computed by using production figures for six States (10,428,000 bushels). 1919 figures are from the report of the fourteenth United States Census.

Table III—Bean Production, by Varieties, in Leading States, 1924 and 1925.
("Crops and Markets", Supplement for December, 1925; p. 111.)

(Production in thousands of bushels, i.e., 000 omitted.)

Variety	Maine		Vermont		New York		Michigan		Wisconsin	
	1924	1925	1924	1925	1924	1925	1924	1925	1924	1925
Small and Medium White	19	18	60	44	564	428	5,416	6,797	76	112
Large White	4	3	—	—	(1)282	(1)356	257	331	4	16
Total, above	23	21	60	44	846	784	5,673	7,128	80	128
Yellow Eye	45	47	—	—	242	143	———	———	—	—
White Kidney	10	11	—	—	121	86	———	———	—	—
Red Kidney	13	15	—	—	725	356	645	995	—	—
Cranberry	—	—	—	—	—	—	———	———	—	—
Red Mexican	—	—	—	—	—	—	———	———	—	—
Pinto	—	—	—	—	—	—	———	———	—	—
Pinks	—	—	—	—	—	—	———	———	—	—
Lima (2)	—	—	—	—	—	—	———	———	—	—
Blackeye	—	—	—	—	—	—	———	———	—	—
Other (3)	16	18	—	—	81	57	129	156	5	4
Total	108	112	60	44	2,015	1,426	6,447	8,289	85	132

Per cent of Total Production by Varieties. (4)

Small and Medium White	0.3	0.2	0.9	0.6	8.8	5.4	84.5	86.3	1.2	1.4
Large White	0.2	0.1	—	—	14.0	15.5	12.7	12.5	0.2	0.6
Total, above	0.3	0.1	0.7	0.4	10.0	7.5	67.4	67.8	1.0	1.2
Yellow Eye	16.0	25.2	—	—	84.0	75.0	———	———	—	—
White Kidney	7.6	11.3	—	—	92.4	88.7	———	———	—	—
Red Kidney	0.9	1.1	—	—	51.5	25.5	45.9	70.8	—	—
Cranberry	—	—	—	—	—	—	———	———	—	—
Red Mexican	—	—	—	—	—	—	———	———	—	—
Pinto	—	—	—	—	—	—	———	———	—	—
Pinks	—	—	—	—	—	—	———	———	—	—
Lima (2)	—	—	—	—	—	—	———	———	—	—
Blackeye	—	—	—	—	—	—	———	———	—	—
Other (3)	2.2	2.3	—	—	11.3	7.3	18.1	21.3	0.7	0.5
Total	0.7	0.6	0.4	2.2	13.6	7.3	45.4	42.3	0.6	0.7

(1) White Marrow.

(2) Includes Baby Limas.

(3) Includes some varieties listed above when of small importance in the particular State.

(4) Computed from above table.

Table III--Continued.

Variety	Minnesota		Montana		Idaho		Wyoming	
	1924	1925	1924	1925	1924	1925	1924	1925
Small and Medium White	100	104	---	---	---	---	---	---
Large White	---	---	(5)388	(5)440	(5)951	1,331	(5)82	(5) 111
Total, above	100	104	388	440	951	1,331	82	111
Yellow Eye	---	---	---	---	---	---	---	---
White Kidney	---	---	---	---	---	---	---	---
Red Kidney	---	---	---	---	---	---	---	---
Cranberry	---	---	---	---	---	---	---	---
Red Mexican	---	---	---	---	---	15	---	---
Pinto	---	---	---	---	---	---	---	10
Pinks	---	---	---	---	---	---	---	---
Lima (2)	---	---	---	---	---	---	---	---
Blackeye	---	---	---	---	---	---	---	---
Other (3)	---	---	20	60	317	238	14	29
Total	100	104	408	500	1,268	1,584	96	150

Small and Medium White	1.6	1.3	---	---	---	---	---	---
Large White	---	---	19.3	16.7	47.2	50.5	4.0	4.2
Total, above	1.2	1.0	4.6	4.2	11.3	12.7	0.9	1.0
Yellow Eye	---	---	---	---	---	---	---	---
White Kidney	---	---	---	---	---	---	---	---
Red Kidney	---	---	---	---	---	---	---	---
Cranberry	---	---	---	---	---	---	---	---
Red Mexican	---	---	---	---	---	4.9	---	---
Pinto	---	---	---	---	---	---	---	0.4
Pinks	---	---	---	---	---	---	---	---
Lima (2)	---	---	---	---	---	---	---	---
Blackeye	---	---	---	---	---	---	---	---
Other (3)	---	---	2.8	7.7	44.5	30.5	1.9	5.7
Total	0.6	0.5	2.7	2.6	8.5	8.1	0.7	0.8

(5) Great Northern.

Table III--Continued.

Variety	Colorado		New Mexico		Arizona		California		Total 15 States	
	1924	1925	1924	1925	1924	1925	1924	1925	1924	1925
Small and Medium White	---	---	---	---	---	---	169	375	6,404	7,878
Large White	---	---	---	---	---	---	48	50	2,016	2,638
Total, above	---	---	---	---	---	---	217	425	8,420	10,516
Yellow Eye	---	---	---	---	---	---	---	---	288	190
White Kidney	---	---	---	---	---	---	---	---	131	97
Red Kidney	---	---	---	---	---	---	24	40	1,407	1,406
Cranberry	---	---	---	---	---	---	97	85	97	85
Red Mexican	---	---	---	---	---	---	121	290	121	305
Pinto	953	2,128	818	575	1	1	---	---	1,752	2,514
Pinks	---	---	17	8	25	34	514	960	556	1,002
Lima (2)	---	---	---	---	---	---	1,257	1,870	1,257	1,870
Blackeye	---	---	---	---	---	---	514	825	514	825
Other (3)	19	112	35	16	4	5	73	75	715	780
Total	952	2,240	870	599	30	40	22,417 (6)	4,570	14,856	(6) 19,590
Small and Medium White	---	---	---	---	---	---	2.7	4.8	100	100
Large White	---	---	---	---	---	---	2.4	1.9	100	100
Total, above	---	---	---	---	---	---	2.6	4.0	100	100
Yellow Eye	---	---	---	---	---	---	---	---	100	100
White Kidney	---	---	---	---	---	---	---	---	100	100
Red Kidney	---	---	---	---	---	---	1.7	2.8	100	100
Cranberry	---	---	---	---	---	---	100	100	100	100
Red Mexican	---	---	---	---	---	---	100	95.1	100	100
Pinto	55.2	84.6	46.7	15.0	0.1	---	---	---	100	100
Pinks	---	---	4.8	0.8	7.0	3.4	88.2	95.8	100	100
Lima (2)	---	---	---	---	---	---	100	100	100	100
Blackeye	---	---	---	---	---	---	100	100	100	100
Other (3)	2.7	14.4	4.9	2.1	0.6	0.6	10.2	9.6	100	100
Total	6.4	11.4	5.9	2.0	0.2	0.2	16.3	23.3	100	100

(6) Revised.

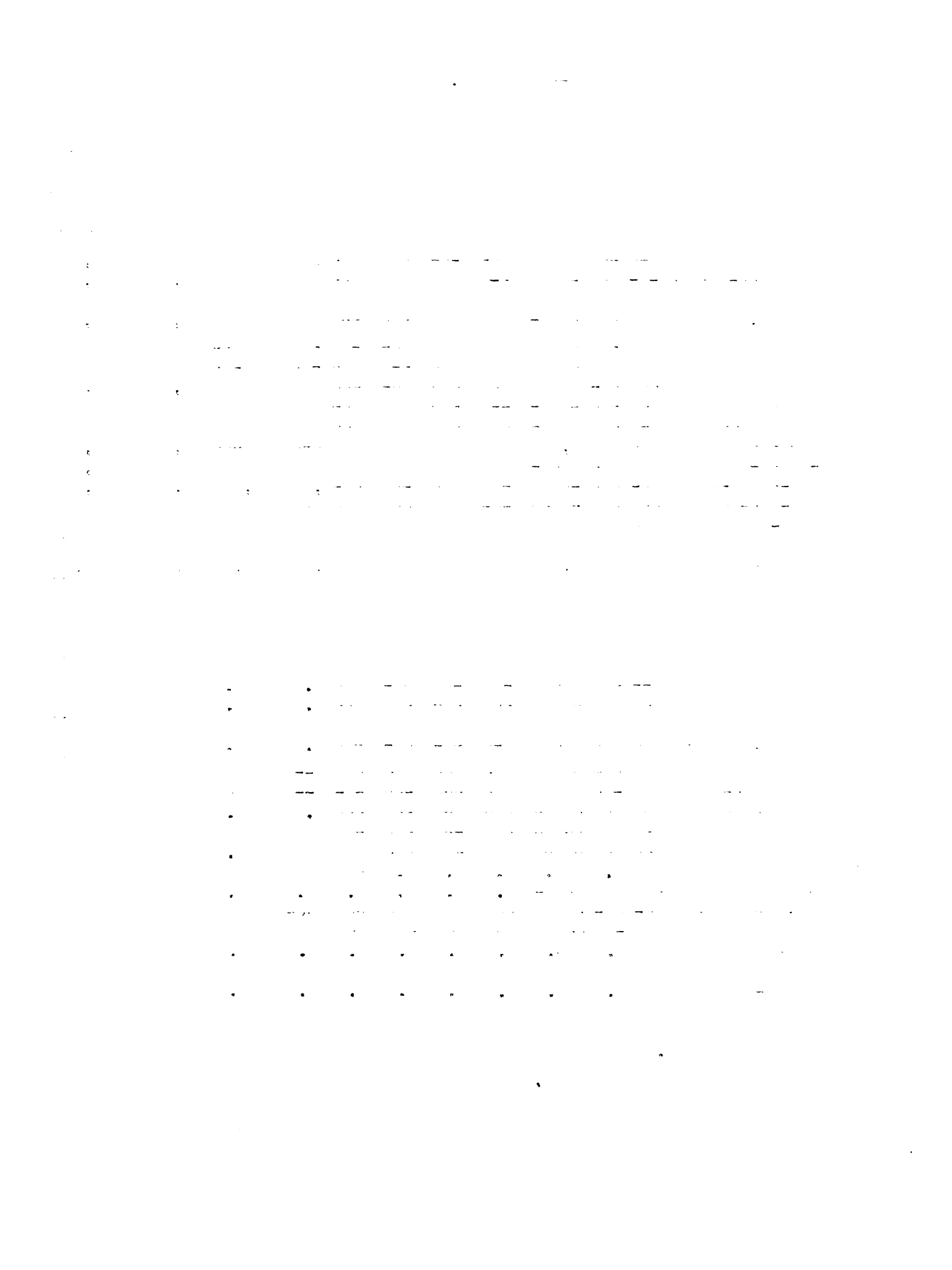


TABLE IV.--Showing for specified periods the average bean acreage, yield per acre, and production for the leading counties of Michigan, and their percentage of the total for the State. (1)

Counties	1913-1915			1916-1918			1924-1926		
	Acres	Bushels per Acre	Production	Acres	Bushels per Acre	Production	Acres	Bushels per Acre	Production
Huron	23,475	10.6	284,265	28,133	7.8	221,011	55,930	10.8	601,867
Saginaw	29,623	13.1	388,985	26,891	9.6	162,174	46,875	12.3	577,900
Gratiot	18,900	11.3	213,254	23,091	8.3	190,772	43,160	13.3	576,120
Tuscola	36,848	9.9	366,119	35,633	9.6	225,591	35,553	11.6	411,213
Clinton	13,613	10.9	148,231	14,426	7.6	110,107	26,007	15.0	389,470
Shiawassee	20,917	10.0	208,581	19,904	9.5	105,580	30,050	12.7	387,433
Sanilac	20,552	9.4	192,910	18,524	3.8	89,370	30,560	10.9	334,155
Isabella	22,561	11.8	265,859	26,375	6.6	174,071	27,523	11.4	315,313
Eaton	20,508	9.3	191,461	17,908	7.3	131,093	22,330	14.1	314,050
Bay	2,617	11.3	29,653	5,198	15.5	80,591	22,870	13.0	297,423
Genesee	23,569	10.0	235,996	17,834	5.4	96,357	21,903	13.4	292,930
Midland	13,604	11.7	159,043	15,117	7.0	105,853	20,640	11.6	239,873
Ingham	17,528	10.5	183,603	17,985	6.4	115,778	18,940	11.9	226,193
Montcalm	13,927	10.7	148,786	18,380	9.9	174,292	15,680	12.6	197,520
Ionia	14,082	9.2	127,126	15,819	7.4	116,990	14,350	12.8	182,980
Lapeer	14,566	9.9	128,798	9,700	5.6	54,251	13,707	12.9	176,870
Kent	11,250	14.3	160,951	18,308	8.4	153,995	12,997	11.8	153,710
Livingston	15,162	9.3	141,368	11,895	6.0	71,015	11,896	12.5	148,457
St. Clair	4,065	7.9	31,960	2,298	4.8	11,095	7,903	12.3	97,593
Newaygo	4,660	12.5	58,369	7,859	7.4	68,154	9,707	10.0	96,997
Jackson	6,679	9.0	60,299	8,754	8.5	74,616	8,007	11.3	90,273
Arenac	3,795	11.7	44,284	4,269	9.2	39,412	7,890	10.7	85,737
Mecosta	9,890	8.3	82,280	11,926	4.7	55,623	6,090	9.7	59,010
Barry	4,380	8.7	37,998	5,334	5.8	30,871	4,137	13.8	57,013
Gladwin	2,200	14.5	31,929	4,028	9.4	37,956	4,553	11.0	50,240
Oakland	8,139	9.6	77,841	7,457	4.9	36,336	3,097	13.3	41,253
Macomb	6,824	10.0	59,668	6,209	3.0	18,600	3,220	11.8	38,073
27 counties	383,945	10.6	4,058,995	389,235	7.1	2,251,494	526,383	12.2	6,439,664
State	473,410	10.3	4,892,000	516,666	7.3	3,761,000	615,333	11.8	7,291,000
Ratio: 27 counties to State (per cent)	811	102.9	83.0	65.7	111.0	73.2	85.5	103.3	88.3

(1) Computed from annual crop reports for Michigan.

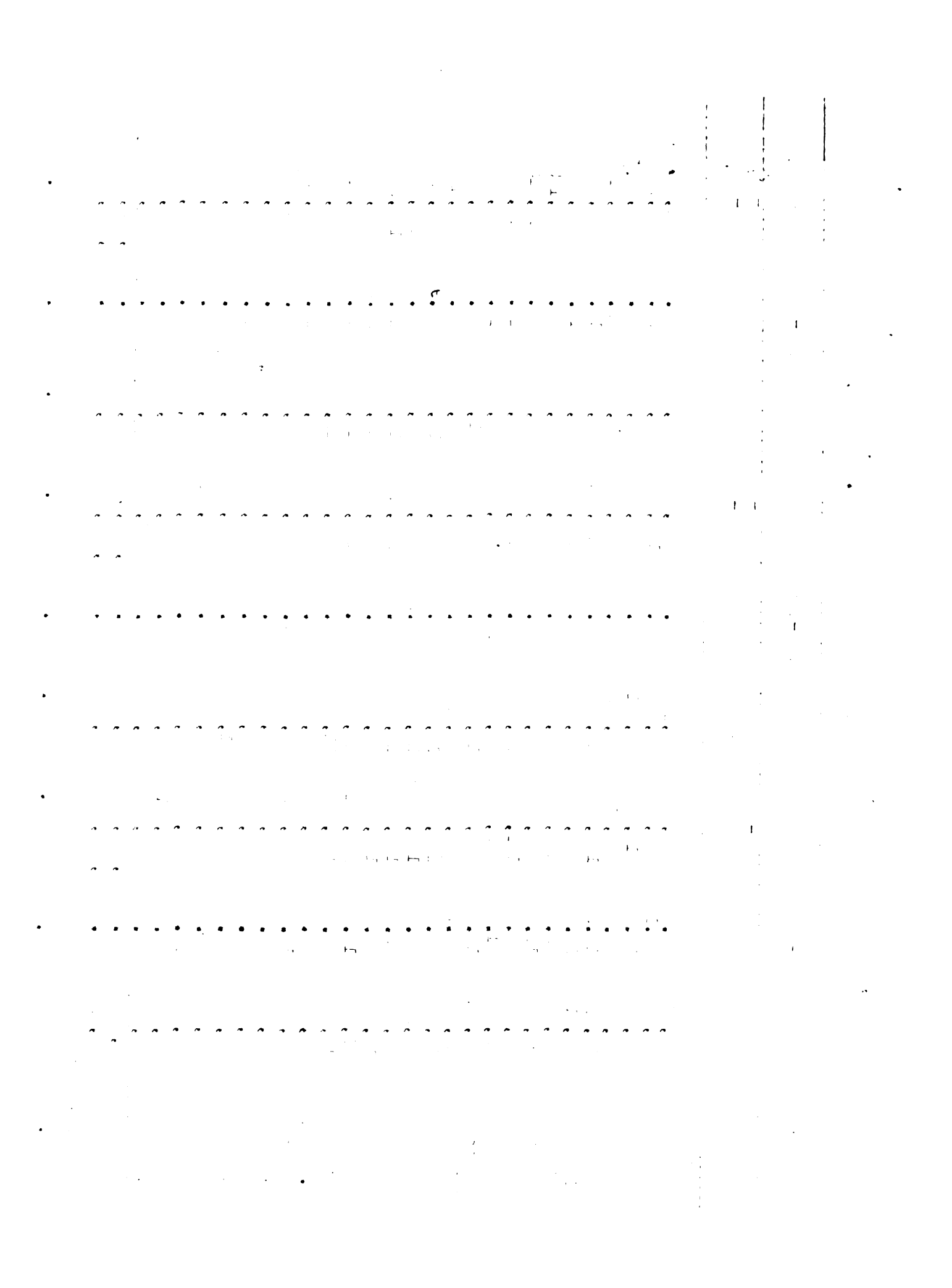


Table V--Production of Beans in the United States, New York, and Michigan, 1849 to 1924. (1)

(Bushels)

	1849	1859	1869	1879	1889
United States	9,219,901	15,061,995	5,746,027	3,075,050	5,163,564
New York	741,516	1,609,359	1,152,541	1,305,444	1,111,510
Michigan	74,245	165,128	349,365	167,658	454,014
New York Per cent of U. S. Crop	25.5	52.3	20.1	42.3	35.3
Michigan Per cent of U. S. Crop	2.3	5.4	6.1	5.4	15.7

Table V--Continued.

	1899	1909	1919	1924 (2)
United States	5,064,844	11,251,160	14,079,093	13,297,000
New York	1,360,445	1,681,506	702,364	1,690,000
Michigan	1,806,413	5,282,511	4,332,317	6,532,000
New York Per cent of U. S. Crop	26.9	15.0	5.0	12.7
Michigan Per cent of U. S. Crop	36.7	47.0	30.8	49.1

(1) Copied from Reports of the United States Census. Beans and peas were reported as one product in 1850, 1860, and 1870.

(2) Yearbook, United States Department of Agriculture, 1925.

Table VI--Carlot Shipments of Michigan Dry Beans, 1920-1925. ((1)

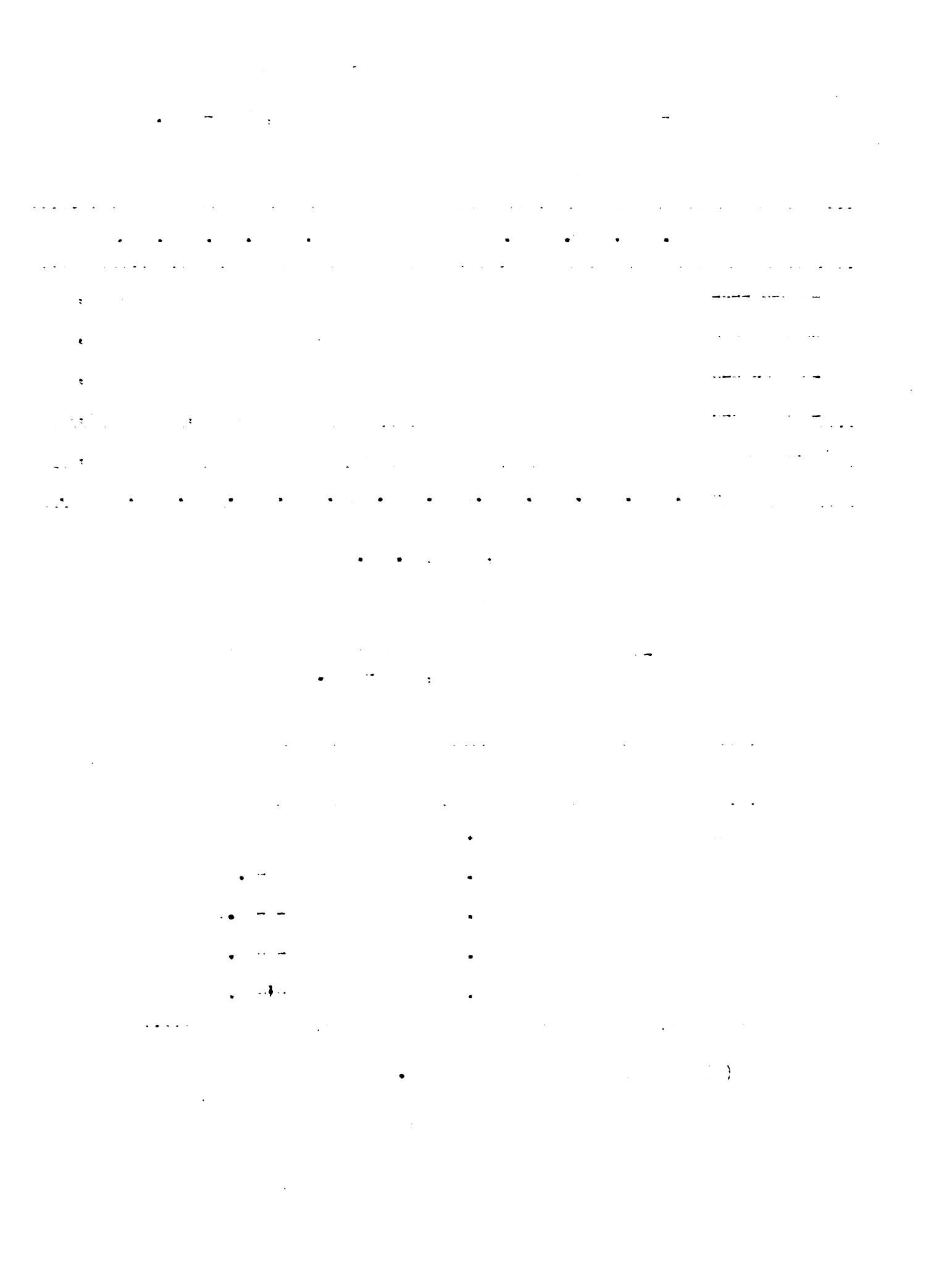
Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Total
1920	107	78	58	125	238	96	81	48	108	341	485	365	2,125
1921	560	592	492	346	312	405	355	417	426	820	715	470	5,908
1922	666	501	445	241	148	124	85	57	305	785	885	741	4,955
1925	658	368	331	288	220	328	268	222	308	982	1,152	810	5,935
Average for period	498	385	330	250	230	238	196	181	286	732	808	596	4,750
Per cent of Yearly Average	10.5	8.1	7.0	5.3	4.9	4.0	4.1	3.8	6.1	15.4	17.1	12.6	100.0

(1) "Bean Bag" September, 1924; p. 24.

Table VII--Production of Beans per capita in the United States by Census periods, 1880-1920. (1)

Year	Pounds	Change per cent
1880	3.7	
1890	3.0	-1.8
1900	4.0	+25.0
1910	7.3	+45.5
1920	8.0	+ 8.1

(1) Computed from Tables I and V.



Appendix B.

MICHIGAN BEAN GRADES

Official grades and regulations adopted by Michigan Bean Jobbers' Association, October 5, 1897; revised, December, 1906; September, 1907; January, 1913; January, 1914; September, 1916; September, 1918; October, 1919; October, 1920; September, 1922.

Choice Hand Picked Pea Beans Michigan Grading must be bright, sound, dry, well screened, and must not contain more than one and one-half per cent of discolored or split beans, and not more than seven per cent of large or medium beans.

Prime Hand Picked Pea Beans Michigan Grading must be fairly good average color of crop year, sound, dry, well screened, and must not contain more than three per cent of discolored and split beans, and not more than ten per cent of large or medium beans.

Fancy Screened Pea Beans Michigan Grading must be bright, sound, dry, well screened, and must not contain more than three per cent of discolored beans, splits or foreign substances, and not more than ten per cent of large or medium beans.

Choice Screened Pea Beans Michigan Grading must be of fairly good average color of crop year, dry, well screened, and must not contain more than five per cent of discolored beans, splits or foreign substances, and not more than ten per cent of medium beans.

Choice White Kidney Beans and Choice Yellow Eyed Beans shall permit of the same package and moisture content as is allowable in Choice Hand Picked Pea Beans.

Choice Hand Picked Medium Beans Michigan Grading must be bright, sound, dry, well screened, and must not contain more than one and one-half per cent of discolored and split beans.

Choice Hand Picked Red Kidney Beans Michigan Grading must be light red in color, bright, sound, dry, well screened, and must not contain more than one and one-half per cent of discolored and split beans, and not more than three per cent of Sports or Blue Beans.

Prime Hand Picked Red Kidney Beans Michigan Grading must be light red in color, fairly bright, sound, dry, well screened, and must not contain more than four per cent of discolored and split beans and not more than four per cent of Sports or Blue Beans.

Choice Hand Picked Improved or Dark Red Kidney Beans Michigan Grading must be dark red in color, bright, sound, dry, well screened, and must not contain more than one and one-half per cent of discolored and split beans, and not more than three per cent of Sports or Blue Beans.

Prime Hand Picked Improved or Dark Red Kidney Beans Michigan Grading must be dark red in color, fairly bright, sound, dry, well screened, and must not contain more than four per cent of discolored beans and splits, and not more than four per cent of Sports or Blue Beans.

A Dry Bean is defined as one containing not to exceed seventeen per cent moisture red and seventy-five degrees Centigrade.

UNITED STATES STANDARDS FOR BEANS.

Effective September 1, 1926.

The following standards for the grading and Marketing of beans are recommended by the Bureau of Agricultural Economics, United States Department of Agriculture. These standards are the result of intensive studies and extensive investigations of the bean industry and of suggestions received from commercial agencies experienced in the grading of this commodity. The adoption and use of these standards by all agencies engaged in handling beans should promote uniform grading and facilitate the marketing of this commodity.

DEFINITIONS

For the purposes of the United States Standards for Beans:

BEANS shall include all kinds of beans produced in the Continental United States commonly sold in the dry threshed state and used for edible purposes, as defined under "classes of beans," including blackeye cowpeas characteristic of these varieties grown on the Pacific Coast, and which contain not to exceed five per cent of foreign material as defined in these standards.

BASIS OF DETERMINATION.-All determination of factors entering into the grading of beans shall be made upon the basis of a representative sample, which sample shall be drawn in accordance with methods approved by the Chief of the Bureau of Agricultural Economics.

PERCENTAGES, except in the case of moisture, shall be percentages ascertained by weight.

PERCENTAGES OF MOISTURE shall be that ascertained by the moisture tester and the method of use thereof described in Department Bulletin No. 1575, issued by the United States Department of Agriculture, Bureau of Agricultural Economics, or that ascertained by any device and method giving equivalent results.

OTHER BEANS shall include all beans of a class or classes other than the class of beans predominating in the lot which is being graded and may include seed garden beans or other commercial types of dry edible beans not defined in these standards.

SPLIT BEANS or "Splits" shall be beans which are split or broken, including pieces up to three-fourths the size of whole beans, but not including beans with cracked or checked skins only.

DAMAGED BEANS or "Damage" shall be beans which are so badly injured or discolored by weather, frost, heat, insects, disease or other causes as to seriously affect the appearance and quality of the sample.

FOREIGN MATERIAL shall be all matter other than beans but shall not include seed garden beans and other types of dry edible beans not defined in these standards.

STONES shall be rocks, stones, pebbles, shale, or other concreted earthly

or mineral matter or other substances of similar composition and hardness that do not disintegrate in water.

BROKEN BEANS shall be beans of Class XVIII, Lima and Class XIX, Baby Lima, showing a bursting or abrasion of the skin, sometimes resulting in a spreading apart of the bean.

WRINKLED BEANS shall be beans of Class XVIII, Lima, and Class XIX, Baby Lima, which have deeply wrinkled skins.

WELL SCREENED, as applied to the general appearance of beans, shall mean that the beans are practically free from such small, shrivelled, undeveloped, split and broken beans and foreign material as can be readily removed in the ordinary processes of milling or screening.

WEEVILY BEANS shall be beans of any class which are infested with weevils or other insects injurious to stored beans or which contain beans that have been damaged by such weevils or insects. Weevily beans shall be graded "Sample Grade".

GRADE DESIGNATIONS.-The grade designation of any lot of beans shall include successively the letters "U. S.", the number of the grade or the words "Sample Grade", as the case may be, and the name of the Class.

FOOD AND DRUGS ACT.-Nothing herein shall be construed as authorizing the shipment of beans in violation of the Food and Drugs Act of June 30, 1906.

CLASSES OF BEANS

Beans shall be divided into classes as follows:

Class I. PEA BEANS.- This class shall include all white beans commonly referred to as Navy or Pea beans characteristic of those varieties grown in the Great Lakes region.

Class II. RED KIDNEY BEANS.- This class shall include all varieties of beans of a light red or brown color of the type known commercially as Red Kidney.

Class III. DARK RED KIDNEY BEANS.- This class shall include all varieties of beans of a dark red or mahogany color of the type known commercially as Dark Red Kidney.

Class IV. WHITE KIDNEY BEANS.- This class shall include all varieties of beans of the type known commercially as White Kidney.

Class V. MEDIUM WHITE BEANS.- This class shall include all white beans commonly referred to as medium beans characteristic of those varieties grown in the Great Lakes region.

Class VI. MARROW BEANS.- This class shall include all large white beans commonly referred to as Marrow.

Class VII. YELLOWEYE BEANS.- This class shall include all varieties or strains of Yelloweye Beans.

Class VIII. BROWN SWEDISH BEANS.- This class shall include all brown beans commonly referred to as Brown Swedish.

Class IX. GREAT NORTHERN BEANS.- This class shall include all white beans of the Great Northern variety.

Class X. PINTO BEANS.- This class shall include all beans of the Mexican Pinto group, but shall not include Spotted Red Mexican.

Class XI. SMALL WHITE BEANS.- This class shall include all white beans characteristic of these varieties grown on the Pacific Coast and commonly referred to as Small White beans but shall not include Tepary beans.

Class XII. LARGE WHITE BEANS.- This class shall include all white beans characteristic of those varieties grown on the Pacific Coast and commonly referred to as Large White beans.

Class XIII. PINK BEANS.- This class shall include all beans of the California Pink group.

Class XIV. CALIFORNIA RED BEANS.- This class shall include all beans of the Red Mexican group characteristic of those varieties grown on the Pacific Coast and commonly referred to as California Red.

Class XV. BAYO BEANS.- This class shall include all beans of a solid bay or chestnut color commonly referred to as Bayos.

Class XVI. CRANBERRY BEANS.- This class shall include all beans of the Cranberry group, commonly referred to as Cranberry, Speckled Cranberry and Horticultural Pole.

Class XVII. BLACKEYE BEANS.- This class shall include all blackeye cowpeas, characteristic of those varieties grown on the Pacific Coast.

Class XVIII. LIMA BEANS.- This class shall include all large Lima beans characteristic of the Large White Pole and Burpee Bush Lima varieties.

Class XIX. BABY LIMA BEANS.- This class shall include all small Lima beans of the Henderson Bush and similar varieties commonly referred to as Baby Lima.

GRADE REQUIREMENTS FOR BEANS

Grades.- The Classes Pea Beans, Red Kidney, Dark Red Kidney, White Kidney, Medium White, Marrow, Yelloweye, Brown Swedish, Great Northern, Pinto, Small White, Large White, Pink, California Red, Baye, Cranberry, and Blackeye each shall be divided into three numerical grades and sample grade and the Classes Lima and Baby Lima each into two numerical grades and sample grade, the requirements of which shall be as follows:

U. S. Grade	Class and General Appearance	Maximum Limits of Splits, Damage, Other Beans, and Foreign Material		
		Total	Other Beans (1)	Foreign Material
		Per cent	Per cent	Per cent
	CLASS I, PEA BEANS			
No. 1	Well screened and good natural color and appearance	1.5	0.0	Tr. (2)
No. 2	Well screened and may be slightly off color	3.0	0.1	0.1
No. 3	May be dull or of poor color	5.0	0.5	0.5
Sample Grade	(See page 8)			
	CLASS II, RED KIDNEY CLASS III, DARK RED KIDNEY			
No. 1	Well screened and good natural color and appearance	2.0	0.0	Tr. (2)
No. 2	Well screened and may be slightly off color	4.0	0.2	0.2
No. 3	May be dull or of poor color	6.0	0.5	0.5
Sample Grade	(See page 8)			

(1) See page 7.

(2) Trace, (Tr.), as applied to "foreign material" in grade No. 1 of the Classes Pea Beans, Red Kidney Beans, and Dark Red Kidney Beans shall not exceed 1/100 of one per cent, and shall not include any stones which can be detected by methods of sampling approved by the Chief of Bureau.

Grade Requirements for Beans, Continued

U. S. Grade	Class and General Appearance	Maximum Limits of Splits, Damage, Other Beans, and Foreign Material. Total	Other Beans(1)	Foreign Material
		Per cent	Per cent	Per cent
	CLASS IV, WHITE KIDNEY CLASS V, MEDIUM WHITE CLASS VI, MARROW CLASS VII, YELLOWEYE CLASS VIII, BROWN SWEDISH			
No. 1	Well screened and good natural color and appearance	2.0	0.1	0.1
No. 2	Well screened and may be slightly off color	4.0	0.2	0.2
No. 3	May be dull or of poor color	6.0	0.5	0.5
Sample Grade	(See page 8)			
	CLASS IX, GREAT NORTHERN			
No. 1	Well screened and good natural color and appearance	2.0	0.3	0.3
No. 2	Well screened and may be slightly off color	4.0	0.6	0.6
No. 3	May be dull or of poor color	6.0	1.0	1.0
Sample Grade	(See page 8)			
	CLASS X, PINTO			
No. 1	Well screened and good natural color and appearance	4.5	0.5	0.5
No. 2	Well screened and may be slightly off color	7.0	1.0	1.0
No. 3	May be dull or of poor color	10.0	1.5	1.5
Sample Grade	(See page 8)			

(1) See page 7.

Grade Requirements for Beans, Continued.

U. S. Grade	Class and General Appearance	Maximum Limits of Splits, Damage, Other Beans and Foreign Material			
		Total	Damage	Other Beans(1)	Foreign Material
		Per cent	Per cent	Per cent	Per cent
	CLASS XI, SMALL WHITE				
No. 1	Well screened and good natural color and appearance	1.5	1.0	0.5	0.5
No. 2	Well screened and may be slightly off color	3.0	2.0	0.5	0.5
No. 3	May be dull or of poor color	5.0	3.0	1.0	1.0
Sample Grade	(See page 8)				
	CLASS XII, LARGE WHITE CLASS XIII, PINK CLASS XIV, CALIFORNIA RED CLASS XV, BAYO CLASS XVI, CRANBERRY CLASS XVII, BLACKEYE				
No. 1	Well screened and good natural color and appearance	2.0	1.0	0.5	0.5
No. 2	Well screened and may be slightly off color	4.0	2.0	1.0	1.0
No. 3	May be dull or of poor color	6.0	3.0	1.5	1.5
Sample Grade	(See page 8)				

(1) OTHER BEANS.- An allowance of 2% in grade 1, 3% in grade 2, and 5% in grade 3, shall be made for "Other Beans" in Classes I to XVII, inclusive, except Class VII, Yelloweye Beans, in excess of the allowance of "total splits, damage, other beans, and foreign material", provided such additional "Other Beans" are similar in shape and size to and the color blends with that of the beans in the sample being graded. This allowance shall apply also to the so-called "Sports" in Class II, Red Kidney Beans; and Class III, Dark Red Kidney Beans. In Class VII, Yelloweye Beans, the total allowance of white beans of a size and shape similar to that of Yelloweyes may be 10% in grade 1, 15% in grade 2, and 20% in grade 3.

Grade Requirements for Beans, Continued.

U. S. Grade	Class and General Appearance	Blistered and wrinkled beans	Skinned and Broken Beans	Splits	Damaged Beans and Foreign Material				
					Total	Worm Damage	Other Damage	Foreign Material Total	Foreign Material Stones
		Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent	Per cent
	CLASS XVIII, LIMA CLASS XIX, BABY LIMA								
No. 1	Well screened (1) and of good natural color and appearance	2.5	2.5	2.0	1.0	0.5	0.5	0.5	0.1
No. 2	Well screened (2) and may be slightly off color	5.0	5.0	5.0	2.0	1.0	1.0	0.5(3)	0.2
Sample Grade	(See below)								

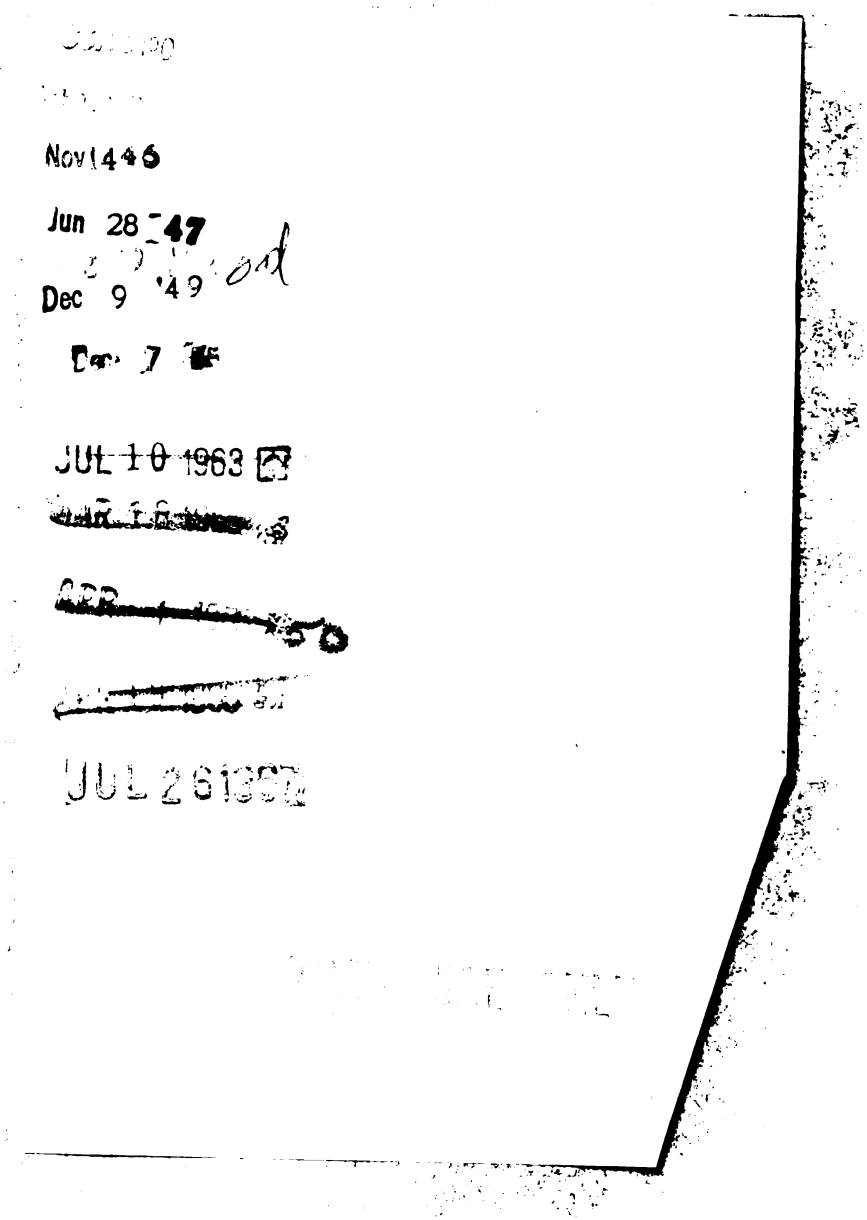
(1) No. 1 LIMA BEANS shall be of a size such that not more than 40% will pass through a 32/64" round hole screen. This size requirement shall be supplemental to that of "well screened" as defined on page 2.

(2) No. 2 LIMA BEANS shall be of a size such that not more than 10% will pass through a 24/64" round hole screen and not more than 45% through a 28/64" round hole screen. This size requirement shall be supplemental to that of "well screened" as defined on page 2.

(3) No. 2 BABY LIMAS may contain not more than 1% of foreign material provided the total of damaged beans and foreign material does not exceed 2%.

SAMPLE GRADE.- Beans of any Class I to XIX, inclusive, which do not meet the requirements for any of the numerical grades applicable to the respective classes or which contain over 17% moisture, or have any commercially objectionable odor, or are heating, or weevily, or otherwise of distinctly low quality.

ROOM USE ONLY



MICHIGAN STATE UNIV. LIBRARIES
31293100647795