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THIRTY-SIXTH ANNUAL REPORT

OF THE

Agricultural Experiment Station

OF THE

UNIVERSITY OF KENTUCKY

FOR THE YEAR 1923

Lexington, Ky.

PART I.

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THIRTY-SIXTH ANNUAL REPORT

OF THE

Kentucky Agricultural Experiment Station

FOR THE YEAR 1923

PART I.

Report of the Director
Meteorological Observations

LETTER OF TRANSMITTAL

To His Excellency, Hon. William J. Fields, Governor of Kentucky:

Sir:—Under the authority of the Board of Control of the Kentucky Agricultural Experiment Station, and in accordance with an act of Congress, approved March 2, 1887, entitled, "An Act to establish Agricultural Experiment Stations in connection with the Agricultural Colleges established in the several states under the provision of an act approved July 2, 1862, and under the acts supplementary thereto," and of the act of the Legislature of the State of Kentucky, approved February 20, 1888, entitled, "An Act to accept the provisions of an act passed by the Congress of the United States, approved March 2, 1887, for the establishment and maintenance of Agricultural Experiment Stations in connection with Agricultural Colleges established by the several states and territories under an act of Congress approved July 2, 1862," I herewith submit the Thirty-Sixth Annual Report of the Kentucky Agricultural Experiment Station.

Very respectfully,

THOMAS COOPER, *Director.*

January 1, 1924.

UNIVERSITY OF KENTUCKY.

Lexington, Ky.

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Mary L. Didlake, Assistant
H. H. Jewett, Research Asst. Ent.
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Marie Jackson, Seed Analyst
R. A. Stevenson, Nursery Inspector
Jessie Terry, Seed Analyst

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Dana G. Card, Asst. Marketing
J. B. Hutson, Farm Management
*E. L. Langsford
*J. C. Melvin

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E. J. Gott, Bacteriologist
A. L. Meader, Asst. Chemist
Ethel L. Hopphan, Asst. Bact.
James H. Martin, Asst. Chemist

*Assigned by the U. S. Department of Agriculture.

KENTUCKY AGRICULTURAL EXPERIMENT STATION.

In Account with the United States Appropriations, 1922-23:

	Hatch Fund	Adams Fund
Receipts from the Treasurer of the United States, as per appropriations for fiscal year ending June 30, 1923, under acts of Congress approved March 3, 1887 (Hatch Fund), and March 16, 1906 (Adams Fund)	$15,000.00	$15,000.00
Expenditures:		
By Salaries	$15,000.00	$15,000.00
Labor		
Publications		
Postage and stationery		
Freight and express		
Heat, light, water, and power		
Chemicals and laboratory supplies		
Seeds, plants, and sundry supplies		
Fertilizers		
Feeding stuffs		
Library		
Tools, machinery, and appliances		
Furniture and fixtures		
Scientific apparatus and specimens		
Live stock		
Traveling expenses		
Contingent expenses		
Buildings and land		
Balance		
Total	$15,000.00	$15,000.00

We, the undersigned, duly appointed Auditors of the Corporation, do hereby certify that we have examined the books and accounts of the Kentucky Agricultural Experiment Station for the fiscal year ended June 30, 1923; that we have found the same well kept and classified as above; that the balance brought forward from the preceding year was nothing on the Hatch Fund and nothing on the Adams Fund; that the receipts for the year from the Treasurer of the United States were $15,000.00 under the act of Congress of March 2, 1887, and $15,000.00 under the act of Congress of March 16, 1906, and the corresponding disbursements $15,000.00 and $15,000.00; for all of which proper vouchers are on file and have been by us examined and found correct, leaving balances of nothing and nothing.

And we further certify that the expenditures have been solely for the purposes set forth in the acts of Congress approved March 2, 1887, and March 16, 1906, and in accordance with the terms of said acts, respectively.

Signed:

F. M. McKee,
H. M. Froman,
Auditors

(Seal)
Attest:

Teresa Buchignani,
Custodian

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ANNUAL REPORT

of the

DIRECTOR OF THE

KENTUCKY AGRICULTURAL EXPERIMENT STATION

For the Year 1923

The progress of the Experiment Station in its service to the agriculture of the state has been satisfactory from the standpoint of attack upon the pressing problems. If, however, progress is viewed from the aspect of investigations which should be initiated or more vigorously supported, then its progress has been less satisfactory.

Appropriations to the Experiment Station have not been increased for over a decade. Costs of material, equipment, labor and salaries show a decided increase. Therefore, the problem of investigation, especially the initiation of new experiments, no matter how greatly needed, has become increasingly difficult.

The Experiment Station has successfully developed and introduced to the farmers of the Burley region a strain of Burley tobacco resistant to what is commonly known as root-rot (*Thielavia basicola*). Farmers have found this strain of tobacco superior to many of the local strains and it is now being produced by a comparatively large proportion of the growers in the Burley area. In connection with the tobacco work, there has been discovered on a few farms a new and more destructive form of root-rot.

The past year has witnessed an outbreak of tobacco diseases in western Kentucky. The leaf was largely affected by what is commonly called wildfire and by angular leaf-spot. It

is probable that both of these diseases may be controlled and that adequate investigation will develop methods which may be applied by every farmer. Diseases which affect the leaf are rather disastrous, for tho the total production in pounds is not greatly curtailed, the quality of the tobacco is seriously affected. The staff of the Experiment Station is carrying as much work upon these important problems as can be arranged for. However, additional funds are required if progress is to be as rapid as the necessity warrants.

Tobacco is not only the most important money crop of the farms of Kentucky, but it plays a greater part in the prosperity of the state than does any other agricultural product. Fifty-three per cent of the farms in the state produce tobacco. Approximately 44 per cent of the total gross sales from farms in Kentucky result from the tobacco crop. Investigations which may result in better methods of production, improved quality, elimination of disease and more economical curing, are greatly to the advantage of the state.

The Experiment Station has continued to develop investigations in the economic field. Much of this investigation is pioneer in character and methods of securing data and their application must be carefully developed. Attention has been devoted chiefly to marketing problems, to studies of the economic organization of farms and to investigations in the cost of crop production. Data are accumulating which eventually should point out the factors that will increase the returns to the farmer and the practical inter-relationship of the farm enterprises which will prove most profitable.

Investigation in the economic field of agriculture is essential to the development of a sound agricultural program for the state. Evidence from the soil experiment fields shows that soil building and maintenance is the first step for a more productive agriculture. This, followed by the production of all feeds and forages required in the state; the extension of certain live-stock enterprises, such as poultry, dairying and sheep husbandry; the better balancing of the production of farm crops; the development of orchard and horticultural

enterprise and, finally, the better standardization of products and their effective cooperative marketing, will greatly improve the farm income under normal conditions.

A cursory study of Kentucky's agriculture serves to point out the present weak spots. They are largely factors which enter into the production of crops and animals and the effective utilization of land. Marketing losses and failure to standardize products to meet the buyer's needs are necessarily important factors affecting the returns to the farmer. Investigations have shown, however, that the fertility of the soil, the production of legumes, the utilization of land to its capacity, the effectiveness of labor and economy in production of crops and animal products, have more to do with the net income of the farm than other factors. The proportionate total farm income received from tobacco is perhaps as large as may reasonably be expected. Growers have developed tobacco acreage beyond the point of greatest advantage. It therefore follows that increases in agricultural income must be largely obtained from the application of improved methods to present production or from other enterprises which may be profitably developed. The latter point may be illustrated by the possibility of increased poultry, lamb and horticultural production in the state. The area of farms, climatic conditions, possible markets and available labor, all appear favorable to increasing the poultry industry. A limit may not be set as to production, but it seems apparent from a long time viewpoint that poultry production in this state, if economically carried on, could profitably be doubled or trebled. Likewise, in the sheep industry, the production of a superior type of early spring lamb offers an unusual opportunity to farmers of this region. This is a product in which competition with other states is limited and which represents the production of a luxury always relatively in great demand. Horticultural production, especially of orchard and small fruits, offers possibilities in many farm areas. Here again is a field of production of certain crops, in which Kentucky has advantage of climate and location. It is worthy of note that investiga-

tions of the Experiment Station have shown the advantages in certain regions of strawberry production on a relatively small scale as a crop which supplements the tobacco acreage.

An agricultural program for the state involves using to a greater extent the superior resources of the state and restraining production in fields where other regions may have superior advantages. A consideration of such a program and its establishment depends upon soundly developed and applied investigation. The Experiment Station, thru its investigations, tho in instances apparently abstract, points the way to economical and effective methods in production; to new forms of production, and to methods of placing products upon the market which, when practised, result in increased income. Support of the Agricultural Experiment Station makes possible the accumulation of agricultural fact upon which may be based the progress not only of the individual farmer, but of agriculture in the state as a whole.

New Projects. The following new projects have been undertaken this year:

Investigation of the marketing of poultry and eggs.

Calcium oxalate crystals in plants.

Cost and returns from complementary crops, including pastures, used in the production of tobacco in Kentucky. (In cooperation with Bureau Agricultural Economics, U. S. Dep. Agr.)

Cost of producing strawberries and the place of strawberries in the organization of farms in western Kentucky. (In cooperation with Bureau Agricultural Economics, U. S. Dep. Agr.)

To determine if manganese is or is not an essential element in animal metabolism, with particular reference to its connection with vitamins.

The control and prevention of white diarrhea in chickens.

The determination of fixation of nitrogen by non-symbiotic bacteria.

The determination of nitrates formed after corn, tobacco, hemp, soybeans and oats.

The determination of rainfall and sulfur in rainfall collected in protected and unprotected gages.

The effect of ventilation and confinement on winter egg production and disease prevention in poultry.

The farmer's standard of living. (In cooperation with Bureau Agricultural Economics, U. S. Dep. Agr.)

Changes in Staff. The personnel of the Experiment Station, other than clerical assistants, is shown by departments on page 7 of this report. The appointments and resignations for the year are as follows.

Appointments:

James H. Martin, assistant chemist, department of public service laboratories. March 1.

J. F. Freeman, superintendent of experiment fields, department of agronomy. July 1.

E. M. Johnson, assistant in agronomy, department of agronomy. August 1.

D. A. Sanders, assistant in veterinary science, department of veterinary science. July 23.

Miss Jessie Terry, seed analyst, department of entomology and botany. August 1.

R. A. Stevenson, nursery inspector, department of entomology and botany. August 20.

Fred Fitschen, inspector, department of feed control. December 6.

Resignations:

Max Braithwaite, nursery inspector. March 1.

G. L. Hoeft, assistant in veterinary science. July 1.

S. C. Jones, superintendent of experiment fields. August 1.

Eugene L. Jackson, vegetable histologist. September 10.

Jack Dorr, inspector creamery license section. November 5.

P. E. Bacon, inspector in charge of creamery license section. November 20.

L. P. Benjamin, serologist. December 8.

Publications. The following is a list of the publications issued for the year:

Bulletins:

No.

246. The Marketing of Kentucky Strawberries. O. B. Jesness and Dana G. Card. January, 1923.

247. The Marketing of Kentucky Bluegrass and Orchard Grass Seeds. Dana G. Card. June, 1923.

248. Studies in Dairy Cattle, II. Milk Production.
   1. Influence of the growing fetus.
   2. Influence of early and late abortions.
   3. Influence of abortion of first calves.
   4. Influence of season.

   J. J. Hooper. July, 1923.

249. Feeds and their Use—Inspection and Analyses. J. D. Turner, H. D. Spears and E. L. Jackson. October, 1923.

250. Calcium Metabolism in the Laying Hen. G. D. Buckner, J. Holmes Martin and A. M. Peter. October, 1923.

251. Analyses of Commercial Fertilizers. H. E. Curtis, H. R. Allen and Lelah Gault. December, 1923.

Circulars:

31. The Mexican Bean Beetle in Kentucky. H. Garman. December, 1923.

Reports:

Thirty-Fifth Annual Report of the Experiment Station —1922. Thomas P. Cooper.

Scientific Papers (In print):

Tetanus. W. W. Dimock and D. J. Healy. North American Veterinarian. January, 1923.

Iron and manganese content of certain species of seeds. J. S. McHargue. Journ. Agr. Research. Vol. 23. No. 6. February 10, 1923.

An important period in the life history of two bacterial organisms causing leaf-spots on tobacco. W. D. Valleau. Phytopathology. Vol. 13, No. 3. March, 1923.

The influence of great sires on their breeds. W. S. Anderson. Proceedings of the annual meeting (1922) of the Society of Animal Production. Published by the Society. March, 1923.

Results of investigations on sterility in males. W. S. Anderson. Proceedings of the annual meeting (1922) of the Society of Animal Production. Published by the Society. March, 1923.

Shorthorns in Kentucky. W. J. Harris. Breeders' Gazette. April 12, 1923.

Effect of adsorption and other factors on certain plant food constituents obtained in the dilute nitric acid digestion of soils and an improvement for their estimation. O. M. Shedd. Soil Science. Vol. 15, No. 4. May, 1923.

Close study of show records is rich in its reward to the student. W. J. Harris. American Hereford Journ. June 15, 1923.

A note on soil reaction studies. P. E. Karraker. Soil Science. Vol. XV, No. 6. June, 1923.

Effect of different concentrations of manganese sulfate on the growth of plants in acid and neutral soils and the necessity of manganese as a plant nutrient. J. S. McHargue. Journ. Agr. Research. Vol. 24, No. 9. June 2, 1923.

An improved method for the determination of nicotine in tobacco and tobacco extracts. O. M. Shedd. Journ. Agr. Res. Vol. 24, No. 11. June 16, 1923.

Oversummering of leaf rust of cereals in Kentucky. W. D. Valleau. Phytopathology. Vol. 13, No. 7. July, 1923.

Herefords in Kentucky. W. J. Harris. Breeders' Gazette. June 7 and August 2, 1923.

Association of manganese with so-called vitamins. J. S. McHargue. Science. September 7, 1923.

Convenient supports for plants in pot or water culture experiments. J. S. McHargue. Soil Science. November, 1923.

Common earthenware jars a source of error in pot experiments. J. S. McHargue. Journ. Agr. Res. Vol. 26, No. 5. November 3, 1923.

A study in herd expansion. J. J. Hooper and Nellie Lawrence. Journ. Dairy Science. November, 1923.

The effects in offspring of the excessive use of stallions. W. S. Anderson. Thoroughbred Record. December 15, 1923.

Bacteria of the genital tract of mares and the semen of stallions and their relation to breeding efficiency. W. W. Dimock and Ethel M. Snyder. Journ. Am. Vet. Med. Assoc. December, 1923.

Yeast bread compared with baking-powder bread in nutritive value. Lelah Gault. Journ. of Home Ecs. Vol. 15, No. 12. December, 1923.

Business economics—an opportunity for agricultural colleges. President's address, American Farm Ec. Assoc. December 27, 1923. Thomas P. Cooper, Lexington Herald. December 31, 1923.

The following papers have been prepared this year, but have not yet appeared in print:

The association of manganese with the so-called vitamins. J. S. McHargue. Accepted by Journ. Agr. Res.

The occurrence of copper, manganese, zinc, nickel and cobalt in soils, plants and animals and their possible significance as vital factors. J. S. McHargue. Read at the Milwaukee meeting of the Am. Chem. Soc. and will appear in the Journal.

The effect of age upon the yield of wool. L. J. Horlacher.

Sterility in mares. W. W. Dimock and E. A. Caslick. Accepted by Journ. Am. Vet. Med. Assoc.

Rations for wintering breeding ewes. L. J. Horlacher.

Read at meeting of the Assoc. Southern Agr. Workers. February, 1923.

What the fertility of the soil means to a community. George Roberts. Read at meeting Ky. Educ. Association. April, 1923.

The value of the vegetable histologist in the detection of adulteration of foods, drugs and feeding stuffs. Eugene L. Jackson. Read at 7th annual convention of Central and South Central Assoc. of Food and Drug Officials. May, 1923.

The B. coli count, using Endo's medium, as an index of the sanitary condition of the production and handling of dairy products. L. A. Brown and E. J. Gott. Read at 7th annual convention of Central and South Central Assoc. of Food and Drug Officials. May, 1923.

Labeling feeds in Kentucky and the difficulty of adoption of a uniform standard for labeling feeding stuffs. J. D. Turner. Read at 7th annual convention of Central and South Central Assoc. of Food and Drug Officials. May, 1923.

Mineral mixture as a supplement in hogging down corn. E. J. Wilford. Read at meeting of the Am. Soc. of Animal Production. November 30, 1923.

Studies on the number of generations it takes Bacterium abortus (Bang) to grow aerobically. Amanda Harms. Accepted by Journ. of Bacteriology.

Library. At the close of 1923, the total number of accessions was 9,682. For the year alone, 756 volumes were received, which included 341 volumes of periodicals and station bulletins bound during the year. The library subscribes for 165 periodicals; 132 domestic and 33 foreign.

PROGRESS OF WORK FOR THE YEAR.

The advancement in the several lines of work has been due in a large measure to the efficient administration and supervision of the following heads of departments:

George Roberts, head, department of agronomy.
E. S. Good, chairman, animal husbandry group.
A. M. Peter, head, department of chemistry.
H. Garman, head, department of entomology and botany.
W. D. Nicholls, head, department of farm economics.
J. D. Turner, head, department of feed control.
H. E. Curtis, head, department of fertilizer control.
C. W. Mathews, head, department of horticulture.
W. W. Dimock, head, department of veterinary science.
L. A. Brown, head, department of public service laboratories.

The report of progress, herewith given, treats of projects typical of the work as a whole, and the results thereof indicate in a general way the progress of significant investigations during the year.

Iron, Manganese, Copper and Zinc Compounds as Food Supplements.

A determination was made of the amounts of these metals contained in different organs and tissues of certain domestic animals, with the result that those parts which are considered high in vitamin potency usually are found to have a greater concentration of these elements than the parts considered low in vitamins. This finding led to an investigation with small animals to determine if a mineral mixture containing compounds of one or more of the metals named can be made to supplement a diet low in vitamins so as to maintain the well-being of the animal or promote growth. In a preliminary experiment, mature pigeons maintained normal weight for seven weeks on such a synthetic diet, some of them even gaining in weight. A report giving an account of some of this work was presented by Dr. McHargue before the Division of Agricultural and Food Chemistry at the fall meeting of the American Chemical Society.

The Function of Manganese in Plants. An experiment has been completed with another series of sand cultures, 20 sets of four 2-gallon jars each, with several species of plants,

using new acid-proof stoneware jars for the controls. Under these conditions the results have been more consistent than heretofore, previous experience having shown that the ordinary earthenware jars may supply mineral nutrients. The new results are consistent in showing that the plants tried do not mature in sand cultures containing the common plant nutrients but no manganese, whereas the same kinds of plants, under exactly similar conditions, except for the addition of a little manganese compound, grow normally. The work this year confirms the conclusion heretofore drawn from previous experiments, that manganese is one of the elements necessary to the normal growth of green plants and that it functions in minute quantity. The possibility exists, however, that some other metal or combination of metals may function in the same way, and this alternative is being investigated. Some of the sand cultures with wheat, oats and tomatoes suggest that copper and zinc may perform an essential function in the fructification and development of the seeds of plants. A supply of quartz sand is being purified for use in experimentation along this line with copper, zinc, nickel and cobalt, using sand cultures of some of the important agricultural plants.

Examination of Soils and Plants for Uncommon Elements. Using the hydrochloric acid solution from 1 kilogram of soil, the detection was made of arsenic, copper, cadmium, zinc, nickel and cobalt in soil from the coalmeasures area, the St. Louis area and the bluegrass area. It was found also that wheat, corn, soybeans, oats and bluegrass grown in the field, contain copper and zinc in greater concentrations than was anticipated, tho, of course, in very small proportion. Quantitative analyses show that iron, manganese, copper and zinc occur in greater concentrations in the pericarp and germ of the cereals tested than in the endosperm, so that these metals are removed, for the most part, in the offal in the modern process of milling, a fact which may have to do with the lowered nutritive value of highly milled flours.

Efficiency of Bacsul Phosphate. Another set of pot experiments were undertaken in the comparison of Dr. Lipman's

inoculated sulfur and rock phosphate against the uninoculated mixture, against these constituents separately and against acid phosphate, both with and without limestone. The same four soils were used as last year, but barley and rye were grown. The findings confirm those of last year, in that the "bacsul phosphate" produced the larger yield in most of the comparisons against the uninoculated mixture, and acted very much the same as acid phosphate.

Sulfur and Gypsum in Rendering Available the Potassium of Soils. Experiments were made with seven soils from different soil areas, by adding sulfur or gypsum at the rate of about 250 parts per million of dry soil, bringing to optimum moisture content and maintaining that condition for several weeks, after which comparative determinations of easily soluble potassium were made by different methods, using as controls similar portions of soil, similarly treated but without admixture. In the sulfur treatments, the water extract contained more potassium than that of the controls in every instance; in the gypsum treatments, however, the water extract contained more potassium than that of the controls in only one instance. On treating the extracted soils with 0.2N. nitric acid, less potassium was dissolved in nearly every instance than was taken from the original soil by this solvent and the sum of the amounts obtained by successive extraction with water and with 0.2N. nitric acid was about equal to the amount dissolved by 0.2N. nitric acid from the original soils. This suggests that the increased amount of water-soluble potassium, following the sulfur treatment, may have resulted from action upon potassium compounds, possibly silicates, by the sulfuric acid formed by oxidation of the added sulfur.

Extraction of the soils with 0.1 molar solution of ammonium nitrate dissolved more potassium in 19 out of 21 instances than did extraction with 0.2 normal nitric acid. Five out of seven of the sulfur treatments, and three out of seven of the gypsum treatments yielded more potassium to the ammonium nitrate solution than did the controls.

The tests by growing wheat plants in the soil after treat-

ment, as described, with sulfur and with gypsum, and determining potassium in the plants, after two weeks' growth, did not give consistent results. It is thought that the increased acidity resulting from the sulfur treatments was inimical to the growth of the wheat plants and prevented them from using the liberated potassium.

Soil Solution and Soil Bacteria. Work has been continued on biological reactions in soils, using the soil solution displaced by alcohol. Samples from the Experiment Station farm, from the experiment field at Berea and from that at Lincoln Ridge were tested in April and July, and samples from the field at Campbellsville, in May. The hydrogen ion concentration diminished as the summer advanced, thus confirming the observation of last year. The pH values found are as follows:

Field	April	July
Lexington	pH 5.85	pH 7.81
Lincoln	pH 6.19	pH 6.41
Berea	pH 4.65	pH 8.53

With the exception of the Lincoln field, the organic, mineral and total residue of the soil solution increased as summer advanced. The results for 100 c. c. portions of the solution were as follows:

	Lexington		Lincoln		Berea	
In 100 c. c. of solution	April	July	April	July	April	July
Total solids, mg.	16.7	64.0	30.8	23.8	22.6	126.7
Ignited solids, mg.	1.6	7.4	1.4	7.0	2.0	25.7
Organic and volatile mg.	15.1	56.6	29.4	16.8	20.6	101.0

The fermentation of peptone, urea and dextrose by the microbes present in the soil solution diminished somewhat as the season advanced. The Lexington field, however, maintained its ability to ferment peptone, and the Berea field, to ferment urea.

Oxidation of ammonium sulfate was not observed with any of the soil solutions. This may have resulted from incorrect cultural methods. Oxidation of sodium nitrite was observed with the Lincoln field solution in April and with the

Berea field solution in July. With the exception of the Lexington field, the reduction of potassium nitrate was very pronounced by all samples of soil solution. With the exceptions of the Lincoln field in April and the Campbellsville field in May, the production of CO_2 from dextrose was very pronounced in all samples of soil solution. The development of non-symbiotic nitrogen assimilating microbes was observed in all samples of soil solution, and the decomposition of cellulose was observed in none.

Hydrogen-ion Concentration Studies on Soils. Studies were made on a number of the experiment field soils and on the sweet clover study soils collected by Professor Roberts in the summer of 1916. The results of this work have been published in Soil Science, Vol. XV, No. 6, June, 1923. Good correlation was found between limestone treatment or natural presence of limestone, as indicated by a satisfactory growth of legumes, and pH value. Soils satisfactorily growing such legumes as sweet clover and red clover, and either having been limed or else known naturally to contain lime, ranged above 6.00, usually around 7.00. The unlimed experiment field soils and the sweet clover study soils gave poor growth of legumes, varying in general from pH 4.00 to 5.00.

Soil Experiment Fields. The results in general on the soil fields are in keeping with the results of the previous years. The average yields of corn this year on the fields show the great effectiveness of limestone and phosphate in the improvement of the soils represented by these fields. These yields are significant because they represent yields made possible by soil improvement methods used over periods varying from five to eleven years on the various soil fields. On the Russellville field, the moisture conditions were unusually favorable for corn, where generally moisture has been the limiting factor.

The work on the Hopkinsville field is new, the wheat crop this year being the first one in the cropping system. The results are significant. The field was established primarily for the purpose of finding a remedy for the low yields of wheat. Christian County formerly grew a large acreage of wheat with

good yields. Studies in crop rotations are a part of the work. In the spring of 1922, one piece of ground was treated with ground limestone applied at the rate of two tons per acre and acid phosphate at the rate of 200 pounds per acre. The ground was seeded to cowpeas, which were turned under, followed by wheat with 200 pounds more of acid phosphate. The yield of wheat, Currell's Prolific, was 32.2 bushels per acre. At the same time, four pieces of ground were limed at the rate of two tons per acre and treated with 400 pounds of acid phosphate per acre. The four pieces were planted to corn, tobacco, soybeans and oats, respectively. These crops were all harvested. The land was broken after oats and disked after the other crops. Currell's Prolific wheat was sown after all of them at the same time, 200 pounds of acid phosphate per acre being used at seeding time. The yields of wheat were:

1.	After corn	9.3 bushels per acre
2.	After tobacco	16.9 bushels per acre
3.	After soybeans	10.6 bushels per acre
4.	After oats	13.2 bushels per acre

Compare these yields with 32.2 bushels following cowpeas turned under.

These results show conclusively that the lack of plant food is a big factor in keeping down yields on this soil. Most of the soils of Christian County need not only lime and phosphate, but nitrogen, which can be obtained most clearly by growing legumes.

Complete Cost of Production Studies. These studies were begun in 1920 and now include 15 farms in western and 17 farms in central Kentucky. These cost studies are bringing out some significant contrasts in costs of production on similar farms. Thus, on one farm the cost of producing corn was 75½ cents a bushel and on an adjoining farm, 93 cents. On the one farm, the cost of producing hay was $10.72 a ton and on an adjoining farm $20.75.

Very marked differences in the efficiency of the use of man and horse labor have been shown by these studies. On one farm, an average of 1,268 hours of work were obtained per work horse as compared with 569 hours on another farm.

The average cost of keeping a horse, on the first farm, was $101.41, on the other, $132.32, and the cost of horse labor per hour 8 cents on one farm and 23.7 cents on the other farm. Some significant differences were also brought out in the item of machinery cost. On one farm, the cost was 11 cents per horse hour, while on another the cost was 26 cents per horse hour.

A Business Analysis of 241 Farms in Fleming and Mason Counties. This study was made during the spring and summer of 1923. Each farm was analyzed to determine the net income secured, efficiency in the use of man labor and horse labor, net returns from the livestock enterprise per $100 worth of feed fed, net returns per animal unit and similar points. Each individual farm was then compared with the average of all farms and with the average of the best ten farms. The figures thus obtained establish standards by which the efficiency of various farms may be compared. The farms were sorted and classified in groups on various causal factors, such as size of farm as related to net income, size of farm as related to efficiency of man labor and horse labor and other correlatives. One important point brought out by this study was the relation of economical management on profits. This is shown in the following table:

Effect of Percentage of Expenses to Receipts on Labor Income.

	168 farms having plus labor income	73 farms having minus labor income	All farms
Acres in farm	144	173	152
Investment	$15,553	$23,227	$17,877
Farm receipts	3,905	3,273	3,714
Farm expenses	1,822	2,214	1,942
Net farm receipts	2,083	1,059	1,772
Interest on investment	933	1,393	1,073
Net earnings	1,150	—334	699
Perquisites furnished by farm to family living	335	323	332
Total net earnings	1,484	—11	1,031
Per cent expenses are of receipts	46%	67%	52%

From the table, it will be seen that the profitable farms had expenses of $46 for every $100 of receipts, while the unprofitable farms had $67 of expenses for every $100 of receipts, and the average farm had $52. The average farmer's net earnings for his year's work was $1,031. Of this amount, $332 was the value of meat, poultry, dairy and garden products, etc., which the farm furnished the family.

A Business Analysis of 84 Farms in LaRue County. This study was along the same lines as that in Fleming and Mason Counties. The following table shows some significant contrasts in the best ten of these farms as compared with the average of the entire number.

Comparison of the Average 84 Farms with the Average of the Best 10 Farms.

	Average 84 farms	Average best 10 farms
Labor income	$332	$1,371
Total acres in farm	150	160
Expenses per $100 income	49	38
Crop index	100	128
Returns per productive animal unit	70	92
Returns per $100 feed fed	123	167
Productive work units per man	236	273
Productive work units per horse	54	58
Price per pound for tobacco	22	26

Attention is called to the striking difference in the receipts from the two groups of farms, to the difference in the expense per $100 of income, to the difference in crop yields, to the marked difference in efficiency in results from live stock and to the greater efficiency in the use of man labor and horse labor. The relation of labor efficiency to profits is shown in the following table.

Relation of Labor Efficiency to Labor Income.

Productive days of work per man	No. of farms	Average Productive work units	Labor Income
Less than 200	29	166	$108
200 to 270	28	234	277
Over 270	27	314	665

One factor which proved to have a marked effect on profits was the ability to operate on a minimum of expenditure. The table following brings out the importance of this factor.

Relation of Total Expenses per $100 Receipts, to Labor Income.

Expenses per $100 Receipts	No. Farms	Average Expenses	Labor Income
$40 or less	28	$34	$771
$41 to $55	27	48	435
Over $55	29	73	—154

Cost of Living Study on 360 Mason County Farms. This study was carried on during the past summer in cooperation with the Federal Bureau of Agricultural Economics. The purpose was to make an analysis of household budgets and to show the costs and various grades of living among farm households. The following preliminary tabulations bring out some interesting facts relative to the distribution and expenditures for the families living on these farms.

Average Expenditures, Values of Various Materials, and Percentage Distribution of Expense Items, for 360 Mason County Farm Families.

	360 Families			360 Families Per cent of Total
	Furnished	Purchased	Total	
Food	$424.8	$172.9	$597.7	37.0
Clothing	.....	237.2	237.2	14.7
Use of house	216.8	.....	216.8	13.4
Furniture & furnishings	.....	31.4	31.4	2.0
Operating expense	16.0	210.1	226.1	14.0
Maintenance of health	.....	50.8	50.8	3.2
Advancement	.....	90.4	90.4	5.6
Personal	.....	32.8	32.8	2.0
Savings	.....	124.2	124.2	7.7
Unclassified	.....	6.7	6.7	.4
Total	657.6	956.5	1,614.1	100.

Cost of Producing Tobacco. Figures on the detailed cost of producing tobacco in the central Kentucky burley district

and in the dark fired district, collected in 1922, have been analyzed, tabulated and prepared for publication. To supplement the detailed tobacco records, additional records on the crops were secured, during the summer of 1923, on 125 farms in the burley district and on 60 farms in the dark fired district.

The analysis of the detailed cost records on burley tobacco showed the average cost per acre as $171.67, the highest cost $248.39, and the lowest cost $106.99. The average cost per pound was 16.6 cents, the highest cost 32.8 cents and the lowest cost 10.9 cents. The most important single factor affecting the cost per pound was the yield per acre, which ranged from 252 pounds per acre on the farm having the lowest yield, to 1,488 pounds on that having the highest yield.

The average cost of dark fire cured tobacco was $73.36 per acre, the highest cost $119.29 and the lowest $53.47. The average cost per pound was 10.2 cents. The cost per pound on the farm having the lowest cost was 7 cents; on that having the highest cost, 20.7 cents. The yield per acre ranged from 351 pounds to 1,042 pounds.

Fertilizer and Rotation Tests on Tobacco. The use of nitrate of soda in varying amounts as applied to the production of tobacco following corn showed, in 1922, only slight increase in yields even from heavy applications. In 1923, applications of nitrate of soda or sulfate of ammonia supplying thirty pounds or more of nitrogen per acre have given considerable increases in yields.

In the rotation experiments, the superiority of grass sods in the production of good burley leaf is outstanding. In the 3-year rotations, root-rot has become a factor limiting yield. It is evident that the disease remains in the soil for at least two years after tobacco is grown, and that short rotations, at least with burley tobacco, are not desirable unless root-rot resistant varieties of tobacco are used.

Quality of Leaf Tobacco as Related to Chemical Characters. Ash analyses show that burley tobacco has somewhat less crude ash and less magnesium and silicon than black tobacco, but considerably more phosphorus, potassium and calcium. In

the comparison of the 1920 and 1921 crops, considerable differences were found in silicon, potassium and calcium content of corresponding grades, but the crude ash, phosphorus and magnesium were more nearly uniform.

Tobacco Root-Rot. Approximately 2,000 packages of black root resistant strains of burley tobacco seed were distributed for trial. Records have been obtained from about 25 per cent of these. The results indicate that slightly over 50 per cent of the fields in which this tobacco was tested were infected with the black root (Thielavia basicola) as indicated by more rapid growth of the resistant strain as compared with the local varieties. Another important root disease of tobacco has come into prominence as a result of these tests. In a considerable number of fields both the resistant strain and the local variety produced a poor, uneven stand and showed symptoms quite similar to those of black root. In about 6 per cent of the fields recorded, the local variety outgrew the resistant strain. Plants from the fields in which the resistant strain was growing poorly were affected with a root disease which resulted in the roots turning brown or occasionally reddish. The disease often occurred on land which had not previously been cropped to tobacco. There is evidence that some local varieties are much more resistant to the disease than others, but none have yet been found which appear to be immune.

Bacterial Leaf-Spots of Tobacco. Seed treatment for the control of angular leaf-spot and wildfire of tobacco, supplemented by the usually recommended sanitary precautions has proved of little value, due in part at least to a previously unrecognized source of infection, that is, chewing tobacco. Angular leaf-spot was found in about 90 per cent of the plant beds examined the past spring and wildfire in only about 5 per cent. Plant beds examined before weeding were quite generally found to be free from both diseases. All but four beds, examined after weeding, were found to be infected with angular leaf-spot and occasionally with wildfire also. The source of infection in all cases appeared to be from tobacco juice spit on the

young plants at weeding time. The beds which were found to be free from infection were all cared for by men who did not chew tobacco. A large majority of growers chew tobacco and most of those questioned chewed the natural leaf of the previous year's crop. It is known that the causal organisms of both these diseases live thru the winter in cured tobacco leaves. It has since been demonstrated that spitting diseased tobacco on the young plants in the bed results in infection.

Mosaic Disease of Tobacco and the Eradication of the Weed Carriers. Tests in 1922 demonstrated that the mosaic disease of tobacco is over-wintered in the bull nettle (*Solanum carolinense*) and in the ground cherry (*Physalis sp.*). Studies are being conducted to determine the extent to which the mosaic disease may be controlled by the elimination of these weed carriers from the plant bed. Eradication of the weeds is not easily accomplished. Plowing followed by steaming the beds does not kill them. The weeds develop a tap root which sometimes extends to a depth of 28 inches. Cutting the tap root off 16 inches below the surface of the ground and filling in the dirt is not sufficient to destroy the plant. So far the only satisfactory method found for ridding the beds of these weeds is by digging them out with a two-jawed post hole digger. With this tool they may be removed completely and quite rapidly.

Clover Diseases Related to Productivity of Soil. A continuation of the study of clover diseases on the Lexington, Berea and Campbellsville soil fields, particularly with reference to the root systems, has shown that while all root systems are diseased, the extent increases with decreased productivity of the soil and with the age of the plant, and the vigor of the plant expresses in a general way the condition of the root system. The study of the stand of clover plants being made in connection with these disease investigations has indicated that weather is a factor of considerable influence in determining the stand at the end of the first season on the least productive soil, but that it has much less effect when the clover is growing on the more productive soils.

During the spring of 1923, a plot of ground was steam sterilized by the steam-pan method as practised in the sterilization of tobacco plant beds. This and an adjoining unsteamed plot, which had been otherwise treated in the same way as the steamed plot, were sown to red clover. A good stand was secured on both plots and for a few weeks the rate of growth was practically the same on both plots. Later, that on the steamed plot began to grow much more rapidly and by the middle of the summer it was twenty inches high and blooming freely. At the same time the clover on the unsteamed plot was only six inches tall and very few plants had bloomed. Both plots were mowed the latter part of July and the clover again made about the same growth on each plot as before. Examination of the root systems thruout the summer showed that those growing in the steamed soil were healthy and normal to a depth of five inches (the depth of sterilization or partial sterilization) while those in the unsteamed soil showed rotted laterals and disease lesions in equal severity. Late fall examinations showed the upper portions of the root systems growing in the steamed plot to be somewhat diseased, but characterized by an abundance of small laterals which have lived thru the summer, while practically all the original smaller laterals on the plants grown in the unsteamed soil were dead. These latter plants, however, had produced a considerable number of new laterals during the fall, especially at the crown.

Corn Root-Rot Studies. Microscopic studies of corn seeds known to carry pathogenic fungi and of other seeds which would generally be considered disease-free if tested in the germinator, have demonstrated that fungus hyphae are nearly always present in the seed-coats. The hyphae may be found between any of the seed-coat layers and over any part of the seed. They are sometimes present as single fine strands running between the cells, but more generally they are found as a loose network between the seed-coat layers or as rather dense masses of hyphae. Thus far, no hyphae have been found farther in than the outer surface of the aleurone layer and the area under the cap at the tip of the seed has not been found

to be infected. Only seeds which appeared normal have been sectioned in these studies.

Field tests in previous years have shown that selection for so-called disease-free ears has not resulted in increasing yields over the "badly diseased" ears. In 1922, selections for the roughest and smoothest ears of 500 seed ears of Boone County White resulted in slightly over 39 per cent more corn from the smooth ears than from the rough. In 1923, the 50 smoothest ears yielded slightly over 13 per cent more than the 50 roughest ears selected from a lot of 700 good seed ears of Boone County White. The season of 1922 was very dry, while the 1923 season was wet.

Sand germinator studies of self-pollinated lines of corn have demonstrated that it is possible to segregate lines of corn some of which produce very short-lived plants when grown in sand in a poorly lighted room, and other strains which, under the same conditions, live much longer. Intermediates between the extremes have also been developed. Death of the plantlets is due to seedborne pathogenic organisms. The ears producing short-lived plants are thought to be comparable to the badly diseased ears of the ragdoll germinator test, and those producing the long-lived plants to the so-called disease-free ears. From these tests no evidence has been obtained which indicates that any ears are free from infection. The differences appear to be the result of differences in the ability of the seed-coats to resist development of the fungi.

The Effect of Fertility Field Treatments on Nodule Development of Legumes. The effect of the single and combined limestone, acid phosphate and rock phosphate field treatments at the Berea, Mayfield and Russellville fields was studied with clover and soybeans grown in small pots in the greenhouse for a period of four to six weeks. There was but little development of nodules with either plant with the Berea soil in the absence of limestone treatment, and good development where this treatment was used. Limestone doubled the development of nodules with red clover and gave an appreciable increase with soybeans with the Mayfield and Russellville soils.

The phosphate treatments were, for the most part, without effect, whether used alone or in combination with limestone. Rock phosphate alone gave an increase with red clover with the Mayfield and Russellville soils.

Alfalfa grown in pots, where the top and bottom portions of the pots differed with respect to presence or absence of limestone treatment, gave distinctly better development of nodules on the roots in the limed portions. The soil portions were inoculated with soil suspensions just ahead of plantings.

Alfalfa. The variety tests comparing common alfalfa with some of the hardy strains, particularly the Grimm, still fail to show any marked superiority for the hardy strains. These plots were sown in 1920, and after four years, the stand on all the plots is excellent and weeds have given little trouble. The season was again favorable for alfalfa and the yield from the plots for three cuttings was over 6 tons of field-cured hay per acre. This land on which the plots are located is very fertile and well adapted to alfalfa. The excellent returns from this alfalfa show the great possibilities of the crop with favorable conditions. The average yields for the past three years of the chief varieties tested are as follows:

Common	10,375 pounds
Grimm	10,570 pounds
Dakota (Wing's Selection)	10,564 pounds
Orenburg	10.465 pounds
Liscomb	10,557 pounds

This shows only a slight superiority for the hardy strains during this period and most of this occurred the first year after planting, due to a heavy freeze after growth had started in the spring. This freeze checked the growth of common alfalfa but the hardy strains were little affected.

Where alfalfa was sown in the wheat plots on the soil fertility field in the spring, good stands were secured on all the plots but the plants persisted only on the plots that had received lime. On these plots a thick, vigorous stand of plants remained when the wheat was harvested and in the other plots no plants could be found. This indicates that alfalfa can be

sown successfully with small grains, provided the soil has been limed and is inoculated. After the wheat was removed, the plots were all plowed and again sown to alfalfa in August. This time good stands persisted on all the plots, but the alfalfa was much more vigorous on the limed plots.

Wheat. The season of 1923 was rather a favorable one for wheat in central Kentucky. It was remarkably free from disease and made a good quality of gain, contrasting very strikingly with the situation in 1922. Ashland, which, as reported, gave poor results in 1922, was the best yielder in the tests of varieties and strains of wheat on the Experiment Station farm this year, while Fulcaster, the best in 1922, was among the lower yielders in 1923. This shows the necessity for carrying on tests over a rather long period in order to determine the true value of a strain or variety. Several selections from Currell's Prolific gave good yields the past year and in fact, they have shown up well for several years. One in particular, R-47, looks promising and some seed of this will be available for distribution in 1924.

On the rotation plots at the Experimen Station farm, where wheat follows various crops, the best yields were obtained after tobacco and corn and the lowest yields after soybeans. Wheat following soybeans sown broadcast gave a lower yield than where soybeans were sown in drills and cultivated. In the tests of nitrogenous fertilizers on wheat, spring and fall applications, no decided increase was secured from any application given. Corn land seemed to furnish enough nitrogen, probably because the corn crop was so small in 1922.

Cotton Worm. Late in the season the cotton worm appeared in the state and did a good deal of harm to cotton grown in Christian and some other counties in southwestern Kentucky. It became known to growers as the cotton army worm, tho different in character from either the common or the fall army worm. The use of arsenate of lime and arsenate of lead enabled growers to save their crops. Toward fall the adult of this insect appeared about ripening fruit in immense numbers and it was charged with destroying grapes, peaches,

apples and the everbearing strawberries, tho from some tests made with the living moths it is believed that it is unable to break the sound skin of these fruits and depends on finding accidental breaks and areas affected by disease.

Harlequin Cabbage Bug. This insect did some damages to kale and other Cruciferae about Lexington and elsewhere in the state. It was found by some preliminary tests that it can be destroyed by a two-per cent nicotine dust, if freshly prepared.

Mexican Bean Beetle. The Mexican bean beetle continued its northward spread in the eastern third of the state and has now been recorded from forty-four Kentucky counties. A circular on this insect and its control is now in press.

Orchard Tests and Practises:

Apples. The young variety apple orchard again, as in 1922, yielded a moderate crop of fruit, showing some peculiarities of distribution which were clearly influenced by the severity of pruning followed for four seasons past. A considerable contrast was evident, also, in the amount of bloom on the heavily and lightly pruned trees, tho not so marked as in the set of fruit and the final yield. The records were taken on 108 varieties and in the most instances two trees of a variety were lightly pruned and two heavily pruned. The trees were divided into groups according to the amount of fruit per tree. Those bearing all a tree ought to carry were classified as heavy crop; those having a good general distribution of fruit thru the tree, equivalent to approximately half the tree could carry, as moderate crop; and those having a few specimens or thinly scattered fruit, as very light crop.

It is interesting to note that altho there were ten trees among those heavily pruned that bloomed full, not one of them set a heavy crop. Out of 38 trees that bloomed full in the lightly pruned trees, 25 produced a heavy crop, 93 trees produced no fruit on the lightly pruned trees, while there were 141 trees with no fruit when pruned heavily. Fifty-seven per cent of the lightly pruned trees bore some fruit, in contrast to 33 per

cent of those heavily pruned. These results show that heavy pruning delays bearing, is unfavorable to the set of fruit and greatly increases the amount of necessary pruning in the future because of the very thick tops of the trees due to the cutting back.

Bud-worm of Apple. It was found that the bud-worm of apple, described in Experiment Station Circular 25, passes the winter among rubbish on the ground and that, consequently, the use of tanglefoot or sticky fly-paper can be made to protect trees completely from this pest. The complete life-history of the pest has now been made out and the results obtained from this knowledge afford a good illustration of the value of a study of life-histories to fruit growers and farmers.

Peaches. The following record is significant in its indication of relative hardiness of peach varieties to the changeable Kentucky winters, altho this single instance could hardly be conclusive. The 1922 season preceding this crop had been particularly trying on the vigor of the trees because of the long, hot, dry summer which undoubtedly hastened maturity in the fall, causing them to enter their dormant condition somewhat earlier than usual. The winter was mild and there was a general tendency of all varieties to swell their buds during early March. On March 31, the temperature fell suddenly to about 15 degrees F. The injury to the peach buds was noticeably severe in some varieties but did not materially affect the opening of the blossoms. It soon developed that the blossoms of many varieties were completely killed, as evidenced by the blackened pistils, while others had survived with little injury.

Of the sixty-three varieties, six carried a full crop and twenty others produced a fair crop of one bushel or more per tree. Fifteen varieties had a few scattered fruits and twenty-two varieties produced no fruit. The varieties producing a full crop were Alton, Arp Beauty, Banner, Belle of Georgia, Engle's Mammoth and Hill's Chili. Of the 22 varieties producing no fruit, it is noteworthy that all those of the Elberta

type failed to produce any fruit, quite in accordance with their reputation of being tender in bud.

Plums. The weather conditions which apparently were responsible for such wide variations in the behavior of peaches, resulted in similar variations in the amount of injury to plums. Some of the native species, supposedly very hardy, suffered most, while others often found more tender in northern regions were practically unharmed. The injury that occurred in peaches and in **Prunus domestica** consisted in the killing of the essential organs of the flower and was easily recognized by the blackened pistils. Such injury did not affect the other parts of the flower or prevent its opening, while the injury to the Japanese plums and many native species and hybrids consisted in killing the entire flower bud and, in some cases, the leaf bud as well, occasioning the later development of adventitious buds. The former results in little or no impairment of tree vigor, while the latter caused the death of the spurs and smaller branches, so that the trees did not come into leaf until adventitious buds sprang up along the main branches, thus producing a marked check upon the vitality of the tree.

The problem of hardiness differs in Kentucky from that in the northern states in that here trees rarely suffer from winter killing from low temperatures, but rather from freezes after the buds have swollen in late winter. The records show that many of the varieties which originated in Iowa, the Dakotas and other parts of the cold Northwest, usually regarded as among the hardiest, were severaly injured under the conditions described above, while other varieties less hardy to absolute cold in northern regions, received little injury. The requirement for hardiness in this state, therefore, seems to be met thru prolonged dormancy rather than thru resistance to low temperatures during the winter. The early blooming varieties of Japanese plums, Japanese hybrids and native species are not as reliable as those which bloom later or which have a longer blooming season. In the 1922 season the varieties of **P. domestica** named above were decidedly superior to

all others in their ability to resist the unfavorable conditions of the weather.

Cost of Producing Strawberries. Data from farms in Christian County, now in process of preparation for a bulletin, show that strawberries have excellent possibilities in many areas of western Kentucky as a cash enterprise supplementary to tobacco. Data as to the cost of production of 165 crops of strawberries marketed in the years 1921, 1922 and 1923, show that 81 per cent of the crops were sold at prices which netted the growers profits. That is, 81 per cent of these crops were sold at prices which allowed the growers returns above wages for their own labor, for the use of teams and tools, for land rent and for the other expenses of production. Detailed figures from 139 crops of tobacco grown in the same area in the same years, show that only 54 per cent of these tobacco crops returned the growers' profits above the cost of production when figured on the same basis.

The growers producing these profitable strawberry crops obtained, on the average, $61.54 per acre above the cost of production. The growers producing the profitable tobacco crops received, on the average, $46.67 per acre above the cost of production.

The average total cost of producing strawberries on all farms from which data were obtained was, for those marketed in 1921, $183.35 per acre or $2.75 per crate; in 1922, $190.84 per acre or $2.21 per crate, and in 1923, $149.52 per acre or $2.54 per crate. This includes all costs until delivered to the local shiping point. The high acreage and low crate costs for 1922 are due to the large yield for that year. Since harvesting costs are included, a high yield means a relatively high acre and a low crate cost. The average price received by these growers was, in 1921, $4.10 per crate; in 1922, $2.60 per crate, and in 1923, $3.07 per crate.

Of interest in this connection is the fact that the group of strawberry growers making the largest profits per acre had only from two to four acres per year. The average acreage for the 50 most profitable crops out of the 165 was only two and

four-tenths acres per grower. The average net profits for this group growing on the average of 2.4 acres per grower was $133.11 per acre. Standard varieties, adequate shipping facilities and a cooperative marketing organization are essential to successful strawberry production. The acreage around the shipping point should be sufficient to load a car daily and this usually requires from 75 to 100 acres which should be within a radius of five miles of the shipping point.

These data indicate that there are many farmers in the areas in which strawberries are being grown at present who could materially increase their yearly total profits by putting two or three acres of their tobacco land in strawberries. On other areas in western Kentucky, the possibilities of strawberries as a cash enterprise with which to supplement tobacco should be seriously considered.

Strawberry Marketing. The strawberry industry in western Kentucky has developed from a small beginning to one of considerable importance in a number of localities. The acreage of strawberries in Kentucky in 1919, as shown by the census figures was twice that of 1909. During this same period, the acreage in the United States as a whole decreased 16 per cent.

For the most part, Kentucky strawberries are sold thru local cooperative marketing associations. The Warren County Strawberry Growers' Association, formed in 1908, was the pioneer strawberry organization in the state. In 1922, the year covered by the marketing study, eleven marketing association were in operation in western Kentucky, with a total membership of over 2,000 growers. The study showed that most of these organizations have been established in recent years.

These associations are on the cooperative basis, some being formed with capital stock and others being non-stock enterprises. It is customary for the members to sell thru their association, all the berries they have for shipment. The business details are handled by a business manager who superintends the grading, loading and sale of berries. The berries

are pooled by cars or by days. Some of the cars are sold f. o. b. the shipping point to buyers who have personal representatives on the ground or to distant buyers by telegraph. When satisfactory f. o. b. sales can not be made, shipments are consigned to distant markets.

The shipments are made under refrigeration by freight, except from two or three points where express refrigeration service is available. The destinations of 650 cars of Kentucky strawberries were ascertained in 1922. These destinations were distributed among 19 states, mostly in the North and East. Detroit was in the lead with 118 cars; Pittsburg next with 101 cars, then Chicago with 52 cars and Boston and Cleveland receiving 24 cars each. Shipments from Kentucky compete principally with berries from Tennessee, Missouri and Arkansas.

The study shows that among important considerations in the marketing of Kentucky strawberries are proper grading and packing, rapid transportation and efficient refrigeration service, market information, location of markets and interchange of information among the various associations.

Infectious Abortion in Mares. Vaccine was prepared for 1,213 mares in 29 different studs. Six of these studs of mares received two treatments seven days apart; 19 studs received three treatments and 4 studs received four treatments. Two of the mares injected, in a stud of 87 mares, aborted. Fetuses of these mares were cultured but Bacillus abortivo-equinus, the organism causing the disease, was not isolated; therefore it was believed that these abortions were due to some other cause. Two abortions occurred in another stud where 62 mares were immunized. One of these abortions occurred from a mare which had received but one treatment and the other mare aborted from an accident. These results cover a large number of individuals. The work with this disease also consisted in drawing blood from immunized mares several months after immunization to determine the degree of immunity to be attained by individuals having received different numbers of injections of vaccines.

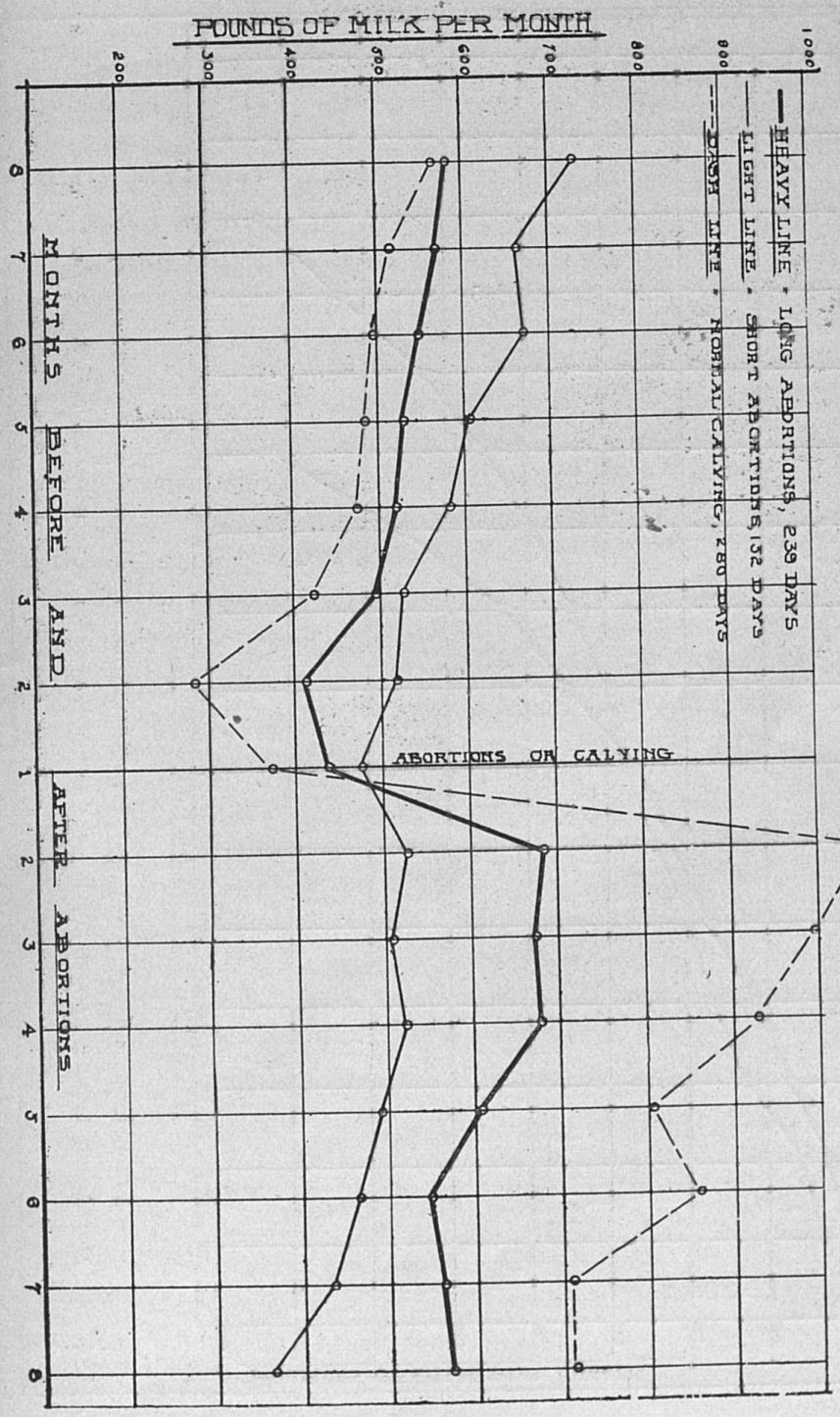
Infectious Abortion in Cows. The work in this study consisted mainly in an endeavor to immunize cows against the disease with a bacterin made from the Bacterium abortus (Bang). Bacterins were prepared for 841 cows in 37 different herds which were under our observation. During this time blood tests were made from 58 herds of cattle to determine positively if the disease of abortion existed. In addition, 15 aborted fetuses from cows were cultured.

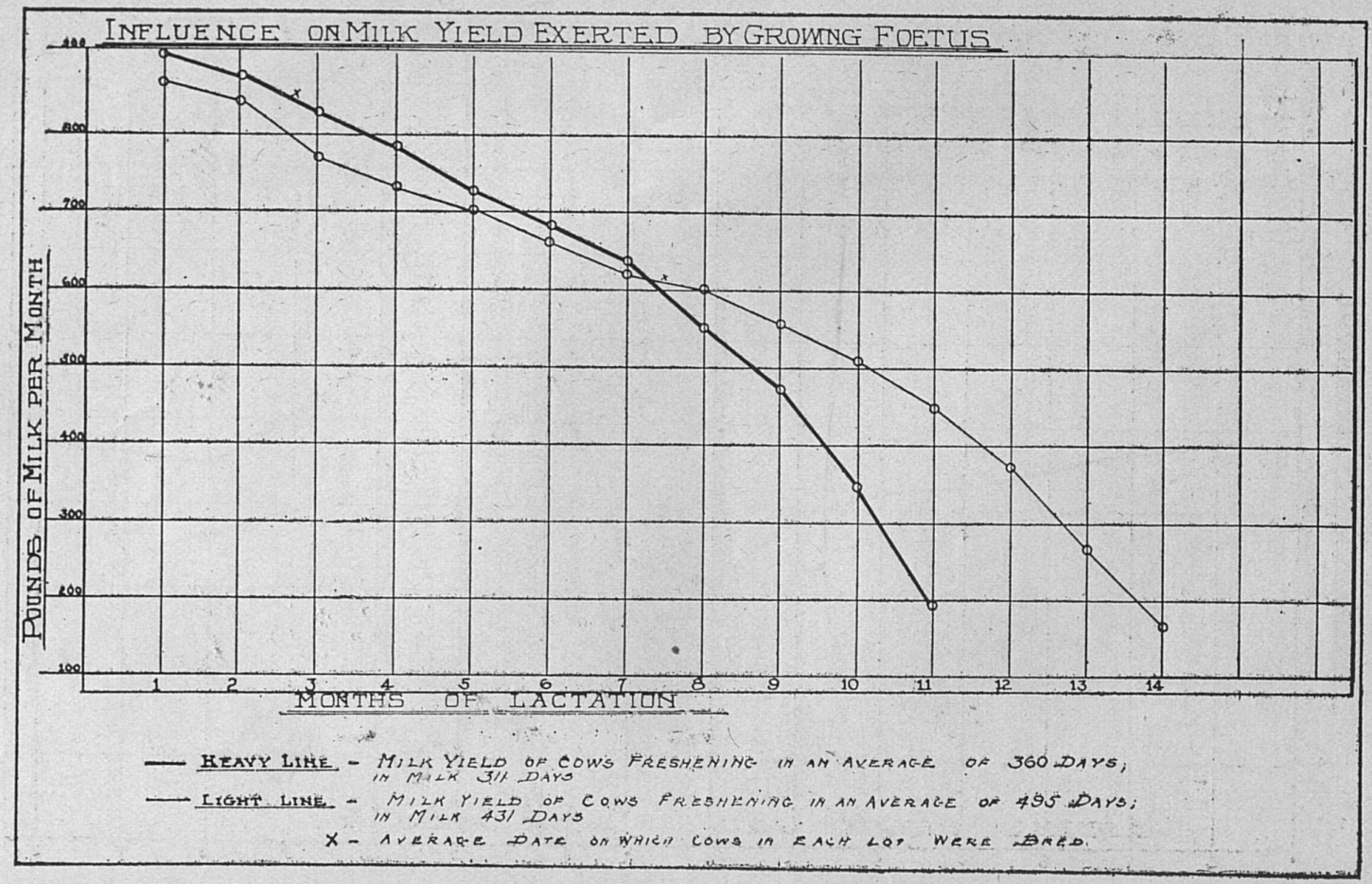
Effect of Abortion of Calf in Stimulating Milk Yield of Cow. Milk records of cows aborting calves show that even a premature abortion gives some stimulus to the milk production of a cow. To study the matter and to gain some definite measure of this stimulus, milk records were tabulated on 6 cows which aborted in an average period of 152 days, and of 6 cows which aborted in 239 days, and milk records of these two sets of aborting cows were compared with records of 6 cows which gave birth to calves in the normal period of 280 days. These records have been graphed as shown on page 43.

Cows aborting in 152 days produced 516 pounds of milk the month before abortion and 524 pounds of milk the month afterwards; the cows aborting in 239 days produced 411 pounds of milk the month before abortion and 683 pounds of milk the month afterwards, while the cows which calved normally produced 281 pounds of milk the month before calving and 1,052 pounds of milk the month afterwards. From this, it is seen that even a premature calving of 152 days stimulates milk secretion a little, a later abortion stimulates more and a normal calving, most.

Effect of Growing Fetus on Milk Production. Tabulations of milk records of 24 dairy cows which were bred soon after calving one year and which, another year, were bred late in lactation, reveal a striking difference in milk production by the same cows during the two years. The graph on page 44 shows the manner in which the same cows behaved in milk production month after month during the two years.

STUDY OF ABORTION IN STIMULATING MILK YIELD OF COWS




INFLUENCE ON MILK YIELD EXERTED BY GROWING FOETUS
POUNDS OF MILK PER MONTH
900
800
700
600
500
400
300
200
100
1
2
3
4
5
6
7
8
9
10
11
12
13
14
MONTHS OF LACTATION
HEAVY LINE - MILK YIELD OF COWS FRESHENING IN AN AVERAGE OF 360 DAYS; IN MILK 311 DAYS
LIGHT LINE - MILK YIELD OF COWS FRESHENING IN AN AVERAGE OF 495 DAYS; IN MILK 431 DAYS
X - AVERAGE DATE ON WHICH COWS IN EACH LOT WERE BRED.

From the graph, it will be seen that the cows decreased more rapidly in milk flow during the year in which they were bred early than they did when bred late and carried a calf only during the latter months of the lactation. It has been suggested that this shrinkage in milk flow, noted particularly after the fetus reaches a development of five to six months, is due to the drain made upon the cow in building the fetus. Another explanation is that a certain secretion of the maturing fetus checks the milk flow of the dam, thus drying her off preparatory to a rest period before calving.

Effect of Calving Season on Milk Production A study on the effect of calving season on milk production has been made which shows that fall-fresh cows yielded more evenly month after month than did those freshening in the spring or summer; the latter began with a higher production, but declined more rapidly as the lactation progressed. Winter-fresh cows yielded the most milk in the course of the year, with other seasons ranking as follows:

No. of Cows	Freshening season	Pounds Yield During Test		Per Cent	
		Milk	Fat	Milk	Fat
22	Winter	410	21.5	100	100
23	Fall	385	21.3	94	99
23	Spring	378	19.0	92	88
20	Summer	334	18.2	81	85

It was found that usually cows produce richer milk toward the end of the lactation period and there seemed to be no decline in richness of milk in July. The cows freshening in the fall produced the most uniform quality of milk from start to finish of lactation. This was due to the fact that as they reached the end of the lactation period and naturally tended to produce richer milk, the grass coming on at that season (spring and early summer) stimulated the flow of milk and checked the rise in richness.

Metabolism of the Chicken. The results of experiments of 1921-22 in this study have been published and a manuscript covering the experiments of 1922-23 is now being prepared. The findings are interesting and important. The difference in the reaction of the hens to the calcium carbonate supplement when the diet included buttermilk, as contrasted with a diet containing a grain-tankage mash, is very striking. On a diet of corn and buttermilk, with limestone, egg production per hen for seven months was twice as great as on a diet of corn and grain-tankage mash, with limestone; or twice as great as on corn and buttermilk, without limestone. Accompanying the increase in the number of the eggs was a distinct increase in their size and in the thickness of the shells. Apparently, the buttermilk-calcium carbonate combination favors both calcium metabolism and protein metabolism.

Hydrogen-ion Concentration and Total Alkalinity of the White and Yolk of Hen Eggs. In the hope of getting a clue to the nature of the chemical reaction concerned in the deposition of eggshell, some tests were made upon the hydrogen-ion concentration and total alkalinity of the white and yolk of hen eggs. The results show that the pH of the white of a fresh egg is quite different from that of the yolk, and changes rapidly, whereas that of the yolk is fairly stable. Apparently, the white contains sodium bicarbonate but the yolk does not; the whole egg, however, contains free carbon dioxid. After the egg is laid, the free carbon dioxid escapes and the bicarbonate begins to change to normal carbonate, making the white more alkaline. This affords a new test for the freshness of eggs. The white of a new-laid egg gives no color with phenolphthalein, but after the egg is a few hours old, the white gives a red color with this indicator, and the older the egg, the darker the color, within limits.

The Feeding of Milk in Various Forms to Laying Hens. The third year's work with White Wyandottes to compare the feeding of skim-milk, with and without a dry mash, substantially agrees with the first two years' results. The average production, for the three years, of the hens fed skim-milk and a

basic mash (equal parts by weight of bran, shorts, ground oats, and corn meal) was 145 eggs, whereas the average of the birds receiving skim-milk and no mash was 152 eggs, an increase of 7 eggs per hen when no dry mash was fed. The results of the three years' work justifies the conclusion that with general purpose breeds, when an ample supply of skim-milk is available for the flock, it is not necessary to feed a dry mash in addition to the grain ration. The pen receiving the standard mash recommended by this Experiment Station, namely, equal parts by weight of bran, shorts, ground oats, corn meal and meat scrap, averaged 149 eggs per hen for the three years.

The pen receiving dried buttermilk instead of meat scrap in the mash produced 179 eggs per hen, whereas the pen receiving meat scrap laid 178 eggs per hen. However, as the mash containing the dried buttermilk was more costly, the meat scrap pen made a larger profit.

A Comparison of the Common Grains as Supplements to Skim-Milk for Laying Hens. To compare corn, wheat and oats in various proportions, when fed with sour skim-milk, four pens of Barred Plymouth Rock pullets, 20 to each pen, were fed the following grain mixtures:

Pen 1, shelled corn only; Pen 2, shelled corn 70 per cent, oats 30 per cent; Pen 3, shelled corn 70 per cent, wheat 30 per cent; Pen 4, shelled corn 60 per cent, oats 20 per cent, wheat 20 per cent. The winter and yearly egg production of each of the pens, along with the yearly consumption of grain and milk are given in the following table:

Grain	Production per Hen		Feed per Hen	
	Winter*	Yearly	Grain	Milk
Corn	68 eggs	180 eggs	70 lbs.	12.8 gals.
Corn, oats	64 eggs	161 eggs	75 lbs.	13.1 gals.
Corn, wheat	77 eggs	188 eggs	73 lbs.	14.0 gals.
Corn, oats, wheat	68 eggs	182 eggs	73 lbs.	12.3 gals.

(*4 months)

The first year's results indicate that corn and wheat are one of the best grain mixtures to use in supplementing sour

skim-milk. The addition of oats to the grain mixture resulted in each case in a slight decrease in production. Hence, it may be inferred that the addition of oats to the grain mixture is of little value when milk is fed as the source of protein.

Steer Feeding. This experimental work in the feeding of steers was begun in 1921-22 and continued in 1923. Twenty steers were divided into two lots and fed 123 days to determine the comparative rapidity of gains and economy of gains made by steers fed silage thruout the entire feeding period, as compared with steers which had clover hay substituted for silage near the end of the feeding period. This experiment was outlined because it is the belief of some feeders that fattening steers receiving corn silage will not make satisfactory gains if deprived of silage during the finishing period, and these feeders advocate selling steers at such a time even if not fat. In this year's tests, it was found that steers fed corn, cottonseed meal, corn silage (70 days), clover hay (63 days) and wheat straw, made an average daily gain of 2.35 pounds on an average daily ration of 13.91 pounds of shelled corn, 2.66 pounds of cottonseed meal, 39.92 pounds of silage, 11.9 pounds of clover hay and .54 pound of straw. The steers fed silage thruout the entire feeding period and no clover hay made an average daily gain of 2.18 pounds on an average daily ration of 13.77 pounds of shelled corn, 2.74 pounds of cottonseed meal, 23.01 pounds of silage and .8 pound of straw.

During the ten days in which clover hay was being substituted for silage, the steers gained only 10 pounds per head. The necessary margin where clover hay was substituted for silage, was $2.35, and where silage was fed straight thru, the necessary margin was $2.19, a difference of 16 cents. Steers receiving clover hay were slightly fatter than those receiving no hay and were valued at 10 cents per hundredweight higher. These results are practically the same as those obtained in the preceding year.

Hogging Down Experiments. Four one-acre plots were used. Corn hogged down, with tankage self-fed, gave a net profit of $39.10 per acre; corn hogged down, with a mineral

mixture self-fed, gave a net profit of $36.73 per acre; corn and soybeans grown together hogged down, with a mineral mixture self-fed, gave a net profit of $36.24 per acre; and corn and soybeans hogged down, with no mineral mixture, gave a net profit of $17.15 per acre. The net profit per acre took into consideration the cost of producing the crop.

Barley for Fattening Hogs. Five lots were fed: Lot 1, dry, whole barley, hand-fed; Lot 2, dry, whole barley, hand-fed, plus a mineral mixture, self-fed; Lot 3, whole barley soaked 24 hours, hand-fed; Lot 4, whole barley soaked 24 hours plus a mineral mixture, self-fed. The trial was for 35 days. Lot 1 produced 124 pounds of pork, with an average daily gain of .92 pound, requiring 658 pounds of grain for each 100 pounds of pork; Lot 2 produced 161 pounds of pork, an average daily gain of 1.2 pounds, requiring 506 pounds of grain per hundredweight; Lot 3 made 140 pounds of pork, an average daily gain of 1.04 pounds, requiring 607 pounds of grain per hundredweight; Lot 4 made 177 pounds of pork, an average daily gain of 1.32 pounds, requiring 480 pounds of grain per hundredweight.

Effect of Age Upon Yield of Wool. There is a direct relationship between the age of sheep and the amount of wool produced. As age increases, there is a gradual decrease in wool, the most marked decrease taking place after the fourth year. The following table shows the average weight of fleece produced by sheep in the Experiment Station flock from 1916 to 1923, inclusive.

Age in Years	Number of Fleeces	Average Weight in Pounds
1	80	$6.64 \pm .12$
2	61	$6.33 \pm .24$
3	72	$6.27 \pm .12$
4	51	$6.21 \pm .20$
5	44	$5.47 \pm .14$

Age in Years	Number of Fleeces	Average Weight in Pounds
6	32	$4.85 \pm .16$
7	21	$4.55 \pm .27$

The coefficient of correlation was .3166 $\pm$ .0317. The weight of the yearling fleece of each sheep proved to be a fairly accurate indicator of the future value of that sheep as a wool producer. Culling all light-shearing yearlings would do much toward increasing the wool production of the flock.

Preparturition Intoxication of Ewes. Sheep breeders thruout Kentucky, and especially in the Bluegrass region, have experienced severe losses in pregnant ewes during the last three years. The same disease has been previously observed in different parts of the United States and it has also been reported in various European countries, where it is known as acute diffuse **parenchymatous hepatitis.** The disease occurs a few weeks previous to lambing time and may continue thruout the lambing period. In flocks so affected, it has caused a 10 to 25 per cent loss of ewes. As yet, the causative factor is not known. It is apparently a non-infectious or non-contagious disease, as repeated attempts made at this station to transmit it or to isolate the causative organism have proved futile. No definite preventive or curative treatment has been found, but in a few cases where abortion could be produced in the early stages of the disease, the ewes have recovered. Also in a number of other cases where the ewes gave normal birth to the lambs, they likewise recovered, and in some instances where purgatives were given during the early symptoms of the disease, the ewes returned to a normal condition in a few days. Flocks which have come under observation have been fed and kept by various methods. While it is believed that feeding is an important factor, yet it is not thought that the disease is attributable to any particular feed or method of feeding. Flocks fed a heavy grain ration, especially one containing con-

siderable corn and no alfalfa or clover, have suffered the greater losses. It is also of interest to note that the disease appeared in many flocks a day or so after having been salted.

Biological Products. The distribution of biological products in the state includes 900,000 cubic centimeters of anti-hog cholera serum and 18,090 cubic centimeters of hog cholera virus; 6,800 cubic centimeters of botulinus antitoxin and 10,180 doses of roup and chickenpox vaccine. Experience has shown that the best results from the use of roup and chickenpox vaccine are obtained when the chickens are not vaccinated until the disease has made its appearance in the flock and when the vaccine is made from material secured from the flock to be vaccinated or when an autogenous vaccine is used.

Nursery Inspection. The nursery inspection has been increased nearly a half by the necessity for including strawberry plants when grown for sale. The number of these plantings found infested with crown borer has been greatly reduced since the inspections began and it is hoped to get rid of the pest in beds grown for slips during the next two years. At present no certificate is issued for infested plantings. Six plantings were found infested in 1923. In the case of infestation with San Jose scale a written agreement has been required by which the nurseryman promises to fumigate with hydrocyanic acid gas all infested blocks of trees. The scale can be avoided, as in the case of the crown borer, by changing the location of plantings and starting the new ones with sound stock. Three nurseries were found infested with scale in 1923. Sixty-three nurseries were inspected during the year.

Seed Inspection and Testing. The year has been exceptional in the demand for testing of seed samples, these demands coming from seedsmen largely, but with a growing demand from farmers also. About 5,785 tests of all sorts were made. The demand for cleaning tobacco seeds continues to grow, notwithstanding the fact that cleaners are being bought by the growers themselves. During the year, 861 samples of tobacco seeds were handled.

Apiary Inspection. The inspection of apiaries placed under the entomologist and botanist of the Experiment Station by a state law enacted by the General Assembly of 1922, has shown that foul brood is so prevalent in counties engaged in beekeeping in a commercial way that it threatens to put a stop to what several years ago was a flourishing business. It was found necessary because of the burden of other work to leave most of this to county inspectors during 1923, and it is believed that good has been done both in suppressing the disease and in educating beekeepers in methods of treatment. A total of 4,242 colonies was inspected, of which number 694 were infected with American foul brood and 159 with European foul brood.

Creamery and Tester's License. Four hundred and fifty-one cream station licenses have been issued during the year; 29 of these were renewal licenses for creameries, ice cream factories and milk plants operating in Kentucky; 8 for new plants beginning operation this year; 25 for independent buyers of butterfat; 272 cream station renewals and 117 for new cream stations. There are at present 374 licensed stations in Kentucky and 11 Kentucky licensed plants in Ohio, Indiana, Illinois, Tennessee and West Virginia buying butterfat in this state.

Twenty-four tester's license examinations were held during the year; 6 at Lexington, 6 at Louisville, 6 at Cincinnati, 3 at Paducah, 2 at Owensboro and 1 at Franklin. For these examinations 204 testers were notified and 135, or 66 per cent of the number notified, appeared. Of those present, 88 per cent made a passing grade of 75 or higher.

Of the 391 licensed testers in Kentucky, 318 hold renewal licenses granted July 1, 1923, and 73 are new operators licensed since that date. Sixty-seven licenses were issued to new operators prior to July 1, 1923.

Creamery and cream station inspection has decreased, due to the fact that fewer stations are in operation. During the year 167 stations were visited in 91 towns and 44 counties. Only a few cases of over or under reading of the test were

found. Four cases of under-reading and incorrect tests were reported to the Examining Board, with the result that the licenses of two testers were suspended, one for 60 and the other for 90 days; the license of a third tester was revoked and a tester's license refused in the fourth case. In several instances, illegal weights were found and confiscated. A number of operators were found testing without thermometers or not using the water bath at all and in these cases, the necessary change in methods to conform with the law was ordered.

A total of 13,821 pieces of glassware were retested during 1923, and 59 pieces rejected as inaccurate.

The fees received for the creamery and tester's license work amounted to $3,738.51, and the expenditures were as follows:

Salaries	$2,501.11
Labor	57.19
Postage and stationery	130.28
Freight and express	1.12
Laboratory supplies	25.14
Sundry supplies	17.35
Furniture and fixtures	84.00
Travel	931.34
Contingent	16.00
Total	$3,763.53

Public Service Laboratories. The character of the work handled by the laboratories has remained practically the same as last year. The work has increased in volume and covers a wide range, including tests for many diseases, such as typhoid, malaria, diphtheria, tuberculosis, rabies; purity test of foods, waters and carbonated beverages, and over forty toxicological examinations of liquids, foods and other materials. Nine hundred and eighty-five physicians, exclusive of institutions, submitted specimens for examination.

In the bacteriological laboratory, a total of 34,147 samples were handled, an increase of 5,517 samples over last year.

As the Wassermann test is becoming better understood, it is being recognized that quite frequently cases are encountered which give a false positive or negative reaction. The cause

of these false reactions is not known positively. It may be due to the presence of certain food or medicinal products in the blood at the time the specimen is collected, or it may be the result of some diseased condition or other unknown or not readily recognized condition at the time the specimen is taken. Many physicians are unable to properly interpret the laboratory results by the Wassermann test, so in order to guard against false reactions, a study of a new and promising test for syphilis was undertaken to test out the Kahn precipitation test parallel with the Wassermann test and to tabulate the results for comparison and study. After some 6,000 specimens had been tested, it was decided that the test was a valuable check against the Wassermann test. Physicians submitting specimens for Wassermann test were notified that beginning July 16, the results by both tests would be reported and references to literature dealing with the test were sent to each one. Physicians were cautioned to consider the Kahn test as supplementary to the Wassermann test until greater experience with it demonstrated its value. It has been possible by means of the two tests to call the attention of physicians to a number of cases yielding conflicting results, thus helping to prevent a false diagnosis.

In the food and drug laboratories, a total of 2,146 food and drug samples have been analyzed, 1,473 of which involved one or more chemical determinations, 181 samples were for bacteriological examination alone and 24 for microscopical examination only, making a total of 1,678 official food and drug samples sumbitted by the State Board of Health. This is an increase of 60 per cent over last year's official work.

A total of 31,729 outfits have been prepared and shipped to physicians, health departments, private citizens and institutions for use in forwarding speciments for examination.

Feed Control. In practically every town in the state where feeding stuffs are sold, inspections have been made, samples taken for analysis and conferences held with those interested in feeding stuffs either as consumers or distributors. Eleven suits have been instituted in the federal courts for viola-

tions of the law and 926 samples of feeding stuffs have been analyzed and the results reported to those concerned. The number of tons of feeds consumed in the state is in excess of 250,000. The number of brands registered during the year was 5,078, representing approximately 1,200 firms.

Fertilizer Control. The registrations for the year covered 803 brands of fertilizer. Analyses were made of 728 samples collected by official inspectors and of 22 samples sent by farmers, county agents and others, in addition to the samples sent by the manufacturers representing the various brands registered. There were issued to the various manufacturers 2,923,000 tags and stamps covering 90,958½ tons of fertilizer.

Nitrogen Determination in the Precipitation in Kentucky. The amount of ammonia and nitrate nitrogen brought down in the precipitation has been determined for the period from April 1, 1922 to March 31, 1923, from seven different places in the state. Wide, and often inexplainable, differences in results were found between different periods of collection and in particular between different places of collection during the same period. The average total ammonia nitrogen found during the year was 11.6 pounds per acre; nitrate nitrogen 7.2 pounds per acre.

Sulfur Determination in the Precipitation in Kentucky. Sulfur determinations were made on the rainfall collected for two years at the same places as for the nitrogen determinations reported above. The following table gives the average annual rainfall and sulfur content for two years.

Place of Collection	Average annual rainfall per acre Inches	Average annual precipitation of sulfur in lbs. per acre
Lexington (Van Meter Farm)	45.60	23.84
Lexington (Fayette Nat. Bank)	44.90	41.18
Lincoln Institute (Shelby County)	41.37	17.10
Paducah (Lone Oak)	42.80	33.86
Mayfield	49.62	25.92
Russellville	43.56	29,80
Greenville	45.54	35.97

The distribution of rainfall and the sulfur content by quarters is shown in the following table:

Quarter	Sulfur per acre, per quarter Average 7 gages for 2 years. Lbs.	Rainfall by quarters. Average 7 gages for 2 years Ins.	Sulfur per acre inch rainfall Lbs.
January, February, March, 1922 and 1923	13.33	14.88	.89
April, May, June, 1921 and 1922	7.09	9.45	.75
July, August, September, 1921 and 1922	6.36	9.52	.63
October, November, December, 1921 and 1922	9.34	11.63	.80

METEOROLOGICAL SUMMARIES
For the Year 1923
Compiled from the Records of the U. S. Weather Bureau Station, Lexington, Ky.

Month.	Temperature, Degrees Fahrenheit							Relative Humidity, Per cent 7 a. m.	Precipitation, in Inches.				Per cent of Sunshine.	Wind.					Number of Days.											
	Mean.			Extreme.												Maximum For five mins.										Max. Temp.		Min. Temp.	
	Maximum.	Minimum.	Monthly.	Maximum.	Date.	Minimum.	Date.		Total.	Maximum in 24 Hours.	Date.	Total Snowfall, Ins.		Average Hourly Velocity.	Prevailing Direction.	Velocity.	Direction.	Date	Gales, 40 miles per hour or over	Clear.	Partly Cloudy.	Cloudy.	Precipitation of .01 Inch or More.	With Trace or More of Snow.	Thunderstorms.	Dense fog.	90 Deg. or Above.	Freezing or Below.	Freezing or Below.	Zero or Below.
January	46.9	31.3	39.1	59	11	17	17	82	6.63	1.95	20-21	T	30	16.3	SW	55	SW	18	4	6	6	19	13	4	2	3	0	0	22	0
February	39.0	24.2	31.6	63	13	2	18	83	4.40	1.49	12	1.9	40	14.6	SW	50	SW	13	1	6	7	15	9	5	1	5	0	9	22	0
March	53.9	31.4	42.6	71	3	14	20	76	4.65	1.37	5-6	0.1	56	17.6	SW	63	SW	12	9	11	8	12	11	3	2	0	0	0	17	0
April	63.3	43.3	53.3	80	27	20	1	72	5.43	2.39	13	0	60	14.0	SW	54	S	21	2	11	9	10	12	0	3	1	0	0	3	0
May	73.1	52.9	63.0	87	31	31	9	72	1.66	0.63	15-16	0.5	52	13.7	NE	60	NW	8	5	7	9	15	13	2	4	0	0	0	1	0
June	82.3	65.7	74.0	96	22	50	29	74	3.55	1.56	10-11	0	54	10.8	SW	36	SE	18	0	16	7	7	8	0	8	0	6	0	0	0
July	85.6	67.5	76.5	90	15	56	1	78	5.01	1.15	7-8	0	63	9.4	SW	44	NW	24	1	13	13	5	12	0	11	3	2	0	0	0
August	82.9	65.9	74.4	90	11	51	22	83	4.02	1.49	21-22	0	46	9.1	SW	36	NW	26	0	9	13	9	13	0	7	2	1	0	0	0
September	77.6	60.4	69.0	88	1	41	14	83	1.51	0.44	19-20	0	46	10.8	SW	34	SW	6	0	9	12	9	10	0	4	1	0	0	0	0
October	65.6	46.9	56.2	81	12	27	31	72	0.56	0.34	23-24	0	58	12.1	NE	31	NW	24	0	16	8	7	7	0	0	2	0	0	2	0
November	52.4	37.1	44.8	66	21	28	28	80	2.71	0.74	29	T	41	14.0	SW	37	SE	29	0	11	3	16	13	2	0	3	0	0	5	0
December	53.1	37.4	45.2	65	30	16	15	88	6.50	1.87	21-22	2.5	28	15.7	SW	46	SW	27	5	7	4	20	16	1	2	2	0	1	4	0
					Jun		Feb				Apr							Mar												
The Year	64.6	47.0	55.8	96	22	2	18	79	46.63	2.39	13	5.0	48	13.2	SW	63	SW	12	27	122	99	144	137	17	44	22	9	10	76	0

MONTHLY AND ANNUAL MEAN TEMPERATURE

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Ann.
1872												27	
1873	30	35	42	53	66	74	75	74	67	53	37	39	54.0
1874	36	38	44	46	66	77	78	75	71	57	45	38	56.0
1875	27	29	42	49	64	72	76	71	64	52	43	43	52.7
1876	41	39	41	52	65	72	77						
1887											44	35	
1888	31	36	41	56	63	72	76	74	63	51	46	37	54.0
1889	37	32	46	55	63	69	75	72	65	52	43	50	55.0
1890	44	45	39	56	63	77	76	71	67	56	49	37	56.6
1891	37	41	40	57	62	76	73	73	72	55	43	43	56.0
1892	28	41	39	54	63	76	75	75	68	57	41	33	54.1
1893	23	36	43	57	61	72	79	74	70	57	43	37	54.4
1894	38	34	49	54	62	75	76	76	71	58	41	37	55.9
1895	28	23	43	56	62	75	73	76	73	52	45	37	53.7
1896	34	35	38	62	71	72	75	75	67	54	48	38	55.9
1897	30	37	48	53	59	72	76	74	72	64	46	37	55.7
1898	38	36	49	50	65	74	76	76	72	56	43	33	55.8
1899	34	24	42	56	67	75	77	77	68	61	48	33	55.1
1900	36	31	39	55	66	72	77	79	73	65	45	37	56.3
1901	34	29	44	49	63	74	80	74	67	58	40	31	53.6
1902	32	25	45	53	68	71	77	74	67	59	53	34	54.8
1903	32	36	50	53	68	68	77	74	70	57	40	28	54.4
1904	30	31	46	48	64	72	74	74	69	57	44	34	53.5
1905	24	25	49	54	66	72	75	74	68	55	44	35	53.5
1906	37	32	36	57	64	72	74	76	71	55	45	36	54.5
1907	40	32	52	45	59	69	76	73	68	53	42	37	53.8
1908	33	33	50	55	65	72	76	75	72	58	48	38	56.1
1909	37	41	43	54	62	73	73	74	66	53	53	28	54.6
1910	32	31	54	54	59	69	75	73	70	60	40	29	53.7
1911	38	40	43	52	70	74	76	76	72	58	40	41	56.6
1912	23	28	39	57	65	69	75	72	70	59	44	36	53.1
1913	42	33	44	53	65	73	78	77	69	56	49	38	56.5
1914	37	29	40	54	66	76	78	75	67	59	46	30	54.6
1915	32	40	36	59	62	70	74	70	70	60	49	36	54.8
1916	40	33	41	52	67	69	78	76	67	58	47	34	55.2
1917	35	32	44	54	57	70	74	74	67	50	44	25	52.3
1918	20	38	49	52	69	72	73	79	62	61	44	43	55.2
1919	37	36	46	54	62	76	79	74	72	64	45	31	56.3
1920	30	33	45	50	62	71	74	72	70	62	43	36	54.1
1921	37	38	55	58	65	76	80	75	73	57	48	39	58.4
1922	33	38	47	57	68	75	76	75	73	61	47	39	57.3
1923	39	32	43	53	63	74	77	74	69	56	45	45	55.8

TEMPERATURE EXTREMES

Month.	Highest	Year	Day	Lowest	Year	Day
January	72	1906	21	—14	1918	12
February	75	1918	28	—20	1899	13
March	85	1910	24	— 1	1873	4
April	88	1915	25	15	1875	18
May	93	1911	28	30	1876	1
June	99	1914	27	40	1910	3
July	102	1901	22	51	1891	9
August	100	1918	6	46	1915	31
September	98	1899	6	32	1899	30
October	89	1919	2	21	1873	29
November	78	1895	7	2	1872	29
December	71	1875	31	— 9	1917	10

MONTHLY AND ANNUAL PRECIPITATION

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Ann.
1872											1.21	3.30	
1873	2.53	4.05	3.73	2.89	6.05	4.49	3.37	2.94	1.60	5.47	1.92	4.48	43.52
1874	5.41	4.89	5.90	6.81	0.79	3.55	6.26	1.57	2.89	0.92	4.27	3.83	47.09
1875	2.61	3.12	6.18	2.06	2.43	4.16	11.24	0.62	1.72	2.37	5.87	3.68	46.06
1876	6.06	1.66	3.63	4.20	2.16	4.13	3.84						
1887											3.02	2.71	
1888	4.29	2.93	5.82	3.17	3.29	2.97	4.21	8.76	1.22	3.02	5.15	1.88	46.81
1889	5.66	1.78	1.63	1.52	3.53	3.49	5.82	1.15	6.79	3.06	5.34	1.73	41.50
1890	5.34	8.13	9.91	3.59	4.71	7.43	3.14	7.32	1.82	2.38	3.54	4.05	61.36
1891	4.70	4.36	7.63	1.85	1.17	5.33	3.23	6.48	1.26	1.33	5.38	2.82	45.51
1892	2.35	3.10	4.01	6.57	5.32	3.81	6.22	3.28	4.10	0.45	3.72	3.03	45.96
1893	2.10	4.44	3.30	5.81	3.88	4.24	3.11	1.86	2.25	5.59	3.36	2.61	42.55
1894	3.58	3.33	2.13	4.19	3.81	4.44	0.87	3.67	4.05	1.40	1.38	3.45	36.32
1895	5.60	0.52	2.79	3.17	4.05	2.93	5.07	1.56	0.33	1.28	2.52	5.50	35.32
1896	1.25	3.15	5.41	0.40	3.20	3.74	10.39	3.37	4.25	1.27	4.30	2.56	43.29
1897	2.59	6.33	6.55	5.80	4.48	4.77	4.34	3.21	0.80	0.38	4.83	5.11	49.19
1898	9.56	2.20	8.18	3.29	6.13	7.94	5.72	2.99	3.55	5.27	2.89	2.80	60.52
1899	6.69	2.84	8.61	2.16	3.63	2.55	0.97	4.18	1.90	2.09	1.70	2.92	40.24
1900	2.13	3.17	1.98	1.23	3.54	2.19	2.80	5.75	1.85	0.79	6.38	1.86	33.67
1901	1.49	0.62	2.23	4.52	2.67	3.70	2.61	3.74	2.18	1.33	1.73	3.50	30.32
1902	4.77	0.90	2.92	1.27	2.43	5.19	2.33	1.89	2.60	2.11	3.09	6.60	36.10
1903	1.68	6.16	3.24	3.29	1.75	2.71	2.62	1.49	0.81	2.12	2.84	1.99	30.70
1904	1.92	2.38	4.75	3.08	2.60	2.51	3.13	2.44	1.71	0.57	0.53	3.10	28.72
1905	2.04	2.13	5.87	2.87	5.54	3.31	4.94	4.11	3.20	3.45	3.58	4.13	45.17
1906	2.29	1.84	6.45	1.11	3.15	4.68	3.89	4.92	5.03	0.74	3.95	4.54	42.59
1907	9.06	1.89	4.13	1.83	3.89	3.65	4.42	2.07	2.72	2.76	2.67	2.28	41.37
1908	1.85	4.81	8.17	4.99	4.20	2.12	3.60	2.98	0.38	0.72	1.65	2.13	37.60
1909	3.35	6.86	3.97	6.72	4.15	5.41	5.98	1.26	4.88	2.05	1.96	2.77	49.36
1910	4.46	4.11	0.46	4.22	6.24	5.92	7.66	4.15	7.92	1.67	1.72	2.81	51.34
1911	2.44	2.21	2.31	4.46	1.07	3.01	0.92	2.84	4.37	3.67	3.84	6.20	37.34
1912	1.78	2.50	4.36	6.89	5.11	2.15	4.70	3.23	2.09	0.51	1.02	3.66	38.00
1913	10.35	2.61	6.04	2.41	4.32	3.29	2.43	1.00	1.76	3.40	4.00	2.74	44.35
1914	2.50	3.87	2.24	2.23	1.65	4.77	2.63	4.69	1.82	5.32	1.62	4.40	37.74
1915	4.38	1.12	1.49	0.65	7.23	3.20	5.72	6.03	3.74	0.81	3.90	6.67	44.94
1916	5.65	3.40	3.30	1.01	2.92	5.33	1.72	2.34	2.75	2.04	1.25	3.63	35.34
1917	5.67	2.12	5.48	3.97	3.51	3.54	2.80	1.94	2.46	2.36	1.03	1.97	36.85
1918	4.46	1.92	1.55	2.09	4.13	3.61	2.01	2.68	1.41	4.57	2.24	4.83	35.50
1919	2.48	1.61	3.71	3.51	6.38	4.49	2.28	2.39	1.12	7.95	8.50	6.70	51.12
1920	5.26	2.11	4.62	6.42	2.51	2.39	1.73	6.71	4.88	2.75	2.22	1.40	43.60
1921	3.24	2.62	5.06	3.28	1.60	2.16	1.04	3.88	5.10	2.46	6.89	5.74	43.07
1922	1.87	3.12	7.75	4.46	3.10	2.44	2.13	2.20	5.99	1.25	0.88	5.67	40.86
1923	6.63	4.40	4.65	5.43	1.66	3.55	5.01	4.02	1.51	0.56	2.71	6.50	46.63

EXTREMES OF PRECIPITATION AND WIND

Month.	PRECIPITATION			WIND			
	Greatest in 24 hrs.	Year	Day	Max. Vel.	Dir.	Year	Day
January	3.50	1913	11	60	sw	1891*	1
February	3.04	1909	23-24	60	sw	1890*	25
March	3.61	1913	25-26	68	sw	1919	17
April	3.24	1909	29-30	64	sw	1909	29
May	2.61	1898	6-7	60	nw	1889*	12
June	4.45	1898	26-27	60	n	1890*	29
July	4.02	1875	11-12	58	nw	1915	30
August	2.98	1915	1-2	72	s	1918	6
September	5.45	1922	3	68	w	1889	8
October	2.32	1893	3-4	50	nw	1904*	21
November	3.95	1919	25-26	62	s	1895*	26
December	3.63	1919	6	60	sw	1895*	26

*Also in subsequent years.

THIRTY-SIXTH ANNUAL REPORT

Of The

Kentucky Agricultural Experiment Station

FOR THE YEAR 1923

PART II

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Kentucky
Agricultural Experiment Station

University of Kentucky

The Marketing of Kentucky Strawberries

BULLETIN NO. 246

Lexington, Ky.

January, 1923.

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BULLETIN NO. 246

The Marketing of Kentucky Strawberries

By O. B. JESNESS and D. G. CARD

The growing of strawberries on a commercial scale is a comparatively recent development in Kentucky. Since its start fourteen or fifteen years ago, however, it has had a rapid growth. According to the United States Census there were 3,112 acres of strawberries in Kentucky in 1919, while ten years before there were 1,553 acres. While the acreage of strawberries in Kentucky in 1919 was 100% larger than the 1909 acreage, the 1919 acreage for the entire United States was about 16% less than the 1909 acreage. The accompanying map (Fig. 1) indicates where the industry has been developt in Kentucky.

MARKETING ORGANIZATIONS

The strawberry growers in Kentucky have established cooperative marketing associations for the sale of their berries wherever strawberry growing has been developt on a commercial scale for the shipment of berries to distant markets. The industry at first centered around Bowling Green, and the first organization formed was the Warren County Strawberry Growers' Association, which has been in operation since 1908. As other localities have taken up strawberry growing they have established similar associations.

There were eleven cooperative marketing associations in Western Kentucky engaged in the marketing of strawberries in

Fig. 1.—The estimated acreage of strawberries in Kentucky in 1921. Each small dot represents five acres of berries. The large dots indicate the locations of marketing associations in operation in 1922.

1922. The dates of organization of these associations as reported by them suggest the growth of the industry.

Number	Year of Organization
1	1908
1	1913
1	1916
2	1919
2	1920
3	1921
1	1922

This shows that most of these associations have been established during the last three or four years.

According to the information furnished by the associations, they had a membership of 2,056 growers in 1922. The number of members at the time of organizing was obtained in order to note the growth. The total membership of all associations at the time of organization was 621, showing a gain of over 200 per cent. Two of the organizations which began with about a dozen members had memberships of 750 and 375 in 1922. Of two organizations which were formed in 1919, one had increased its membership from 45 to 80 and the other from an initial membership of 20 to one of 125 in 1922. The gain in membership in the more recently organized associations naturally is smaller than in the older organizations.

The acreage of strawberries grown by the members at the time of organizing and in 1922 was obtained from nine of the associations. The total of the reports for these nine associations showed that the acreage had increased from 767 acres to 3,770 acres. One association which began with less than 50 acres of berries had about 1,350 acres in 1922. Of two associations which started out several years ago with about 50 acres, one reported that its members had 750 acres and the other reported 500 acres in 1922.

The plans of organization which have been adopted by the various associations are very similar. Several of them have adopted practically the same plan as that which was worked out by the association in Warren County. Most of the associations are incorporated under State law. Some have been formed

with capital stock and some are nonstock organizations. The organizations which have capital stock, adopted this form mainly because they desired to incorporate under a law which provided only for capital stock organizations. The amount of capital stock is not very large in any case. The nonstock plan is well suited to the needs of strawberry marketing associations and, since the Bingham Cooperative Marketing law, which was enacted in January, 1922, provides for the incorporation of cooperative associations formed either with or without capital stock, it is likely that at least some of the associations will organize and incorporate under that law. One strawberry association has already incorporated under the Bingham law and others have this step under consideration.

These associations observe the cooperative plan of voting, each member being limited to one vote. They are managed by a board of directors selected by the members from among their own number, and employ a business manager, who has charge of the business and selling operations under the supervision of the board of directors.

It is customary for the members to market all the berries which they have for sale thru their association, except, in some cases, berries for local consumption may be sold by the growers. The members are required to sign specific marketing contracts only in the case of a few of the associations. The others have sections in their by-laws which stipulate that the members must market their berries thru the association. It should be noted that the situation with respect to these organizations differs to some extent from that found in the case of many cooperative marketing organizations due to the fact that the strawberry marketing associations have developt with the industry and have not been organized to supplant or compete with existing marketing agencies. The growers consequently regard the organization as the logical outlet for their strawberries and no tendency to sell the berries outside the organization has been in evidence. At one or two points, it is true, there has been some lack of understanding among the members, with the result that two or more

organizations have been formed where one could handle the business.

The manager of the association is in direct charge of the marketing of the berries. He usually spends some time in advance of the opening of the shipping season in getting in touch with buyers. The keeping of the necessary records is in his hands, and he must devote some time after the close of the shipping season to the winding up of the season's business. He also attends to the purchase of supplies handled thru the association so that his services are required for a considerably longer period than the actual shipping season. In the case of one or two of the associations, the business office has been kept open thruout the year.

The berries are pooled either by cars or by days. By pooling is meant the averaging of returns, usually by grade, so that each member is paid at the same rate for each grade. The associations which employ the carlot pools average the returns of each car, while those that employ the daily pools average all the sales each day. Final settlement is not made with the growers until the shipping season is over. Some associations make advances during the shipping season to the growers who desire such advances. The expenses of operating the association are prorated and are deducted from the returns before final payment is made to the growers.

The associations in addition to marketing berries for the members usually purchase for them such supplies as plants, boxes, crates and fertilizers needed in the production and handling of their berries. They also assist in securing a supply of pickers for their members.

MARKETING METHODS

The picking and packing of the berries bear a close relation to their sale, because the way in which these operations are performed has considerable to do with the results obtained. Picking requires much hand labor and this is often difficult to obtain, especially in the more important producing sections, as in these

localities the local supply of help is not sufficient to take care of the needs of the growers and workers must be brought in from other places.

It is customary to pay the pickers on the basis of the amount of berries which they pick instead of on a time basis. The rate used at most points during the 1922 season was ten cents a gallon with a bonus of three cents a gallon for the workers who were available thruout the season. The purpose of the bonus is to encourage the pickers to stay so that a supply of help will be available. Various systems of keeping records of the amounts picked are in use. Some growers have numbered cards which are punched as the picker delivers berries; others give out printed tickets indicating the amount. Payment customarily is made once or twice a week. Some difficulty is encountered in the system of checking as pickers may discover ways of punching their cards themselves or the tickets of different growers may become mixt due to a shifting about of the pickers. From four to ten pickers per acre are employed. The larger growers also employ field bosses, each one of whom supervises the work of a certain number of pickers or a certain part of the field.

The grading of the berries is done in the fields to some extent, but for the most part is taken care of at the packing sheds. In grading, the berries may be poured from one box into another or are poured into grading pans designed especially for that purpose. These pans permit the grader to see the berries and he can sort out undesirable berries before pouring them back into the box. The berries in some cases are "plate" packed, that is, the berries in the top layer are arranged on their sides, all pointed one way in order that the boxes may present a more attractive appearance. The facing of the boxes in this manner, however, requires extra labor, which means increased cost, consequently the ordinary loose pack is usually employed. When the boxes are faced it is important that the berries in the top layer fairly represent the rest of the contents and not be larger and more attractive.

The grades employed by most of the associations are designated as 3X, 2X and X, the 3X grade being the best and the X grade representing the culls, which usually are not shipt. Some of the associations designate their grades by the numbers 1, 2 and 3, number 1 being the best grade.

The associations make inspections of berries before shipment. In some cases, some crates of each crop are inspected, while other associations report that each crate is inspected. Crates that are inspected are opened and several boxes examined to note the quality of the berries and the way in which they are packed. The quality and uniformity of strawberries are important factors in selling them, because good quality creates demand while inferior berries discourage consumption. Careful inspection is necessary in order that a reputation for quality can be built up and maintained.

The berries are delivered at the loading point by the growers in farm wagons with springs or in automobiles. They are inspected by the association's inspectors and loaded on the cars. At some points they are loaded directly from the growers' wagons on the cars. In other cases they are piled from the wagons on to a platform and loaded from that into cars. Receiving sheds or warehouses are available at a few points for the receiving and loading of berries.

A receipt is given the grower upon delivery of his berries and a copy of this is kept by the association for its records. In some cases, these receipts are made in triplicate, the association filing one under the grower's name and the other under the number of the car in which the berries are shipt. The accounting forms used by the various associations vary, but, in general, they provide for an account with each member. All transactions between the member and the association, such as the sale of berries, the purchase of supplies, advances made, etc., are itemized in this account. Some associations keep this account in duplicate so that a copy may be given the grower as his statement at the end of the season. Other associations prepare a separate statement for the grower. A record which shows the

Fig. 2.—The size of the dots indicates the relative importance of various states and Canada, as markets for Kentucky berries in 1922. (Based on 650 cars for which the destinations were ascertained by the U. S. Department of Agriculture.)

number of crates, the grade of berries and the names of the growers delivering them, also is kept for each car shipt. This record is essential when carlot pools are employed.

Nearly all the berries are shipt to markets in the states to the North and East either by freight or express. Express shipments are mostly from points on one railroad line which furnishes service of this kind. The shipments, of course, must be made under refrigeration.

The sales are made f. o. b. shipping point when possible so that the associations are relieved of the marketing of the berries after they are loaded on board cars. Shipments are consigned to dealers in distant markets to be sold for the association on a commission basis when satisfactory f. o. b. sales cannot be made. Some of the f. o. b. sales are made to buyers who have personal representatives at the shipping points, while others are made by wire to distant buyers.

Information regarding market conditions is obtained by wire. During most of the 1922 shipping season, a representative of the U. S. Department of Agriculture was stationed at Bowling Green to obtain shipping point information and to distribute information sent him from representatives of the department in the principal markets. Part of the expense involved in rendering this service was paid by several of the associations, which earlier in the season established an informal central association for the interchange of information.

The U. S. Department of Agriculture, thru its Food Products Inspection Service, has inspectors stationed in a number of the leading markets. These inspectors make inspections of shipments of fruits and vegetables when called upon to do so by an interested party. A fee is charged for this service and a certificate showing the results of the inspection is furnished. This service is of value in settling disputes between the buyer and the seller. Government inspection is not used directly to any great extent by the strawberry marketing associations in Kentucky. One reason for this is that many of the shipments are sold at the shipping point.

tained by the U. S. Department of Agriculture.)

The outlets for Kentucky strawberries are found mainly in Michigan, Ohio, Pennsylvania, Indiana and Illinois. The U. S. Department of Agriculture, in connection with its market news service on strawberries, obtained information regarding the primary destinations of both freight and express shipments of berries from Kentucky during the principal shipping season. These reports did not include all the shipments, as some were made both before and after the main marketing season covered by these reports. The distribution of destinations by states of the cars for which this information was obtained was as follows:

State	By Freight	By Express	Total Cars
Michigan	133	.....	133
Ohio	122	9	131
Pennsylvania	110	3	113
Illinois	68	5	73
Indiana	58	.....	58
Massachusetts	.....	32	32
New York	15	11	26
Rhode Island	.....	18	18
Wisconsin	11	1	12
Kentucky	12	.....	12
Minnesota	2	8	10
West Virginia	8	.....	8
Missouri	7	.....	7
Canada	.....	6	6
Maine	.....	5	5
Maryland	3	.....	3
Iowa	1	.....	1
Nebraska	.....	1	1
Georgia	1	.....	1
Unknown	99	7	106
Total	650	106	756

The markets which were reported to have received ten or more cars of Kentucky berries in 1922 are as follows:

City	Cars
Detroit	118
Pittsburgh	101
Chicago	52
Cleveland	24
Boston	24
Fort Wayne	19
Providence	18
Columbus	17
Youngstown	13
Canton	10
Milwaukee	10

In addition to the above there was a large number of other cities which received from one to nine cars of berries. Altogether, 77 cities were listed as having received cars by freight and 20 cities by express. Ten of the cities received both freight and express shipments, making a total of 87 cities which received Kentucky berries in carload lots. As the destinations of over 100 of the cars were unknown, the actual number of markets no doubt is larger and some of the markets listed received more than the number of cars indicated.

Kentucky berries compete with berries from several other sections which ship about the same time. The principal competing regions are located in Tennessee, Missouri and Arkansas. The following table prepared by the U. S. Department of Agriculture indicates the daily carlot shipments of strawberries from these different states and the United States as a whole, during the period May 10 to 31, 1922, with comparisons for the corresponding periods in 1921. As will be noted, the 1922 season was considerably earlier than that of 1921,

WEEKLY SHIPMENTS BY STATES AND U. S. TOTALS COMPARED WITH LAST SEASON

Week	Kentucky 1922-'21		Tennessee 1922-'21		Arkansas 1922-'21		Missouri 1922-'21		Total U. S. 1922-'21	
Apr. 16-22	.....	.....	.....	.....	10	72	.....	.....	678	464
Apr. 23-29	.....	.....	66	179	72	234	.....	.....	809	809
Apr. 30 May 6	.....	.....	767	307	389	240	.....	.....	1949	844
May 7-13	35	0	1622	505	707	242	1	....	3445	1270
May 14-20	308	110	804	356	613	92	120	13	3068	1344
May 21-27	310	231	457	301	304	168	867	354	3072	2053
May 28 June 3	101	46	78	43	81	28	722	126	2131	1114

These states to some extent depend upon markets in the same territory as Kentucky, altho considerable amounts of ber-

ries from the shipping regions in these states move to markets farther west. Kentucky has some advantage in the markets to the north and east in that she is nearer to those markets than are the other states.

The following table shows the destinations by states of 1,372 cars of Southwestern Missouri berries, 801 cars from Northwestern Arkansas and 1,255 cars from the White County, Arkansas, district during 1922. (Data from U. S. Department of Agriculture, Market News Reports.):

Southwestern Missouri

States	Cars
Missouri	344
Nebraska	100
Iowa	114
Minnesota	145
Illinois	82
Colorado	74
New York	72
Ohio	58
Canada	51
South Dakota	51
Kansas	43
Wisconsin	41
Oklahoma	37
Massachusetts	37
Michigan	31
Pennsylvania	25
Texas	19
Montana	16
Rhode Island	9
Indiana	6
North Dakota	6
New Jersey	4
Connecticut	2
Utah	1
Vermont	1
Louisiana	1
West Virginia	1
Wyoming	1
Total	1372

Northwestern Arkansas

States	Cars
Missouri	266
Minnesota	112
Iowa	67
Kansas	62
Nebraska	59
Illinois	50
Wisconsin	48
Michigan	28
Oklahoma	22
Texas	18
Colorado	17
South Dakota	13
Montana	9
Indiana	6
Canada	5
Ohio	5
New York	4
Massachusetts	3
Pennsylvania	3
North Dakota	2
Washington	1
Louisiana	1
Total	801

White County, Ark., District

States	Cars
Missouri	492
Minnesota	189
Illinois	144
Iowa	101
Michigan	47
Pennsylvania	41
Texas	31
Kansas	28
Colorado	25
Ohio	22
Nebraska	22
Wisconsin	21
New York	20
Massachusetts	18
Indiana	15
Oklahoma	12
New Jersey	8
Montana	4
Louisiana	3
Tennessee	3
North Dakota	2
South Dakota	2
Wyoming	2
Canada	2
Kentucky	1
Total	1255

This table shows that considerable quantities of strawberries from these sections moved into the states where are found the principal outlets for Kentucky berries. Unfortunately, the destinations of Tennessee shipments were not ascertained. The shipments from Tennessee naturally would be more likely to go mainly into the same states as the Kentucky shipments than those from the states to the west. Altho the heaviest movement from Tennessee is about over when Kentucky berries begin to move, still large quantities of Tennessee berries go to market during the height of the Kentucky season.

PRICES IN 1922

The prices received for strawberries vary during the shipping season in response to fluctuating market conditions, volume of shipment from Kentucky and competing regions and the market demand. Weather conditions also affect prices because of their effect on the quality of the berries. The prices are highest in the early part of the season and work lower as the season advances and the volume of shipments increases. The average prices received by the different associations vary considerably, due to differences in local conditions and selling methods. The average prices received by the associations in 1922, according to their reports, ranged from an average of $3.25 per crate for the association which reported the highest average to $2.15 per crate for the one reporting the lowest.

The following tables, which were included in the final report of the news station of the U. S. Department of Agriculture for the 1922 season in Western Kentucky, summarize the situation with regard to market conditions and prices for Kentucky berries. The first table gives the f. o. b. prices at the country shipping points and the second indicates the prices at which berries were sold to the jobbers in several of the important markets.

F. O. B. PRICES OF STRAWBERRIES*

Date	Hauling	Demand	Market	Quality	Carloads F.O.B. Usual Terms
					24-qt. crates
May 12	Light	Good	Unsettled	Good	$4.50
May 13	Moderate	Improving	Weaker	Generally good	$3.00—$3.50—few $3.75
May 15	Moderate	Good	Weaker	Generally good	3.00— 3.25
May 16	Moderate	Good	Steady	Generally good	3.00— 3.25
May 17	Moderate	Good	Firm	Mostly good	3.00— 3.25
May 18	Light	Active	Firm	Generally good	Mostly $3.25
May 19	Mod. but Inc.	Good	Firm	Generally good	Mostly $3.00—$3.25
May 20	Increasing	Good	Weaker	Mostly good	$2.75—$3.00—few $3.25
May 22	Heavy	Moderate	Weaker	Generally good	Mostly $3.00—few $2.75
May 23	Heavy	Good	Steady	Generally good	$3.00
May 24	Heavy	Good	Steady	Generally good	$2.75—$3.00
May 25	Heavy but Decr.	Good	Steady	Generally good	Mostly $3.00—few $2.75
May 26	Heavy but Decr.	Moderate	Sli. weaker	Considerable soft	Mostly $3.00—few $2.75
May 27	Heavy	Good	Steady	.....	

*This table includes only f. o. b. prices. Berries usually are consigned when satisfactory f. o. b. sales can not be made and under these circumstances it is to be expected that the prices received for consigned berries would average less than those sold f. o. b.

JOBBING PRICES OF 24-QUART VENTILATED CRATES KENTUCKY AROMAS IN FOUR IMPORTANT MARKETS

Date	Chicago	Pittsburgh	Detroit	Cleveland
May 15	.....	$5.00—$5.50	$4.50—$5.00	$4.00
May 16	.....	mostly $5.00	$4.50	$4.50
May 17	.....	$4.25—$4.50	$4.25—$4.50	$4.50
May 18	$3.00—$3.25 few $3.50	$4.00—$4.50 mostly $4.25—$4.50	$4.00—$4.25	$4.25—$4.50
May 19	$3.50—$3.75 few $4.00	$3.75—$4.25 mostly $4.00—$4.25	$4.25	$4.25—$4.50
May 20	$3.75—$4.00	$3.50—$4.00 few $4.25	$3.75—$4.00 few $4.25	$4.15—$4.50 few $4.00
May 22	$3.25—$3.75 mostly $3.50—$3.75	$4.00—$4.50	$4.00—$4.25 mostly $4.00	$4.00—$4.25
May 23	$3.00—$3.75 mostly $3.25—$3.75	$4.00	$3.75—$4.00	.....
May 24	$3.00—$3.50 mostly $3.25—$3.50	$3.75—$4.00 mostly $4.00	$3.75—$4.00	$3.25—$3.50 few $3.75
May 25	$3.25—$3.50	$4.00—$4.25	$3.50—$3.75	$3.75—$4.00
May 26	$3.00—$3.50 mostly $3.25—$3.50	$4.00—$4.25	$3.50—$3.75	$3.75—$4.00
May 27	$2.75—$3.50 few $3.75 mostly $3.00—$3.50	$4.00—$4.25	$3.00—$3.50	$3.75—$4.00
May 29	$3.00—3.50	$3.75—$4.00	$3.00—$3.50	.....

EXPENSES

The expenses of operating the associations must be paid out of the returns for berries before final settlement is made with the growers, so that the price which they receive is the price received by their association less these expenses. The services of the manager must be paid for and he usually receives a certain amount for each crate handled. In one or two cases the manager is paid a definite salary. He may take care of other local help needed or that may be handled separately. The associations keep in touch with markets and make sales by wire and the expense incurred thereby for telegraph and telephone services also must be paid for by the associations.

The associations reported the following local expenses per crate for the 1922 season:

Number Reporting	Per Crate
1	7c
1	12c
1	12½c
2	14c
2	15c
1	16c
1	17c
1	20c
1	51c

The association reporting local expenses of 51 cents per crate is a new association and the high charge per crate is accounted for by the fact that it had a very small volume of business and that its berries were sold largely in small lots to the retail trade. In addition to the local expenses, a commission is paid in case of shipments which are consigned instead of being sold locally. Two of the associations employed the services of a sales agency in marketing their berries in 1922 and a definite fee was paid to this agency in addition to the local expenses.

DEVELOPMENT OF OUTLETS

What appears to be a case of overproduction may be only an instance of faulty distribution. A highly perishable product such as strawberries must be handled quickly and immediate markets must be found since the berries cannot be held very long. Satisfactory marketing of a product of this kind is dependent upon prompt locating of sufficient outlets. Because of this fact, the various associations devote considerable attention to market outlets. The larger volume of shipments resulting from the rapid increase in the strawberry acreage in Kentucky has increased the importance of this work. The associations usually depend upon making advance contacts with dealers at central points in order that these dealers may be apprised of what the associations will have to offer during the season and be in the market for their berries. Contacts of this kind

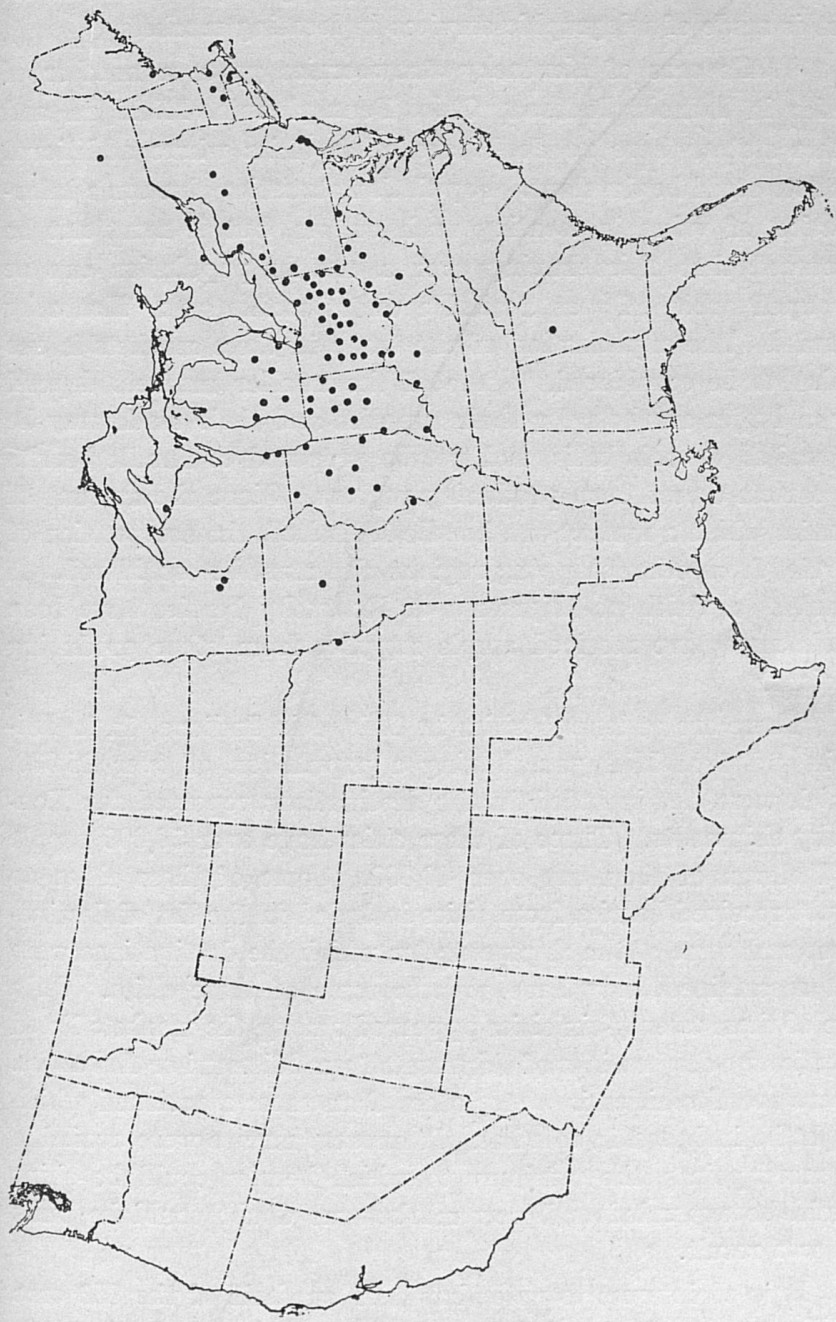


Fig. 3.—Map showing the primary destinations reported for shipments of Kentucky berries in 1922. Each dot represents a city.

are very valuable. During the shipping season considerable use is made of telegraphic services in locating markets.

While cars of Kentucky strawberries go to a number of cities in Illinois, Indiana, Ohio, Pennsylvania, Michigan and other states, there no doubt are other cities where additional outlets could be developt. Population statistics give some information of value in locating such outlets, but it must not be assumed that cities having over a certain population can be grouped arbitrarily as available carlot markets for Kentucky berries. The organization of the trade in these markets is one point to be considered. Some of the smaller markets depend upon larger markets for their supplies and their trade may be organized on this basis, and not be prepared to handle berries in carlots direct from producing regions. Since the amount of berries which a market can handle is limited, the competition of berries from other shipping regions also must be considered. A market to which no shipments of Kentucky berries have been made may have received ample supplies from other producing regions.

There are at least 5 cities in Ohio, 4 in Indiana, 11 in Illinois and 6 in Michigan, having a population of over 25,000, which were not included in the destinations reported for Kentucky shipments. Three of these cities have over 50,000 people and eleven of them are over 40,000. Some of these cities no doubt received berries from cities included in the list of destinations and some of the shipments for which the destinations were not ascertained, may have gone to some of these cities. Only five of these twenty-six cities appeared among the markets listed as primary destinations of shipments from Missouri or Arkansas. There are also cities in states other than those mentioned which might be included in this list. If express service were available at more points, the territory to which berries could be shipt would be expanded and new markets no doubt could be built up as a result.

It is of interest to note that over one-half of the 650 cars of Kentucky strawberries for which the primary destinations

in 1922 are available, went to cities that have a population of over 500,000. Less than 3 per cent of these cars went to cities that have a population of less than 10,000. The following table shows the percentage of these shipments going to markets falling within certain groups:

Cities having a population of	Per cent of shipments
500,000 and over	53.8
250,000 to 500,000	5.7
100,000 to 250,000	17.1
50,000 to 100,000	9.8
25,000 to 50,000	5.7
10,000 to 25,000	5.0
Below 10,000	2.9
	100.0

Exprest in cumulative percentages, the result is:

2.9% of shipments went to cities below 10,000 population
7.9% of shipments went to cities below 25,000 population
13.6% of shipments went to cities below 50,000 population
23.4% of shipments went to cities below 100,000 population
40.5% of shipments went to cities below 250,000 population
46.2% of shipments went to cities below 500,000 population

These tables show clearly the dependence of the Kentucky strawberry growers upon larger cities as markets for their berries. Larger markets customarily supply not only the population within their city limits, but also smaller cities nearby so that part of the shipments made to the larger markets are distributed from them. It is also probable that in a few instances, some of the smaller markets mentioned among the primary destinations of Kentucky shipments were in reality only diversion points and that the berries moved from them to other markets.

Some suggestions have been made that the associations should conduct advertising campaigns to stimulate the demand for Kentucky berries. Nothing has been done along this line, but it is a step which merits careful consideration. The advertising projects of cooperative marketing associations in other

parts of the country, such as those for citrus fruits, raisins, cranberries, walnuts and other products, are of interest and service in considering plans for extending the markets for strawberries by means of advertising. However, they must be regarded in the light of the conditions and problems existing in the case of strawberries. Among the points which can be suggested are that strawberries are a highly perishable commodity which enjoys a comparatively brief marketing season. Some of the other products which are being widely advertised are distributed thruout the year so that the creation and supplying of demand are continuous. Many of the advertised farm products also are grown in comparatively restricted areas under circumstances where it is not difficult to perfect marketing organizations controlling the distribution of a large proportion of the product. Strawberries come from a number of widely separated districts and best results would seem to require the combined advertising efforts of these various districts, or at least of such districts as enter the same markets. Some advertising of Kentucky berries probably could be carried on with worth while results if the various associations in the State would unite their forces in this field.

Advertising berries and distributing them among the different markets available are not the only factors to be considered in connection with the development of demand. Quality and uniformity always will be important. Good berries encourage consumption, while poor berries discourage demand. Quality depends upon the methods of handling on the farm, picking, grading, packing, hauling, inspection, loading into cars, icing of cars, speed of trains, handling at central markets and by retailers, and on weather conditions.

CENTRAL ORGANIZATION

During the last few years there have been extensive farmers' cooperative marketing developments in various parts of the country. Some of these have been organizations covering a considerable territory directly or thru the formation of federations

of local marketing associations. Some interest has been indicated in Kentucky in the possibilities of forming a central marketing organization made up of the local strawberry marketing associations which have been established. Among the possible services which have been suggested for such a central body has been to concentrate the sale of the berries under one management, the interchange of information regarding production and marketing problems, the development of greater uniformity in grades and the expansion of market outlets. A central organization should be helpful especially in the routing of consigned shipments in such a way as to keep these shipments away from glutted markets as much as possible. The larger organization also should be in a better position to obtain and use market information than are the individual local associations.

The formation of such an association is not entirely free from difficulties. There is need for an appreciation on the part of the various associations and their managers of the importance of giving up some of their freedom of action in return for the greater strength which should come from a well organized and properly directed central body. There must exist a feeling of confidence among the various organizations. A satisfactory division of activities between the locals and the central must be determined upon. Every effort must be made to eliminate jealousies and to prevent the development of any reasons for distrust in the management of the central body. If a central association is formed it should come about as a result of a recognized need. It would be a mistake to organize it unless this need is felt as otherwise it would probably lack the support required for success.

SOME PROBLEMS ENCOUNTERED

Some of the problems encountered in the marketing of Kentucky strawberries have their source on the farms in the growing and handling methods followed; others relate to the handling at the loading point, and still others occur in connection with transportation and the handling of berries in the

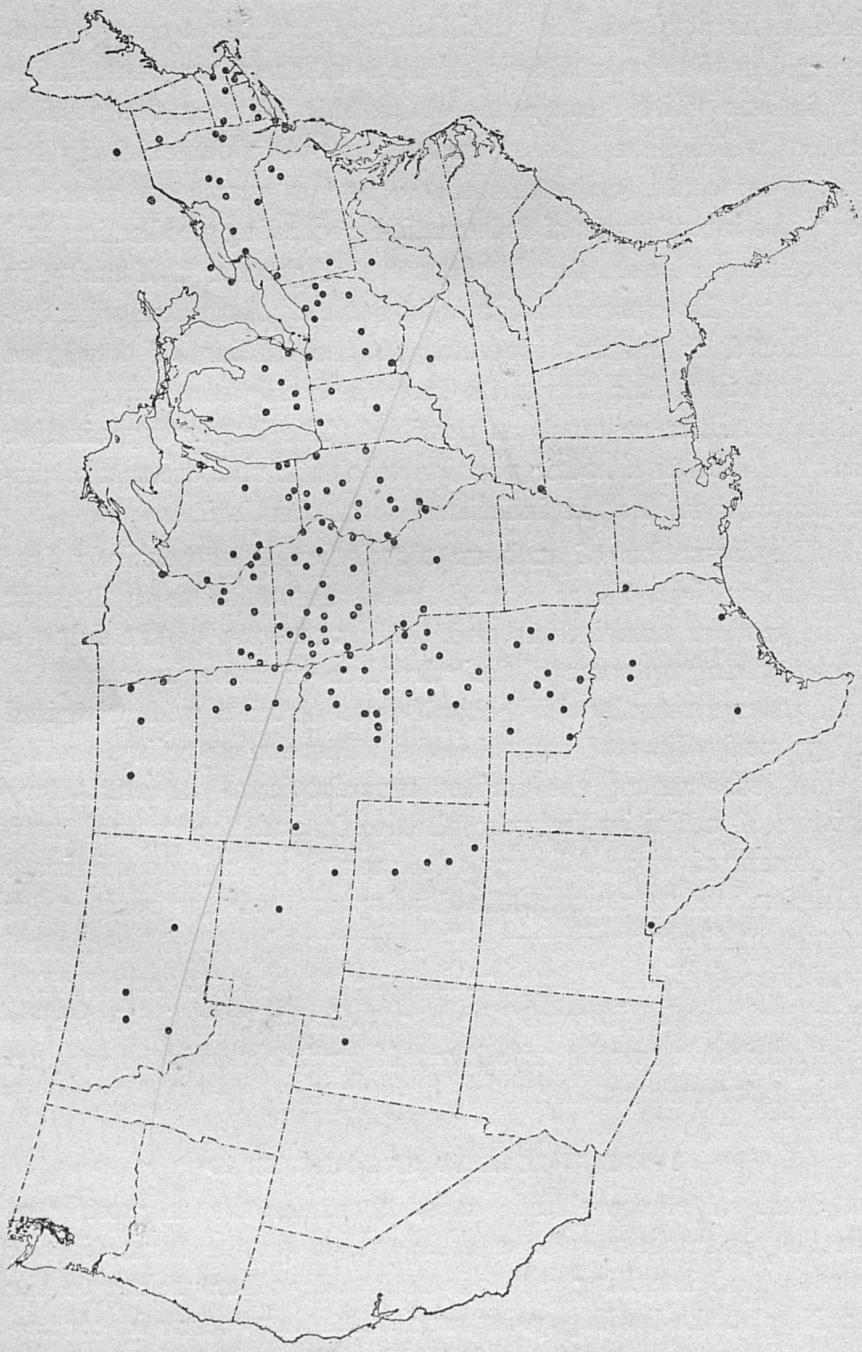


Fig. 4.—Map showing the primary destinations reported for shipments of strawberries from Missouri and Arkansas in 1922.

central markets. From the viewpoint of marketing it is important that the best cultural and handling methods be used by the growers because quality aids the sale of the berries. This extends to the picking, packing, grading and delivery. If berries that are too ripe or too green are included, quality is lowered. If the boxes are not well filled, they will present an unsatisfactory appearance when they reach the consumer. If the boxes are too full, the berries are likely to be crushed and present an unattractive appearance on that account.

The care employed by the associations' inspectors plays an important part in the matter of quality and uniformity. If inspection of the berries and the pack is rigid, better quality and uniformity will be obtained. The loading of cars also presents problems. They must be properly loaded and braced so as to withstand the shocks incident to shipping. The cars should be well iced in advance of loading so that they will be well cooled when loaded. One difficulty resulting from the inspection of berries at the car, is that the car at times may be kept open unnecessarily long during loading so that it is not cool when it leaves.

A government inspector stationed at one of the principal markets for Kentucky berries reports that considerable decay was in evidence in the top layer of cars loaded four layers deep. Temperatures in the cars of Kentucky berries inspected at that market in 1922 showed a range of from 39° F. to 54° F., the former being in the bottom layer and the latter in the top layer. Most cars had a temperature of 44° to 46° in the bottom layer and 48° to 52° in the top layer. The three-layer loads showed less decay than the four layer. Inspectors at several of the markets offered the suggestion that cars should be iced from 20 to 24 hours before being loaded. Berries loaded into cars which have not been well cooled or which are allowed to become warmed up too much in loading, are likely to show a higher proportion of decay because good refrigeration does not take place. Some of the association managers stated that cars

Fig. 4.—Map showing the primary destinations reported for shipments of strawberries from Missouri and Arkansas in 1922.

were not always well iced and had to be re-iced before being loaded.

The associations sometimes have difficulties in getting the necessary cars when wanted. Express refrigeration is available only at some points at the present time and extending this service to other points would be helpful in opening up additional markets for Kentucky berries.

Answers received from association managers, when asked to express what, in their opinion, is the principal problem confronting their particular association, are of interest. Three managers stated that the greatest need is for better organized methods of marketing; one said means should be devised to avoid price cutting between competing associations; and two said that the greatest difficulty came from dissatisfaction due to misunderstandings on the part of members. One of the newer associations experienced some difficulties when too many people tried to have a hand in managing its affairs, while another had trouble in getting members to deliver berries at the proper time. Keeping up the quality of berries and the interest of growers are problems which also confront this association. Difficulty in securing satisfactory plants was reported by one association and control of plant diseases by another. The manager of one association said he had no problems of any consequence, but had always been able to sell more berries at satisfactory prices than he had available for sale.

SUGGESTIONS AND CONCLUSION

There is an important relation between methods of production and the results obtained in marketing. The wide distribution and the successful marketing of such products as California oranges, Northwestern apples and Eastern Shore of Virginia potatoes, are dependent to a considerable extent upon careful growing, handling and grading methods. Kentucky strawberry growers should bear this fact in mind because the successful sale of their berries depends not only upon having effective distributing machinery, but also upon the care observed in grow-

ing, picking, grading and packing the berries. Educational campaigns probably could be carried on by the marketing associations among their members to emphasize the importance of these matters.

Lack of harmony among the members or misunderstandings between members and the management are apparent in some of the marketing organizations. The personal element which necessarily is present often produces difficulties which are hard to solve. It is highly essential, of course, that there be at all times full understanding between the members and the management. The management should so conduct its affairs that there will be no cause for lack of confidence on the part of the members and the latter should give the management their wholehearted support. Membership contracts will not of themselves eliminate friction between groups of the members or between members and the management, but they should aid by setting forth clearly the responsibilities of the growers and the organization and by giving greater stability to the enterprise. Because of this fact, it would seem advisable for the associations to give careful consideration to the employment of suitable marketing contracts.

The strawberry marketing associations probably do not feel any pressing need to revise their organization plans and reincorporate under the Bingham Cooperative Marketing Act, which was passed early in 1922. Several of the associations, however, are contemplating such a step and the other associations, no doubt, will find it worth while to give consideration to this matter.

It appears that there is room for some improvements in the transportation service. Some of the associations indicated that the cars were not always adequately iced and had to be re-iced before shipment. It is highly desirable that the cars should be iced sufficiently in advance of loading so that they will be thoroly cooled when loaded. Cars should not be kept

open during loading for a longer period than necessary. Some suggestions have been made that the berries be precooled before shipment. This involves the question of providing additional equipment, which would be used only for a comparatively brief season and the expense would be a limiting factor. The extension of express refrigeration service to more points than those which have this service at present would open up a wider territory for shipment of Kentucky berries. One or two associations which load at more than one point would find it helpful at times if arrangements were made so that they could load a part car at one point and fill the car at another point. Some of the associations also indicated that a later train than now scheduled at their loading points would be serviceable at times.

The various strawberry marketing associations have many problems in common and the proposition of establishing a central association to look after such questions, merits careful consideration on the part of the organizations. Among the propositions to which such a central body could give attention are better cultural and handling methods, the interchange of information, the location and development of outlets, the routing of consignments, the supervising of sales and the handling of transportation questions. Some persons have suggested that a plant to process berries which are too ripe for shipment would be a desirable undertaking. This is a line of endeavor which each association cannot handle for itself. Careful consideration, however, might be given to this question by a central organization to determine whether or not such a plant would be a profitable addition to the marketing machinery. A central organization likely would be found of service in obtaining pickers and in the purchase of plants and supplies needed by the growers.

The question of the condition of Kentucky strawberries when they arrive at their destination was taken up with Food Products Inspectors of the U. S. Department of Agriculture in some of these markets. The following are some of the comments made by these officials.

One inspector writes that "For many years Kentucky strawberries were looked upon as one of the best carrying berries in the country, the stock almost invariably arriving in the market in perfect condition, dry, well colored and well packed. However, during the last two years, most shipments have arrived in a soft condition, showing dull color, probably due to the heavy rains in your state at the time of picking. The merchants also state that during the past two or three years the berries do not seem to have been as well graded as formerly."

Another inspector writes that "Considered as a whole, the quality and condition was good. Missouri, Arkansas and Tennessee berries arrive about the same time with Missouri and Kentucky usually bringing top prices."

"About the only thing I might suggest is to lay special stress on the importance of proper equipment. It is about a four days' haul up here and you can readily appreciate the necessity that only cars offering the best refrigeration should be used. It might be well to call attention to the fact that the car should be iced at least 20 hours before loading in order to insure bringing the temperature down as low as possible."

Another market representative of the department writes that "A good many cars of Kentucky Aromas were sold on this market this season, and the quality and condition compared favorably with that of berries from other sections. Rains caused much of the stock from all sections to come in in a soft, watery condition, but as I remember, Kentucky berries were no worse in this respect than berries from any other section. They usually sold at either the same price as Missouri Aromas, or sometimes one cent a quart or so less. They generally brought 2c-3c a quart less than Gandies and Chesapeakes from Maryland and Delaware, and 2c-4c more than Klondikes, being smaller than the former but larger and more attractive in appearance than the latter."

Another representative states that "My impression from what I saw in the markets last spring is that Kentucky berries

suffered rather less from decay than those from several other Southern states, but did show enough decay to mean appreciable loss. Much of the decay in the Southern states last spring was due, I think, to prolonged wet weather and the failure to mulch. Mulching is not a cure-all, but it has been proved to be a valuable aid in improving the crop in amount, quality and ability to carry to market.''

Kentucky
Agricultural Experiment Station

University of Kentucky, Lexington, Ky.

THOMAS P. COOPER, Dean and Director

The Marketing of Kentucky Bluegrass and Orchard Grass Seeds

BULLETIN NO. 247

Lexington, Ky.

June, 1923

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BULLETIN NO. 247

The Marketing of Kentucky Bluegrass and Orchard Grass Seeds

By DANA G. CARD

Bluegrass seed and orchard grass seed are produced on a commercial scale in the United States only in certain regions, and Kentucky is the leading state in their production. The methods of marketing these seeds differ in some respects from those employed for most other farm products of Kentucky. Their localized production and the specialized outlets are factors in creating these differences. Bluegrass seed is not ready for use until it has been cured and carefully cleaned. Orchard grass seed usually must be cleaned before it is ready for use, also. The growers of other farm products frequently have the choice of several outlets while these seeds usually are sold to dealers in the producing areas, who have the necessary cleaning equipment. It should be borne in mind that bluegrass seed is obtained as a byproduct from bluegrass pastures and is not grown solely for seed, as is commonly true with other crops. Seed is harvested from part of the pastures only, so the supply can be increased by stripping seed from a larger area when it appears profitable to do so.

KENTUCKY BLUEGRASS SEED PRODUCTION

The Bluegrass Region of Kentucky is known the world over for its wonderful bluegrass pastures and the thorobred horses which are raised on these pastures. Bluegrass seed is produced on a commercial scale only in part of the Bluegrass Region, mainly in the counties of Bourbon, Clark, Fayette, Scott, Montgomery and Jessamine.

Since the seed is merely a byproduct of bluegrass pastures, the acreage from which seed is stript varies greatly with the season and the price of seed. The 1912 crop, the largest ever harvested, was estimated at 1,500,000 bushels of cured seed in the rough. This no doubt was due, first, to a favorable season, and second, to the fact that during 1911 cured seed in the rough sold for $1.65 to $1.75 per bushel, prices which, because they were considerably higher than those which had been received previously, encouraged the stripping of a larger acreage the next year. As a result of this enormous production, cured seed in the rough brought only $0.55 to $0.70 per bushel in 1922. In 1913 only 175,000 bushels were harvested. A large holdover from the 1912 crop affected the bluegrass seed market for the next four or five years. However, as one man expressed it, "The Great Master took a hand" and, with the exception of the crops of 1914 and 1922, all have been comparatively short crops since 1912, with prices gradually growing higher until in 1921 growers received from $2.00 to $2.50 for cured seed in the rough, the highest prices known in recent years. Cleaned seed sold in 1921 for $6.00 per bushel and for over $7.00 early in 1922. A report of the Commissioner of Agriculture of Kentucky shows the production of bluegrass seed in Kentucky from 1900-1921 and the average annual production for this period was 425,682 bushels. The crop of 1922, estimated to be over 1,000,000 bushels of seed in Kentucky and Missouri, started moving in July at prices from $1.00 to $1.25 per bushel for cured seed in the rough. These prices increased slowly until September, when dealers were offering $1.25 to $1.50 per bushel for cured seed in the rough and wholesale prices for cleaned 19-pound seed ranged from $3.15 to $3.40 per bushel.

While Central Kentucky is the largest producing district, about 200,000 bushels of bluegrass seed are harvested annually in the so-called Missouri area which includes small portions of Missouri, Iowa and Kansas. Missouri seed, as a rule, is a little heavier and is sometimes mixt with Kentucky seed to bring up the weight of the latter. Cured Missouri seed in the rough is sometimes shipt to Kentucky for cleaning.

Canadian bluegrass seed to some extent has competed with that of Kentucky bluegrass. These seeds are very similar in appearence and as the Canadian bluegrass seed usually is cheaper, it formerly was used to adulterate Kentucky bluegrass seed. Seed laws which have been enacted have largely eliminated this practis. Canadian bluegrass is more often used for hay than for pasture in sections where Kentucky bluegrass does not grow well so that it is not a direct competitor with the latter to any extent.

METHOD OF HANDLING ON THE FARM

The methods of stripping, handling and curing bluegrass seed are important from a marketing standpoint because of their influence upon the quality of the seed. As with other products, quality is an important factor in determining the price of Kentucky bluegrass seed. Altho the quality varies from year to year, an excellent crop may be practically lost by improper handling, or a comparatively poor crop may result in seed of reasonably good quality with proper care.

The stripping season for bluegrass comes late in May or early in June and often lasts only five or six days. The shortness of the stripping season makes it necessary to obtain a supply of extra labor and results in some seed being stript when green in order to prevent other seed from getting over-ripe. Many large farmers own strippers while others depend upon contractors to strip their seed for them. Yields range from 5 to 25 bushels per acre, depending upon the season, the presence of weeds in the field and the amount of stock grazed prior to stripping. An average yield per acre in Kentucky is about eight bushels.

Seed when removed from the stripper is placed in large sacks and taken to a suitable place for curing, either out-of-doors or in barns or tobacco warehouses. The seed is placed in long windrows, which should be about 18 inches high and not over that wide at the base. These windrows must be turned frequently, usually three or more times each day, to prevent the green seed from overheating. Overheating is the most common

cause of low germination, and usually occurs when green seed is left in sacks or large windrows too long. Seed left in sacks as long as three hours has been known to reach temperatures of 120° F. to 145° F. (1) For this reason seed should be removed from the sacks as quickly as possible and placed in small windrows, whether cured indoors or out. Tests have shown that a temperature of 140° F. results in a decided lowering of the germination percentage, so it is highly important to prevent overheating.

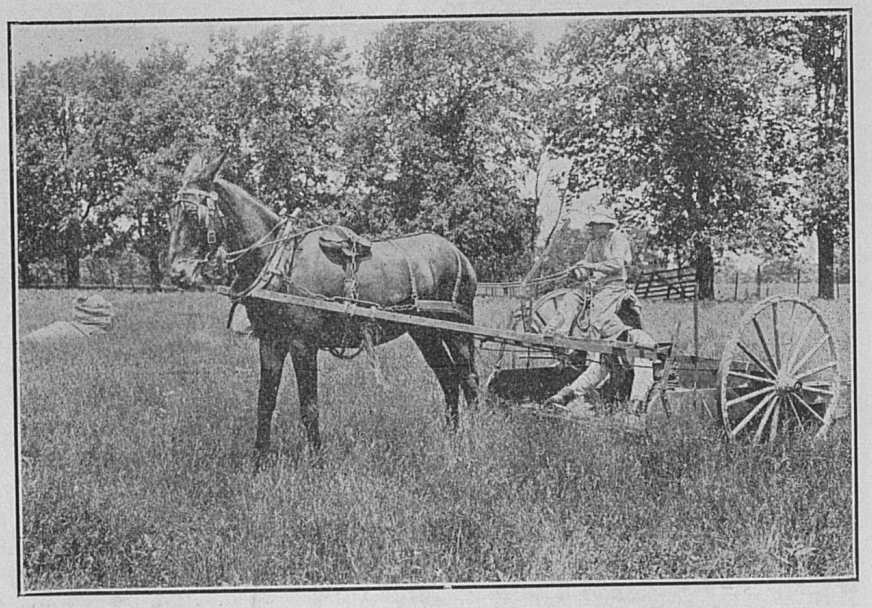


Fig. 1.—Stripping Kentucky Bluegrass Seed.

With favorable weather and proper attention, the seed becomes properly cured in two to four weeks. Freshly cured bluegrass seed has a low germinating power so that good seed may fail to germinate almost entirely when first taken from the ricks. If not stript too green it should test 65-85% germination after three or four months and if graded to 21 pound seed or heavier, it probably will germinate still higher. The seed

1 "The Curing of Bluegrass Seeds as Affecting their Viability." Bulletin No. 198. Kentucky Agricultural Experiment Station, page 30.

loses from one-third to one-half its weight in the curing process, depending upon its maturity and the presence of weeds and other foreign matter. One of the dealers in bluegrass seed stated that the average germination of bluegrass seed has been improved in recent years by increased care in stripping and curing, but that there is still room for improvement.



Fig. 2.—Stript seed is placed in large sacks for convenience in handling.

MARKETING METHODS

Bluegrass seed has been sold by the farmer in one of three ways. First, standing in the field before stripping; second, after stripping, but before curing; third, as cured seed in the rough. When sold standing in the field it is sold as a whole or at a certain price per bushel of green seed stript. Men who buy from farmers in this way and do the stripping are usually

termed "contractors." They either strip the seed on shares, usually for 2/5 or 1/2 of the seed, leaving the farmer with his share of the green seed on his hands, which he sells to dealers, or they purchase the seed in the field prior to stripping. Some contractors sell their seed green; others cure it before selling.

Probably the majority of farmers who harvest bluegrass seed, do it with their own equipment, then cure the seed and sell it in the rough to large dealers. Many farmers, no doubt, would locate a direct market for their seed if it were practicable to clean it sufficiently on the farm.

After the seed has been cured it is cleaned. In cleaning, the rough seed is first broken up by a beater, then dropt into a bottomless box, out of which it is taken thru a pipe by suction. This removes sticks, stones and considerable dirt which have become mixt with the seed. The seed is then passed over a cylinder which rotates inside a closely fitting wire mesh sleeve, and rubs open the seed heads, liberating the seeds. After this is accomplished it is run thru regular seed-cleaning machinery which has been adjusted to fit bluegrass seed. During this process, most of which takes place in closed, box-like compartments, the dust and chaff are removed by a current of air and caught in long canvas tubes. This material is blown into the fire-box in the boiler room and used for fuel, sometimes furnishing one-fourth to one-third of the fuel necessary for operation. When thoroly cleaned of all foreign matter which wind and sieves can remove, the seed is run over a gravity grader which removes heavy weed seeds and grades the bluegrass seed.

The weight lost in cleaning bluegrass seed varies greatly with the crop, its condition when stript and foreign material content. A crop stript when mature, properly cured and relatively free from chaff and weeds, may lose only 25% of its rough weight in cleaning, while one stript green, carrying a mixture of stems, weeds and dirt, may lose 50% or even more. The cost of cleaning this seed, other than shrinkage, is from 10 to 15 cents per bushel of rough seed.

Large dealers in Kentucky bluegrass seed, who own cleaning equipment, are located in Georgetown, Lexington, Paris and

Winchester, Kentucky. These dealers have handled practically all the bluegrass seed which has been cleaned in the state. They buy seed in all stages, as some of them own strippers, but the bulk of the seed has been purchased as cured seed in the rough. When the seed is cleaned it is sold to wholesale dealers, jobbers, retail dealers and those who specialize in lawn grass mixtures. Kentucky dealers, as agents for the Bluegrass Seed Growers' Association, cleaned and handled the 1922 crop of seed of the members of that organization.

The marketing of any product involves the performance of a series of services in getting the product from the point of production to the ultimate user. Among the marketing services rendered by the dealers in bluegrass seed are cleaning of the seed, its storage until there is demand for it and the locating of outlets for it. Careful cleaning is of utmost importance. Storage for considerable periods is necessary. Seed to be used in the preparation of lawn grass mixtures usually is sold in the fall, but seed for golf links and pastures often must be stored until spring. The development of outlets is of importance in finding a satisfactory market for the seed.

OUTLETS FOR SEED

As has been noted above, the principal uses of Kentucky bluegrass are for lawns, golf links and pastures. The export demand at present is of much less importance than prior to the war but is again making itself felt. No doubt foreign demand will develop with readjustment of rates of exchange and European conditions.

Lawn grass mixtures in use all over the United States contain varying amounts of Kentucky bluegrass seed depending upon the price at which it is sold and upon the price of bluegrass seed in comparison with other grass seeds. This use of the seed no doubt could be increased thru advertising. The golf links in this country, which have been increasing in number so rapidly during the last few years, are taking large quantities of bluegrass seed. These links often are reseeded heavily several

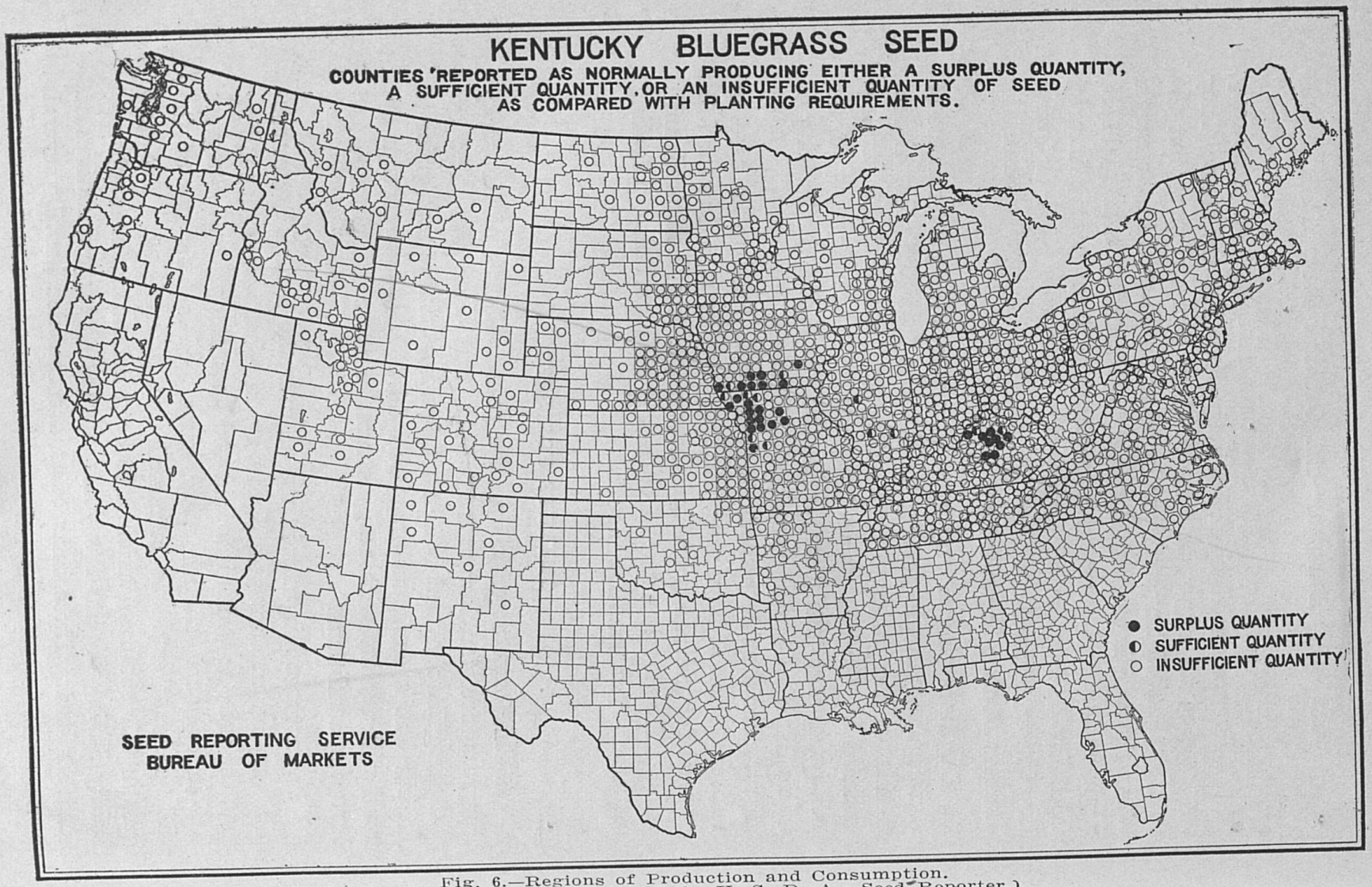


Fig. 6.—Regions of Production and Consumption.
(From June 7, 1919, issue of the U. S. D. A., Seed Reporter.)

times a year. Altho Kentucky bluegrass thrives much better on limestone soils, rich in phosphorus, it can be used successfuly for lawns and golf links in all parts of the country.

The amount of bluegrass seed used for pastures is comparatively small except in parts of Virginia where export cattle are finished and in Kentucky where some reseeding is required to replace pastures plowed up for tobacco.

Fig. 6.—Regions of Production and Consumption.
(From June 7, 1919, issue of the U. S. D. A., Seed Reporter.)

GRADES AND GERMINATION

Altho the legal weight of bluegrass seed is 14 pounds per bushel, cleaned seed usually found in the trade weighs from 19 to 21 pounds to the measured bushel. The legal weight was established years ago when there were no adequate machines for removing chaff, immature seeds, weed seeds and the like. However the old weight still prevails, and all bluegrass seed, whether cleaned or in the rough, is bought and sold on a 14 pound bushel basis.

Bluegrass seed is seldom graded in the rough altho prices vary somewhat with the amount of foreign material mixt with the seed. The grading of cleaned seed is done by an automatic gravity grader. The grades in use which have been developt on the basis of weights are 15-, 17-, 19- and 21-pound seed. The germination usually varies with the weight and ranges from 50% to 85% or higher. Foreign trade demands a heavy seed so 23 or 24 pound seed sometimes is produced for exportation.

POSSIBLE IMPROVEMENTS

Improvements in the industry must be either in methods of production or methods of marketing and distribution. One of the weaknesses is the low germination of seed. Germination is materially affected by the condition of the seed when stript, the methods of handling while in the curing process, and by cleaning. Altho extra labor and equipment may be necessary, it is important that the seed be stript in the proper stage if high germinating seed is to be produced. The new strippers now coming into common use are helping to relieve the situation.

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These strippers are much more expensive than the old comb strippers, but are labor-saving because only one man is required to operate them. Because of their initial cost they likely will not replace the old comb strippers entirely for some time. More strippers and more labor, together with greater efficiency in handling the seed, are needed to solve the stripping problem. In improving the methods of marketing bluegrass seed, as with other products, the question of quality is of major importance. Both the farmer and the cleaner are responsible for the quality of the seed because the farmer must first produce mature, well-cured seed and the cleaner must remove the light-weight seeds and foreign matter. Since over-heating is a common cause of low quality in blue grass seed, improvement may be brought about by greater care in the curing. Green seed should not be allowed to remain in sacks for more than one or two hours and should be cured in small ricks not over eighteen inches in height. Thermometers may be used to advantage in guarding against over-heating. Best results in the cleaning of seed cannot be obtained unless the machines and the gravity grader used in the cleaning process are properly adjusted.

The question of increasing the demand for Kentucky bluegrass seed is important in considering ways of improving the industry. Since the grass is not suitable for hay, any increased use must be for lawns, parks, golf links or pastures. Thru advertising, satisfactory lawn grass mixtures containing bluegrass seed could be suggested, together with directions for properly preparing the seed bed and caring for bluegrass lawns. Efficient and practical methods of seeding and caring for parks and golf links could be suggested for the purpose of increasing the use of seed. A campaign leading to the beautifying of home grounds and of those around public buildings should stimulate the use of Kentucky bluegrass seed.

A careful study of the uses made of bluegrass seed should prove valuable in seeking outlets. Its use no doubt is very limited in some sections. Conditions in the bluegrass seed trade have been such that wide fluctuations in price often have occurred during the season. Such uncertainties in the market tend

to discourage rather than encourage consumption. Improvement should result from a more uniform price thruout the season and a well directed marketing organization should be able to be of service in bringing this about.

COOPERATIVE MARKETING

The Kentucky bluegrass seed industry lends itself favorably to cooperative marketing because the seed is produced in comparatively limited areas in Kentucky and Missouri, which simplifies the formation and operation of an organization. The seed meets with very little outside competition and its use very probably could be increased thru advertising. Encouraged by the widespread interest in cooperative marketing and the success of the Burley Tobacco Growers' Cooperative Association, in its first year's business, the bluegrass seed growers organized a cooperative marketing association under the Bingham Cooperative Marketing Act early in 1922. Contracts covering the delivery of about 500,000 bushels of the 1922 crop of seed were signed by producers. The Association, thru its executive committee, made contracts with Kentucky dealers to clean and sell the seed and agreed to pay them fifteen cents per bushel of rough cured seed for cleaning and ten cents per bushel of clean seed for selling. The seed was graded upon delivery and after sales are made, each member is to be paid according to the grade and quality of his seed.

The 1922 crop being unusually large, much of the normal demand for bluegrass seed was supplied by producers in the Missouri area and non-members in Kentucky who seemed willing to sell at prices slightly lower than those at which association seed was offered. In February, 1923, however, the association made a distribution to its members of about $250,000.00, equivalent to fifty cents per bushel of seed handled.

Early in March, following the first payment for seed, a meeting of the association was held and a committee was selected to work out plans for increasing the membership. A five-year contract was to be used and signatures secured, representing

three-fourths or more of the bluegrass seed production in Kentucky. Action was so delayed, however, that the 1923 crop was not handled by the association.

If future developments indicate that it will be desirable for the association to own cleaning equipment and establish its own marketing outlets, the necessary steps can be taken at such time. It would be inadvisable for the association to duplicate existing cleaning facilities or to acquire ownership of them unless a saving would result from such action. Careful consideration no doubt will be given to this matter before such a move is made.

It is still too early to know what part cooperative marketing will play in the future of the bluegrass seed industry. However, there can be little doubt of the beneficial effect of an association which is based on business principles, efficiently operated, backed by loyal support of its members and insured a sufficient volume of business by contracts with a large proportion of the growers.

No marketing organization of bluegrass seed producers has been formed in the Missouri area. This area covers a larger territory than the seed-producing region of Kentucky, since the growers who strip seed are more scattered. The possibilities of organizing the farmers in the Missouri region into an association which might be federated with an association in Kentucky are lessened by the scattered production.

The opportunities for service, open to a Kentucky Bluegrass Seed Growers' Association, are of interest in this discussion. Thru such an organization it may be possible to increase the use of bluegrass seed for lawns, golf links and parks by working with reputable lawn grass seed dealers. The good will of the trade is a valuable asset to any marketing organization. Thru efforts to stabilize the market, dealing in products of uniformly good quality and following fair business practises, this good will may be won. By carrying on educational activities among the members a bluegrass seed association should be able to improve materially the quality of their seed. No one factor will tend to increase consumption more or be of greater benefit to the associa-

tion than that of high quality seed. Members should be taught better methods of stripping, curing, handling and delivering the seed.

By the pooling of sales thru an association, growers will receive the average price paid for seed throughout the season or period during which the association is making sales. This will be of benefit in such times as the 1921-22 season when the market price of Kentucky bluegrass seed advanced about seventy-five per cent between September and January. Most of this rise in price occurred after the seed had left the growers' hands.

The individual farmer has not been able to familiarize himself with all market conditions and become an expert salesman for his products. Thru cooperative marketing, however, the bluegrass seed producer may employ expert salesmanship at a small cost per bushel because of the volume of business transacted. The association can not hope to control the production of seed because that depends upon weather conditions and the acreage stript. Neither can it fix an arbitrary price upon the seed, as price determination must be based upon careful consideration of the supply available and the demand for seed. Its possibilities, therefore, lie in improvements in handling methods, economies in marketing and the stimulation of demand. With careful study by those familiar with the trade and general economic conditions, the prices at which seed is offered by an association may be so adjusted as to strike a balance between the supply of seed available and the demand which may be developt for it. If these factors are adjusted properly the price will be as high as can be safely secured without curtailing the demand for seed. In other words, the price received will be what the market justifies.

The opportunities in advertising have been discust. Activities in this field will become possible thru cooperative marketing when a sufficient volume of business is handled to warrant the required expenditure of funds. Such advertising should seek to extend the distribution and use of bluegrass seed to sections where it is not used at present and also to increase its use in regions now partially supplied.

The opportunities open to a cooperative marketing association, however, do not insure its success. These opportunities must be taken advantage of. First of all, the association must be of service to its members and to those with whom it has dealings. It must lessen marketing costs or perform the marketing services more effectively than they have previously been performed. To do this a volume of business sufficient for economical operation must be obtained. Sufficient capital for the needs of the organization must be available. There are numerous ways of securing needed capital, such as from banks, individual investors, the membership and from the sale of goods. Many associations are entirely financed by means of membership fees or subscription to capital stock made by members. Products in storage furnish security for obtaining loans for use in making advances to the members and paying operating expenses.

No business organization can accomplish much without good management. The business manager and officers of the bluegrass seed association should be selected because of their knowledge of the business to be undertaken, their unquestioned honesty and integrity and the faith and confidence which association members have in them. Inefficient management is one of the leading causes of failure in cooperative marketing associations and should be carefully guarded against.

The members must be loyal to their organization if it is to be of outstanding success. Membership loyalty implies the production of high quality products and marketing them thru association channels. It implies active participation in the affairs of the association insofar as the individual member is concerned. Members should feel their responsibility in selecting officers and directors of the association. Their relationships with non-members should always be friendly. They should attempt to secure additional members for their organization thru careful persuasion, but always bearing in mind that it is everyone's privilege to remain a non-member if he so desires.

With these essentials for successful operation carefully secured and maintained, a bluegrass seed growers' association should become an influential factor in the industry and be of material benefit to the producers. If a successful organization is formed in the Missouri area this benefit may become even greater thru the federation of the two organizations.

AVERAGE WHOLESALE PRICES OF KENTUCKY BLUEGRASS SEED IN THE UNITED STATES*

Corresponding Dates in

	1923	1922	1921	1920	1919
	Per 100 lbs.	Per 100 lbs.	Per 100 lbs.	Per 100 lbs.	Per 100 lbs.
January	$26.25	$48.05	$27.90	$29.05	$22.25
	26.45	48.35	28.05	29.30	23.00
	26.40	48.25	27.75	29.50	22.25
	26.40	48.25	27.65	29.70	22.75
February	26.30	48.85	27.35	29.90	23.00
	26.35	49.30	27.50	30.10	23.00
	26.20	50.20	27.30	30.20	23.00
	26.10	50.40	27.25	30.30	23.00
March	26.05	51.40	27.15	30.45	23.00
	25.90	51.90	27.15	30.55	23.00
	25.25	52.05	27.65	30.40	23.00
	25.75	52.40	28.50	30.30	23.00
April	25.60	52.55	29.30	30.05	24.00
	25.40	53.20	30.90	29.65	24.75
	25.55	54.00	31.65	29.35	24.75
	25.40	55.80	31.90	29.25	24.75
	25.40	55.90	32.25	29.10	24.75
May	25.10	56.00	32.40	28.90	24.75
	24.65	56.20	32.90	28.30	24.75
	24.30	56.20	33.05	28.25	24.75
	24.30	56.35	33.95	28.25	24.75

*Wholesale prices of field seeds, on Saturday, in twelve leading markets are quoted in Weather, Crops and Markets each week. These prices are used to compute the United States average from which the above table has been compiled.

PRODUCTION AND PRICES OF KENTUCKY BLUEGRASS SEED IN KENTUCKY

Data for the years 1900 to 1918, inclusive, have been taken from a table in the July 12, 1919, issue of the Seed Reporter. Data for the years 1919 to 1922, inclusive, have been compiled from issues of Weather, Crops and Markets and the Seed Reporter.

Year	Production of Stripped Seed, Bus.	Prices Paid Growers for Stripped Seed, Per Bu.	Cleaners' Selling Prices in Carload Lots Per Bushel	
1900	500,000	$0.42—$0.45	$0.85—$1.00	
1901	400,000	.50	.80— 0.85	
1902	275,000	.72	1.10— 1.15	
1903	340,000	.65	1.18— 1.20	for 19-lb. seed
1904	750,000	.42— .45	.65— .85	
1905	275,000	.70— .85	1.25— 1.30	
1906	350,000	.70— .85	1.65— 1.85	
1907	425.000	.80— 1.25	2.00— 2.25	
1908	600,000	.60— .62½	1.13½	
1909	450,000	.80— 1.00	1.68— 1.82	for 21-lb. seed
1910	200,000	1.25— 1.60	2.65— 2.90	
1911	350,000	1.65— 1.75	2.35— 3.20	for 19-lb. seed
1912	1,500,000	.55— .70	.95— 1.15	
1913	175,000	.60	.90	
1914	700,000	.45	.90	
1915	350,000	.60	1.50	for 21-lb. seed
1916	250,000	.70	1.25	
1917	200,000	1.40— 1.65	2.75	
1918	350,000	1.50	2.85	
1919	375,000	1.50— 1.75	3.55— 4.25	
1920	325,000	1.75— 1.85	3.65— 4.25	for 19-lb. seed
1921	175,000	2.15— 2.25	6.60— 8.10	
1922	700,000	1.25— 1.50	3.50	

ORCHARD GRASS

Orchard Grass Seed Production

The principal orchard grass seed producing area in the United States is located near Louisville, Kentucky, including the counties of Oldham, Shelby, Henry, Woodford, Franklin and Jefferson, in Kentucky, and Clark, Jefferson and Switzerland, in Indiana. Warren and Barren counties in South Central Kentucky, and Clinton and Highland counties, in Ohio, are other

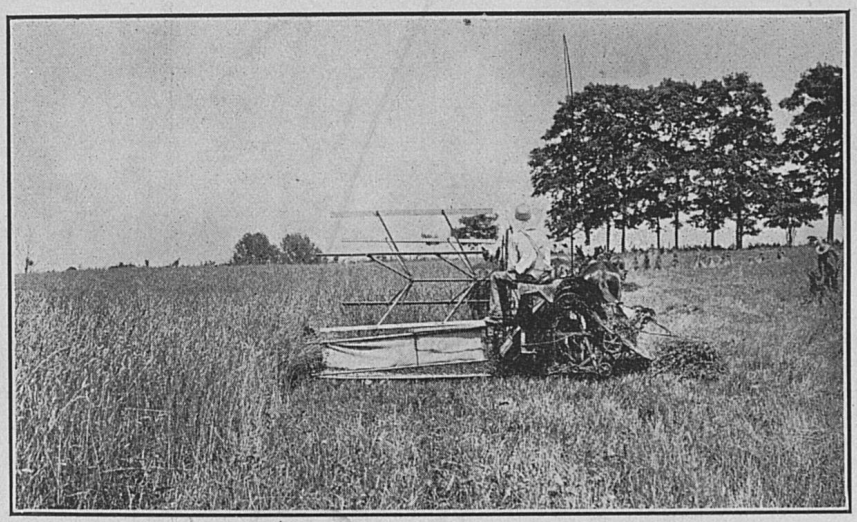


Fig. 4.—Harvesting Orchard Grass for Seed.

smaller producing areas. Fauquier county, Virginia, produces about 30,000 bushels of orchard grass seed annually. Missouri has come into the field recently and produces about 50,000 bushels annually. The Kentucky, Indiana and Ohio areas produce about 225,000 bushels in a normal season, a large portion of which passes thru the hands of Louisville and Cincinnati dealers.

Orchard grass seed produced in this country must compete in the market with imported seed. Importations of orchard grass seed in some years have amounted to over 200,000 bushels. In Denmark, a large producer of orchard grass seed, the grass is

planted in rows and cultivated. This practis, together with seed selection and the use of commercial fertilizers, has developt yields of 25 to 40 bushels, whereas yields in Kentucky average 10 to 15 bushels per acre. In New Zealand the seed grows wild among the forest trees and is harvested by hand. Foreign seed usually is brighter in color and somewhat heavier in weight than home grown seed.

Orchard grass seed prices were good, during and after the World War period, until 1922. Much of the 1921 crop was pur-

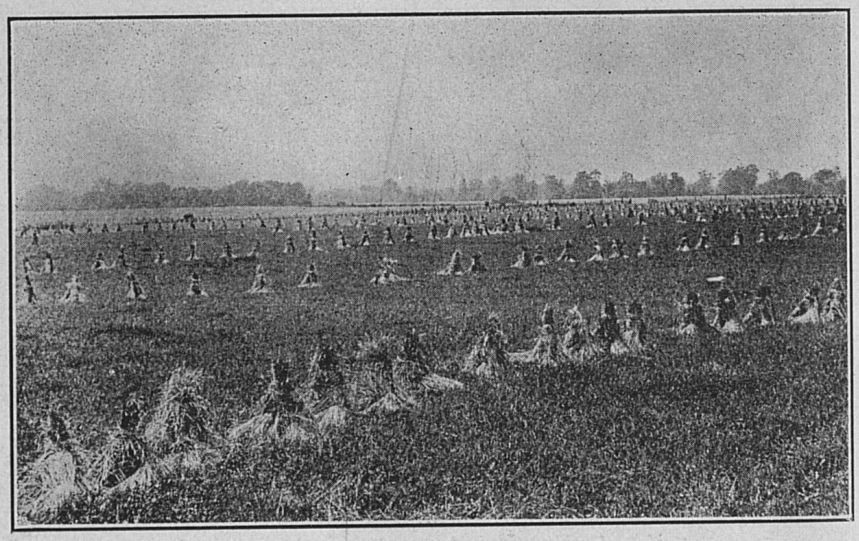


Fig. 5.—Orchard grass is allowed to cure in the field before threshing.

chased from farmers at $2.00 per bushel on the basis of recleaned seed, while the wholesale price for the same period was about $2.50 per bushel. In 1922 growers received from $0.75 to $1.25 for machine run and $1.00 to $1.50 per bushel for seed purchased on the recleaned basis, while prevailing wholesale prices were $1.65 to $1.95 per bushel for recleaned seed.

Methods of Handling on the Farm

Orchard grass is cut with a binder and tied in very small bundles to facilitate curing. Three bundles are placed together in a shock and tied with two bands near the top. Harvesting in

the Kentucky-Indiana area usually begins about the middle of June and lasts a week or ten days. The shocks are allowed to stand from two to four weeks or until properly cured, when they are threshed directly from the field. The small shocks are loaded on wagons, drawn to the thresher and placed on the table before the bands are broken, reducing loss from shattering to a minimum. A common grain separator, with special riddles, is used for threshing orchard grass. Usually the seed is placed in large eight-bushel sacks for convenient handling.

The threshing of orchard grass seed requires careful attention, since the seed is so light there is great danger of blowing it over. The wind must be carefully controlled to blow out redtop seed and chaff but retain the slightly heavier orchard grass seed. Threshing so as to avoid unnecessary loss of seed is a problem of considerable importance to the grower.

Marketing Methods

The marketing of orchard grass seed after it leaves the farm has been left entirely to dealers. These dealers usually are engaged in handling other field seeds also. This affords the use of cleaning equipment, warehouse space, office supplies and labor in handling orchard grass seed, when needed, which can be used for other products during the remainder of the year.

The recleaning of orchard grass seed is an important service performed by dealers. Altho the process required is not as elaborate as in the cleaning of bluegrass seed, it requires accurately adjusted machinery and careful attention. The equipment used in recleaning the seed is a common seed-cleaning mill, using sieves and wind to remove foreign matter. Foreign material, weed seeds, light-weight orchard grass seed and other seeds, if not removed, lower the quality and sale value of the orchard grass seed. According to estimates made by dealers the cost of recleaning orchard grass seed varies from five to ten cents per bushel, with an average of about nine cents per bushel of recleaned seed. The additional expense due to loss in weight from the removal of weed seeds, chaff, light seeds and the like, varies

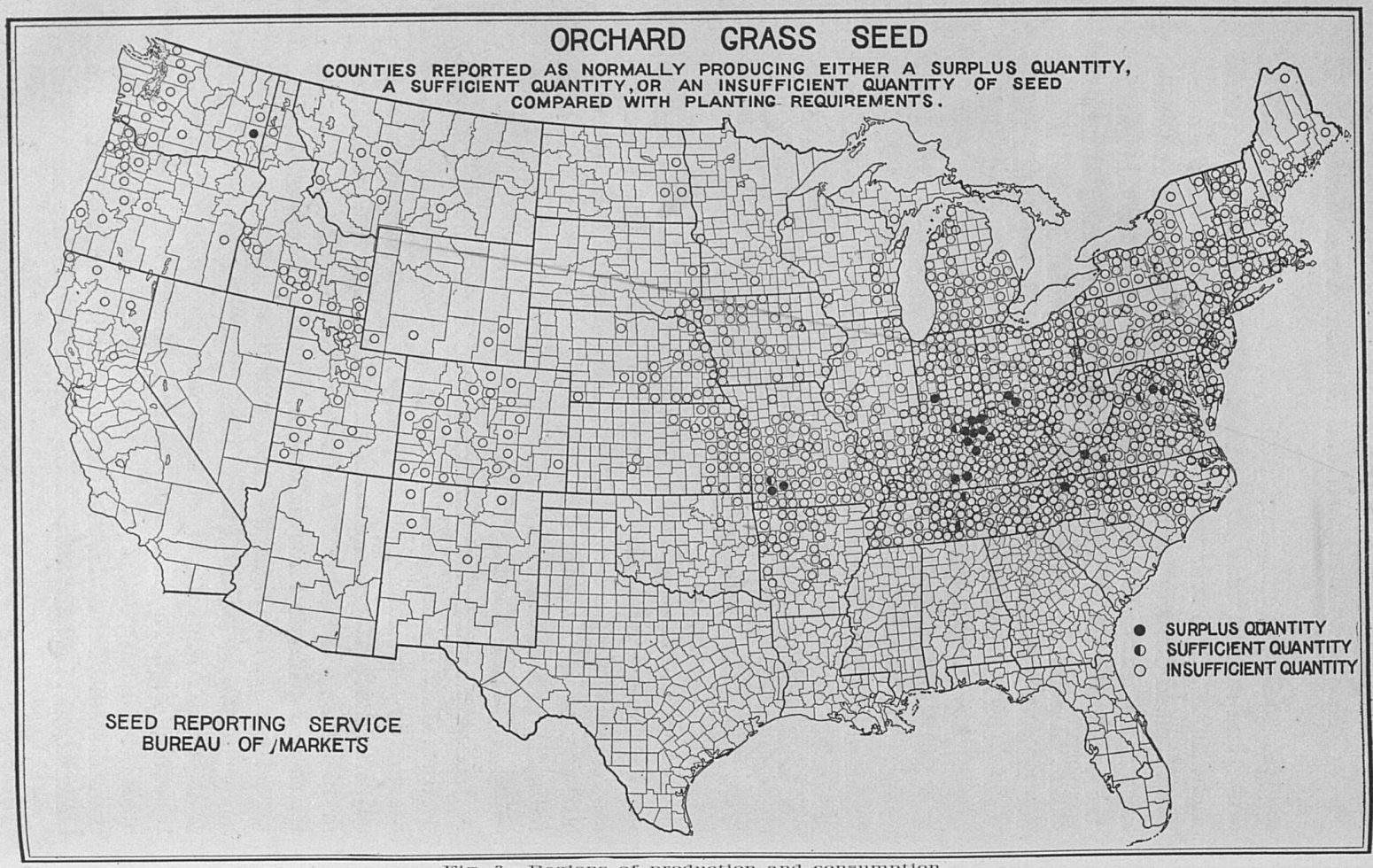


Fig. 3.—Regions of production and consumption.

considerably with the quality and price of seed. Sometimes the seed is sufficiently clean for market when it comes from the thresher.

Much of the seed is purchased from the farmers by wholesale dealers thru field representatives who visit each farm and make a preliminary test of the seed by means of a small cleaning machine operated by hand. The approximate amount of recleaned seed which can be obtained from each crop is calculated from the test and the price offered is based upon this amount. The prices usually include delivery to the grower's shipping point from which the dealer pays further transportation charges.

Some seed is sold by the wholesale dealers in the summer and fall, but the height of trade comes in the early spring, which necessitates storage thru the winter. The seed loses little weight if properly stored in a dry warehouse. The furnishing of such storage and the funds required to hold the seed as well as carrying the risk of loss from market fluctuation, fire and other causes are additional costs to the wholesale dealer.

Altho the commercial production of orchard grass seed in the United States is limited to comparatively small areas, the grass is used for hay and pastures in many parts of the country. The dealers who reclean the seed, sell to wholesale dealers, jobbers and retailers in other markets. Sometimes seed has been exported during years of a short foreign crop.

Outlets for Seed

Orchard grass is in little demand as a hay crop in sections where timothy yields well, because of its coarse and woody texture, especially if allowed to ripen before cutting. When cut in the bloom and well cured, however, it makes excellent hay for cattle and horses. The quality of orchard grass hay may be much improved by sowing with it red or alsike clover. The orchard grass and clover are ready to cut at about the same time and often yield a second crop in favorable seasons. This mixture is not so desirable when grass is grown for seed altho the clover often dies out after the first or second year leaving a clean field of orchard grass.

Orchard grass has proved to be excellent for pastures, especially when mixt with clover and other grasses. It is being recommended in mixtures for the renewal of old pastures because of its luxuriant growth both early and late in the season. More orchard grass would be used for pastures if farmers realized its full value. By planning the farm operations so that the grass could be cut somewhat earlier than the usual haying season, orchard grass might well be used more extensively for hay.

Aside from its use for hay and pasture in practically all sections of the country, orchard grass is used to some extent for an orchard mulch.

Grades

Altho orchard grass seed varies somewhat in weight, all sales are made on the basis of 14 pounds per bushel. Sales are made by sample because no definite grades have been established and variation in the color, purity and germination of the seed makes it difficult to sell by description. Heavy paper envelopes bearing the results of germination and purity tests are used to distribute samples by mail to prospective purchasers.

Because there are no definite grades for orchard grass seed, it usually is classified on the basis of germination, which varies from 60% to 90%. Imported seeds are classified according to the percentage of pure viable seed, which considers both the purity and germination of the seed. Thus seed testing 90% purity and 90% germination rates as 81% viability. All imported orchard grass seed must show a viability test of 65% or more.

Possible Improvements in the Present System

One improvement needed is the production of cleaner seed. Weed seeds, chaff and the like, in seed, make threshing and recleaning more expensive. Since some weed seeds are very difficult to separate from orchard grass seed, the production of clean seed should start in the field. Clean seed should be used in sowing a properly prepared seed bed and weeds should be kept down in the fields insofar as possible. This is done quite satisfactorily

by the use of sheep which can be grazed in orchard grass fields up to within two or three weeks of harvesting. They eat down weeds and tender grass blades in preference to the more woody seed stalks, and so do not injure the seed crop materially. This practis of pasturing sheep in orchard grass fields is quite common in the seed-producing areas but can well be extended. Some hand work in cutting out dock and other weeds is of benefit.

The importance of clean seed is stressed in the following statement made under "Observations of the European Seed Trade" in the Seed Reporter for April 5, 1919:

"**Orchard Grass, or Cocksfoot.** In the past the larger part of the imports of orchard grass into the United Kingdom have been from the United States and New Zealand. In recent years, Denmark has been offering considerable seed which, because of its better average appearance and purity, has taken precedence over some of the American seed. From a casual examination of a number of samples, it appears that the advantages of the Danish seed are entirely in appearance and purity. In both weight and germination it seems that the American seed averages fully as good as, or better than, the Danish seed. If greater care is taken by American exporters in the preparation of orchard grass seed for export, to remove the dock, sorrel, and other impurities that are often present, and by American growers to give more attention to keeping the weed seeds out of the crop, it is thought that the American seed will regain its former position with British dealers and that there will even be an increase over the former normal demand. Where British dealers find it necessary to reclean cocksfoot (orchard grass) in order to meet their trade requirements, there is a great expense, due to (1) cost of recleaning, (2) reduction in weight caused by removing weed seeds and hulled cocksfoot, and (3) freight paid on useless foreign matter which is removed in cleaning."

Another improvement can be made in the care taken in threshing, both from the standpoint of producing clean seed and of eliminating waste. Stacks of orchard grass straw sometimes include enough seed blown over in threshing to make a fairly good profit on the crop, had it been saved. Proper adjustment of both screens and fans is important in threshing orchard grass.

Foreign grown seed can compete successfully with home grown seed, partly because of higher yields of seed in producing

regions. Little work has been done in this country toward improving strains or yields of orchard grass. In increasing the yield of orchard grass seed by selection, great care must be taken that the hay and pasture qualities are not lost as the yield of seed increases. Fertilizer tests also might prove of value in pointing the way to increased yields.

If orchard grass is to become more widely distributed, this must be brought about mainly thru increasing its use as a pasture grass. Experimental work has shown that orchard grass is very valuable in seed mixtures for pastures. Some state agricultural colleges are recommending its use in pasture improvement work. This information might well be employed to increase the use of orchard grass seed, thru advertising. No individual farmer or dealer who handles a small amount of seed can afford to advertise very extensively altho a farmers' cooperative association handling more seed might be able to do so. Orchard grass is used to some extent as an orchard mulch. "Sod culture" is becoming a more common practis in some apple sections and as this grows it may furnish a slight demand for orchard grass seed.

COOPERATIVE MARKETING

A discussion of cooperative marketing of orchard grass seed may be divided into, first, what has been done in the past, and second, what may be done in the future. Several years ago the orchard grass seed producers formed an association and made arrangements with a firm in Louisville to handle their seed. The seed was graded, recleaned and sold for a definite charge per bushel by this firm and settlement was made with the members after the seed was sold. Altho this system worked satisfactorily for some time, there was a gradual decrease in the membership. Competing firms in Louisville made good offers to members of the organization as well as to non-members. No contracts to deliver their seed to the association were signed by members and when prices continually improved during the war period the orchard grass seed growers' association became inactive.

There also have been local pools for the sale of machine run seed to dealers. One successful pool of this kind was centered at Eminence, Kentucky, in 1920. A competent man was selected to

sample and grade each man's crop on his farm. These samples were assembled and classified and each crop graded according to this classification. A record was kept of the amount of seed in each classification and this information was used in securing bids. This method, tho quite satisfactory, was temporary, since no permanent organization which could be depended upon to perform this service from year to year was formed. The expense of selling seed thru this pool was about one-half cent per bushel and the net price received was as high as that at which the bulk of sales were made that season, or higher. This pool is of interest because it demonstrated the possibility of grading machine run orchard grass seed as a basis of sale. Such a plan would be of considerable advantage to a cooperative association organized for the marketing of orchard grass seed as each grower could be paid in accordance with the quality of his seed.

There are possibilities for future development in the cooperative marketing of Kentucky and Indiana orchard grass seed. Some of the conditions which favor this development are the comparatively small area of production, the ease with which the seed may be handled, the possibility of meeting the competition of foreign seed thru an organization, and the opportunity for increasing the use of orchard grass thru advertising.

Altho up to the present time no official experiments have been completed comparing home grown and foreign seeds it is commonly believed that home grown seed is preferable for seed, hay and pasture uses. Foreign seed usually is brighter in color and more attractive in appearance and this probably accounts for its extensive use. Official experiments comparing foreign and home grown seed might be of considerable value.

During the spring of 1922, the farmers of Oldham county, Kentucky, undertook to form a cooperative marketing organization. Articles of incorporation and bylaws were drawn up and contracts printed. Nearly all the orchard grass seed producers in Oldham and Jefferson counties signed the contracts, but sufficient signatures in other producing counties were not obtained to make the contract binding, as it called for a sign-up of seventy-five per cent of the production in Kentucky. In the spring

of 1923, renewed interest in cooperative marketing resulted in further consideration being given to organization plans.

If a cooperative marketing association for orchard grass seed is formed, it should be organized, like other farmers' cooperative marketing associations, for a definite purpose, operated on business principles, properly financed and efficiently managed. Such an association might sell the seed of its members to wholesale dealers, the dealers might be employed as agents to clean and sell the seed or, if it seemed advisable, the association might purchase and operate cleaning equipment and sell the recleaned seed to wholesale seed men or jobbers. Such a movement, coming from the producers in an effort to help themselves, if properly managed, should be of material benefit to the orchard grass seed industry.

As in the case of Kentucky bluegrass seed the opportunities in cooperative marketing are not those of price fixing or control of production, but are primarily those of economical marketing and improvement of demand for the seed. Numerous examples of beneficial results from advertising by cooperative marketing associations may be found. Among the most outstanding are the "Sunkist" oranges of the California Fruit Growers' Exchange and the "Eatmor" cranberries of the American Cranberry Exchange. The production of oranges has steadily increased but the development of demand thru advertising backed by a high quality product and an efficient system of distribution has furnished a ready outlet for them. Advertising as a means of increasing the use of cranberries was first carried on in one of the larger markets. This resulted in an increased consumption, over that of the previous three years, of about 44 per cent, while the consumption in six other leading markets decreased materially during the same season. The first attempt being successful, advertising has become an important part of the services performed by the American Cranberry Exchange.

Those interested in marketing orchard grass seed cooperatively may well look to the opportunities in advertising. Its value as a pasture grass could be stressed and satisfactory mixtures for meadows and pastures could be suggested. Improved

cultural methods and economical uses of fertilizer might also be suggested. A study of the distribution of orchard grass seed should prove valuable by suggesting ways of increasing its use.

Quality is one of the most important factors in marketing any product successfully. Orchard grass seed growers must look to methods of producing a product of high quality economically, since they must always face the competition of imported seed and their industry can only be profitable as they are able to meet this competition successfully.

AVERAGE WHOLESALE PRICES OF ORCHARD GRASS SEED IN THE UNITED STATES*

	Corresponding Dates in				
	1923	1922	1921	1920	1919
	Per 100 lbs.	Per 100 lbs.	Per 100 lbs.	Per 100 lbs.	Per 100 lbs.
January	$14.00	$18.80	$15.90	$26.35	$27.00
	14.00	18.85	15.90	26.30	27.00
	14.00	18.90	15.70	26.35	27.00
	14.05	18.70	15.50	26.45	27.50
February	14.00	18.70	15.15	26.65	27.50
	14.00	18.70	15.10	26.65	27.50
	14.00	18.80	15.05	26.65	27.75
	13.90	18.80	14.65	26.65	27.75
March	13.95	18.80	14.75	26.40	27.75
	13.95	18.85	14.85	26.05	28.00
	13.85	18.90	15.00	26.00	28.00
	13.85	18.85	15.10	25.85	28.50
April	13.70	18.40	15.15	25.75	28.50
	13.65	18.70	15.20	25.25	28.50
	13.70	18.50	15.20	24.90	28.50
	13.75	18.40	15.25	24.65	28.50
	13.75	18.40	15.20	24.75	28.50
May	13.70	18.20	15.20	24.15	28.50
	13.70	18.10	15.10	23.95	28.50
	13.75	18.05	15.35	23.75	28.50
	13.75	17.95	15.35	23.75	28.50

*Wholesale prices of field seeds, on Saturday, in twelve leading markets, are quoted in Weather, Crops and Markets each week. These prices are used to compute the United States average from which the above table has been compiled.

ESTIMATED PRODUCTION AND PRICES PAID PRODUCERS FOR ORCHARD GRASS SEED

(Kentucky and Indiana)

Data for 1908 to 1917, inclusive, have been taken from a table in the November, 1917, issue of the Seed Reporter. Data for 1918 to 1922, inclusive, have been compiled from a number of issues of the Seed Reporter, Market Reporter and Weather, Crops and Markets. Prices for 1918 and 1919 were obtained directly from a large wholesale seed dealer.

Year	Total Production in Bushels	Average Per Bu. to Producers	
1908	250,000	$1.90	
1909	220,000	1.40	
1910	120,000	1.75	
1911	260,000	1.80	
1912	240,000	1.25	
1913	150,000	1.60	
1914	165,000	1.70	
1915	160,000	1.80	
1916	200,000	2.00	
1917	175,000	2.20	
		Prices paid producers on basis of country run seed—recleaned seed.	
1918	250,000	$1.85—$2.50	
1919	214,000	1.80— 2.75	
1920	200,000	1.25— 1.75	$1.40—$2.25
1921	125,000	1.50— 1.75	2.00
1922	200,000	.75— 1.25	1.00— 1.50

IMPORTS OF ORCHARD GRASS SEED

(From U. S. D. A. Yearbook, 1922, and Weather, Crops & Markets)

During Twelve Months Ending June 30	Pounds	Bushels
1911	548,000	39,150
1912	137,000	9,800
1913	119,000	8,500
1914	1,939,000	138,500
1915	701,000	50,700
1916	754,000	53,850
1917	1,286,000	91,850
1918	58,000	4,100
1919	177,000	12,650
1920	2,771,000	197,900
1921	.....*	.....*
1922	2,922,000	208,700
1923	768,000	54,850

*None reported.

Kentucky
Agricultural Experiment Station

University of Kentucky

Studies of Dairy Cattle II. Milk Production.

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1. INFLUENCE OF THE GROWING FOETUS.
2. INFLUENCE OF EARLY AND LATE ABORTIONS.
3. INFLUENCE OF ABORTION OF FIRST CALVES.
4. INFLUENCE OF SEASON.

BULLETIN NO. 248

(Research Bulletin)

Lexington, Ky.

July, 1923

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BULLETIN NO. 248

Studies of Dairy Cattle II. Milk Production.

By J. J. HOOPER

This bulletin contains studies made recently in reviewing the daily milk records kept on the Station dairy herd for the past twelve years, and official test records of the past two years.

The production, or secretion, of milk by the dairy cow has been studied from four angles, as follows:

(1) Influence of the growing foetus.
(2) Influence of early and late abortions.
(3) Influence of abortion of first calves.
(4) Influence of season.

1. Influence of the Growing Foetus on Milk Production.

For a considerable time it has been realized that a cow cannot carry a calf and equal in milk production an unbred cow.[1] Sometimes it has been the practise of dairymen to leave their test cows unbred until after they have completed their year's test, or at least not to breed the cows until late in the year of the test. To gain accurate data on this question and to compare the milk production of cows bred early in their lactations with ones bred later, we searched the records on the Experiment Station herd and found that twenty-four of the cows were bred early during one of their milking periods (about the 80th day after calving) and another year the breeding was deferred for one reason or another until about the 215th day after calving.

The year that the cows were bred on about the 80th day after calving they went 360 days between calves and milked 311

[1] Ky. Bul. 234, Part 3.

days. The year they were bred about the 215th day they went 495 days between calves and milked 431 days out of 495 days between calvings. We can thus compare the milk yield of 24 cows bred early in their milking period one year, with the yield of the same cows bred late another year. The larger foetuses in the first case seem to check the milk yield in the latter months of the lactation. A similar study has been reported by C. H. Eckles.[2]

The average production of milk per cow by these twenty-four cows was quite different during the two lactations, as shown by the table and graph that follow:

TABLE I.

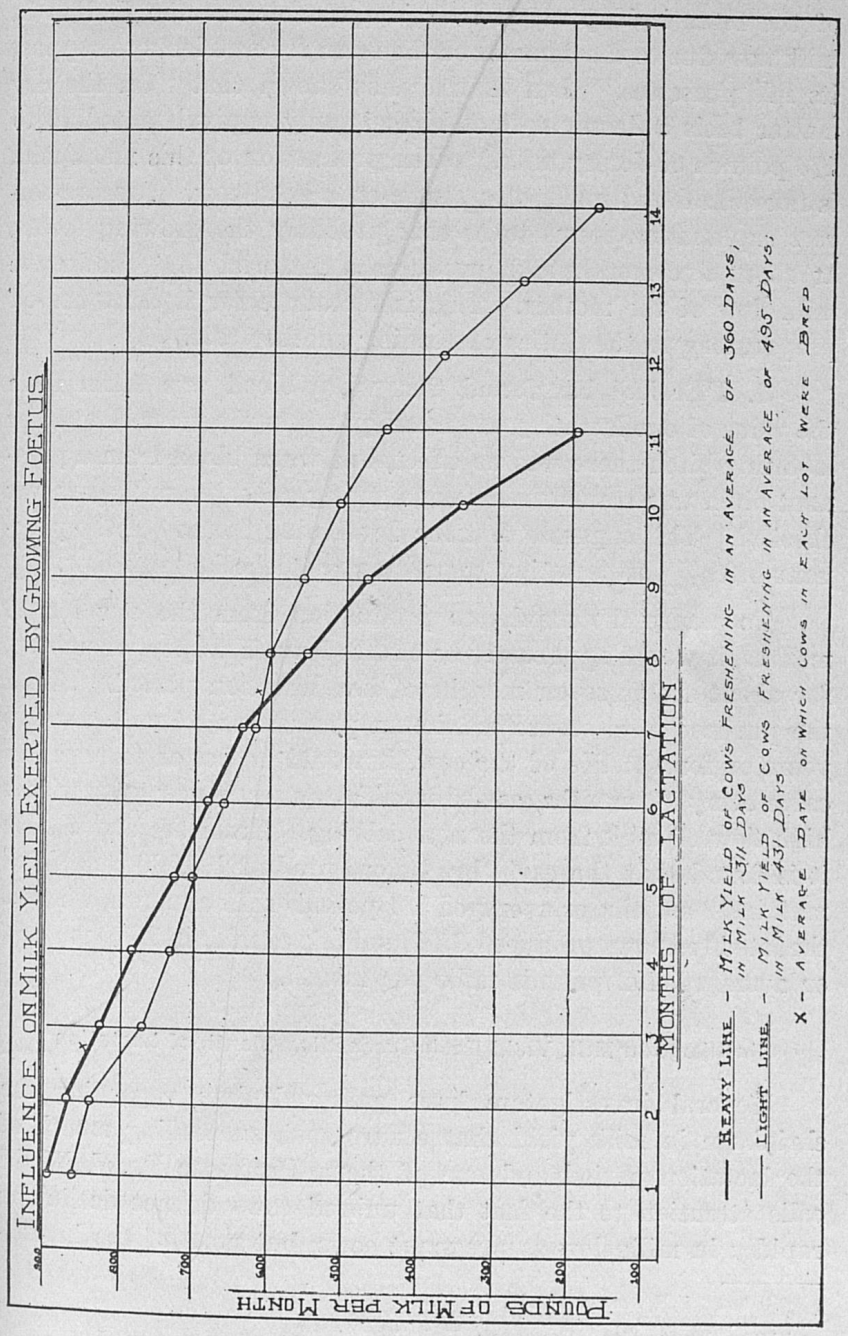
Average Production Per Cow.

	360 Days Between Calves	495 Days Between Calves
Number of cows	24	24
Days in milk	311	431
Milk yield for twelve months	6980	7693
Milk yield for the lactation	6980	8128

When the cows were bred about the 80th day after calving they produced 6980 pounds of milk in the year, dried up in 11 months and had a month's rest before next calving. When left unbred, or open 215 days, they produced 7,693 pounds of milk in the year, an excess of ten per cent over the other year; they milked 431 days and produced 8,128 pounds of milk. When left open, or unbred, for 215 days they milked for a longer period and held up better in milk yield. It seems apparent that when the foetus is about five months old it causes a perceptible shrinkage in milk production.

To explain this behavior it has in the past been thought that the production of a foetus was a great strain on a pregnant cow. A recent report from S. Brody, A. C. Ragsdale and Chas. W. Turner[2*] contains the statement that "it is inferred that growth

[2] Hoard's Dairyman, March 2, 1923.
[2*] Journal of General Physiology, Vol. V, No. 6, July 20, 1923.


INFLUENCE ON MILK YIELD EXERTED BY GROWING FOETUS
POUNDS OF MILK PER MONTH
MONTHS OF LACTATION
HEAVY LINE - MILK YIELD OF COWS FRESHENING IN AN AVERAGE OF 360 DAYS; IN MILK 311 DAYS
LIGHT LINE - MILK YIELD OF COWS FRESHENING IN AN AVERAGE OF 495 DAYS; IN MILK 431 DAYS
X - AVERAGE DATE ON WHICH COWS IN EACH LOT WERE BRED

of the fetus is in part, at least, responsible for the decline in milk flow due to the demand of the fetus for nutrients to support its life processes.'' But Eckles[3] has shown that ''On the dry matter basis a Jersey calf at birth is only equivalent to 110 to 170 pounds of Jersey milk.'' The production of this much milk is not considered much of a strain on a good cow. A more correct explanation seems to be that probably the growing foetus, at about five months old, produces a material that checks the milk flow of the mother. This is fortunate for it dries her off preparatory to the duties of feeding another calf.

G. d'Errico[4] has found that when blood was taken from the veins of one lactating bitch and put into the veins of another lactating bitch there was no effect, but when blood from a pregnant bitch was transferred to one giving milk, the milk flow was checked. This suggests that the developing foetus (of the pregnant bitch) was secreting something that checks milk flow.

To secure the maximum production from the cow for 12 months, it would apparently be best to leave her open, or unbred, for about six or seven months of her lactation period. But if the purpose is to secure maximum production of milk for two years or for the life of the cow, it would be better to have her calve every 12 months, as she would start each new year with a high flow of milk from the new calving. From the above table it is found that the early bred cows produced 6,980 pounds of milk in 12 months, or averaged 581 pounds milk a month, whereas the late bred cows produced 8,128 pounds of milk in 16½ months, or averaged 492 pounds milk per month.

Shrinkage in Milk Yield Each Succeeding Month of Lactation

Several investigators have gathered data regarding the shrinkage in milk yield that occurs each succeeding month of the lactation period and one of them, Professor F. W. Woll,[5] calls attention to the fact that unbred cows do not decline as rapidly in milk flow as pregnant cows, but none of the investi-

[3] Missouri Research Bulletin 26.
[4] Exp. Station Record, Vol. 26, p. 376.
[5] Wis. Expt. Sta. Research Bul. 26.

gators gives separate estimates for bred and unbred milk cows. The estimates of these several investigators, based on studies of numerous lactations, are as follows:

TABLE II.

Shrinkage of Milk Yield Each Month Expressed as Percentage of the Yield in the Preceding Month.

Month of Lactation	Conn.[6]	Wis.[7]	Wis.[8]	Mo.[9]	Maine[10]	Average
Second	7.9	5.0	6.4	+3.0	7.0	4.7
Third	8.5	7.0	7.2	5.8	7.5	7.2
Fourth	5.7	6.0	7.9	7.2	8.1	7.0
Fifth	4.5	5.0	5.2	6.7	8.9	6.1
Sixth	5.6	5.0	3.5	6.0	8.3	5.7
Seventh	6.1	6.0	6.5	5.0	10.6	6.8
Eighth	7.5	10.0	10.2	5.4	10.2	8.7
Ninth	14.2	13.0	10.9	5.6	13.2	11.4
Tenth	13.3	20.0	17.4	6.0	15.2	14.4
Eleventh	.....	13.0	7.1	6.3	2.5	7.2
Twelfth	.....	16.0	5.7	8.5	0.	10.1

[6] Conn. Sta. Bul. 29.
[7] Wis. Research Bul. 26.
[8] Wis. Bulletin 102.
[9] Ragsdale and Turner, Jersey Bulletin, April 18, 1923. Recalculated on month-to-month basis.
[10] Report of Progress in Animal Husbandry Investigation, 1915. Recalculated on month-to-month basis.

May[11] estimates from four years' review of the Kentucky Experiment Station herd that the average monthly shrinkage in milk yield during the first eight months of a lactation is 8.1 per cent. Sturtevant[12] found a natural falling-off for each month of 9 per cent of the milk yield compared with the preceding month. Linfield[13] observed a quite constant decrease of about 9 per cent per month until the end of the period.

Tabulating the data we have gathered in our present study with twenty-four cows we find a different shrinkage per cent during the year the cows were bred early, as compared with the

[11] Ky. Agric'l Exp. Station, Bul. 106, p. 55, 1903.
[12] Geneva Exp. Station, Report 1886.
[13] Utah Agric'l Exp. Station, Bul. 68.

year they were left open, or unbred, for several months after calving. The figures in table III show the average decrease each month, expressed as percentage of the production for the preceding month.

TABLE III.

Decrease in Milk Flow of 24 Cows Bred Early in Lactation One Year and Later Another Year.

Month of Lactation	Bred Early	Bred Late
Second	3.0	2.8
Third	5.3	9.0
Fourth	5.4	5.0
Fifth	7.3	4.2
Sixth	6.0	6.7
Seventh	9.4	3.8
Eighth	11.2	5.7
Ninth	14.2	7.2
Tenth	29.3	8.7
Eleventh	44.1	12.0
Twelfth	.....	17.0
Thirteenth	.....	28.3
Fourteenth	.....	37.1

These figures show that the milk flow of the cows bred early in the lactation (about the 80th day after calving) began to shrink greatly the seventh month of lactation, whereas the year they were not bred until later (about 215th day after calving) the shrinkage was not so great until the tenth month of lactation.

2. Influence of Early and Late Abortions on Milk Production

Every dairyman has noted that as the time for calving approaches the udder of the cow becomes greatly enlarged and tense, indicating that the cow is getting ready for heavy milk production. If abortion happens early, before the enlargement of the udder, the cow will not produce her full quota of milk. To determine from actual figures what milk yield may be expected from a cow if the birth of the foetus occurs before the normal

period of 280 days, records of six cows that aborted in approximately 152 days, of six others that aborted in 239 days and of six that calved normally are compared in this study. The first group aborted in 103 to 183 days, an average of 152 days; the second group aborted in 216 to 254 days, an average of 239 days, and the third group carried their calves the full period of 280 days.

The records have been tabulated so that they cover 7 months before the month of abortion or calving and extend eight months after the abortion or calving, counting month of abortion as one of the eight, covering a total milking time of 15 months.

The following table and graph present the results of the study:

TABLE IV.

Milk Yielded from Six Cows Aborting in Five Months. Pounds Per Month.

	8th	7th	6th	5th	4th	3rd	2nd	1st	2nd	3rd	4th	5th	6th	7th	8th
1.	774	719	666	530	552	540	578	603	615	482	488	441	392	407	368
2.	799	656	725	746	703	566	530	450	399	432	392	335	378	372	134
3.	699	578	583	499	575	606	643	554	560	556	572	530	518	509	467
4.	548	521	476	417	378	329	274	309	559	585	597	568	478	403	348
5.	1076	1039	1016	916	757	602	637	451	503	490	535	532	531	483	419
6.	480	465	536	520	527	516	435	467	508	484	538	533	472	432	440
Av.	729	663	667	604	582	527	516	472	524	505	520	490	462	434	363

The above cows carried their calves the following number of days: 1—133, 2—156, 3—161, 4—183, 5—179, 6—131.

Milk Yielded from Six Cows Aborting in Eight Months. Pounds Per month.

	8th	7th	6th	5th	4th	3rd	2nd	1st	2nd	3rd	4th	5th	6th	7th	8th
1.	518	509	467	429	546	631	532	439	715	718	776	682	517	610	576
2.	644	635	643	579	559	480	416	310	449	445	458	400	477	502	497
3.	664	621	585	576	559	546	572	546	729	915	877	835	743	699	642
4.	629	648	659	665	579	551	360	394	669	576	572	508	496	594	694
5.	556	606	598	639	573	497	502	671	641	607	625	544	480	492	561
6.	476	394	345	288	294	253	84	230	896	771	744	666	562	445	431
Av.	581	568	550	529	518	493	411	432	683	672	675	606	546	557	567

The above cows carried their calves the following number of days: 1—254, 2—251, 3—216, 4—230, 5—229, 6—253.

The above cows carried their calves the following number of days: 1—254, 2—251, 3—[illegible], 4—[illegible], 5—[illegible], 6—[illegible].

Milk Yielded from Six Cows Calving Normally. Pounds Per Month.

	8th	7th	6th	5th	4th	3rd	2nd	1st	2nd	3rd	4th	5th	6th	7th	8th
1.	786	725	651	526	564	496	355	480	1040	1073	977	813	715	716	780
2.	512	397	411	407	296	377	512	569	1353	1203	1032	778	713	631	616
3.	496	464	443	501	508	390	163	291	953	846	857	755	715	611	565
4.	411	374	371	372	359	303	146	302	1167	1126	1178	922	1030	994	994
5.	615	539	486	479	563	465	220	174	838	985	915	967	874	784	588
6.	590	599	616	634	575	514	292	407	964	728	615	573	487	523	509
Av.	568	517	496	486	476	424	281	370	1052	993	929	801	756	709	709

STUDY OF ABORTION IN STIMULATING MILK YIELD OF COWS
HEAVY LINE - LONG ABORTIONS, 239 DAYS
LIGHT LINE - SHORT ABORTIONS, 152 DAYS
DASH LINE - NORMAL CALVING, 280 DAYS
ABORTIONS OR CALVING
POUNDS OF MILK PER MONTH
1000
900
800
700
600
500
400
300
200
8 7 6 5 4 3 2 1 0 1 2 3 4 5 6 7 8
MONTHS BEFORE AND AFTER ABORTIONS

It will be noted that the three groups of cows were declining in milk production normally until they aborted or calved. The six cows that had been pregnant for an average of 152 days increased very slightly in milk production after the abortion, for they averaged 516 pounds of milk each during the month preceding the abortion and 524 pounds of milk the month after abortion; the cows that aborted after being pregnant for an average of 239 days considerably increased in milk flow after the abortion, averaging 411 pounds of milk the month preceding the abortion and 683 pounds of milk the month succeeding abortion; normal calving of the third group of six cows caused them to rise in milk yield from 281 pounds of milk to 1,052 pounds of milk in a month.

From these results we find that an early abortion, 152 days, will slightly stimulate the milk flow, while a late abortion, 239 days, augments it considerably, but that in neither case are the cows stimulated like the ones that calve normally.

3. Influence of Abortion of First Calves on Milk Production

As stated above, normal calving brings about the proper enlargement and stimulation of the milk glands of the cow. Every one is acquainted with the tense udder and stretched teats of the cow that is due to calve. Our experience has shown that if the heifer fails to conceive at the proper time she will continue to grow in body but her udder will not keep pace in the proper relation and she will never have the productive mammary system of her sister who calved at the normal time. It is known to all dairymen that heifers that abort their calves will produce some milk, the later they abort the better it is, and we desired to obtain some definite figures on the comparative yield that might be expected from good heifers that aborted the first calf, in comparison with good heifers that were more fortunate in carrying their calves the full period of 280 days. The heifers in each group were good and equal in quality, but not the best heifers in the herd.

We have been able to tabulate records of five heifers that aborted their first calves late in their pregnancy, or in 215 to 261 days, and to compare their milk yield for ten months with that of five heifers that calved normally. All were well-grown heifers that averaged 790 pounds in weight at calving time.

The following table shows length of pregnancy of each of the aborting heifers and the pounds of milk that each heifer produced for ten months after aborting, compared with the production of the heifers that calved normally.

TABLE V.

Milk Production of the Five Aborting Heifers in Pounds Each Month.

		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	Total Milk
1.	215 days	405	754	695	628	572	449	464	460	466	421	5314
2.	225 days	571	592	492	462	384	371	369	341	372	421	4375
3.	240 days	215	451	313	333	434	415	404	416	476	444	3901
4.	255 days	877	778	808	770	680	693	690	651	630	578	7145
5.	261 days	631	618	594	596	422	492	389	423	386	443	4994
Av.	239 days	539	638	580	558	498	484	463	458	466	461	5146

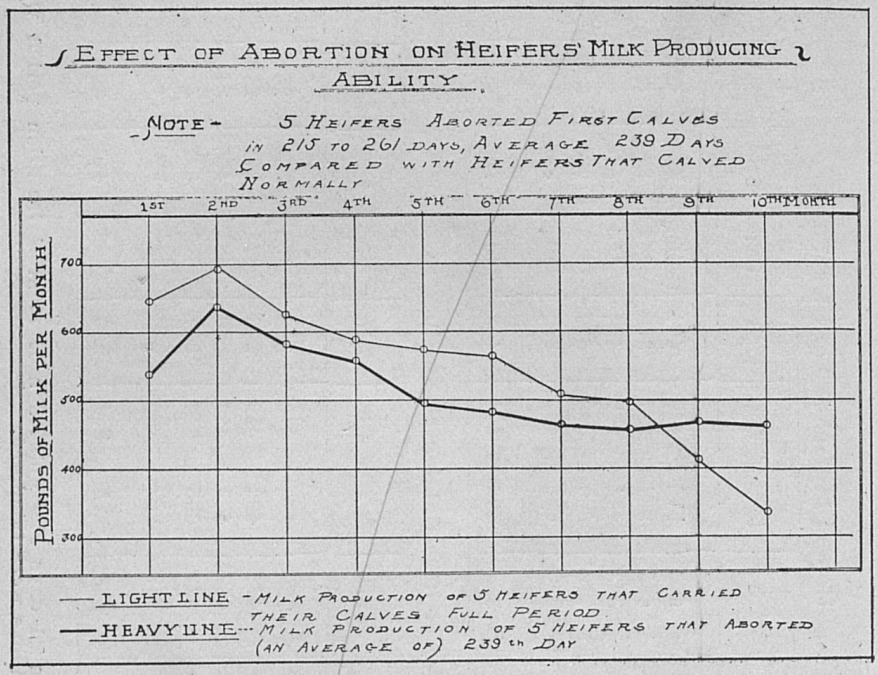
2, 3, 5 Jerseys; 1 and 4 Holsteins.

Milk Production of the Five Heifers Calving Normally.

		1st	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	Total Milk
1.	Calved normally	585	832	793	738	682	616	562	462	358	202	5830
2.	Calved normally	507	581	517	478	430	429	350	391	375	276	4334
3.	Calved normally	566	496	439	437	482	483	500	481	405	347	4636
4.	Calved normally	700	798	788	686	655	644	557	643	627	418	6516
5.	Calved normally	869	750	590	599	616	634	575	514	292	407	5846
Av.	Calved normally	645	691	625	588	573	561	509	498	411	335	5432

1, 2, 3, 4 Jerseys; 5 Guernsey.

NOTE:—An additional Jersey heifer that had aborted in 251 days has finished a 12 months' lactation period with a production of 4,200 pounds of milk. Completed since data above were tabulated.



From the table and graph it is noted that the heifers that aborted in 7 to 8½ months produced in ten months of their lactation 5,146 pounds of milk, while the heifers that calved normally produced 5,432 pounds of milk in the same length of time. The period of 10 months is used because some of the heifers were dried off at that time. All the heifers that aborted did so easily without any unfortunate after effects. It is realized that if they had aborted earlier in their pregnancy or had become sick after abortion, such high milk yields could not have been expected.

From the table and graph we note that the heifers that calved normally declined rapidly in milk yield after the eighth month of lactation, due to the fact that they were bred during the first month of lactation and were carrying larger foetuses than the aborting heifers that were bred approximately on the 101st day after aborting. Here again, as in our first study, we meet the fact that the larger foetus at five to six months old apparently causes a decided shrinkage in milk yield of the pregnant cows.

4. Influence of Season of the Year on the Quantity and Quality of Milk Produced.

In preparing this study the records of 88 cows have been selected from official test records made during the past two years on two hundred and eighty-four Kentucky Jersey cows. This many records were found sufficiently complete for a full and satisfactory lactation period, to justify their use. Records have been selected for groups of cows that freshened in all seasons of the year, some in winter, spring, summer and fall. The records are based on test periods covering two days each month, during which periods a tester from the Experiment Station visited each herd and weighed the milk from each cow and tested it for fat percentage. The two-day record thus secured is a true index of the productive capacity of the cow for a month, as numerous investigations, particularly in connection with cow test associations, have shown that the multiplication of such figures by the factor 15 gives 30 days' production with an assurance of accuracy of 96 per cent, compared with data gathered by weighing and testing the milk every day of the month.

It has been stated[14] that the tendency is for cows to produce richer milk in winter and poorer milk in summer. As stated, the work reported upon herein embraces records of 88 cows, covering from 10 to 12 months of the lactation period of each cow. Some of the cows were dried off upon completing a ten months' test. The records include twenty-two cows freshening in winter, twenty-three in the spring, twenty in the summer and twenty-three freshening in the fall; thus an almost equal number of records are gathered for cows calving in the four seasons of the year. We believe this is the proper way to determine the seasonal effect on test cows in Kentucky, which may be different from that observed in other sections of the United States.

The tabulated data for the 88 cows are as follows:

[14] Vt. Rpt. 1907, Mo. Bul 179; Conn. Bul. 94; Henry & Morrison's Feeds and Feeding, p. 353; Tenn. Honor Cow List, June, 1923.

TABLE VI.

Average Yield of Milk and Percentage of Fat for Cows Freshening at Different Seasons. Two Days' Yield.

Winter Fresh Cows	Dec.		Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.	
	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat
6 cows fresh in December	47.6	4.8	47.9	5.0	44.0	5.2	46.5	5.2	45.4	5.1	50.1	5.1	41.6	4.9	33.1	5.5	34.8	6.6	35.6	5.3	34.9	5.5	.....	.....
9 cows fresh in January	.....	.....	49.4	5.5	51.5	4.8	51.3	4.9	52.0	4.9	51.7	5.0	44.1	4.6	42.7	5.4	40.6	5.2	34.5	5.4	31.4	5.8	.....	.....
7 cows fresh in February	.....	.....	.....	.....	55.8	4.8	60.0	5.3	57.9	5.1	62.3	5.2	54.6	5.9	47.4	4.8	50.5	5.1	41.7	6.5	35.9	6.1	30.6	6.4
22 cows average	.....	.....	.....	.....	50.4	4.9	52.6	5.1	51.8	5.1	54.7	5.1	46.8	5.0	41.1	5.1	41.9	5.6	37.3	5.8	34.1	5.8	.....	.....

Spring Fresh Cows	Mar.		Apr.		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Jan.	
	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat
8 cows fresh in March	63.7	4.7	66.9	4.6	65.3	4.8	56.8	4.5	54.8	4.9	52.5	4.8	42.6	5.0	39.8	5.7	36.5	5.4	33.3	5.7	.....	.....
4 cows fresh in April	.....	.....	57.7	4.9	63.7	4.5	54.5	4.9	54.0	4.6	54.5	4.7	46.5	4.9	38.9	5.6	33.9	6.0	31.2	5.9	.....	.....
11 cows fresh in May	.....	.....	.....	.....	64.5	4.9	56.1	4.8	52.6	4.9	51.2	4.8	46.0	4.9	38.5	5.5	35.4	5.5	31.4	5.7	29.5	5.6
23 cows average	.....	.....	.....	.....	64.5	4.7	55.8	4.7	53.8	4.8	52.7	4.8	45.0	4.9	39.1	5.6	35.3	5.6	31.9	5.8	.....	.....

Summer Fresh Cows	June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Jan.		Feb.		Mar.		Apr.	
	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat
6 cows fresh in June	63.5	4.6	61.0	4.7	63.2	4.5	55.4	4.9	47.1	5.5	40.4	5.8	42.7	5.5	35.7	5.5	32.8	5.8	30.6	5.6	.....	.....
8 cows fresh in July	.....	.....	51.7	5.2	58.2	4.4	48.3	5.2	42.5	5.8	37.6	5.7	35.8	5.9	34.2	6.1	33.0	6.1	31.9	6.0	.....	.....
6 cows fresh in August	.....	.....	.....	.....	59.7	4.7	51.2	5.1	40.8	6.1	38.2	6.0	38.1	5.8	35.8	5.6	35.7	5.7	34.3	5.8	35.4	5.7
20 cows average	.....	.....	.....	.....	60.4	4.5	51.6	5.1	43.5	5.8	38.7	5.8	38.9	5.7	35.2	5.7	33.8	5.9	32.3	5.8	.....	.....

Fall Fresh Cows	Sept.		Oct.		Nov.		Dec.		Jan.		Feb.		Mar.		Apr.		May		June		July		Aug.	
	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat	Lbs. Milk	% Fat
4 cows fresh in September	49.2	4.9	44.2	6.0	39.8	5.9	37.7	6.3	34.9	6.6	34.4	6.4	32.8	6.3	35.8	6.2	37.2	5.8	29.9	6.1	.....	.....	.....	.....
7 cows fresh in October	.....	.....	54.1	5.5	55.0	5.3	53.5	5.7	51.0	5.6	46.4	5.5	48.3	5.5	53.8	5.3	52.6	5.6	46.9	5.2	42.2	5.4	.....	.....
12 cows fresh in November	.....	.....	.....	.....	47.7	4.8	46.3	4.9	43.9	5.2	44.0	5.1	42.4	5.1	41.1	5.4	42.5	5.5	39.4	5.1	37.4	5.1	35.6	5.7
23 cows average	.....	.....	.....	.....	47.5	5.3	45.8	5.6	43.3	5.7	41.6	5.6	41.2	5.6	43.6	5.6	44.1	5.6	38.7	5.5	39.8	5.3	.....	.....

| | | |

REVIEW OF DATA

(1) The winter fresh cows produced an average of 50.4 pounds of milk in the two-day test period in February; 52.6 pounds in March; 51.8 pounds in April; 54.7 pounds in May, and 46.8 pounds in June. They increased 4 pounds in milk yield while on spring grass, as was anticipated. They declined slowly but gradually in milk production all summer and fall. The butter fat percentage of their milk was 4.9 per cent in February; 5.1 per cent in March; 5.1 per cent in April; 5.1 in May; 5.0 in June, and 5.1 in July, and after that rose gradually until it reached 5.8 per cent in September. These winter fresh cows gradually rose in milk production from the start in the winter until May and declined gradually thru the summer and fall; while the butter fat content of their milk remained constant at 5.1 per cent until August and rose gradually to 5.8 in October. It is generally thought that cows fresh in winter should greatly increase in milk yield in the spring and early summer, and that the milk will be less rich in the spring. These cows did rise 3 pounds in milk production in May compared with April, but the butter fat test was not lowered in the summer compared with the spring.

(2) The spring fresh cows, numbering 23 head, started off with the highest milk yield of any group, due to the stimulus of calving and the stimulus of green grass, the two stimuli acting simultaneously in this case. But as grass pasture became less abundant in the late summer, a rapid decrease in milk yield is noted, the cows yielding 64.5 pounds milk in the two days in May and only 45 pounds in September, and 32 pounds in December. The fat percentage of the spring fresh group of 23 test cows, rises gradually from May until September and then rises rapidly until the cows are dry in mid-winter. In May the test was 4.8 per cent, in September 4.9 per cent, and in December 5.8 per cent.

(3) The 20 summer fresh cows behave about the same as the spring fresh ones, declining gradually in milk yield from

August when they started with a two day production of 60.4 pounds milk, to 38.7 pounds milk in November, and 32.3 pounds in March. They declined from August to March.

The fat percentage of this group rises rapidly from the start in August, when it registered 4.5 per cent, thru fall to October, when it stood at 5.8 per cent, and it maintained this high level thru the fall and winter.

(4) The 23 fall fresh cows maintained a more level production than any other group. They started in November with 47.5 pounds in the two-day test period, dropped only four to six pounds in January, February and March, and rose a little (to 44.1 pounds) in April and May, and during June and July dropped gradually in milk yield. In fat test, we find that these cows started high, at 5.3 per cent, in November and the test had risen to 5.7 per cent by January, where it stood thru the winter, spring and summer, with little variation.

REVIEWING TABLE AND GRAPH AS A WHOLE.

In reviewing the table and graph as a whole, it is found that the spring grass of May caused a rise in milk yield of the winter and fall fresh cows, but that they declined in a regular way thereafter.

Studying the fat percentage of the milk we find that the percentage runs low in spring in the case of the winter and spring fresh cows, but that the summer and fall fresh cows produce rich milk in spring. In other words, the fat percentage runs lower while the cow is fresh (regardless of the time of year she freshens) and the milk becomes richer as the lactation proceeds, unless some other factor upsets this routine. For instance, the fat percentage of milk of fall fresh cows remains even, or level, because the green grass of spring stimulates milk flow toward the end of their lactation. This results in holding up the milk flow and in holding down the fat percentage. There is no indication that the fat percentage runs lower in July.

As has been observed before, the spring fresh cows start out with a remarkably high production of milk in May and the fat

test is lower than the average until September, as observed in the table and graph.

McDowell,[15] studying records of 10,870 cows in 64 cow-testing associations, finds that fall and winter fresh cows exceed spring and summer fresh cows by 10% in milk and fat production in the course of a year.

To study this matter somewhat in detail we have totalled the amounts of milk and fat given on the bottom line of figures for each group in Table VI. For instance, we have added together the average milk production for each cow included in the winter fresh cows, beginning with 50.4 pounds milk and ending with 34.1 pounds milk produced by each cow in October, and find that the average winter fresh cow produced during the nine months 410.7 pounds milk, while the spring fresh cows averaged 378.1 pounds, the summer fresh 334.4, and the fall fresh 385.6. The fat produced, on the average, was 21.5 pounds for the winter fresh cows, 19.00 pounds for the spring fresh cows, 18.21 pounds for the summer fresh ones and 21.3 pounds for the fall fresh cows.

Tabulated, these data are as follows:

TABLE VII.

No. Cows	Fresh	Period Milked	Yield During Tests		Per Cent	
			Milk	Fat	Milk Lbs.	Fat Lbs.
22	Winter	Feb. to Oct.	410.7	21.50	100	100
23	Spring	May to Dec.	378.1	19.00	92	88
20	Summer	Aug. to Mar.	334.4	18.21	81	85
23	Fall	Nov. to July	385.6	21.34	94	99

From the grand total of all tests, from which Table VI is compiled, we find that the winter fresh cows had longer lactations, and from Table VII we note that the winter fresh cows produced more milk and fat than the cows that freshened in the spring, summer or fall.

These test cows were fed somewhat better and their production is more uniform over the year than many of our cows, but the way they behave over the period of the year reflects the way

[15] U. S. Dept. Agricultural Dept. Bul. 1071.

in which the cows of the better dairymen of Kentucky produce, for most of these cows were owned by farmers who give but little extra care to their test cows. Spring fresh cows that are neglected (or given bad care and feed) suffer for lack of feed in the late summer and fall, and are in many cases dry by fall. The cows reported upon herein were fed and milked twice a day and in some few cases three times daily.

Seasonal Effect on Production.

A large proportion of Kentucky dairy cows calve in the spring and summer. In looking over the 284 test records of Jersey cows owned by Kentucky farmers and breeders, we find that 84 of the cows calved in the spring, 82 in summer, 58 in fall and 60 in winter. The percentage is as follows: 30 per cent calved in spring, 29 per cent in summer; 20 per cent in fall and 21 per cent in winter.

Considering the fact that the spring and summer fresh cows are drying off in the winter when milk and cream are highest in price, and the further fact that it is found from table VI that the fall and winter fresh cows produce more milk and cream during their lactation periods and that they have longer lactations than the spring and summer fresh cows, it is unfortunate that so many of our cows freshen during the latter named months.

Kentucky
Agricultural Experiment Station

University of Kentucky

Feeds and Their Use—Inspection and Analyses

BULLETIN NO. 249



Lexington, Ky.

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BULLETIN NO. 249

Feeds and Their Use—Inspection and Analyses

By J. D. Turner, H. D. Spears and E. L. Jackson.*

Hardly a score and half years ago, the food problem for both man and beast was a simple one. It is just as simple today as it was thirty years ago as compared to what it will be tomorrow. The struggle for food increases with the multiplying thousands of consumers and the new problems arising with these changes are varied and perplexing.

The food industry is becoming more and more specialized each year and yet the industry is very young. Human and stock foods are closely interdependent—the source of the one being the source in the main of the other—each being affected vitally by the making and distribution of the other. Without the conservation and utilization in stock feeds, of the various by-products and the unsuitable and rejected materials obtained in the manufacture of human foods, and the reconversion of these materials into human food by feeding them to the animal and the soil, the supply of food for human consumption would not be adequate and the price would be prohibitive. It is equally true that if we did not have the by-products obtained in the manufacture of human food to form the basis of animal rations, the supply of stock feed would be greatly reduced and the value materially lowered and the large class of high-protein by-products practically eliminated.

The commercial aspect of the stock feed industry is just beginning to be realized. The distribution of feed materials has already reached considerable proportions. Even with its

*Acknowledgment.—The writers take pleasure in acknowledging the efficient work of R. W. Jones, inspector, and W. G. Terrell, inspector and assistant analyst, who made the official inspections and collected samples for analysis.

Mr. Jackson resigned September 1, 1923.

present status, its zenith is scarcely in sight to the most forward-looking men engaged in the industry. It is undoubtedly true that the feed industry is yet in its infancy.

The beginning of scientific feeding of animals in the United States dates back about fifty years. Since its introduction the study of the science of animal nutrition has steadily grown in interest and increased in importance. This study has had much to do in the introduction of the various classes of feeds. The changing of the methods of manufacture has likewise changed the value of many of the by-products and many experimental data gathered from previous experiments are not altogether applicable to by-products obtained in the present-day manufacture. It should also be borne in mind that experimental data covering the digestibility and nutritive value of many of the most common feeding materials are limited to few trials and are often incomplete. Great as has been the advance in the scientific feeding of animals, most scientists of today agree that much is yet to be learned. The chemical analysis alone is not a true index or measure of the value of a feed. Scientists have determined, for example, that there are several kinds of proteins. Proteins differ both in digestibility and in other important qualities. The same is true of fat and fiber. Consequently, merely to state that a feed contains a given percentage of protein, fat and fiber does not tell the complete story. However, in spite of this fact, the chemical analysis serves a very useful purpose and must suffice for the present and until a better standard is developed. Therefore, the discussions, suggestions and analyses herein given are only helpful if properly studied and valued.

Along with the development of scientific feeding and the scientific preparation of feeds, which undoubtedly accounted for much of the success in the commerce of feeds, came the regulatory laws of the states. In 1895 Connecticut passed the first feed law in this country. Other states soon passed feed laws. These laws were designed to protect the purchaser of feeds and also the honest manufacturer. Massachusetts is

credited with issuing the first bulletin covering the inspection of feeding stuffs.

This and other bulletins of similar nature contained advice to feeders and cautioned them against the use of low-grade and adulterated feeds.

The Kentucky law followed early in the enactment of feed laws by other states. Other bulletins of this Department have discussed at length the results of its operation, questions of interest to both the feeder and manufacturer, and the function of nutrients, and many authors have published works on the nutrition of animals; but it will not be amiss to present here some of the more important things of general interest relating to these subjects. The operation of the law and the benefits resulting from it are so generally understood and recognized that fradulent practises have been reduced to a minimum. Consequently, few prosecutions are necessary, as compared with previous years, and generally speaking the feeds put on the market in Kentucky are up to the claims of the manufacturers, and the spirit of co-operation between those directly concerned is very good.

The purposes of the law are fourfold: First, to require all feeding stuffs offered for sale in Kentucky to be labeled with an official Kentucky label stating the manufacturer's guaranty; second, to protect the consumer against inferior and adulterated feeds and short weights; third, to protect the honest manufacturer and dealer against dishonest competition; fourth, to promote a more economical and intelligent use of commercial feeding stuffs by feeders, whether used as a prepared ration or as a supplement to the materials produced on the farm.

System of Tagging

In addition to the information printed on the State tag, the Department uses a color scheme of three colors, black, red and yellow. This is done in order to classify the feeds according to their general make-up and help the buyer to recognize by a glance at the tag the general character of the feed. This, in

connection with the information printed on the tag, should serve as guide to the purchaser and give reasonable warning and an opportunity to make whatever investigation he desires before he accepts the feeds.

The color system is: First, a manila tag printed in black ink represents a feeding stuff made of the products or by-products of one grain or plant only, such as wheat, or corn, or cotton seed, etc. For example, wheat shorts, mixed wheat feed, wheat bran, cotton-seed meal or corn feed meal would bear manila tags printed with black ink. Such feeds are commonly known as "straight" feeds.

Second, a manila tag printed in red ink indicates that the feeding stuff is made of the products or by-products of two or more grains or plants, such as corn and wheat, or corn, wheat and cottonseed meal, etc. For example, a combination of corn feed meal, wheat bran, alfalfa meal, molasses and cottonseed meal would take a manila tag printed with red ink.

Third, a yellow tag printed in black ink indicates that a feeding stuff contains a material of little or no feeding value, or a material not classified as a concentrate, such as oat hulls, corn cob meal, peanut hulls, cottonseed hulls, flax-plant refuse, clipped oat by-product, peat, etc.

The Feeder's Problem

The feeder should constantly bear in mind that the amount, kind and general nature of feed an animal requires, depend entirely upon the use to which the animal is going to put the feed. In studying his animals' needs, the feeder will find that the problem they present is a threefold one.

First, he must furnish a maintenance ration; that is, he must supply sufficient feed to keep the body machinery running.

For instance, a machine or a factory must first be supplied with enough power to put it into motion or action before it can produce or turn out any work. It is also true that the animal mechanism must be provided with sufficient feed to maintain the processes essential to life before it can function

further or before any continued production is possible. In the case of the machine, the power that keeps the machine in motion may be called the maintenance power; in the animal, the quantity of feed required to maintain the processes essential to life is the maintenance ration. It is the amount of feed necessary simply to support the animal when doing no work and yielding no material product.

Second, in addition to a maintenance ration, he must supply his animals with the amounts of feed necessary for the production of meat, milk or work. The production capacity of the animal is the prime factor in the problem. No argument is needed to show that a cow producing thirty pounds of milk a day requires a greater addition to her maintenance ration than does one having a capacity of only fifteen or twenty pounds, or that a steer which can gain three pounds daily needs more additional feed than one capable of making only one pound of gain.

Third, the feeder, like the manufacturer, must be able to adapt his feeding practises to the market conditions. As prices of feeding materials fall and those of animal products rise, he will be inclined to feed more liberally in order that his production may be increased; but he must take into consideration also, that a portion of this increased feed is turned into fat and some may be undigested and wasted so that his returns may not be increased proportionately. A feeder, therefore, in order to meet this situation intelligently, must not only know something about fixed standards in feeding animals, but he must have a knowledge of the amount and kind of feed required under various conditions for the manufacture of a unit of product—a pound of increase in live weight, for example, or a pound of milk of a given quality.

Commercial feeds often are purchased for the purpose of supplementing the feed materials raised on the farm and especially is this true where corn, oats, timothy hay and like materials are the only crops. If alfalfa, cowpeas, soybeans and similar crops can be raised and used on the farm in Kentucky, very little of the concentrates, if any, will be needed, because

these materials are rich in protein and supply sufficient nourishment. When feeding stuffs must be purchased to supplement the materials raised on the farm, in order to get the desired relation between the protein and the energy of the ration, it is evident that often a wide range of materials may be offered from which to choose. In such case the question at once arises, which of the various feeds available is it most economical to purchase, it being evident, of course, that this is not necessarily the one offered at the lowest price. No simple method of determining this point is possible, but comparisons of values of the digestible protein content of such feeds may be safe under most circumstances, as the fats and especially the carbohydrates are produced in abundance in the cereals and legumes which can be raised on the farm. On the other hand, if a feeder's requirements are such that he must buy a general feed, he must take into consideration the digestible content of all the essential constituents.

Points a Feeder Should Consider

No feeder can get the best and most economical results unless he exercises due intelligence in purchasing his feeds. The value of a feed depends upon that portion of the nutrient which an animal can, under ordinary conditions, digest and take into its system for producing growth, keeping up the heat and energy and repairing the natural waste of the body. It may prove of much value to a feeder if he will observe these suggestions:

Ascertain what the animals need and what will supply these needs, as no animal will give good results without proper food.

If in doubt as to what the animals need, consult the Experiment Station or an expert.

Buy no feed that is not properly registered and tagged with an official tag.

Read and study carefully the information given on the official tag.

High-grade feeds are most economical. Many commercial feeds sold in Kentucky are cheap, inferior and unbalanced, and

do not furnish the animal with proper nourishment, thus resulting in hardship to the animal and a loss to the owner as well.

The kind and character of feed an animal requires depend entirely upon the use to which that animal is going to put the food.

The amount of crude protein, fat and fiber will serve only as a general guide in selecting a feeding stuff. The purchaser should base his final conclusion on the amount of digestible nutrients, which can be reasonably estimated from the tables of average analyses of materials and digestible nutrients.

An excessive amount of food not only overtaxes the digestive organs and invites disease but is an actual waste, as well. On the other hand, an insufficient amount causes loss for want of necessary nutrition and diminishes the ability of the animal for performing the desired amount of work. Unless the food is properly balanced one set of tissues of the body may not receive sufficient nourishment, thus causing loss by destroying the equilibrium of the nutrients demanded by the animal system for its proper maintenance and growth.

Points a Manufacturer Should Consider

Registration—All concentrated commercial feeding stuffs must be registered with the Experiment Station and have the State official tag attached before they can be legally sold or offered for sale within the State.

Concentrated Commercial Feeding Stuffs—This term, in the Kentucky law, covers practically all materials used as feeding materials except whole hays, straws, cottonseed hulls, corn stover, and whole seeds and grains when unmixed with other materials.

Brand—Every distinctive brand must bear a State official tag showing the manufacturer's guaranty, as provided in the law.

State Official Tag—The State official tag contains the only legal guaranty recognized in Kentucky, and any guaranties on private labels or containers are not considered within the provisions of the law.

Alteration of Labels—No alteration, either by additions or erasures, of the State official label, is permissible under the law, and any alteration made is in violation of the law.

Change in Guaranty—Registrations are received as permanent and no change will be accepted without a new registration or written authorization to make the change, and if the change made materially lowers the value of the feed, the name of the feed must also be changed. At times the Department may ask for new registrations in order to facilitate matters in the office, but due notice will be given.

Manufacturers' Guaranties—All feeding stuffs must equal or exceed the guaranties made by the manufacturers. An excess of one ingredient will not compensate for a deficiency in another, nor will the combined amount of the analyst's finding of crude protein and fat be accepted for the combined crude protein and fat of the guaranties made by the manufacturer.

Attachment of Label—The State official label must be attached to each and every package of feed. Do not make shipments into the State or make deliveries within the State without properly attaching labels, as you will subject your customers to violations of the law unintentionally.

Points That Dealers and Distributors Should Consider

Study the Law—Be sure you are familiar with the requirements of the law, rules and regulations governing the sales of feeding stuffs. If you are not, consult the Department and secure copies of the law and regulations.

From Whom to Buy—Buy only from reputable concerns—concerns that have good records and are complying with the law, and will assist you in complying with the law.

Selection of Feeds—Have definitely in mind the kind of feeds you wish to purchase for your trade and accept no shipments

that are not properly labeled with the State official label. In making your contract for feeding stuffs, do so on the official guaranty and when the shipment is received examine labels closely to see whether they are in accord with the guaranty, before accepting the feed. If the labeling is not in accord with the guaranty, it would be better to refuse to accept the shipment until the matter is adjusted in accordance with the contract.

Assistance by the Department—In case of any irregularity in shipments made by manufacturers to dealers or agents, in misbranding, non-labeling, short weights, or other infraction of the law, if the Department is notified it will act immediately on the merits of the case.

Freight Bills and Invoices—It is sometimes necessary to be able to trace shipments and especially is it necessary on interstate shipments in our co-operative work with the United States Department of Agriculture when the goods are found not up to guaranty. Therefore, all freight bills and invoices on shipments of feeding stuffs should be retained by the purchasers.

Rebates—The paying of a rebate for deficiencies does not release a manufacturer or dealer from prosecution for a violation. It does show in many cases good faith and intention on their part. If rebate is made, such rebate should go directly to the actual purchaser or feeder, on an equitable basis. Record of the transaction should be filed with the Department immediately. The Department will, upon request, gladly assist in making settlements of refunds between manufacturer and purchaser when this is clearly within its jurisdiction.

Labeling—It is the practise of some manufacturers to place labels in the car with shipment of feeds, without attaching labels to the bags, which often results in confusion or a failure to label at all. In some cases the labels were not put in the car or were misplaced or lost. The labels should be attached when a car is loaded and certainly not later than when the feed is taken from the car.

The Components of Feeding Stuffs and How These Substances Are Grouped by the Chemist

All food, with the exception of air, water and salt, is produced either directly or indirectly, by plants. Plants are composed of many substances, both simple and complex. During growth comparatively simple substances nourish the plant and serve to build up other substances, many of which are very complex in chemical structure. It is enough here to name and describe the principal classes of substances of food value and to give some idea how the chemist groups these chemical compounds. Besides water, which is a single chemical compound, these groups are protein, carbohydrates, fats and oils, and mineral matter.

Water is composed of hydrogen and oxygen. The amount of water in a commercial feeding stuff depends upon the character of the materials of which the feed is made, their age or state of greenness, the process of manufacture and the atmospheric conditions of the place in which the feeding stuff is stored. In grains and dried or cured fodders, hays, etc., water usually constitutes from 5 to 20 per cent of the weight; in the grasses and other green foods, it may run as high as 90 per cent; in roots, such as turnips, stock beets, carrots, etc., 95 per cent of the weight may be reached. By-product feeds, such as distillers' dried grains, digester tankage, dried blood, corn gluten feed and dried buttermilk, have gone thru a process of drying by artificial heat and their water content usually is small. The percentage of water in molasses feeds is affected by the amount of molasses they contain and the water content of the same.

Altho water is necessary for the existence of animals, its presence in commercial feeding stuffs adds nothing to their value as food for live stock, because the animals receive their supply from other sources. Therefore, any amount of water other than that necessary to keep the feeding stuff in proper condition, reduces the value of the feed by reducing the percentages of the desirable substances. An excessive amount of water lowers the keeping qualities of the feed.

Protein includes a group of substances of which albumin of eggs, casein of milk, fibrin of meat and gelatin of bones are familiar examples. They contain about 16 per cent of the element nitrogen. Protein is the most valuable food material. It produces flesh, muscle, ligaments, glandular secretions, milk, blood, tendons, hair, hoof, hide and is found in all portions of the animal body, including the bones which contain 25 to 30 per cent. Under certain conditions, as in starvation, protein may serve as a source of heat and energy; it may even go, in part, to the formation of fat, thereby taking the place of the other substances, fats and carbohydrates, but no other substance can take the place of protein in the animal economy.

The proteins are very complex chemical compounds. The different kinds differ greatly in their efficiency for promoting growth, repairing tissues and preserving the health of animals. The proteins of green plants and hay are more efficient in promoting growth than those of grains. The animal proteins, such as those contained in milk, are particularly efficient in promoting growth. Recent investigations have shown that the action of one protein may supplement the action of another, so that the two together are more efficient than either alone; hence it is generally well to include more than one source of protein in a feed or ration. The presence of some animal protein is especially effective in enabling the animal to use the proteins of grains to best advantage. A knowledge of the sources of the proteins in feeds, therefore, is of advantage to the user who is well versed in scientific methods of feeding, as taught in recent treatises on feeding animals.

The percentage of protein in the materials used in feeding stuffs ranges from 2 to 3 per cent in hulls, straw, etc. to 80 or more in dried blood.

Carbohydrates. Sugars and starch together with the related products, the celluloses, pentosans and gums are called carbohydrates. Compounds of this group make up the major portion of all plant substance. The term "carbohydrates" means that these compounds are composed of the three ele-

ments, carbon, hydrogen and oxygen, the latter two being present in the proportion existing in water.

Carbohydrates are valuable as a source of heat and energy. While they do not have as great a power in this respect as fat, they are present in such large quantities in feeding stuffs that they are considered very important food compounds. The members of this group, however, differ in food value on account of the wide variance of their digestibility. The sugars and starches are almost completely digestible whereas pentosans and celluloses, or crude fiber, are digested with much more difficulty and far less completely. It is therefore desirable, in selecting a feeding stuff, that starches and sugars should constitute the greater part of the carbohydrates. Carbohydrates are converted into fats in the animal body and stored as such in the fatty tissues. Along with fats they are burned in the body, thereby giving out heat and energy. The amount of carbohydrates and fats assimilated, in addition to that used immediately by the body for heat and energy, is stored up as fat in the tissues. Whole grains contain the more digestible carbohydrates, whereas hays, straws and hulls of grains contain the less digestible ones. Animal products such as meat meal and fish meal contain very little carbohydrates and when they are used in feeding stuffs the carbohydrates must be supplied by some other source.

Fats and Oils. The proportion of oxygen in these substances is much less, and that of carbon and hydrogen much greater than in the carbohydrates; because of this fact, the fats give off more heat on burning, one pound of fat producing about two and a quarter times as much heat as a pound of carbohydrates. The fats are solid at ordinary temperature, whereas the oils are liquid. Oils and fats abound in the seeds of plants. In general, fats and oils are not present in as large amounts in feeding stuffs as either protein or carbohydrates, and because they do not vary as greatly as do these other substances they are not given as much importance in selecting a feeding stuff as is given either protein or carbohydrates. The percentage of crude fat in feeding stuffs ranges from about 1 to about

15 per cent. Fat, besides producing heat and energy, also serves as a protection to the protein compounds of the body against destruction and as a protection for the other tissues.

Mineral Matter or Ash. Some of the important mineral constituents found in plants are compounds of sulfur, phosphorus, potassium, calcium, magnesium, manganese and iron. They are used in the formation of protein and other complex plant compounds. In the animal these mineral substances form the bony structure and are found in the various tissues and secretions of the body. As in the case of fats, there is not so great a variance in the mineral matter in the different feeding materials and for this reason mineral matter is not given as much prominence in selecting a desirable feed; yet it, like fat, is just as important as is either protein or carbohydrates.

When a feeding stuff is burned, most of the mineral matter it contains is left as ashes.

Fiber. As stated in the preceding pages, some carbohydrates have a very low food value. Therefore, in order to get a somewhat clearer idea as to the character of the carbohydrates present, it is customary to divide them by analysis into two groups, *crude fiber* and *nitrogen-free extract.* The chemist determines in a more or less rough manner the cellulose present and calls it crude fiber.

As already explained cellulose, or crude fiber, is one of the less digestible carbohydrates and hence, if a large part of the carbohydrates in a feeding stuff is made up of crude fiber, the feeding stuff is of not as much value as one in which the carbohydrates include only a small amount of crude fiber. Besides, as a general rule, a feeding material having a high fiber content is very low in both protein and fat; hence a knowledge of the proportion of fiber gives a better idea as to the general nature of the feed. In cereal grains and nuts the amount of fiber is small; but there is a large percentage in stems, stalks, hays, straws, fodders, husks, hulls and cobs.

Nitrogen-free extract. That part of carbohydrates which remains after deducting the crude fiber is what the chemist terms nitrogen-free extract. It contains the easily digestible carbohydrates; therefore, knowledge of the amount present is important. The chemist estimates the percentage of nitrogen-free extract by subtracting from 100 the sum of the percentages of water, ash, protein and fiber found by analysis.

A "Complete Analysis." What is commonly called a complete analysis of a feeding stuff is a statement of the percentages of water, ash, crude protein, fat or ether extract, crude fiber, and nitrogen-free extract. Of course, such an analysis is complete only in the sense that it shows in a practical way how much of each of the important groups of nutrients is present. The Kentucky Feed law requires that official analyses of feeding stuffs be determined by the methods of chemical analysis adopted by the Association of Official Agricultural Chemists.

Microscopical Examination

The chemical analysis and the microscopical examination are supplementary each to the other. The chemical analysis determines the chemical nature of the feed, but the proper interpretation of the analysis is seldom practicable without the aid of the microscopical examination. The microscopical examination identifies the exact constituents or ingredients of the feed. This is possible from the fact that each plant is composed of cells, these cells forming tissues, which are characteristic, for the most part, of that particular species of plant. In a ground feed the various cells and tissues can be seen and identified with the microscope.

A microscopical examination of a feed, then, determines the exact constituents or ingredients and, roughly, their percentages, condition and quality. From this examination we are able to judge: First, whether the feed contains the guaranteed ingredients and the quality of each. Second, whether it contains additional ingredients and whether or not they are adulterants.

Third, whether any of the ingredients are present in such small amounts that their presence does not affect materially the nature of the feed, they being added in very small amounts merely to meet the guaranty in name, but not in fact.

A few examples will illustrate these points. First. A feed is guaranteed to be wheat middlings with an analysis of 16% protein, 4% fat and 7.5% fiber. The microscopical examination showed this middlings to contain wheat bran tissue, and the chemical analysis showed it to contain 15% protein, 3.75% fat and 8.5% fiber. Thus the chemical analysis shows only a deficiency of protein and an excess of fiber, but the microscopical examination makes it possible to properly interpret the results by stating that the wheat middlings contains added wheat bran.

Second. A hog feed guaranteed to contain 23% protein, 5.5% fat and 4.67% fiber, and to be made of reground corn hearts, wheat middlings and digester tankage, was found by chemical analysis to contain 14.13% protein, 5.06% fat and 7% fiber. The microscopical examination showed the feed to be composed of corn bran, corn meal and very little corn hearts. It did not contain any digester tankage or wheat middlings. This finding makes it possible to interpret the chemical analysis as follows: Below guaranty in protein and fat due to the absence of digester tankage and wheat middlings and high in fiber due to the presence of corn bran.

Third. A dairy feed guaranteed to contain 24% protein, 4.5% fat and 14% fiber, and to be made of cottonseed meal, linseed oil meal, alfalfa meal, wheat bran, corn feed meal, hominy meal, kaffir corn meal, molasses and salt 1%, was found by chemical analysis to contain 23.63% protein, 6.7% fat and 13.6% fiber. The microscopical examination showed the presence of rice bran, rice hulls and ground oats, but no linseed oil meal or kaffir corn meal. This illustrates how the chemical analysis may be as guaranteed, but the ingredients not be as guaranteed. The feed contained inferior materials substituted for some of the valuable guaranteed ingredients, and a sufficient amount of cottonseed meal to maintain the percentages.

The Value of Chemical and Microscopical Analysis

A number of factors may influence more or less the nutritive value of feeds. With cereals and other plants, the climate, the season, and the stage of maturity are the most important factors which influence their composition. The composition of a crop is also influenced to a limited extent by the amount of available plant food in the soil on which the crop is grown. The roughages are even more variable than the grains because their composition is more easily influenced by the stage of maturity, the manner of curing and the moisture content. The same is true of the oil mill by-products, and the variation in animal by-products is no less marked, due to different methods of preparation and storing, and to the water content.

Prepared or proprietary feeds are influenced in quality, also, by a number of factors which may be described as man-made, to distinguish them from the natural forces or factors which influence individual crops. Some of these factors are: The use by the manufacturer of inferior or low-grade materials; the substitution in whole or in part of a lower-grade material for a high-grade; the use of an adulterant as a filler; the use of molasses to cover up low-grade, trashy materials; storing the feed in a place which influences the water content, etc.

An ample number of analyses of straight feeds or standard by-products are available, the averages of which give the feeder reasonably accurate knowledge of compositions of the feeds under consideration. In purchasing proprietary or mixed feeds, however, the feeder must use greater caution, because these differ greatly in composition, so that the averages of analyses at hand do not afford a safe guide. Yet these feeds are sold in large quantities everywhere in the State, most of them under standard brands and guaranteed by reputable manufacturers. It is possible, therefore, for the feeder to select high-grade feeds if he uses the guaranteed analysis and scrutinizes the list of ingredients intelligently in making his purchases.

A knowledge of the chemical analysis and general character of either the straight by-products and cereals or mixtures of

these materials is essential to the intelligent feeder. Without such knowledge, the feeder can neither buy his feeds nor make up his rations intelligently. A knowledge of the amounts of crude protein and fiber a feed contains serves as an index. A high percentage of fiber in a feed is a general indication that the percentages of the essential nutrients in that feed are correspondingly low and their digestibility impaired by the presence of excess fiber. Much fiber is not always objectionable with ruminants; in fact, roughages are essential for them, but with animals having small stomachs, much inert material in the feed is undesirable. If fillers, such as hulls, sweepings, dust, refuse, screenings, etc., are used in feeding stuffs, the feeder usually pays about the same price for the filler or fiber as he does for the actual food in first-class materials and he suffers a financial loss, while his animals suffer for the lack of sufficient nourishment.

The amount of nitrogen-free extract may serve as a further index of the character of the feed, since a high nitrogen-free extract indicates a better grade of feed. In analyses of materials or combinations of materials where the amount of nitrogen-free extract is not given, this may be computed by adding together the amounts of protein, fat, fiber, water and ash and subtracting this total from 100. In case the amounts of water and ash are not given and cannot be gotten from the tables of analyses, the average percentages of water and ash in similar materials or their combinations may be used as a basis for calculation, tho the proportions of water and ash vary considerably. The average percentage of water may be taken as 10, the percentage of ash in whole grains, 2.5, and in their by-products, 4.50. For example, the approximate percentage of nitrogen-free extract in a mixed feed composed of corn feed meal, wheat bran, wheat shorts, cottonseed meal and alfalfa meal, with an analysis given as 16.5 per cent protein, 4.50 per cent fat and 12.5 per cent fiber, can be obtained as follows: Taking 10 per cent as the average moisture and 4.5 per cent as the average ash, add together 16.5, 4.5, 12.5, 10.0 and 4.5, giving 48.0; subtract this

from 100 and we have 52 per cent as the amount of nitrogen-free extract.

Likewise, the nitrogen-free extract can be computed from other formulas where part of the figures can be obtained from the guaranty on the label and the average figures taken on standard materials. These results are not accurate, but will help in forming a judgment as to the character of the feed.

In addition to the ordinary chemical analysis of feeding stuffs, special determinations sometimes must be made. For example, in molasses feeds, it is often necessary to know the sugar and moisture contents. In feeding materials such as silage, it is desirable to know the acidity, since this determination is an index as to the palatability of the material. In animal materials, the amount of phosphate is determined in order to ascertain whether the material should be classified as a meat material or a meat and bone mixture. In feeds containing screenings, sweepings, dust and refuse from mills and elevators, it is very desirable to determine the proportion of sand.

Besides obtaining the chemical components of feed materials, the chemical analysis aids in determining whether a feed is misbranded or adulterated. A feed chemist, with many chemical procedures at his command and aided by his long experience and familiarity with the chemistry of feed materials, can determine fairly accurately from chemical determinations alone the general character of the feed materials under consideration. However, the chemical analysis is not and should not be considered final in determining the character of feeding stuffs. In addition to the chemical analysis, it is not only important but very necessary that a microscopical examination be made, as the microscopical examination identifies the exact constituents or ingredients of feeds and determines fairly accurately their percentages, as explained in a preceding page under the head of *Microscopical Examination.* The chemical and microscopical examinations are therefore supplementary to each other and it is very evident from the foregoing discussion that a knowledge of each of these analyses is very necessary to intelligent preparation and use of feed rations.

Nutritive Ratio

Nutritive ratio is a term with which all feeders should be familiar. It is the ratio between the amount of digestible protein and the amount of digestible carbohydrates (or fiber and nitrogen-free extract) and digestible fat (or ether extract) which a given feed contains, based on their energy values. Protein and carbohydrates have the same energy-producing value, but fat has 2.25 times as much as either; hence, in calculating a nutritive ratio, fat must be put on the same energy basis as the carbohydrates, which is done by multiplying the percentage of digestible fat by 2.25.

If we take as an example wheat middlings containing 12.8 per cent of digestible protein 3.9 per cent of digestible fat and 47.5 per cent of digestible carbohydrates, we have, by completing the foregoing arrangement: Carbohydrates, 47.5, plus 8.8 (fat, 3.9 times 2.25) divided by protein, 12.8, or 56.3÷12.8=4.4; therefore, the nutritive ration is 1:4.4. In this way the nutritive ratio of any feed in which the digestible nutrients can be obtained, may be calculated.

A feed having a large percentage of digestible crude protein in proportion to the digestible crude carbohydrates and fat combined, is said to have a narrow nutritive ratio; if the reverse, it has a wide nutritive ratio. Examples: cottonseed meal, linseed oil meal, corn gluten meal, wheat shorts, etc., have very narrow nutritive ratios; while the straws, low-grade by-products and materials like corn feed meal, etc., have wide nutritive ratios.

Net Energy Value

Probably the most accurate measure of the feeding value of feeds is the *net energy value.* This represents the amount of energy which the animal can derive from the feed, over and above what is consumed in the work of mastication and digestion and that remaining unused in the feces, urine and combustible gas. It is a measure of that part of the feed which the animal

can use in actual production, such as making growth and fat, producing milk, doing work, etc.

Net energy values are expressed in *therms* per 100 lbs. of feed, a therm being the amount of heat required to raise 100 kilograms of water one degree Centigrade, or approximately 1,000 pounds of water four degrees Fahrenheit. The total energy which a feed is capable of yielding is easily determined by measuring the amount of heat it produces when burned; this does not give us a true measure of the value of the feed, however, because the amounts of energy consumed in the work of preparing the food by chewing and digestion or thrown off in waste products are very different with different kinds of feed. The animal can use a much larger proportion of the total energy of concentrates than of roughages. For example, corn meal and timothy hay yield about the same amounts of total energy from equal weights; about 171 therms and 174 therms, respectively, from 100 pounds, but the deductions to be made for waste, including undigested material, combustible gas arising from fermentations in the digestive tract, unburned substances in the urine and work of mastication and digestion, amount to about 85 therms for 100 pounds of meal and 132 therms for an equal weight of hay. Subtracting these figures from the total energy values, we find that the animal consuming 100 lbs. of corn meal can get from it 86 therms of *net* energy which it can use in work or growth, whereas the consumption of 100 lbs. of hay would have yielded only 42 therms.

The net energy values of many feeds have been determined by the elaborate experiments of Armsby and others. These values, quoted from Armsby's Animal Nutrition, have been included in Table III. They are based on experiments with ruminants, but are thought to be fairly accurate for horses and swine. The requirements of animals are sometimes stated in terms of net energy and rations worked out accordingly. More detailed information on this subject can be obtained from Bulletin 459 of the U. S. Department of Agriculture or from recent textbooks on animal nutrition.

Vitamins

Recent investigations in nutrition have proved the importance of certain substances called vitamins, which are contained in some food materials, but not in all. These substances are present in very small quantities in feed-stuffs. At least three kinds, called, "fat soluble A," "water-soluble B" and "vitamin C" have been recognized by their physiological effects. A fourth food factor hitherto unrecognized, has recently been discovered and has been named "vitamin X." These are provisional names given in the absence of definite knowledge as to the chemical composition and relations of the substances. "Flat soluble A," so called because it is soluble in fats or oils, is found in its most concentrated form in butter fat and egg-yolk fat, but not in lard. It occurs in the leafy parts of plants, but not in the vegetable oils, such as cotton seed oil or olive oil. This substance is necessary for growth and maintenance in all animals and its absence leads to a disease known as xerophthalmia, characterized by sore eyes, accompanied by general decline. The other two vitamins are soluble in water but not in fats or oils. "Water-soluble B," also a growth-promoting substance, is found in adequate quantity in many natural food-stuffs, such as milk, eggs, grains, leaves, etc. It prevents the occurrence of a disease known as beri-beri, a disease of the nerves in man. "Vitamin C," also known as the antiscorbutic vitamin, is found in the juice of the orange, the tomato and elsewhere. It prevents or cures scurvy. It is to supply this substance that the use of the orange juice or the tomato, is necessary for infants fed exclusively on pasteurized milk. The presence of adequate quantities of vitamins, A, B and C in the food of animals is essential to their health and growth. It appears that animals must have vitamin X before they can produce young. This occurs in lettuce and alfalfa, egg yolk and fresh meat.

Two other vitamins D have been announced recently but have not been fully accepted as yet.

Mineral Matter

Mineral matter in feeding stuffs is often spoken of as ash. It has been shown that animals fed rations freed from mineral matter, or ash, so far as it is possible, will soon die of mineral starvation. It is found that animals thus fed generally perish sooner than when no food is given. Mineral matter, therefore, is of vital importance to animals. It is necessary in every ration and the common feeding materials contain all the necessary mineral substances, tho they may be in very small amounts. The proportion of these substances in ordinary feeding stuffs varies materially according to the kind of plant, the portion of the plant used—seeds, stems, leaves, roots, etc.—the variety of the plant, and other conditions. In the animal, the presence of mineral matter is most evident in bones. About two-thirds of the dry bone consists of mineral matter or ash. Mineral matter also forms an essential ingredient of the soft tissues. The proportion varies in different organs of the animal, the proportion of mineral matter to dry matter being greater in the lean than in the fatty portions of the body and greater in the young than in the mature animals.

The roughages usually are much richer in mineral substances than the grains. If suitable roughages are not available and the rations are deficient in mineral substances, a mineral substitute may be mixed with the concentrates. Such materials as ground limestone, oyster shells, wood ashes, bone meal, bone black and ground rock phosphate are used to supply the necessary calcium and phosphorous. For an iron substitute iron oxide is sometimes used.

The use of expensive proprietary mineral mixtures is not necessary and generally proves uneconomical.

Essentials of a Balanced Ration

Until recently, the conception of a balanced ration was that it should contain digestible protein, carbohydrates and fat in the right relative amounts, and it was assumed that the consumption

by the animal of a sufficient amount of such a ration would bring about proper nourishment. Recent investigations have shown that the proportion of digestible protein to digestible energy-producing nutrients, or the nutritive ratio, while of fundamental importance, is only one of the essentials to a balanced ration. It can now be said that a ration is properly balanced only when it satisfies the following conditions:

1. Contains the proper amount of energy-producing substances, such as sugars, starches and fats.
2. Affords the proper supply of complete proteins.
3. Supplies the proper quantity of mineral matter.
4. Contains the proper amount of undigestible material as furnished by the fibrous or structural parts of plants.
5. Supplies the vitamins in adequate amount.
6. Is devoid of an appreciable amount of any poisonous substance having a cumulative effect.

Certain experiments conducted at the University of Wisconsin will serve to illustrate some of the recent advances in our knowledge of feeds. Young heifers fed a ration consisting exclusively of wheat and wheat straw grew until they weighed about 1,000 pounds, when their weights became stationary, followed by a general decline, roughened coats, blindness and failure to reproduce. Cows fed on a wheat ration remained in an apparently good state of health but their calves were often prematurely born and always in a poor state of health. Where the ration consisted entirely of corn products, including all parts of the plant, normal growth, maintenance and reproduction followed. Where the ration consisted solely of oat products, abnormal reproduction resulted. The wheat ration and the oat ration were deficient in mineral matter but, besides this, the wheat ration contained a poisonous substance which is cumulative in its action. The deficiency of mineral matter may be supplied by the addition of the proper salt mixture or by the use of a suitable roughage, such as corn stover or a leguminous hay. The effect of the poisonous substance was overcome, to a certain extent, by substituting corn stover for part of the wheat straw, and to a greater degree by the use of any leguminous hay.

Experiments of this kind show the serious consequences which may result from improper feeding. It is quite possible that some of the premature births of animals on the farm, attributed to contagious abortion, may have resulted from improper feeding. It is most important that corn stover, corn silage, or one of the leguminous hays form part of the ration of any herbivorous animal, because these materials contain all the substances necessary to round out a balanced diet, when fed in connection with the ordinary grains.

Average Composition of Feeding Stuffs

Table I comprises the average analyses of materials usually found in commercial feeds. The data are derived, as far as possible, from analyses made in the laboratories in this Station, supplemented by the published results of other laboratories.

Table II contains analyses of miscellaneous seeds and materials used at times in feed rations.

Table III contains analyses of materials used as fillers or adulterants, such as hulls, screenings, sweepings and waste by-products.

Materials like charcoal, grit, salt, peat, calcium carbonate and oyster shells are not listed in the tables because they do not supply any organic nutrients.

Table IV gives the average digestibility of the nutrients in common feeding stuffs, taken from "Feeds and Feeding" by Henry and Morrison.

Table V gives the average percentage of digestible nutrients contained in the common feeding stuffs, the nutritive ratio and the net energy value of each. The figures for digestible nutrients are derived in part by computation from our own analyses, using the coefficients of digestibility given in Henry and Morrison's tables, part are quoted from that work, and the net energy values are copied from tables in "The Nutrition of Farm Animals" by H. P. Armsby, 1917.

TABLE I.—AVERAGE COMPOSITION OF FEEDING STUFFS

	POUNDS IN 100					
	Water	Ash	Protein	Fat	Carbohydrates	
					Fiber	N. F. Extract
Alfalfa meal	8.0	7.0	14.0	1.5	30.0	39.5
Barley meal	10.5	2.7	11.5	1.8	4.8	68.7
Barley feed	8.4	4.3	10.0	2.5	16.4	58.4
Blood, dried	9.4	3.3	82.0	1.5	.....	3.8
Brewers' dried grains	8.7	3.7	28.5	6.7	13.5	38.9
Buckwheat	13.4	2.3	10.8	2.4	11.5	59.6
Buckwheat mixed feed	11.6	3.9	16.5	4.5	20.5	43.0
Buckwheat middlings	12.0	4.8	28.0	7.5	6.5	41.7
Buttermilk, dried	11.0	6.6	34.0	1.0	.....	47.4
Cane seed	10.9	1.9	9.5	3.4	3.5	70.8
Cocoanut meal	9.0	5.8	20.5	9.0	9.1	48.2
Corn	12.0	1.5	9.5	4.3	2.0	71.7
Corn bran	10.4	2.4	10.0	5.5	10.5	61.2
Corn and cob meal	10.5	1.5	8.0	3.7	7.9	68.4
Corn chop	12.3	1.5	9.0	4.4	2.3	70.5
Corn feed meal	11.7	1.6	9.0	4.0	2.0	71.7
Corn germ oil meal	8.5	2.7	22.5	10.5	7.5	48.3
Corn gluten feed	9.2	2.0	25.0	3.5	7.3	53.0
Corn gluten meal	9.0	1.5	35.5	4.0	2.0	48.0
Cottonseed meal 41%	7.5	6.2	41.0	7.0	10.0	28.3
Cottonseed meal 38½%	7.5	6.4	38.5	7.0	12.0	28.6
Cottonseed feed 36%	7.5	6.6	36.0	6.5	14.0	29.4
Cottonseed feed 22%	8.3	6.0	22.0	7.3	22.0	34.4
Cottonseed hulls	9.5	2.7	4.6	1.8	44.4	37.0
Cowpeas	12.0	3.4	23.0	1.5	4.1	56.0
Flaxseed	8.5	4.4	22.6	33.7	7.1	23.7
Hominy meal, feed or chop	9.6	2.5	10.5	7.5	6.5	63.4
Kaffir corn	11.5	1.7	11.0	2.5	2.5	70.8
Linseed meal (old process)	9.0	5.5	34.0	7.5	7.3	36.7
Linseed meal (new process)	9.0	5.5	36.0	3.0	8.9	37.6
Malt sprouts	9.0	6.0	27.3	5.3	11.6	40.8
Meat scrap	8.0	6.5	52.5	7.5	2.6	22.9
Meat and Bone meal	7.0	35.4	45.0	8.5	.....	4.1
Millet	8.5	3.5	10.5	5.0	7.5	65.5
Milo maize	9.5	2.8	10.8	2.8	2.7	71.4
Molasses (beet)	25.5	5.5	3.4	.....	.....	65.6
Molasses (cane)	25.8	6.4	3.0	.....	.....	64.8
Oats	10.4	3.4	11.5	4.4	11.0	59.3
Oat kernels	6.7	2.3	14.5	7.5	1.5	67.5
Oat shorts and hulls (85%)	7.5	5.0	6.0	2.1	26.5	52.9
Peanut oil meal (41%)	10.3	4.6	41.0	7.5	4.5	22.1
Peanut oil meal (38½%)	10.4	4.7	38.5	7.8	10.1	26.4
Peanut oil feed	8.5	4.4	30.0	6.0	22.0	29.1
Rice bran	10.0	9.5	12.0	10.0	12.0	47.5
Rice polish	10.8	4.8	11.9	9.0	2.0	62.5

TABLE I.—AVERAGE COMPOSITION OF FEEDING STUFFS
(Continued)

	POUNDS IN 100					
	Water	Ash	Protein	Fat	Carbohydrates	
					Fiber	N. F. Extract
Rye	9.5	2.0	11.3	1.5	2.1	73.6
Rye mixed feed	10.5	3.8	15.0	4.7	3.0	63.0
Rye middlings	11.0	3.7	15.7	3.5	4.7	62.4
Soybean meal	9.7	5.3	43.5	5.8	5.3	26.4
Sunflower seed	8.6	3.4	16.3	24.0	25.0	22.7
Tankage (digester 60%)	7.0	14.5	60.0	7.5	3.5	7.5
Tankage (50%)	9.0	18.0	50.0	9.5	5.0	8.5
Velvet-bean feed	10.0	4.0	17.5	4.5	17.0	47.0
Wheat	10.5	1.8	11.9	2.0	2.3	71.5
Wheat bran	10.3	6.0	15.0	4.0	9.0	55.7
Wheat middlings or shorts	10.7	4.4	16.5	4.5	6.0	57.9
Wheat mixed feed	9.8	5.4	16.0	4.5	7.5	56.8
Wheat red dog	11.0	2.2	17.5	4.4	2.7	62.2
Wheat screenings	11.9	4.0	12.4	3.2	6.1	62.4
HAYS						
Alfalfa hay	8.6	8.6	14.5	2.0	30.0	38.0
Clover hay (red)	12.9	7.1	12.5	3.0	25.5	38.5
Soybean hay	8.6	8.6	16.0	2.8	24.9	39.1
Timothy hay	11.6	4.9	6.2	2.5	30.0	45.0

TABLE II.—COMPOSITION OF MISCELLANEOUS SEEDS AND MATERIALS

	Protein %	Fat %	Fiber %
Beech nuts	15.04	30.64	14.94
Beech nut hulls	2.51	0.40	32.63
Beech nut kernels	23.50	51.05	3.00
Bluegrass chaff	7.75	5.73	27.43
Buckwheat middlings	17.13	4.28	.....
Butter beans	20.69	1.92	4.53
Cheat	10.41	2.23	7.42
Corn flour	8.63	2.35	0.72
Cracklings	39.50	45.34	0.41
Cushaw seed	30.18	28.87	22.61
Cushaw seed hulls	20.64	0.95	60.92
Cushaw seed kernels	35.25	43.71	2.35
Ensilage—corn—heavy	5.27	2.44	8.98
Ensilage—corn—light	2.66	1.30	8.39
Field beans	22.75	1.35	8.43
Flour, graham	12.38	2.02	2.04
Flour, pancake	10.38	1.27	0.63
Lady peas	27.25	2.73	5.38
Morning glory seed	18.45	9.25	11.43
Rye middlings	15.62	4.03	.....
Sorghum stalk meal (bagasse)	3.88	1.50	35.00
Soybean straw	4.00	1.13	.....
Sweet clover seed	36.13	4.96	10.79
Tomato pulp	2.70	1.17	6.33
Weed seed (miscellaneous)	13.75	7.13	15.48
Wild hemp seed	32.00	3.70	13.22
Yeast grains	16.69	6.60	18.90

TABLE III.—AVERAGE COMPOSITION OF MATERIALS USED AS FILLERS

	POUNDS IN 100					
					Carbohydrates	
	Water	Ash	Protein	Fat	Fiber	Nitrogen-free Extract
Buckwheat hulls	10.4	2.3	4.4	1.2	44.0	37.6
Corn bran	10.3	2.5	9.7	6.0	10.5	61.0.
Corncob meal	10.0	1.5	2.5	0.5	32.0	53.8
Cottonseed hulls	9.5	2.7	4.6	1.8	44.4	37.0
Clipped oat by-product	8.7	5.6	6.8	2.3	26.3	50.3
Flax plant by-product	8.5	7.5	8.7	7.5	20.5	47.3
Flax screenings	9.3	8.3	9.5	10.6	14.3	48.0
Grain screenings (weed seeds, etc.)	10.6	4.5	13.5	5.9	15.9	49.6
Oat dust	6.8	7.3	12.6	4.2	9.4	59.7
Oat hulls	7.4	6.3	3.7	1.8	29.2	51.6
Peanut hulls	9.3	5.6	4.5	4.8	67.3	12.5
Rice hulls	9.6	16.9	3.3	1.1	35.4	34.0
Sorghum stalk meal (Bagasse)	11.3	2.9	3.8	1.5	35.0	45.5
Wheat chaff	10.0	4.4	4.3	1.4	29.2	48.7
Wheat screenings	10.2	3.9	12.2	4.4	7.7	61.6
Velvet-bean hulls	13.2	6.1	11.6	1.9	24.5	42.7

TABLE IV.—AVERAGE DIGESTIBILITY OF THE NUTRIENTS IN COMMON FEEDING STUFFS, TAKEN FROM "FEEDS AND FEEDING," BY HENRY AND MORRISON

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FEEDING STUFF	Crude Protein %	Fat %	Carbohydrates: Fiber %	Carbohydrates: Nitrogen-free Extract %
Alfalfa	71	38	43	72
Barley	78	78	56	92
Barley, ground	88	86	70	93
Beet pulp, dried	52	.....	83	83
Blood, dried	84	.....	.....	.....
Bluegrass, Kentucky	57	52	66	61
Brewers' grains, dried	81	89	49	57
Buckwheat	75	100	24	76
Buckwheat bran	47	56	39	56
Buckwheat middlings	87	83	32	86
Clover, alsike	62	43	48	64
Clover, crimson	69	44	47	65
Clover, red	59	57	54	66
Cocoanut meal	90	100	23	87
Corn, ground	74	93	57	94
Corn bran	60	80	71	80
Corn cob	19	50	60	52
Corn-and-cob meal	52	84	45	88
Corn fodder, mature	45	70	63	73
Corn germ meal	73	96	75	78
Corn gluten feed	85	85	76	88
Corn gluten meal	85	93	55	90
Corn stover	37	62	66	59
Cotton seed	68	87	76	50
Cottonseed cake, cold-pressed	81	96	48	72
Cottonseed feed	58	90	45	61
Cottonseed hulls	6	79	47	34
Cottonseed meal, choice and prime	84	95	37	75
Distillers' dried grains	73	95	95	81
Flax seed	91	86	60	55
Hominy feed or meal	66	91	76	90
Linseed meal, new process	86	95	73	87
Linseed meal, old process	89	89	57	78
Malt sprouts	77	85	87	80
Meat scrap	93	98	.....	.....
Millet seed	59	80	41	84
Millet seed, ground	71	73	53	92
Molasses, cane	32	.....	.....	90
Oats	78	87	35	81
Oat feed (oat middlings and oat hulls)	75	78	42	46

TABLE IV.—AVERAGE DIGESTIBILITY OF THE NUTRIENTS IN COMMON FEEDING STUFFS, TAKEN FROM "FEEDS AND FEEDING," BY HENRY AND MORRISON—Continued

FEEDING STUFF	Crude Protein %	Fat %	Carbohydrates	
			Fiber %	Nitrogen-free Extract %
Oat middlings	80	93	49	85
Peanut cake from hulled nuts	90	90	9	84
Rice, ground	62	91	.....	92
Rice bran	65	77	25	79
Rice hulls	10	67	1	35
Rice polish	67	82	26	91
Rye, ground	84	64	.....	92
Rye feed	80	90	.....	88
Skim milk	94	98	.....	98
Soybeans, ground	91	92	75	81
Soybean oil meal	92	68	99	100
Tankage (with swine)	71	100	.....	100
Wheat, ground	74	72	59	93
Wheat bran	78	68	31	72
Wheat mixed feed	77	87	36	76
Wheat middlings or shorts	88	86	36	88
Wheat red dog flour	80	70	60	83
Wheat screenings	72	88	.....	73

TABLE V.—AVERAGE DIGESTIBLE NUTRIENTS OF FEEDING STUFFS

	POUNDS IN 100					
			Carbohydrates			
	Protein	Fat	Fiber	Nitrogen-free Extract	Nutritive Ratio	Net energy per 100 lbs. for ruminants. Therms.
Alfalfa meal	9.9	0.6	12.9	28.4	1: 4.3	34.2
Barley meal	10.1	1.5	3.4	64.0	1: 7.0	89.9
Barley feed	8.5	2.2	4.1	54.3	1: 7.4	.....
Blood, dried	59.0	.....	.....	3.5	1: 0.1	68.1
Brewers' dried grains	23.1	5.2	6.7	12.2	1: 1.8	53.4
Buckwheat	8.1	2.5	3.0	45.3	1: 6.6	59.7
Buckwheat feed	9.9	3.1	7.8	31.0	1: 4.6	.....
Buckwheat middlings	23.4	6.2	1.9	35.7	1: 2.0	72.2
Cocoanut meal	18.5	9.0	2.0	42.9	1: 3.5	83.5
Corn, ground	7.1	4.0	1.1	70.4	1:10.4	85.5
Corn bran	6.0	4.4	8.1	48.0	1:11.0	.....
Corn-and-cob meal	4.2	3.1	3.7	60.2	1:17.0	75.8
Cracked corn	7.3	3.6	1.0	69.0	1:11.0	89.2
Corn feed meal	7.0	3.7	1.1	67.4	1:11.0	85.2
Corn germ oil meal	16.5	10.1	5.6	37.8	1: 3.9	83.9
Corn gluten feed	21.2	3.0	5.4	46.6	1: 2.8	80.7
Corn gluten meal	30.2	3.7	1.0	43.2	1: 1.7	84.2
Cottonseed meal, choice	34.4	6.7	3.7	21.3	1: 1.2	93.4
Cottonseed meal, prime	32.3	6.7	4.4	22.5	1: 1.3	90.0
Cottonseed feed, 36%	30.3	6.2	5.1	22.0	1: 1.4	.....
Cottonseed hulls	0.3	1.6	17.3	16.4	1:13.3	9.9
Cowpeas	18.0	1.1	2.6	51.1	1: 3.2	79.5
Flaxseed	20.6	29.0	4.3	13.0	1: 3.7	83.2
Hominy feed, meal or chops	6.9	6.8	4.8	57.0	1:11.1	88.8
Kaffir corn	5.2	1.3	1.1	35.4	1: 7.6	.....
Linseed meal, old process	30.3	6.7	4.2	28.6	1: 1.6	88.9
Linseed meal, new process	31.0	2.9	6.6	33.8	1: 1.5	85.1
Malt sprouts	21.0	4.5	10.1	31.8	1: 2.5	72.7
Meat scrap	48.8	7.3	.....	.....	1: 0.3	73.0
Millet	6.2	3.2	3.9	53.3	1:10.4	.....
Milo maize	6.3	2.5	2.7	59.0	1:10.7	.....
Molasses, cane	1.1	.....	.....	59.1	1:53.7	55.4
Oats	8.2	3.8	3.9	48.8	1: 7.3	67.6
Oat shorts and hulls (hulls 85%)	5.0	2.0	8.4	29.4	1: 8.5	.....
Peanut oil meal, 41%	36.9	6.7	0.4	17.5	1: 0.1	93.6
Peanut oil meal 38½%	34.6	7.1	0.9	22.2	1: 1.1	.....
Peanut oil feed, 30%	21.0	5.4	2.6	14.6	1: 1.4	42.6
Rice bran	7.8	7.7	2.3	39.0	1: 7.5	45.3

TABLE V.—AVERAGE DIGESTIBLE NUTRIENTS OF FEEDING STUFFS

	POUNDS IN 100					
			Carbohydrates			
	Fat Protein	Fat	Fiber	Nitrogen-free Extract	Nutritive Ratio	Net energy per 100 lbs. for ruminants. Therms.
Rice polish	8.0	7.0	0.5	56.3	1: 9.1	77.7
Rye	9.5	1.3	.....	60.7	1: 7.2	93.7
Rye mixed feed	11.7	4.2	.....	55.9	1: 5.4	.....
Rye middlings	12.6	3.1	.....	55.5	1: 4.5	.....
Soy-bean meal	40.0	4.0	4.9	22.4	1: 0.9	99.7
Sunflower seed	13.5	18.9	6.3	17.8	1: 4.9	92.5
Tankage, digester, 60%	42.6	9.2	.....	.....	1: 0.4	93.0
Tankage, digester, 50%	35.5	9.0	.....	.....	1: 0.4	73.0
Velvet-bean feed	14.9	3.8	13.0	34.5	1: 3.8	.....
Wheat	8.8	1.5	1.6	66.5	1: 7.8	91.8
Wheat bran	11.7	2.6	2.5	40.4	1: 4.0	53.0
Wheat middlings and shorts	14.5	3.9	1.8	51.8	1: 4.4	59.1
Wheat mixed feed	12.5	3.9	2.4	45.0	1: 4.2	.....
Wheat red dog	15.4	3.9	0.8	54.6	1: 4.2	75.0
Wheat screenings	8.9	1.9	.....	46.3	1: 6.1	.....
HAYS						
Alfalfa hay	10.3	0.6	12.9	27.4	1: 4.3	34.2
Clover hay (red)	7.6	1.8	13.8	25.4	1: 5.7	38.7
Soy-bean hay	11.7	1.2	17.0	25.0	1: 3.8	44.0
Timothy hay	3.0	1.3	15.0	27.9	1:15.3	43.0

CHEMICAL STANDARDS IN FORCE IN KENTUCKY

	Minimum Protein %	Minimum Fat %	Maximum Fiber %
Mixed wheat feed	15.50	4.00	8.50
Wheat bran	14.50	3.75	10.00
Wheat middlings / Wheat shorts	16.00	4.00	7.50
White wheat middlings or shorts / Flour middlings	16.50	4.00	5.50
Red dog flour	15.00	3.00	3.50
Corn feed meal	8.00	3.75	5.00
Cracked corn	8.00	3.50	3.00
Alfalfa meal	....	...	32.00
Rye middlings	....	...	6.00
Ground barley	.....	...	6.50

OTHER STANDARDS

Screenings

Percentage of screenings required and statement whether ground or unground, except in poultry grains.

Material of Little or No Feeding Value

Percentage of material of little or no feeding value must be stated.

Essential Ingredients

A feeding stuff must not contain less than 3% of any essential food ingredient listed in the guaranty. If an ingredient is so listed and found to be less than 3%, the feed will be construed as being misbranded.

If a material change is made in the guaranty of a feed, in effect lowering the value of the feed, the name of the feed must be changed also.

Grit and Shell

The maximum amount of grit or shell, or both together must not exceed 5%.

Salt

The amount of salt in cattle and horse feeds should not exceed 1%; in hog feeds ½ to ¾%; in poultry feeds, none.

Definitions and Descriptions of Feeding Materials

Most of the high-grade materials used in commercial feeding stuffs are the by-products of the grain elevators, flouring mills, sugar, glucose, starch, and oil factories, slaughter houses, breweries and distilleries, the amount from the last two having been recently reduced to an inconsiderable quantity. Another source of materials is the light and immature grain of wheat, barley, oats and other grains and cereals, certain weed seeds, oat by-products such as oat shorts, oat middlings and oat hulls, clipped-oat by-products, flax-plant refuse, etc., which range from low to fair in feeding value and should not be wasted but should be utilized in a legitimate manner, on their own merits. Finally, there is a source of materials which is exploited in the trade under false cover, such as the trash and sweepings of elevators and mills, peanut hulls, corn cobs, cocoa waste, certain weed seeds, and similar materials ranging from worthless to dangerous.

Many of the leading materials are so uniformly made, in the manufacture of other articles of commerce, that they have become standardized and classified and defined to come within certain limits, if made of reasonably good materials. The definitions which follow are given as standards by this Department. The percentage of digestible nutrients used in the discussions are taken from Henry and Morrison's "Feeds and Feeding."

See Table I for average composition of materials.

See Table III for average composition of materials used as fillers or adulterants.

See Table IV for average digestibility of the nutrients in common feeding stuffs.

See Table V for average percentage of digestible nutrients, nutritive ratio and net energy value.

ALFALFA

Alfalfa hay is possibly of wider use than any other roughage. It can be used with all classes of horses, if fed correctly, but better with horses doing slow, steady work. Alfalfa is an excellent feed for fattening cattle and reduces the quantity of concentrates required to produce a given gain. For the dairy cow it makes a very desirable feed, because alfalfa hay is not only rich in crude protein but in mineral matter as well. As a feed for sheep, alfalfa leads the roughages. It can be used to a limited extent in connection with other feeds in fattening hogs and in maintaining stock hogs thru the winter. With a fair understanding of the composition and nature of alfalfa hay, a feeder can use it in feeding all farm animals, with economy and satisfaction.

Fraud is sometimes practist in the preparation of alfalfa meal and alfalfa leaf meal. Alfalfa hay is ground to a certain degree of fineness and then past over screens; the finer parts that are sifted out are sold and used as "alfalfa leaf meal" and the straw or coarser parts are sold and used as "alfalfa meal."

The so-called alfalfa leaf meal is used in hog and poultry feeds, while the coarser meal is used in horse and dairy feeds. The "alfalfa leaf meal" is composed of the alfalfa leaves, the small stems and the finer parts of the main stems, while the coarser part of the so-called "alfalfa meal" is nothing more than alfalfa stems or straw.

Alfalfa Meal is the entire alfalfa hay ground, and does not contain an admixture of ground alfalfa straw or other foreign materials.

In view of the fact that the market price of alfalfa meal is often as high as that of wheat bran, or even of mixed wheat feed, or higher, whereas its feeding value is less, particularly so in feeding dairy cows, its purchase can be recommended only when it sells at an appreciably lower price than these materials. Ordinarily a feeder can produce roughage more economically on his farm than he can purchase alfalfa meal in commercial feeds at prevailing prices.

Three samples were analyzed and exceeded their guaranties in protein but two were above guaranties in fiber. The average analysis of the three samples is 15.4% protein, 1.8% fat and 31.4% fiber.

Alfalfa has an average digestibility of 71% of the protein, 38% of the fat and 43% of the fiber.

ANIMAL PRODUCTS

One of the sources of the more highly concentrated and digestible feeds is the by-products of packing houses. These by-products are sold as blood meal, cracklings, digester tankage, meat scrap or meat meal and meat and bone scrap or meat and bone meal. Some of these products contain more or less bone and are therefore correspondingly rich in calcium and phosphorus. Owing to their very concentrated form and high digestibility and the high prices which they command, the feeder should understand their nature and how to use them in connection with other materials, in order to secure the best results.

In addition to the packing-house by-products a considerable amount of animal products is sold as feed, made from dead animals collected in and around cities and stock yards by rendering plants. The carcasses are cooked in live steam under high pressure from six to ten hours, the fats

pressed out, and the residues dried. The better grade of this material is used for feed and the lower grades are sold for fertilizer. This product compares in feeding value with digester tankage. It is questionable whether any of this material should be utilized as a feed, both from the standpoint of its source and the liability of it becoming contaminated, in its production at the plant, with some disease germ, from which the animal died.

Blood Meal is ground dried blood. This is the richest of the animal by-products, with an average crude protein content of 80%. It is particularly useful as a substitute for skim-milk in feeding young pigs and calves. It is used in some classes of mixed feeds to some extent but is employed largely in the lower grades of digester tankage and meat meals to raise the protein content.

No samples were obtained for analysis.

The average digestibility of blood meal is 72% of the protein.

Cracklings are the residue after partially extracting the fats and oils from the fatty tissue of the animal. If they bear a name descriptive of their kind, composition or origin, they must correspond thereto.

No samples were obtained for analysis.

Digester Tankage is the residue from animal tissue, exclusive of hoof and horn, specially prepared for feeding purposes by tanking under live steam, drying under high heat, and suitable grinding. If it contains more than 10% of phosphoric acid (P_2O_5) it must be designated Digester Meat and Bone Tankage.

Several grades of tankage are being made, ranging from 35% to 60% protein. In some instances the addition of blood is being made to raise the protein content. Good tankage is high in digestible protein, makes an excellent feed for hogs and is good to include in the ration of horses run down.

Sixty-five samples were analyzed, twenty-two of which fell below guaranty in protein, one fell short in fat and three ran above in fiber.

Tankage has an average digestibility of 71% of the protein.

Those firms whose products are reported herein and showed material deficiencies in comparison with their guaranties, are: Buhner Fertilizer Co., Seymour, Ind., No. 72121; Early & Daniel Co., Cincinnati, O., No. 72324; Groves Fertilizer Co., Cincinnati, O., No. 72146; Hopkins Fertilizer Co., New Albany, Ind., No. 71651 and No. 71652; Morris & Co., Chicago, Ill., No. 72378, No. 72943 and No. 72928; Standard By-Products Co., Louisville, Ky., No. 71901 and No. 72105; Swift & Co., Chicago, Ill., No. 72510; United Bi-Products Co., Chicago, Ill., No. 72414, No. 72474, No. 72461, No. 73131 and No. 73167.

Dried Buttermilk averages over 30% protein and 6.5% fat and is used to feed swine and poultry. It ranks very high for this purpose tho its high price makes it uneconomical compared with other high-protein supplements used for this purpose. No samples were obtained for analysis.

Meat Scrap and *Meat Meal* are the ground residue from animal tissues, exclusive of hoof and horn. If they contain more than 10% of phosphoric acid (P_2O_5) they must be designated Meat and Bone Scrap and Meat and Bone Meal. If they bear a name descriptive of their kind, composition or origin they must correspond thereto.

This product varies in amount of protein, ranging from 40 to 60%, the value depending on the amount of protein. Blood meal is often added to meat meal, as in the case of tankage, to increase the protein content. It makes an excellent feed for hogs and poultry. This product is often confused with tankage.

Twelve samples were analyzed, three of which fell short in protein.

The average digestibility of meat scrap is 71% of the protein, and 98% of the fat.

Those firms whose products are reported herein as showing material deficiencies in their guaranties, are: Armour Fertilizer Works, Chicago, Ill., No. 72355; Kentucky Chemical Manufacturing Co., Covington, Ky., No. 72040.

BARLEY PRODUCTS

Barley is one of the most widely cultivated of the cereals and was the chief bread plant of many of the ancient nations, but in recent years has been used almost wholly for brewing, and to a much less extent for stock feeding. The reverse is the case now, especially in sections where corn and oats cannot be raised to an equal degree.

Experiments show that barley has less digestible protein than oats and more than corn; less fat than either, and more carbohydrates than oats, but less than corn. In sections where barley is the prevailing crop, it takes the place of corn and oats as the leading feed. Feeding experiments show corn and oats slightly in favor over barley, tho with barley a good substitute for either.

Barley Meal, or *Ground Barley*, is the entire grain ground.

Seven samples were analyzed and ran well up to their guaranties.

The average digestibility of barley meal is 88% of the protein, 86% of the fat and 70% of the fiber.

Barley Mixed Feed is the entire by-product from the manufacture of pearl barley or barley flour. It contains the shorts, bran and hulls and averages about 10% of protein, 2.5% fat and 16.5% fiber.

Malt Sprouts are the sprouts of the malted barley grain. If the sprouts are derived from any other malted cereal, the source must be designated. Malt sprouts has a digestibility of 77% of the protein, 85% of the fat and 87% of the fiber.

BEET PRODUCTS

Dried Beet Pulp is a by-product obtained in the manufacture of beet sugar and consists of the dried residue after the extraction of most of the sugar of the beets.

Two samples were analyzed and exceeded their guaranties.

Beet pulp has an average digestibility of 52% of the protein and 83% of the fiber.

BUCKWHEAT PRODUCTS

Buckwheat is rarely used in feeding stock, except in chicken feeds, tho it has a fair feeding value, running somewhat lower in the nutrients than most of the cereals. It has an average composition of 10% protein, 2% fat and 9% fiber.

Buckwheat Shorts or *Buckwheat Middlings* are that portion of the grain immediately inside of the hull, after separation from the flour.

They have an average composition of 28.5% protein, 7% fat and 6% fiber, and make a highly nutritious feed.

Buckwheat middlings or shorts have an average digestibility of 87% of the protein, 83% of the fat and 32% of the fiber.

COCOANUT PRODUCTS

Cocoanut Oil Meal is the ground residue after the extraction of part of the oil from the meat of the cocoanut.

One sample was analyzed and exceeded its guaranty.

Cocoanut oil meal has an average digestibility of 90% of the protein, 100% of the fat and 23% of the fiber.

CORN PRODUCTS

Corn is regarded as the greatest energizing, heat-giving, fat-furnishing food of any of the cereals, for the animal on the farm, and it produces more animal food on a given area, with less expenditure of labor and outlay of money, than any other grain or cereal. Not being rich in protein and mineral matter, it fails to furnish the nutrients in proper proportion to meet the needs in growth. These deficiencies must be supplied by means of other feeds. Corn is rich in starch and oil and produces heat, energy and fat.

Experiments in nutrition have demonstrated that yellow corn is rich in the fat-soluble vitamin while white corn is deficient in it. If the other materials in the ration are deficient in this vitamin, it is evident that yellow corn should be used; but where it is not a question of the fat-soluble vitamin, the relative values of white corn and yellow corn appear to be the same.

Corn has an average digestibility of 74% of the protein, 93% of the fat and 57% of the fiber.

Corn Bran is the outer coating of the corn kernel.

The average analysis of corn bran is 10.5% protein, 6.5% fat and 11.5% fiber. It has no ready sale as a distinct feed on account of its low feeding value and the bulk of its output is used to mix with other materials. However, recent experiments tend to show that corn bran substituting 30% of a mixed ration not derived from corn produces substantially the same amount of milk as wheat bran and the living gains of the animal were about the same. The ash and protein in corn bran are noticeably less than in wheat bran. Digestion experiments with sheep show that 80% of the dry matter is assimilated while only 66% in wheat bran is assimilated. Corn bran has a digestibility of 60% of the protein, 80% of the fat and 71% of the fiber.

Corn Chop is a term commonly applied to cracked or crushed corn, but more generally used to cover that portion of cracked corn after the finer particles have been sifted out and to which corn bran may or may not have been added.

Cracked Corn or *Crushed Corn* is what the term implies—the whole grain cracked or crushed, from which nothing has been taken and to which nothing has been added. Sifted Cracked Corn is the material left after the small particles have been sifted out.

Seven samples were analyzed, one of which fell short of guaranty in fat.

The average digestibility is 76% of the protein, 86% of the fat and 58% of the fiber.

Corn Feed Meal is the by-product obtained in the manufacture of corn chop, with or without aspiration products added to the siftings, and is also the by-product obtained in the manufacture of table meal from the whole grain by the non-degerming process.

Twenty-five samples were analyzed; four were below guaranty in protein, one in fat, and three were above in fiber.

One sample contained ground oat hulls; two, ground screenings, and two were made out of damaged grain.

Corn Feed Meal has an average digestibility of 74% of the protein, 93% of the fat and 57% of the fiber.

Corn Germ Meal is a product obtained in the manufacture of starch, glucose and other corn products. It is the germ layer from which a part of the corn oil has been extracted.

No samples of this product were obtained for analysis.

It has a digestibility of 73% of the protein, 96% of the fat and 75% of the fiber.

Corn Gluten Feed is that portion of corn that remains after the separation of the larger part of the starch and the germ by the process employed in the manufacture of corn starch and glucose. It may or may not contain corn solubles.

One sample was analyzed and exceeded its guaranty.

Corn Gluten Meal is that part of corn that remains after the separation of the larger part of the starch, the germ and bran, by the processes employed in the manufacture of corn starch and glucose. It may or may not contain corn solubles.

No sample was taken.

This product has an average digestibility of 85% of the protein, 85% of the fat and 76% of the fiber.

Grits are the hard, flinty portions of Indian corn, without hulls and germs, broken finer than hominy and free from dust.

No samples of grits were taken.

Hominy Meal, Hominy Feed, or *Hominy Chop* is a kiln-dried mixture of the mill-run bran coating, the mill-run germ, with or without a partial extraction of the oil, and a part of the starchy portion of the white corn kernel, obtained in the manufacture of hominy, hominy grits and cornmeal by the degerming process. Yellow hominy product is defined in the same way, except that the product is made of yellow corn.

Thirty-seven samples were analyzed; twelve fell short in protein and ten in fat and one ran high in fiber. Six samples were misbranded and one adulterated.

Those firms whose products reported herein did not comply with their guaranties, are: Aubrey & Co., Louisville, Ky., No. 71740, No. 72533; Cincinnati Grain & Hay Co., Covington, Ky., No. 72134, No. 71758; Dixie Mills Co., E. St. Louis, Ill., No. 72186; Early & Daniel Co., Cincinnati, Ohio, No. 72470, No. 73142; Perin-Brouse-Skidmore Grain Co., Cincinnati, Ohio, No. 72709; The Quaker Oats Co., Chicago, Ill., No. 72439.

This product has an average digestibility of 66% of the protein, 91% of the fat and 76% of the fiber.

COTTON-SEED PRODUCTS

Cotton-Seed Meal is a product of the cotton seed only, composed principally of the kernel with such portion of the hull as is necessary in the extraction of the oil and must contain at least 38.62% protein. Any cotton-seed product containing less than this amount is termed cotton-seed feed, and the percentage of hull contained in it must be given.

Cotton-seed meal is regarded as the cheapest source of protein in available form and, thru it, of nitrogen for maintaining the soil. It is one of the most valuable feeds when properly fed. The amounts which can be safely fed to each kind of stock should be carefully studied in the textbooks on feeding. Cotton-seed meal can be fed with safety in small amounts in proper rations to dairy cows, beef cattle, sheep and horses, but if fed injudiciously, may be injurious, or even cause death. Swine are very susceptible to the effects of the poisonous substance contained in cotton-seed meal. If cotton-seed meal forms as much as one-third of the concentrates fed to pigs, in a short time they may become sick and die. Young calves (under six months) are very susceptible. Even small allowances fed to young calves daily usually prove fatal to them. Stock closely confined and heavily fed on cotton-seed meal often are affected, whereas, stock allowed the use of pasture and succulent food are not so susceptible; especially is this true with swine.

Cottonseed meal has an average digestibility of 84% of the protein, 93% of the fat and 37% of the fiber.

Choice Cotton-Seed Meal must be finely ground, not necessarily bolted, perfectly sound and sweet in odor, yellow, free from excess of lint, and must contain at least 41% of protein.

One hundred and seventeen samples of meal guaranteed to be choice meal were analyzed, thirty-eight of which were below guaranty in protein and twenty-three above in fiber. A small number of the meals were adulterated with hulls.

Those firms whose products reported herein showed material deficiencies in comparison with their guaranties, are: F. W. Brode Corporation, Memphis, Tenn., No. 72363, No. 72095, No. 72608, No. 73190; Chas. A. Hill & Co., Nashville, Tenn., No. 72366; Humphrey-Godwin Co., Memphis, Tenn., No. 72988; Lyle & Lyle, Huntsville, Ala., No. 71798; Marianna Cotton Oil Co., Memphis, Tenn., No. 72886, No. 73166; C. L. Montgomery & Co., Memphis, Tenn., No. 72064; Memphis Cottonseed Products Co., Memphis, Tenn., No. 73200; W. C. Nothern, Memphis, Tenn., No. 73027; Texas Cake & Linter Co., Dallas, Texas, No. 71674.

Prime Cotton-Seed Meal must be finely ground, not necessarily bolted, of sweet odor, reasonably bright in color, yellow, not brown or reddish, free from excess of lint, and must contain at least 38.62% protein.

One sample guaranteed to be prime meal was analyzed and was up to guaranty.

Cotton-Seed Feed is a mixture of cotton-seed meal and hulls and includes any mixtures of less than 38.62% protein, tho the bulk of this material was guaranteed to contain 36% protein.

Twenty-one samples of cotton-seed feeds were analyzed. This product, except in one shipment, was guaranteed to be 36% protein grade. Seven fell short in protein and five ran high in fiber. A number of these samples contained an excessive amount of hulls.

Those firms whose products reported herein showed material deficiencies, are: Ashcraft & Wilkinson Co., Atlanta, Ga., No. 71649, No. 71653; F. W. Brode & Co., Memphis, Tenn., No. 72377.

FLAX PRODUCTS

Flax-Plant By-Product is that portion of the flax plant remaining after the separation of the seed, the bast fiber and a portion of the shives. It consists of flax shives, flax pods, broken and immature flax seed and the cortical tissues of the stem.

This product has very little feeding value and is used largely as an adulterant. No samples were found for analysis.

Unscreened Flax Oil Feed is the residue after extracting a part of the oil from unscreened flax seed. The value is lower than that of linseed meal, depending on the amount of screenings present. Linseed meal is sometimes adulterated by the substitution of screenings meal.

Linseed Meal is the ground residue after extraction of part of the oil from ground flax seed. It is regarded as one of the most healthful feeds for limited use with all farm animals. It is rich in protein, slightly laxative in action, is mucilaginous and has soothing properties. It is also rich in calcium and fairly high in phosphorus. It can be fed to good effect to all kinds of animals. If the price is too high to make it economical as a source of protein, then it should only be fed in sufficient quantity to produce the desired tonic and regulating effect.

Two methods are used in extracting the oil, thus producing two kinds of meals, Old Process and New Process meals. Old Process Meal is the ground product obtained after extraction of part of the oil by crushing, cooking and hydraulic pressure; New Process Meal is the ground product after most of the oil has been extracted by means of solvents, instead of hydraulic pressure. Practically all the linseed meals found on the Kentucky market were the old process meals, with a guaranty of 30 to 34% protein. Nineteen samples were analyzed all of which exceeded their guaranties.

Linseed meal has an average digestibility of 89% of the protein, 89% of the fat and 67% of the fiber.

OAT PRODUCTS

The production of oats in Kentucky is small as compared with some of the other States. Next to corn, oats are the most extensively grown cereal in this country. Oats are safest of all feeds for horses, are excellent for dairy cows and can be fed to advantage to poultry and hogs. They are not good for fattening live stock, but are good for growing animals and breeding swine. Bleaching of low-grade oats and barley with sulfurous acid fumes to whiten the grains and raise the market grade, has become a common practise. Pin-head and wild oats are bleached also and commonly sold as a good grade of oats.

A number of oat by-products are obtained at the oatmeal factories and grain elevators, the value of which depends upon the proportion of the oat grain or kernel to the hull and other waste. Often light-weight oats of low feeding value are mixed with corn and the ground or chopped

product put on the market as corn and oats chop. Large quantities of oat hulls are put out by the oatmeal factories and, as the modern machinery can so completely separate the hulls from the kernel, the chaff-like material that is left has very little feeding value. None of the oat by-products were found in an unmixed state on the Kentucky market, but they were found in mixed feeds, usually molasses feeds, which are manufactured without the State. These products are rarely worth the price paid for them and are mixed with other materials in order to find a market for them.

Eight samples of ground oats were analyzed. Two fell below guaranty in protein and three exceeded guaranty in fiber. Three samples contained wild oats and barley.

Oat Groats are the kernels of the oat berry.

Oat Hulls are the outer chaffy coverings of the oat grains.

Oat Middlings or *Oat Shorts* are the floury portions of the oat groat, obtained in the milling of rolled oats.

Clipped Oat By-Product is the by-product obtained in the manufacture of clipped oats. It may contain light, chaffy material broken from the ends of the hulls, empty hulls, light, immature oat grains and dust.

PEANUT PRODUCTS

Peanut Meal is a product of the hulled peanut and must not contain less than 38.62% protein. Any peanut product containing less than this amount of protein is regarded as peanut feed and the percentage of hulls must be stated. This product contains from 38.5% to 50% protein. It is palatable and has given good results in feeding dairy cows, sheep and pigs. If fed in too large proportions it may produce soft pork.

Peanut meal has an average digestibility of 90% of the protein, 90% of the fat and 9% of the fiber.

Choice Peanut Meal is the ground residue after the extraction of part of the oil from peanut kernels, and must not contain less than 41% protein.

Prime Peanut Meal is the ground residue after the extraction of part of the oil from peanut kernels, and must not contain less than 38.62 protein.

Peanut Feed is a mixture of peanut meal and hulls and varies in amount of protein from 28 to 38.62%. The percentage of hulls must be stated in all peanut feeds sold in Kentucky.

RICE PRODUCTS

The production of rice in this country is limited principally to Louisiana and Texas. The rice grain is rather low in protein and fat, but its by-products have considerable value as a stock feed. The source of these products is too far from the Kentucky market to make them an economical feed for this section, but some shipments have been made the past year. Rice meal, rice polish and rice bran have an average digestibility of 65% of the protein, 77% of the fat and 25% of the fiber.

Rice Bran is the cuticle beneath the hull of the rice grain.

Four samples of rice bran were taken for analysis and equaled their

guaranty in protein and fat and only one exceeded its guaranty in fiber. Two samples contained an excess of hulls.

Rice Hulls are the outer, chaffy coverings of the rice grain. They are tough and woody and are considered dangerous to feed to stock and for this reason are prohibited to be sold as feed in Kentucky.

Rice Polish is the finely powdered material obtained in polishing the kernel. No samples were taken for analysis.

RYE PRODUCTS

Rye is not extensively grown in this country. It has been used heretofore largely for the manufacture of whisky and to some extent as a food for live stock. Animals show no fondness for it, but eat it readily when mixed with other feeds. It is not regarded a good feed to feed alone or in large quantities but, fed in connection with other materials, it gives fair results. Rye feeds are not used extensively in Kentucky and only during seasons of high cost of feeds are they used to an appreciable degree.

Rye Bran is the outer coating of the rye grain, corresponding in character to wheat bran and having about the same food value.

Rye Middlings are the fine particles just beneath the bran coating, corresponding in character to wheat middlings. Seven samples were analyzed and were well up to guaranty.

Rye Mixed Feed is a mixture of the mill-run bran and middlings obtained in milling the rye grain.

SOYBEAN PRODUCTS

The soybean is of high value both as a food and a fertilizer and its production is being greatly increased. At the present time it is grown in this country primarily for forage, but the beans are beginning to be used extensively as a food for man and animals. The bean carries 16 to 20% of oil, and this, when extracted, is used for human food and other purposes, while the resultant by-products, called soy-bean cake and meal, are used for stock food and fertilizer.

Soybean seeds are rich in protein, fat and mineral matter and make a good feed for growing stock. They have an average digestibility of 84% of the protein, 82% of the fat and 81% of the fiber. Owing to their high digestibility they compare favorably with linseed meal and cotton-seed meal as a feed for live stock.

Soybean Meal is the ground residue after extraction of part of the oil from the bean. It has an average digestibility of 92% of the protein, 68% of the fat and 99% of the fiber. It may be classed as one of the most valuable protein supplement feeds.

VELVET-BEAN PRODUCTS

The velvet bean is being grown extensively in the South for feeding purposes. It has been tried out in a number of Northern and Eastern States, but it has not proved the success as a feed in Kentucky that was

hoped for it. This has been due, perhaps, to some extent at least, to the lack of knowledge in feeding it, and also to the extravagant claims made for it by those who were interested in it from a commercial standpoint.

Feeding tests made with velvet-bean feed at this Station show it to be a very good substitute for some of the common by-products of the milling industry as a feed for cows, but the prices asked for this product are out of proportion to its real value as a feeding material. As a supplement to corn in the feeding of hogs, velvet-bean feed was found to be a poor material.

Velvet-Bean Feed is the product obtained by grinding the natural run of the bean and pod and contains, on the average, about 40% of the pod. It has an average analysis of 17% protein, 4.5% fat and 16% fiber.

It has a digestibility of 74% of the protein, 78% of the fat and 64% of the fiber.

Velvet-Bean Meal is the ground bean after it has been separated from the pod. It is a much better product than velvet-bean feed, being richer in protein and fat and having a higher digestibility. No velvet-bean meal was found on the Kentucky market. This product should not be confused with velvet-bean feed, which contains about 40% velvet-bean hulls.

WHEAT PRODUCTS

In the extent of the production of the cereals in this country wheat ranks third. As compared with corn, oats, barley and rye, wheat is richer in protein, but less rich than corn and oats in fat and about the same as rye and barley. The average analysis of Kentucky wheats is 12% protein, 2% fat and 2.25% fiber. Wheat has an average digestibility of 74% of the protein, 72% of the fat and 59% of the fiber. Only low-grade wheats are used for feeding live stock, the bulk of sound wheat being used in making food for human consumption.

The by-products from the wheat-milling industry make excellent feeds for stock and form a large part of the legitimate feeds found on the market in Kentucky. These by-products vary a good deal, depending on the number of streams and the process of milling. Millers do not always combine the same streams into the same by-products, as they differ widely in opinion and practise as to what streams should be run together, thus causing wide variance in the by-products obtained in this great industry. These products should be bought only under chemical standards. See Kentucky standards for wheat by-products, page 121.

Wheat Bran is the coarse outer coating of the wheat berry, obtained in the usual commercial milling process from wheat that has been cleaned and scoured.

Wheat Bran is a palatable feed, comparatively rich in digestible protein and fat, light and fluffy, rather high in fiber and rich in mineral matter, except calcium. Bran is lower in total digestible nutrients or in net energy than many of the concentrates but it supplies an abundance of phosphorus, so essential in milk and bones, tho it is lacking in calcium, which is needed in still larger amount. Horses fed heavily on bran sometimes suffer from what is called "bran disease," which seriously affects their bones, but the calcium may be supplied in an inorganic form, such as wood ashes, burned lime, bone meal, etc., or by feeding the plants high in calcium, such as the legumes.

In order to feed bran economically, one must know its properties. It should be mixed with other ingredients to lighten the ration or give bulk, while at the same time improving its nutritive qualities. It has a laxative effect and for this reason cannot be fed extensively to work animals. It is an excellent feed for the dairy cow, furnishing bulk to the ration and providing protein and phosphorus, so vital to the formation of milk. It is a satisfactory feed for feeding breeding sheep and lambs. It is not a good feed for pigs, tho considered valuable in preparing a ration for breeding swine and stock hogs when they cannot get legume pasture or hay.

Thirty-six samples were analyzed, some of which contained screenings and were so registered. Two fell below guaranty in protein, one in fat, and four ran high in fiber. Two samples were adulterated.

Bran has an average analysis of 15% protein, 4% fat and 8.5% fiber, with an average digestibility of 78% of the protein, 68% of the fat and 43% of the fiber.

Middlings, or *Shorts*, are the fine particles of the outer and inner bran, separated from bran and white middlings.

The terms, middlings and shorts, are generally used in the trade as interchangeable terms. The materials vary greatly in quality and should be bought with caution. When of proper quality they make an excellent feed for hogs of all ages. They should be mixed and fed with other materials, as cornmeal, barley meal, ground oats, tankage, etc. When properly mixed with other materials, they form a good combination for the dairy cow, since they are rich in protein and phosphorus. They should not be fed alone to horses, on account of being heavy and pasty and liable to cause colic. Like bran, they are deficient in calcium and this must be supplied by other ingredients which go to make up the ration.

There has appeared on the market in Kentucky a wheat product under the name of "Brown Shorts," "Brown Middlings," or Standard Middlings," which is made of ground wheat bran only or which may at times contain a small amount of shorts or middlings. This product has been rejected for registration in Kentucky under the name of "Brown Shorts," "Brown Middlings," or "Standard Middlings," on the ground that this is a misnomer, and dealers and consumers are warned to refuse shipments of such materials as shorts or middlings. Violations of this nature will be dealt with under the head of adulteration and misbranding.

Two hundred and twenty-five samples of middlings and shorts were analyzed, forty-eight of which fell below guaranty in protein, eleven in fat, and thirty-eight ran above guaranty in fiber. Forty-six were adulterated or contained an excess of ground wheat bran, eight were adulterated with corn bran, forty-one were adulterated with screenings and weed seeds and three with ground oat hulls.

Shorts and middlings have a digestibility of 77% of the protein, 88% of the fat and 30% of the fiber.

Those firms whose products reported herein showed material deficiencies as compared with their guaranties, or were adulterated, are: Allen & Wheeler Co., Troy, Ohio, No. 73120; Arnold-Madaus Milling Co., Sterling, Kan., No. 72388; Ashland Trading Co., Ashland, Ky., No. 71663; Aubrey & Co., Louisville, Ky., No. 72601; Aviston Milling Co., Aviston, Ill., No. 72221, No. 73118; Cincinnati Grain & Hay Co., Cincinnati, Ohio, No. 72859; Diamond Mills, Evansville, Ind., No. 71982, No. 72529, No. 71929; Dunlop Milling Co., Clarksville, Tenn., No. 71693; Edinger & Co., Louisville, Ky., No. 72102, No. 72827, No. 72926; Oscar Farmer & Sons, Louisville, Ky., No. 72099; J. H. Fedders & Sons, Covington, Ky., No. 73143;

Ferger Bros., Cincinnati, Ohio, No. 72625; Edward F. Goeke Co., Evansville, Ind., No. 72649; Gwinn Bros. & Co., Huntington, W. Va., No. 71662, No. 71718, No. 71959, No. 72231; Hubbard Milling Co., Mankato, Minn., No. 71871; Keister Milling Co., Huntington, W. Va., No. 71655, No. 71657, No. 71659, No. 71709; George Keller, Newport, Ky., No. 72868; Kenton Hay & Grain Co., Latonia, Ky., No. 71755, No. 72855; Kentucky Feed & Grain Co., Louisville, Ky., No. 73006; Lambert Milling Co., Kenova, W. Va., No. 72716, No. 73059; Climax Roller Mills, Shelbyville, Ky., No. 72828, No. 72996; National Feed Co., St. Louis, Mo., No. 72787; Nutritia Co., Cincinnati, Ohio., No. 71995; Russell-Miller Milling Co., Minneapolis, Minn., No. 71933; Tell City Flouring Mills, Tell City, Ind., No. 72332, No. 72334.

Mixed Wheat Feed or *Shipstuff* is a mixture of the products other than the flour obtained from the milling of the wheat berry, combined in the proportions obtained in the usual process of commercial milling. In other words, it is the mill-run mixture of the bran and middlings or shorts, to which red dog flour may or may not have been added.

Mixed wheat feed forms a combination which can be fed to animals of almost every class with safety and good results, for it is rich in digestible protein and fat and contains an abundance of minerals, except calcium; the laxative properties of the bran are reduced by the presence of middlings and shorts; the heavy and pasty nature of the middlings is overcome; the mineral matter found in both is maintained and the digestible protein and fat are kept up to a high standard. For general feeding it is one of the best feeds.

One hundred and eleven samples were analyzed, of which twenty-six fell below in protein, two in fat and fourteen ran above in fiber. Ten samples contained screenings; five, corn bran; four, ground weed seeds; and one, ground oat hulls.

Red Dog Flour is a low-grade wheat flour containing the finer particles of bran. The name "reddog" originated in the early days of the flour-milling industry, before patent flours were as highly developed as they are today. Often the separations were not clear, due to a large percentage of the middlings and shorts and bee-wing bran getting into the final product, thus giving it a reddish color. In order to distinguish this off-colored flour from the clearer flours the mill hands called it "red dog." This name has been handed down with the varying conditions and developments of the flour industry and it is used indiscriminately in the present day to cover any low-grade flour—even low-grade patent flours.

This material is rich in digestible nutrients and has a high feeding value, especially for young pigs, calves and milk cows.

Three samples were taken for analysis and exceeded their guaranties.

MISCELLANEOUS WHEAT FEEDS

Some manufacturers of wheat by-product feeds make grades which cannot be classified under the standard wheat by-products. These feeds do not meet the Kentucky standards for the regular established wheat feeds and therefore cannot be registered under these established names. These feeds vary in composition and chemical analysis and are registered and sold under proprietary names, or names that are not descriptive of the materials. Under such names the manufacturers are not required to make their chemical guaranties of these products harmonize with the

standards given to the various wheat by-products under their established names. This class of feeds as a whole compares very favorably with Mixed Wheat Feed, but a good deal of it is finely ground wheat bran and screenings.

Forty-three samples of feeds of this class were analyzed. Seven fell below guaranty in protein and two exceeded guaranty in fiber. Two samples were adulterated with ground weed seeds, one with corn bran and one with oat hulls.

MISCELLANEOUS

Brewers Dried Grains are the properly dried residue from cereals, obtained in the manufacture of beer or other malt beverages. Due to war restriction and prohibition, the use of this material has been reduced to a minimum.

Four samples were analyzed, one of which fell below guaranty in protein.

Distillers Dried Grains are the dried residue from cereals, obtained in the manufacture of alcohol and distilled liquor.

Garbage, or household and hotel waste, is being collected in cities by specially equipped garbage plants, the material sorted and treated, and the product sold as a garbage tankage for feeding hogs. This material varies in food value but, thru proper sorting, it can be produced in a highly concentrated form. No digestion experiments have been made on garbage, but it is thought by many that the digestibility of this material is low. If the material is not properly cooked, there is danger of poisoning from decayed garbage, and bad results may come, also, from the presence of chemicals used for washing, like lye or soda. Another source of danger from using garbage is from broken glass and china that are found in collected garbage of this nature and, unless this material is carefully sorted out of the waste material, death of animals may result.

Screenings consist of the smaller grains, weed seeds and other foreign materials having feeding value, separated in cleaning the grain.

A farmer takes his grain to market and is paid according to the way it is graded. If it contains weed seeds, chaff and inferior grains, it is docked according to the estimated amount of these materials. The grain is taken to the elevator and cleaned, yielding probably a good grade of grain on one side and screenings on the other. The grain is used for milling and the screenings for mixing with feeding stuffs. Most of the screenings coming into the State in mixed feeds are ground, thus rendering germination impossible; many of the poultry feeds, however, contain weed seeds in a viable condition.

Screenings vary greatly in composition and quality. Their value may be considerable or rather small, or they may even be dangerous on account of the presence of poisonous weed seeds.

In a sample of poultry feed, No. 71826, reported herein, 35% of the mixture were weed seeds, or an estimated number of 58,100 weed seeds for each 100 lbs. of the feed. If these weed seeds in a viable form are fed on the farm, they will soon stock the farm with undesirable and noxious weed plants.

Some poisonous fungi and weed seeds are likely to occur in feeds made from crops grown in Kentucky. The most dangerous ones are:

Ergot of rye and grasses (*Claviceps purpurea*).
Cockle (*Agrostemma githago*). This weed is commonly known as corn cockle.
Jimson weed (*Datura stramonium and D. tatula*).
Cocklebur (*Xanthium glabratum and Xanthium canadense*).
Sneezeweed (*Helenium antumnale*).
Larkspur (*Delphinium ajacis*).
Smut of wheat (*Tilletia tritici*).
Moldy corn (due to *Aspergillus glaucus*).

All the weeds mentioned are common on farms in most sections of the State and the list is often increased by the importation of other weed seeds in grains and mixed feeds, including the most objectionable ones. Care should be exercised to avoid purchasing grain and feeds containing weed seeds in a viable condition. If screenings or weed seeds are used in feeds of any sort, they should either be ground or subjected to high temperature to destroy their power to germinate in case they should reach the farm. In some of the molasses feeds and particularly the poultry feeds are found weed seeds in a perfectly viable state and, if permitted to reach the land, they will germinate and stock it with weeds.

An examination of a sample, M 16129, of "Feed Barley," revealed the following:

Barley	71.04%
Oats	19.21%
Weed seeds (wild mustard, barnyard grass, smartweed, catchfly, wild buckwheat, green foxtail)	3.45%
Inert matter (dirt and chaff)	6.30%
	100.00%

Examination of a sample of "grain screenings" from wheat, oats, rye and barley showed that 100 pounds of the screenings contained the following:

Wheat and rye	47.4 lbs.
Wild buckwheat	33.7 "
Flax	2.1 "
Hare's ear	2.3 "
Mustard sp.	4.6 "
The following weed seeds all together amount to	6.6 "
White prickly poppy	1315 seeds
Corn cockle	363 "
Lamb's quarters	1134 "
Pigeon grass	1633 "
Foxtail	4172 "
Oats	680 "
Oat-grass	272 "
Stickweed	453 "
Canada thistle	45 "
Cress	90 "
Lady's thumb	181 "

Compositae	90	"
Miscellaneous	453	"
Corn (parts of seed)	45	"
Sticks and dirt	3.3	lbs.
	100.0	lbs.

The most objectionable weed seeds in this sample are wild buckwheat, corn cockle, pigeon grass, foxtail and Canada thistle. Others are also objectionable, tho they are widely scattered everywhere on land and are not difficult ordinarily to suppress on cultivated ground.

A bag of 100 pounds of feed containing 25% or 25 pounds of these screenings, as presented in this analysis, is estimated to have in it 8¼ pounds of wild buckwheat seed, 9,075 corn cockle seed, 40,800 pigeon grass seed, 104,300 foxtail seed and 1,125 Canada thistle seed, which if permitted to germinate, will stock the farms with these weeds wherever such feeds are used.

MIXED FEEDS

Under this head a class of mixed feeds is included, composed of wheat by-products, a small amount of corn bran and, in most cases, grain screenings. These feeds vary somewhat in composition and value, depending on the amount of corn bran and screenings used. The bulk of feed made and sold in this State is from this group. The mixing of corn bran with the wheat products does not add any value to the wheat products but, on the contrary, takes from their value as a feed. Adding corn bran is merely a means of disposing of an inferior material at a price in excess of its value. Many of these feeds were adulterated with screenings, weed seeds and sweepings and rendered much inferior to their guaranty.

In this group of mixed feeds are included the analyses of bakery refuse, distillers' and brewers' dried grains, palmo midds and barley and oat chops or feeds.

One hundred and sixty-four samples were analyzed, seventy-four of which fell below in protein, ten in fat and nine ran above in fiber.

Those firms whose products reported herein show material deficiencies in comparison with their guaranties, are: Aviston Milling Co., Aviston, Ill., No. 72243, No. 72275; Baskett Grain Co., Henderson, Ky., No. 72404; Central Milling Co., Brodhead, Ky., No. 72156; Dawson Milling Co., Dawson Springs, Ky., No. 72127; Early & Daniel Co., Cincinnati, Ohio, No. 72188; Faywood Milling Co., Faywood, Ky., No. 72689; Franklin Kentucky Mills Co., Franklin, Ky., No. 72487; Garrard Milling Co., Lancaster, Ky., No. 72288, No. 72421, No. 72807; Glass Milling Co., Wilmore, Ky., No. 72045, No. 72057, No. 72297; R. L. Harrison & Sons, Bagdad, Ky., No. 72564; Hickman Milling Co., Nicholasville, Ky., No. 72050; Horse Cave Mills, Horse Cave, Ky., No. 72589; Lancaster Milling Co., No. 72802; Lone Mountain Milling Co., Middlesboro, Ky., No. 72257; Mountain City Mill Co., Chattanooga, Tenn., No. 72260; W. N. Neville, Arlington, Ky., No. 72951; Owenton Roller Mills, Owenton, Ky., No. 72685; Paducah Milling Co., Paducah, Ky., No. 72504, No. 71990, No. 72962; Scottsville Milling Co., Scottsville, Ky., No. 71934; Somerset Milling Co., Somerset, Ky., No. 72062, No. 72295; Star Roller Mills, Cloverport, Ky., No. 72546; Star Milling Co., Clinton, Ky., No. 71997; Vanhoose-Adams Co., Ashland, Ky., No. 72282; Woolcott Flour Mills, Lexington, Ky., No. 72132, No. 71705, No. 72198, No. 72691, No. 72699, No. 72712, No. 73102.

PROPRIETARY HORSE, DAIRY AND STOCK FEEDS

This is a group of mixed feeds made up largely of high-grade materials, with or without molasses. They vary in composition and value. Attention is called to the fact that many of the feeds in this group are made from the best materials obtainable and show care and intelligence in their manufacture, but, on the other hand, many are ordinary mixtures of low-grade materials and are often sold at excessive prices. Some of the brands are sold under fancy and catchy names and under names that are in no sense descriptive of the feeds or materials used. Molasses is added to most of these feeds, ostensibly for the added value it gives the feeds, but on the other hand it is used, in many cases, to cover up inferior materials used in the mixture. The feeder should bear in mind that the names, extravagant claims and excessive prices usually bear no relation to the true composition and that there is no real mystery in the compounding of these feeds.

Three hundred and twelve samples were analyzed, sixty-five of which fell below guaranty in protein, twenty-eight in fat and eleven ran above in fiber. Some of these feeds were adulterated and many were misbranded. The substitution of one ingredient for another, or the omission of an important one, or the use of a mere trace of important ingredients in the mixtures is too common a practise.

Those firms whose products reported herein showed material deficiencies in comparison with their guaranties, are: Acme Evans Co., Indianapolis, Ind., No. 72012, No. 72161; The Acme Mills, Hopkinsville, Ky., No. 71978; Ashland Milling Co., Ashland, Ky., No. 71660; Aubrey & Co., Louisville, Ky., No. 72399; Bradley Bros., Paducah, Ky., No. 72389; Cate Milling Co., Hopkinsville, Ky., No. 72944; Chapman-Doake Co., Decatur, Ill., No. 72853; Cincinnati Grain & Hay Co., Cincinnati, Ohio, No. 72170, No. 72871; Colton Bros. Co., Bellefontaine, Ohio, No. 71944, No. 72253, No. 71945, No. 71715; Diamond Mills, Evansville, Ind., No. 72122; Early & Daniel Co., Cincinnati, Ohio, No. 73141, No. 73145; Elmendorf Coal & Feed Co., Lexington, Ky., No. 72473; Ferncliff Feed & Grain Co., Louisville, Ky., No. 72801, No. 73054, No. 72135; Grain Belt Mills Co., S. St. Joseph, Mo., No. 72785, No. 73070; Gwinn Bros. & Co., Huntington, W. Va., No. 71716; Hawthorne Milling Co., Cincinnati, Ohio, No. 72255; International Sugar Feed Co., Memphis, Tenn., No. 72513, No. 72953; Kentucky Feed & Grain Co., Louisville, Ky., No. 71845, No. 72830, No. 72159, No. 72191, No. 72345, No. 72757, No. 73008, No. 73048, No. 73082, No. 72317, No. 71910, No. 72222; Wm. H. Kramer, Cincinnati, Ohio, No. 72782, No. 73096, No. 73068; Louisville Seed Co., Louisville, Ky., No. 72249; M. C. Peters Mill Co., Omaha, Neb., No. 72337; Rapier Sugar Feed Co., Owensboro, Ky., No. 73003, No. 72603, No. 73117, No. 72547; The Sugarine Co., Owensboro, Co., No. 73022, No. 72480; Winchester Roller Mills, Winchester, Ky., No. 72700, No. 73057; Wood, Stubbs & Co., Louisville, Ky., No. 72302; Woolcott Flour Mills, Lexington, Ky., No. 72806; Ziliak & Schafer Milling Co., Evansville, Ind., No. 72919.

PROPRIETARY HORSE, DAIRY AND STOCK FEEDS CONTAINING MATERIAL OF LITTLE OR NO FEEDING VALUE

All feeds containing a material of little or no feeding value, or a material that cannot be classed as a concentrate under the law, are grouped in this class, except poultry feeds containing grit. Many of these feeds contained also other low-grade materials such as damaged grains, screen-

ings, weed seeds, and sweepings and elevator refuse. These feeds vary widely in composition and feeding value. The prices paid for them were excessive in most cases, and it may be said of these feeds, generally speaking, that they are inferior grades of feeds. Many of these feeds contained materials, tho low in feeding value, yet of sufficient amount of nutrients to justify their use and conservation, but many of the materials are worthless as feeds. The use of these low-grade materials as feeds often result in hardship for the animals to which they are fed and a loss to the owners of such animals as well. These feeds are rarely sold on their true merit, the low-grade materials selling for what first class feeds bring. Most of these feeds equaled or exceeded their guaranty, and in many cases the prices were based on a reasonable value of the feed. Generally speaking these feeds are not economical.

Ninety-eight samples of this group were analyzed, thirty of which fell below guaranty in protein, fourteen in fat, and seventeen ran above in fiber.

Those firms whose products reported herein showed material deficiencies in their guaranties, are: Acme Evans Co., Indianapolis, Ind., No. 73113; The Corno Mills Co., E. St. Louis, Ill., No. 72937, No. 72276; No. 72292, No. 72938, No. 73041; D. A. Davis & Son, Jeffersontown, Ky., No. 73209; Golden Grain Milling Co., E. St. Louis, Ill., No. 72269; Hales & Hunter Co., Chicago, Ill. No. 72796, No. 72862, No. 73071; Chas. A. Krause Milling Co., Milwaukee, Wis., No. 72720, No. 73066, No. 73061, No. 72283, No. 72719; The Sugarine Co., Owensboro, Ky., No. 73004, No. 73127.

POULTRY FEEDS

The poultry feeds, both grain and mash, varied considerably in composition, but came well within their guaranty in both protein and fat. A number contained grain screenings with a large percentage of weed seeds.

One hundred and twenty-five samples of poultry grains were analyzed, six of which fell below guaranty in protein, two in fat and one ran above in fiber. Forty-two were adulterated with weed seeds, ranging from 1 to 30%. Thirty-five samples were misbranded in that they did not contain the ingredients guaranteed.

Those firms whose grain products reported herein show deficiencies and adulteration with weed seeds, are: American Milling Co., Peoria, Ill., No. 73191, No. 73156, No. 73192; Arcady Farms Milling Co., Chicago, Ill., No. 72790, No. 72308, No. 73098; Aubrey & Co., Louisville, Ky., No. 73044, No. 73207, No. 73202; Cincinnati Grain and Hay Co., Cincinnati, Ohio, No. 72306; The Corno Mills Co., E. St. Louis, Ill., No. 72261; Diamond Mills, Evansville, Ind., No. 72978, No. 72534; P. H. Harsha, Portsmouth, Ohio, No. 71713; Illinois Feed and Elevator Co., Bloomington, Ill., No. 72571, No. 72572; International Sugar Feed Co., Minneapolis, Minn., No. 72335; Kentucky Feed and Grain Co., Louisville, Ky., No. 72192, No. 71682, No. 72913, No. 71826 (this sample contained 35% of weed seeds, or an estimated number of 58,100 for 100 lbs. of this feed), No. 73204, No. 73206; Louisville Cereal Mill Co., Louisville, Ky., No. 72058, No. 72242, No. 73172, No. 73174; Park & Pollard Co., Chicago, Ill., No. 73158; M. C. Peters Mill Co., Omaha, Neb., No. 72338; Rapier Sugar Feed Co., Owensboro, Ky., No. 72824; R. D. Riedling, Louisville, Ky., No. 72464,

No. 72558, No. 73188; Ritter-Hennings Co., Louisville, Ky., No. 73179, No. 73178, No. 73181; Robey Mills, Chicago, Ill., No. 73099, No. 73110; Roosevelt Mills, Chicago, Ill., No. 73160; Rosenbaum Bros., Chicago, Ill., No. 72029; Southern Seed Co., Louisville, Ky., No. 73136, No. 72477, No. 72059; The Sugarine Co., Owensboro, Ky., No. 73162, No. 72397, No. 72415, No. 72416, No. 73193; Wood, Stubbs & Co., Louisville, Ky., No. 73024, No. 72367.

Seventy-six samples of mash were analyzed, fifteen of which fell below guaranty in protein, two in fat and five ran above in fiber. Sixteen were misbranded.

Those firms whose mash products reported herein showed material deficiencies in their guaranties are: Alfocorn Milling Co., St. Louis, Mo., No. 72215; Baskett Grain Co., Henderson, Ky., No. 72114; Blue Grass Commission Co., Lexington, Ky., No. 72879; Chapman-Doake Co., Decatur, Ill., No. 72852; The Corno Mills Co., E. St. Louis, Ill., No. 72008; Ferncliff Feed and Grain Co., Louisville, Ky., No. 72890; W. E. Hess & Co., Louisville, Ky., No. 71808; Morganfield Roller Mills, Morganfield, Ky., No. 72374; Simmons Milling Co., Cincinnati, Ohio, No. 72754; The Sugarine Co., Owensboro, Ky., No. 71884.

NUMBER OF TONS OF THE DIFFERENT KINDS OF FEEDS SOLD IN KENTUCKY FOR 1921 AND 1922

	1921 Tons	1922 Tons
Alfalfa meal	200	100
Barley, ground	100	225
Barley malt	.....	175
Brewers' dried grains	125	50
Calf meal	125	75
Corn bran	388	75
Corn chop and cracked corn	21900	23500
Corn and cob, crushed	175	200
Corn and oat chop	275	350
Corn, oats and barley chop	.....	175
Corn feed meal	3925	4100
Corn germ meal	.....	25
Corn gluten feed	100	200
Cotton seed meal 43%	1690	1175
Cotton seed meal 41%	6525	5775
Cotton seed meal 38½%	175	.....
Cotton seed feed 36%	700	925
Dairy feed	14800	22750
Dried beet pulp	.....	100
Dried buttermilk	.....	50
Dried yeast grains	25	.....
General stock feed	7600	10450
Hog feed	1200	2350
Hominy feed	7450	7175
Horse and mule feed	23650	26275
Linseed oil meal	525	600
Matzos meal	.....	100
Meat meal	425	850
Meat scraps	400	275
Mixed feeds (wheat and corn)	33475	37967
Oats, ground	200	625
Oats, rolled	.....	125
Oats and barley, ground	25	50
Oat feed (oat middlings and oat hulls)	.....	100
Oat middlings	.....	25
Palmo middlings	675	625
Pigeon feed	.....	175
Poultry feed, grains	19200	30400
Poultry feed, mash	4000	9000
Red dog flour	300	1050
Rice bran	225	50
Rye middlings	275	425
Tankage	1550	1775
Wheat bran (and screenings)	7300	7525
Wheat middlings (and screenings)	19650	19650
Wheat mixed feed (and screenings)	24225	25775
Wheat and rye middlings	.....	750

EXPLANATION OF THE TABLES

The analyses given in the following tables represent samples taken by our inspectors from various kinds of feeds registered and found on the market. For convenience, the analyses of feeds of the same class are grouped together. In the tables of analyses the manufacturer's guaranty is printed in *bold face figures.*

Table VI covers straight feeds, or feeds made of one grain or plant only. The names of the grains or plants from which these feeds are made are given in alphabetical order and the names of the products of each grain or plant are given in alphabetical order also.

Table VII contains a class of mixed feeds composed of wheat and corn and their by-products, with wheat screenings ranging from 1 to 15%. The feeds in this group are composed almost wholly of wheat, but where corn product appears, corn bran is the principal ingredient and ranges from a trace to 20 or 30%.

Brewers' and distillers' dried grains, mixed middlings and palmo mid dlings are included in Table VII as mixed feeds.

Table VIII includes all feeds termed "poultry feeds."

Table IX contains the miscellaneous mixed feeds, made up of materials which are clearly classed as concentrates and a combination of grains or cereals.

Table X contains the miscellaneous mixed feeds containing a material or materials of little or no feeding value.

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TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
	Alfalfa Meal.				
2654–20	Alfalfa Meal	The Cincinnati Hay & Grain Co. Cincinnati, Ohio.	15.13 **12.00**	1.55 **3.00**	34.60 30.00
2974–20	Alfalfa Meal	J. H. Fedders & Sons. Covington, Ky.	16.63 **14.50**	1.78 **2.00**	30.90 28.50
659–20	Peters' Lucern Choice Alfalfa Meal	M. C. Peters Mill Co. Omaha, Nebr.	14.38 **12.00**	1.95 **0.50**	28.70 33.00
	Animal Products.				
761–19	Armour's Meat Meal	Armour Fertilizer Works. Chicago, Ill.	57.69 **60.00**	11.96 **6.00**	2.38 2.00
761–21	Same	Same	60.25 **60.00**	10.21 **6.00**	2.16 2.00
761–21	Same	Same	60.38 **60.00**	5.42 **6.00**	2.98 2.00
761–22	Same	Same	59.06 **60.00**	5.37 **6.00**	2.08 2.00
1817–19	Magic Brand Meat Scraps	Chicago Feed & Fertilizer Co. Chicago, Ill.	54.94 **50.00**	14.46 **5.00**	2.33 3.00
4219–22	Abattoir Brand Meat Meal	The Joslin-Schmidt Co. Cincinnati, O.	51.00 **50.00**	12.97 **5.00**	1.40 3.00
4163–22	K-C Special Meat Scraps	The Ky. Chemical Mfg. Co. Covington, Ky.	51.12 **50.00**	14.78 **8.00**	2.55 3.00
4163–22	Same	Same	50.12 **50.00**	17.06 **8.00**	2.50 3.00
2496–21	U. S. Standard Meat Scraps	Same	45.56 **50.00**	15.15 **8.00**	3.65 3.00
3371–22	Swift's Meat and Bone Scraps	Swift & Co. Chicago, Ill.	50.26 **50.00**	12.17 **6.00**	1.45 3.00
3812–22	"Red W" Brand Poultry Meat Scraps	Wilson & Co., Inc. Chicago, Ill.	53.32 **50.00**	11.08 **6.00**	2.48 5.00
3812–22	Same	Same	57.62 **50.00**	9.13 **6.00**	2.43 5.00
4084–22	Buhner's Digester Tankage	Buhner Fertilizer Co. Seymour, Ind.	57.12 **60.00**	9.15 **5.00**	1.73 3.00
2893–20	Premium Digester Tankage	Cleveland Provision Co. Cleveland, Ohio.	68.20 **60.00**	6.00 **7.00**	1.23 2.50
863–19	Darling's Digester Tankage	Darling & Co. Chicago, Ill.	58.22 **60.00**	3.54 **0.50**	3.48 3.00
863–20	Darling's 60% Digester Tankage	Same	63.12 **60.00**	3.78 **0.50**	3.88 3.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
2654–20	Collier Bros. Paris, Ky.	Alfalfa meal	Above guaranty in fiber.
2974–20	Mfrs. Warehouse	Alfalfa meal	
659–20	Owensboro Milling Co... Owensboro, Ky.	Alfalfa meal	
761–19	Mayhew & Gilbert..... Franklin.	Meat residues	Below guaranty in protein.
761–21	Trigg Co. Feed & Pro. Co. Cadiz.	Same	
761–21	J. P. Page..... Barlow.	Same	
761–22	Owensboro Milling Co... Owensboro.	Same	Below guaranty in protein.
1817–19	Wm. Addams ..... Cynthiana.	Meat residues	
4219–22	Breeden & Ward..... Science Hill.	Meat product	
4163–22	C. S. Brent Seed Co..... Lexington.	Meat scraps	23.75% bone present. Mislabeled.
4163–22	Boone Co. Farm Bureau. Florence.	Same	
2496–21	Cincinnati Grain & Hay Co., Covington.	Same	Below guaranty in protein and above in fiber. Inferior to guaranty.
3371–22	Oscar Farmer & Sons... Louisville.	Meat and bone residue	
3812–22	Edinger & Co..... Louisville.	Meat scraps	This product should be called meat and bone scraps. Misbranded.
3812–22	Geo. P. Taylor Co..... Burnside.	Meat, blood and bone	
4084–22	Henry Paris ..... Marion.	Blood and meat product	Below guaranty in protein. Inferior to guaranty.
2893–20	Henderson Feed & Commission Co., Henderson	Meat product	
863–19	Beaver Dam Milling Co.. Beaver Dam.	Same	Below guaranty in protein.
863–20	Henderson Feed & Commission Co., Henderson	Same	

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
	Tankage	Diamond Mills Evansville, Ind.	49.82	8.95	3.80 .....
2295–21	60% Digester Tankage	Early & Daniel Co Cincinnati, Ohio	57.76 60.00	8.20 8.00	2.13 .....
894–21	Eckert's Pig's Delight	Eckert Packing Co Henderson, Ky.	39.25 30.00	11.56 10.00	6.28 4.00
894–21	Same	Same	40.13 30.00	10.87 10.00	3.75 4.00
563–22	60% Feeding Tankage	The Evansville Packing Co Evansville, Ind.	59.50 60.00	8.79 8.00	2.58 3.00
563–22	Same	Same	58.76 60.00	6.54 8.00	2.38 3.00
563–22	Same	Same	64.94 60.00	7.90 8.00	2.24 3.00
563–22	Same	Same	60.88 60.00	5.47 8.00	2.48 3.00
563–22	Same	Same	60.50 60.00	7.73 8.00	2.55 3.00
563–22	Same	Same	64.26 60.00	7.29 8.00	2.90 3.00
563–22	Same	Same	67.38 60.00	6.26 8.00	2.78 3.00
563–22	Same	Same	63.62 60.00	6.81 8.00	0.24 3.00
563–22	Same	Same	64.76 60.00	6.68 8.00	2.68 3.00
3535–22	Field's Tankage	Field Packing Co. Owensboro.	64.36 60.00	6.67 5.00	0.88 4.00
964–21	Abattoir Brand Digester Tankage.	Groves Fertilizer Co., (Joslin-Schmidt Co., Cincinnati, O...	58.38 60.00	8.30 5.00	1.70 3.00
964–21	Same	Same	57.38 60.00	7.55 5.00	1.58 3.00
1490–19	Hine Bros. Digester Tankage	Hine Bros. Co Chicago, Ill.	63.38 60.00	5.96 5.00	1.75 .....
1490–19	Same	Same	64.00 60.00	6.17 5.00	3.05 ....
2347–19	Ellis Digester Tankage	Hopkins Fertilizer Co New Albany, Ind.	51.50 50.00	6.30 5.00	1.83 3.00
3033–20	Pigrow	Same	56.00 60.00	8.89 5.00	2.08 3.00
3033–20	Same	Same	56.88 60.00	8.28 5.00	2.34 3.00
3033–21	Same	Same	60.62 60.00	10.66 5.00	1.00 3.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
	R. W. Willingham..... Henderson.	Meat and bone.....	Meat and bone tankage. Not labeled with the Kentucky label. 25.47 per cent bone.
2295–21	Cogar Grain, Coal & Feed Co., Harrodsburg.....	Meat residues	Below guaranty in protein.
894–21	Baskett Grain Co..... Henderson.	Blood, bone and meat residues..	Considerable offal and foreign matter present. Above guaranty in fiber.
894–21	Norris-Lockett & Co.... Henderson.	Same	
563–22	Park City Feed Store... Bowling Green,	Blood, meat	Ground bone present.
563–22	Wilson & Newman..... Russellville.	Same	Ground bone present. Below guaranty in protein.
563–22	G. H. Harris..... Cloverport.	Same	
563–22	Morganfield Hardware & Gro. Co., Morganfield....	Same	Below guaranty in fat. 13.45% bone present.
563–22	Cline Bros. ..... Franklin.	Same	
563–22	F. H. Vogle..... Henderson.	Same	
563–22	Park City Feed Store... Bowling Green.	Same	
563–22	John L. Hosman..... Morganfield.	Same	
563–22	W. E. Wilson..... Russellville.	Same	
3535–22	Lancaster-Smith Seed Co. Owensboro.	Ground dried blood, meat scraps, ground residue from animal tissue exclusive of hoof and horn, ground bone.....	
964–21	M. D. Royse..... Winchester.	Meat product	Below guaranty in protein.
964–21	Wm. Addams ..... Cynthiana.	Same	Inferior to guaranty. Below guaranty in protein.
1490–19	A. B. Wilkins ..... Elkton.	Same	
1490–19	Lambert-Grisham Hardware Co., Henderson..	Same	12% bone present.
2347–19	Woosley & Son..... Elizabethtown.	Dried tankage, blood.....	
3033–20	Blue Grass Com. Co.... Lexington.	Same	Below guaranty in protein.
3033–20	Same	Same	Same.
3033–21	Louisville Hay, Grain & Coal Co., Louisville. ...	Same	

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
3033–21	Pigrow	Hopkins Fertilizer Co.	64.13	8.70	2.10
		New Albany, Ind.	60.00	5.00	3.00
3633–21	Digester Tankage	Indianapolis Abattoir Co.	68.88	4.83	1.30
		Indianapolis, Ind.	60.00	3.50	3.00
3637–21	Diamond K Digester Tankage	The E. Kahn's Sons Co.	63.38	4.40	1.38
		Cincinnati, Ohio.	60.00	5.00	4.00
3637–21	Same	Same	59.82	6.53	.....
			60.00	5.00	4.00
3637–21	Same	Same	62.26	4.51	1.55
			60.00	5.00	4.00
3637–21	Same	Same	65.00	4.83	1.45
			60.00	5.00	4.00
3637–21	Same	Same	61.26	4.94	1.48
			60.00	5.00	4.00
2088–22	Klarer Digester Meat and Bone Tankage	Klarer Provision Co.	41.00	10.99	3.78
		Louisville, Ky.	42.43	5.31	2.24
4023–22	Digester Tankage	Memphis Packing Corporation.	51.62	6.15	4.09
		Memphis, Tenn.	50.00	2.00	5.00
501–19	Big Sixty Meat Meal Digester Tankage	Morris & Co.	55.62	9.48	1.76
		Chicago, Ill.	60.00	6.00	5.00
501–19	Same	Same	62.26	8.28	1.73
			60.00	6.00	5.00
501–19	Same	Same	58.82	8.55	1.95
			60.00	6.00	5.00
501–19	Same	Same	55.88	10.93	2.83
			60.00	6.00	5.00
501–22	Same	Same	56.26	5.35	1.78
			60.00	6.00	5.00
501–22	Same	Same	59.50	8.01	1.60
			60.00	6.00	5.00
1913–19	Rauh's Digester Tankage	E. Rauh & Sons Animal Feed Co	58.94	9.05	1.37
		Indianapolis, Ind.	60.00	8.00	3.00
4361–22	"Daisy" Tankage	C. Rice Packing Co.	49.56	29.58	2.85
		Covington, Ky.	46.00	23.53	6.60
1263–19	Digester Tankage	Standard By-Products Co.	61.63	5.34	2.47
		Louisville, Ky.	60.00	5.00	4.00
1263–20	Same	Same	46.63	5.10	1.70
			60.00	5.00	4.00
1263–20	Same	Same	54.44	4.73	1.49
			60.00	5.00	4.00
1263–20	Same	Same	60.75	3.91	1.87
			60.00	5.00	4.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
3033–21	Lebanon Carriage & Implement Co., Lebanon	Dried tankage, blood	
3633–21	Conrad J. Clausen, Louisville.	Meat, blood and bone	
3637–21	J. L. Hart, Cynthiana.	Same	
3637–21	Brent & Co., Paris.	Same	
3637–21	F. E. Gordon, Richmond.	Same	
3637–21	J. B. Penn & Co., Georgetown.	Same	9.22% bone present.
3637–21	Brent & Co., Paris.	Same	
2088–22	Harvey Stout & Sons, Buechel.	Blood, bone and meat offal	Below guaranty in protein and above in fiber.
4023–22	Herbert Hawkins, Paducah.	Tankage, blood	Small amount offal present.
501–19	Browder Milling Co., Fulton.	Residue of animal matter, exclusive of hoof and horn	Below guaranty in protein.
501–19	Same	Same	
501–19	Same	Same	Below guaranty in protein.
501–19	Acme Mills, Hopkinsville.	Same	Below guaranty in protein and inferior to claims.
501–22	Mayhew & Gilbert Co., Franklin.	Same	Below guaranty in protein and much inferior to claim.
501–22	Browder Milling Co., Fulton.	Same	
1913–19	J. B. Penn & Co., Georgetown.	Meat product	Below guaranty in protein.
4361–22	Boone Co. Farm Bureau, Florence.	Beef, calf and lamb offal	
1263–19	Yopp Seed Co., Paducah.	Ground dried blood, meat scraps, ground residue from animal tissue exclusive of hoof and horn, ground bone	
1263–20	Bedford & Tuttle, Winchester.	Same	Much below guaranty in protein. Inferior quality.
1263–20	Henry Fruechtenicht, Louisville.	Same	Below guaranty in protein.
1263–20	Conner-Hayden & Co., Bardstown.	Same	

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
485–22	Swift's Digester Tankage	Swift & Co.	60.26	8.20	1.85
		Nat'l Stock Yards, Ill.	**60.00**	**5.00**	**3.00**
485–22	Same	Same	51.56	12.48	1.55
			60.00	**5.00**	**3.00**
485–22	Same	Same	62.76	6.37	2.18
			60.00	**5.00**	**3.00**
485–22	Same	Same	61.62	7.67	2.20
			60.00	**5.00**	**3.00**
4100–22	"Success Brand" Digester Tankage	United By-Products Co.	59.25	10.82	2.43
		Chicago, Ill.	**60.00**	**6.00**	**5.00**
4100–22	Same	Same	56.12	10.65	2.28
			60.00	**6.00**	**5.00**
4100–22	Same	Same	58.62	9.71	2.56
			60.00	**6.00**	**5.00**
4100–22	Same	Same	57.32	11.97	2.15
			60.00	**6.00**	**5.00**
4100–22	Same	Same	59.56	10.11	1.93
			60.00	**6.00**	**5.00**
4100–22	Same	Same	58.88	11.06	2.00
			60.00	**6.00**	**5.00**
4100–22	Same	Same	58.38	13.75	1.75
			60.00	**6.00**	**5.00**
4100–22	Same	Same	60.88	11.09	2.08
			60.00	**6.00**	**5.00**
4100–22	Same	Same	56.38	14.99	1.83
			60.00	**6.00**	**5.00**
4100–23	Same	Same	56.38	8.57	2.73
			60.00	**6.00**	**5.00**
1428–20	Western Digester Tankage	Western Packing and Provision Co., Chicago, Ill.	61.88	8.98	1.90
			60.00	**6.00**	**3.00**
1011–21	Wilson's High Protein Tankage	Wilson & Co., Inc. Chicago, Ill.	59.50	9.07	.....
			60.00	**6.00**	**5.00**
1011–21	Same	Same	62.38	8.01	3.78
			60.00	**6.00**	**5.00**
4012–22	"Red W" Brand Digester Tankage	Same	60.38	9.93	4.11
			60.00	**6.00**	**5.00**
4012–22	Same	Same	60.26	9.44	3.85
			60.00	**6.00**	**5.00**
	Barley Products.				
149–21	Dorsel's Barley Meal	The Dorsel Co. Newport, Ky.	12.63	3.17	5.53
			12.00	**2.50**	**6.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
485–22	Browder Milling Co..... Fulton.	Meat residues	Offal present.
485–22	Herbert Hawkins..... Paducah.	Same	Below guaranty in protein.
485–22	Blue Grass Comm. Co.... Lexington.	Same	
485–22	Farmers Union Sup. Co.. Winchester.	Same	
4100–22	D. A. Davis & Son..... Jeffersontown.	Meat, blood and bone.....	Below guaranty in protein. Offal present.
4100–22	C. S. Brent Seed Co..... Lexington.	Same	Below guaranty in protein. Inferior product. Offal present.
4100–22	Blue Grass Comm. Co.... Lexington.	Same	
4100–22	Trent & Bruner..... Irvington.	Same	Below guaranty in protein. Offal present.
4100–22	Smith & Smith..... Shepherdsville.	Same	
4100–22	Ferncliff Feed & Grain Co Louisville.	Same	Below guaranty in protein.
4100–22	Haydon Mill & Grain Co. Springfield.	Same	Same.
4100–22	T. W. Duncan..... LaGrange.	Same	
4100–22	W. F. Wilson..... Nancy.	Same	Below guaranty in protein. Bad odor, inferior to claim.
4100–23	Ferncliff Feed & Grain Co Louisville.	Same	Below guaranty in protein.
1428–20	Wilson & Newman..... Russellville.	Meat scraps, blood.....	
1011–21	Ritter-Hennings Co..... Louisville.	Blood and meat product.....	
1011–21	Lexington Seed Co..... Lexington.	Same	Offal present.
4012–22	Henry Fruechtenicht.... Louisville.	Meat, blood, bone.....	
4012–22	Edinger & Co..... Louisville.	Same	
149–21	Mfrs. Warehouse	Barley	Contains considerable ground oats and corn product.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
567–20	Ground Barley	The Early & Daniel Co.	13.06	2.62	5.45
		Cincinnati, Ohio.	**12.50**	**2.50**	6.00
567–22	Same	Same	12.38	3.00	6.15
			12.50	**2.50**	6.00
16–22	Same	The Early & Daniel Co.	12.75	2.96	5.26
		Covington, Ky.	**12.50**	**2.50**	6.00
1339–19	Arrow Ground Barley	Edinger & Co.	13.00	2.49	3.85
		Louisville, Ky.	**11.00**	**1.80**	5.20
3680–21	Ground Barley	George Keller	12.25	2.36	4.95
		Newport, Ky.	**12.00**	**2.55**	5.33
1707–21	Ground Barley	The Nutritia Co.	13.13	2.24	5.93
		Cincinnati, Ohio.	**11.00**	**3.50**	7.00
	Dried Beet Pulp.				
4664–23	Dried Beet Pulp	J. H. Fedders & Sons.	8.75	0.84	19.63
		Covington, Ky.	**8.00**	**0.50**	20.00
487–18	Dried Beet Pulp	Larrowe Milling Co.	8.25	0.45	16.98
		Detroit, Mich.	**8.00**	**0.50**	20.00
	Cocoanut Meal.				
2668–20	Copra Meal	The Cincinnati Grain & Hay Co.	24.63	15.43	8.17
		Covington, Ky.	**19.00**	**5.50**	12.00
	Cracked Corn.				
581–21	Yellow Cracked Corn	The Early & Daniel Co.	8.94	4.37	1.75
		Cincinnati, Ohio.	**8.60**	**4.00**	2.50
1562–21	Cracked Corn	Greenup Milling Co.	9.75	4.43	2.08
		Greenup, Ky.	**8.59**	**3.75**	1.90
2051–22	Same	Harrison Milling Co.	9.13	3.41	1.98
		Harrison, Ohio.	**8.00**	**4.00**	1.90
2832–18	Corn Chops	Morganfield Roller Mills.	9.63	3.49	2.16
		Morganfield, Ky.	**9.40**	**4.80**	2.00
4370–22	Cracked Corn	Olive Hill Milling Co.	9.75	4.07	2.73
		Olive Hill, Ky.	**8.65**	**4.10**	2.25
3156–22	Same	Rapier Sugar Feed Co.	9.95	3.11	1.58
		Owensboro, Ky.	**9.65**	**4.00**	2.00
1731–21	Same	The Washington Milling Co.	9.63	4.97	2.20
		Washington C. H., Ohio.	**8.97**	**4.16**	2.50
	Corn Feed Meal.				
310–22	Homlik Feed	Acme-Evans Co.	9.69	4.30	3.54
		Indianapolis, Ind.	**8.50**	**3.00**	4.00
3561–21	Alfocorn's Corn Feed Meal.	Alfocorn Milling Co.	8.00	3.12	1.90
		St. Louis, Mo.	**9.00**	**3.50**	4.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
567–20	F. K. Tribble..... Danville.	Ground barley	
567–22	Bedford & Tuttle..... Winchester.	Barley	Ground oats present.
16–22	Coffee & Van Hook..... Moreland.	Ground barley	Same.
1339–19	Anderson Feed & Seed Co Lawrenceburg.	Barley	
3680–21	Hudson & Farnau..... Lancaster.	Ground barley	
1707–21	John L. Hart..... Cynthiana.	Barley	Below guaranty in fat.
4664–23	Harry Hartke..... Covington.	Residue of sugar beets dried after extraction of sugar.....	
487–18	Baskett Grain Co..... Henderson.	Same	
2668–20	Collier Bros..... Paris.	Dried cocoanut meats.....	
581–21	F. K. Tribble ..... Danville.	Shelled corn	
1562–21	J. Harris ..... Middle Creek.	Corn	
2051–22	J. F. Bertram ..... Vanceburg.	Shelled corn	
2832–18	Rea & Rice..... Earlington.	Corn	
4370–22	C. S. Cartee..... Olive Hill.	Same	
3156–22	W. D. Smith..... Russellville.	Whole corn	Below guaranty in fat.
1731–21	Ashland Iron & Mining Co., Ashland.	Shelled corn	
310–22	Cole, Hughes & Co..... Barbourville.	Reground corn feed meal.....	Oat hulls present.
3561–21	J. R. List..... Latonia.	Ground shelled corn.....	Below guaranty in protein.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
3561–21	Alfocorn's Corn Feed Meal.....	Alfocorn Milling Co.....	10.38	7.10	2.73
		St. Louis, Mo.	**9.00**	**3.50**	4.00
824–19	Homco Hominy Feed, Corn Screenings, (and part of germ removed)	American Hominy Co.....	10.88	7.37	4.59
		Indianapolis, Ind.	**10.00**	**6.00**	6.00
2798–20	Corn Feed Meal.....	Ballard & Ballard Co.....	10.06	4.59	2.97
		Louisville, Ky.	**10.00**	**3.70**	2.90
433–21	Same	Cincinnati Grain & Hay Co	10.00	4.15	2.05
		Covington, Ky.	**9.85**	**4.25**	1.43
2026–21	Feed Meal	The Colton Bros. Co.....	9.00	3.62	1.65
		Bellefontaine, Ohio.	**9.50**	**4.00**	2.50
3479–21	Corn Feed Meal.....	Dixie Mills Co.....	10.75	4.52	3.80
		E. St. Louis, Ill.	**8.00**	**2.00**	5.00
321–21	Dorsel's Corn Meal.....	The Dorsel Co.....	8.38	4.82	5.21
		Newport, Ky.	**9.00**	**4.00**	2.00
269–21	Corn Feed Meal.....	The Early & Daniel Co.....	8.13	5.21	3.20
		Covington, Ky.	**8.43**	**4.29**	5.00
585–21	Yellow Corn Meal.....	The Early & Daniel Co.....	10.31	4.60	2.85
		Cincinnati, Ohio.	**8.00**	**4.00**	5.00
585–21	Same	Same	8.75	4.70	2.40
			8.00	**4.00**	5.00
1087–20	Arrow Feed Meal.....	Edinger & Co.....	9.88	3.82	2.25
		Louisville, Ky.	**8.75**	**3.98**	2.50
2969–20	Corn Feed Meal.....	J. H. Fedders & Sons.....	9.75	4.33	1.90
		Covington, Ky.	**8.00**	**2.00**	3.00
3367–21	Same	Golden Grain Milling Co.....	8.50	4.15	2.70
		E. St. Louis, Ill.	**9.00**	**3.50**	3.00
3073–21	Same	Illinois Feed & Elevator Co....	9.63	4.19	3.28
		Bloomington, Ill.	**9.00**	**4.00**	5.00
3441–23	Corn Feed Meal.....	Kentucky Feed & Grain Co....	9.13	4.05	2.25
		Louisville, Ky.	**9.00**	**3.00**	4.00
4030–22	"Snowflake" Corn Feed Meal (and ground screenings).....	Lawrenceburg Roller Mills Co..	9.63	6.48	3.50
		Lawrenceburg, Ind.	**8.70**	**3.70**	3.00
4125–22	Feed Meal	London Mill Co.....	8.56	3.62	1.95
		London, Ohio.	**9.00**	**3.00**	2.50
3157–21	Corn Feed Meal.....	Rapier Sugar Feed Co.....	10.25	4.22	2.53
		Owensboro, Ky.	**8.65**	**4.00**	2.00
3157–21	Same	Same	9.88	3.99	2.05
			8.65	**4.00**	2.00
3157–21	Same	Same	9.00	3.55	3.50
			8.65	**4.00**	2.00
3157–22	Same	Same	10.38	4.61	3.50
			8.65	**4.00**	2.00
3157–22	Same	Same	9.00	4.40	2.28
			8.65	**4.00**	2.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
3561–21	Yopp Seed Co. Paducah.	Ground shelled corn	
824–19	Jellico Grocery Co. Corbin.	By-product from the manufacture of grits, meal and flake with corn screenings added and part of the germ removed.	
2798–20	The Bryant Feed Co. Corbin.	Corn	
433–21	B. Wieck & Co. Covington.	Shelled corn	Contains ground and unground wheat screenings.
2026–21	Thompson Grocery Co. Pineville.	Pure ground corn	Below guaranty in both protein and fat.
3479–21	Oscar Farmer & Sons. Louisville.	Shelled corn	
321–21	Fred Sauerbeck. Newport.	Corn	Below guaranty in protein.
269–21	John Kunkemoeller. Newport.	Corn	
585–21	Hall & Son. Stamping Ground.	Same	
2969–20	Henry Deters. Covington.	Same	
1087–20	Amos Yeager. Louisville.	Same	
2969–20	Henry Deters. Covington.	Same	
3367–21	Renfro Supply Co. Williamsburg.	Corn feed meal	Below guaranty in protein.
3073–21	Oscar Farmer & Sons. Louisville.	Siftings from cracked corn	
3441–23	Harlan Grocery & Grain Co., Harlan	Corn	
4030–22	Pineville Produce Co. Pineville.	Pure corn by-product, ground corn screenings 3%	Above guaranty in fiber.
4125–22	Dixie Wholesale Gro. Co. Barbourville.	Shelled corn	
3157–21	W. E. Cook. Whitesburg.	Whole corn	Made out of damaged corn. Above guaranty in fiber.
3157–21	Harlan Grocery & Grain Co., Harlan	Same	
3157–21	Dunmor Roller Mills. Dunmor.	Same	Above guaranty in fiber.
3157–22	C. R. Rhodes & Bro. Owensboro.	Same	Ground cob and corn screenings present.
3157–22	L. Cohen. Central City.	Same	

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
3377–22	Atlas Corn Feed Meal	Southern Seed Co. Louisville, Ky.	9.81 **8.50**	3.82 **3.00**	2.43 5.00
	Corn Gluten Feed.				
814–20	Buffalo Corn Gluten Feed	Corn Products Refining Co. New York, N. Y.	25.38 **23.00**	2.51 **1.00**	6.88 **8.50**
	Hominy Feed.				
4449–22	Trojan Hominy Feed	The Allen & Wheeler Co. Troy, Ohio.	10.63 **10.00**	8.18 **6.00**	6.48 6.00
824–22	Homco Hominy Feed (Corn Screenings and part of germ removed).	American Hominy Co. Indianapolis, Ind.	11.38 **10.00**	7.73 **6.00**	4.80 6.00
2877–21	Hominy Feed	Aubrey & Co. Louisville, Ky.	9.13 **10.00**	4.80 **6.50**	3.80 6.00
2877–22	Same	Same	10.50 **10.00**	8.37 **6.50**	4.20 6.00
2877–22	Same	Same	10.13 **10.00**	4.83 **6.50**	2.68 6.00
3549–21	Purity Hominy Chops	Baskett Grain Co. Henderson, Ky.	10.25 **8.50**	7.58 **5.25**	3.84 5.00
776–22	Hominy Feed	Chas. Broeker & Co. Owensboro, Ky.	12.19 **10.00**	9.55 **8.00**	5.60 7.00
776–22	Same	Same	11.75 **10.00**	9.10 **8.00**	5.05 7.00
776–22	Same	Same	11.00 **10.00**	10.84 **8.00**	5.33 7.00
776–23	Same	Same	11.13 **12.00**	8.18 **9.00**	4.03 7.00
1550–21	Hominy Feed	Cincinnati Grain & Hay Co. Covington, Ky.	9.63 **11.00**	4.63 **8.45**	2.30 7.50
1550–21	Same	Same	7.25 **11.00**	3.52 **8.45**	2.15 7.50
1550–22	Same	Same	12.00 **11.00**	9.47 **8.45**	5.83 7.50
3708–21	Same	Dixie Mills Co. East St. Louis, Ill.	7.75 **10.00**	2.50 **5.00**	1.80 7.00
264–22	Same	The Early & Daniel Co. Covington, Ky.	11.13 **9.86**	7.31 **8.22**	4.66 7.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
3377–22	H. J. Grieve..... Louisville.	Corn	
814–20	Ritter-Hennings Co. .... Louisville.	Corn gluten feed.....	
4449–22	Bell Grocery Co..... Pineville.	Corn by-product.....	
824–22	The H. T. Hackney Co.. Harlan.	By-product from the manufacture of grits, meal and flakes, with part of the germ removed and corn screenings 2½%.....	
2877–21	Duncan & Co..... Pewee Valley.	Corn by-product.....	Below guaranty in both protein and fat.
2877–22	S. T. Frazier..... Whitesburg.	Same	
2877–22	Elkins & Kimmel ..... Greenville.	Same	Misbranded. Not hominy feed but corn feed meal.
3549–21	S. B. Jones..... Pembroke.	Mill run corn hearts (germ). Corn bran, and fine particles of meal from the kernel in the manufacture of degerminated meal.	
776–22	Henderson's Feed Store. Owensboro.	Corn	
776–22	Same	Same	
776–22	Taulbee & Co..... Hazard.	Same	
776–23	Lancaster-Smith Seed Co. Owensboro.	Same	Below guaranty in protein and fat.
1550–21	Owenton Roller Mills.... Owenton.	Corn	Corn feed meal and not hominy feed.
1550–21	John Wuengermiller .... Latonia.	Same	Not hominy feed, but corn feed meal of low grade. Misbranded. Below guaranty in protein and fat.
1550–22	Boone Co. Farm Bureau. Burlington.	Same	
3708–21	Kenton Hay & Grain Co. Covington.	Corn product	Misbranded. The product is not hominy feed. Below guaranty in both protein and fat.
264–22	J. W. Rink..... Walton.	Corn	Below guaranty in fat.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
584–22	Hominy Feed	The Early & Daniel Co.	9.88	4.06	2.70
		Cincinnati, Ohio.	**9.86**	**8.00**	7.00
584–22	Same	Same	8.94	3.91	2.40
			9.86	**8.00**	7.00
1101–22	Arrow Hominy Feed	Edinger & Co.	11.13	7.71	5.45
		Louisville, Ky.	**10.22**	**6.72**	5.50
3218–21	Evans Hominy Feed	Evans Milling Co.	11.50	9.58	4.95
		Indianapolis, Ind.	**10.00**	**7.50**	7.00
3218–21	Same	Same	11.38	9.43	5.95
			10.00	**7.50**	7.00
3218–21	Same	Same	11.25	9.78	5.35
			10.00	**7.50**	7.00
3218–21	Same	Same	11.25	8.80	5.05
			10.00	**7.50**	7.00
3218–21	Same	Same	10.75	8.08	4.03
			10.00	**7.50**	7.00
3060–21	Farmers Hominy Feed	Farmers Hominy Mill	11.56	7.99	4.58
		Seymour, Ind.	**10.00**	**7.50**	4.00
2903–21	Hominy Meal	Kentucky Feed & Grain Co.	11.25	8.21	5.22
		Louisville, Ky.	**10.00**	**6.00**	6.50
1758–20	Corn Feed	Lexington Roller Mills Co.	10.75	8.38	9.56
		Lexington, Ky.	**10.40**	**8.70**	10.95
405–21	Hominy Meal	Louisville Cereal Mill Co.	9.50	5.50	2.63
		Louisville, Ky.	**10.00**	**6.00**	6.50
1027–21	Sunny South Hominy Feed	Louisville Milling Co.	12.00	7.50	4.77
		Louisville, Ky.	**10.00**	**7.00**	6.00
1027–22	Same	Same	10.50	7.05	4.01
			11.00	**7.00**	6.00
1433–22	Choice Hominy Feed	Perin-Brouse-Skidmore Grain &	9.88	4.01	2.18
		Milling Co., Cincinnati, Ohio.	**10.00**	**6.00**	6.00
.....	Iowa White Hominy Feed	Purity Oats Co.	11.00	7.87	4.30
		Davenport, Iowa.	**9.00**	**5.00**	7.00
2923–20	Yellow Hominy Feed	The Quaker Oats Co.	10.63	6.98	4.75
		Chicago, Ill.	**10.50**	**6.00**	5.00
2923–20	Same	Same	9.63	5.98	3.38
			10.50	**6.00**	5.00
4221–22	White Hominy Feed	Same	9.13	3.39	2.83
			10.50	**5.00**	6.00
4221–22	Same	Same	9.75	5.90	4.50
			10.50	**5.00**	6.00
3648–21	Hominy Feed	R. D. Riedling.	10.25	8.07	5.90
		Louisville.	**10.00**	**6.00**	7.00
3577–21	Sugarine Hominy Feed	The Sugarine Co.	13.06	6.42	4.98
		Owensboro, Ky.	**10.00**	**8.00**	7.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
584–22	Bedford & Tuttle..... Winchester.	Corn product	Below guaranty in fat.
584–22	Joe Kohmann..... Covington.	Same	This product is corn feed meal.
1101–22	Shelbyville Feed & Produce Co., Shelbyville..	Same	
3218–21	Foley Bros. ..... Pewee Valley.	Same	
3218–21	Latonia Hay & Grain Co. Latonia.	Same	
3218–21	J. H. Fedders & Sons... Covington.	Same	
3218–21	H. C. Bird & Sons..... Independence.	Same	
3218–21	Edw. M. Riedling..... Louisville.	Same	
3060–21	Conrad J. Clausen..... Louisville.	Corn product	Above guaranty in fiber.
2903–21	C. L. Jewell..... Horse Cave.	Corn	
1758–20	Fayette Coal, Feed & Grain Co., Lexington..	Corn hearts, corn bran.....	
405–21	Joe Lovett..... Williamsburg.	Same	Below guaranty in both protein and fat.
1027–21	J. W. Rider..... Mt. Vernon.	The product from the manufacture of hominy, hominy grits, and corn meal.....	
1027–21	T. A. Gray & Son..... LaGrange.	Same	
1433–22	Powell-Hackney Co..... Hazard.	Corn	Corn feed meal and not hominy meal.
.....	R. D. Riedling..... Louisville.	Corn	
2923–20	A. Schneider's Sons..... Louisville.	Yellow corn	Contains oat hulls.
2923–20	Blue Grass Comm. Co.... Lexington.	Same	Below guaranty in protein.
4221–22	Harry Hartke ..... Covington.	Corn by-product	Below guaranty in both protein and fat.
4221–22	R. F. Collier & Co..... Paris.	Same	Below guaranty in protein.
3648–21	P. Fredericks..... Louisville.	Corn	
3577–21	Amos Yeager ..... Louisville.	Same	Below guaranty in fat. Oat hulls present.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
	Choice C/S Meal.				
2044–21	"Aco" Brand Cotton Seed Meal..	The American Cotton Oil Co... New York, N. Y.	40.13	7.93	9.28
			41.20	**7.00**	**10.00**
2044–21	Same	Same	42.26	6.82	9.50
			41.20	**7.00**	**10.00**
2044–21	Same	Same	43.00	7.28	8.85
			41.20	**7.00**	**10.00**
2044–21	Cotton Seed Meal.....	Ashcraft-Wilkinson Co..... Atlanta, Ga.	41.06	7.83	9.18
			41.00	**7.00**	**10.00**
2444–21	"Lone Star Brand" High Grade Cotton Seed Meal.....	F. W. Brode Corporation..... Memphis, Tenn.	42.81	8.58	8.35
			43.00	**6.00**	**9.00**
2444–21	Same	Same	39.88	7.17	10.06
			43.00	**6.00**	**9.00**
2444–22	"Owl Brand" 43% Cotton Seed Meal	Same	42.70	8.34	7.63
			43.00	**6.00**	**10.00**
2444–22	Same	Same	42.12	8.54	8.30
			43.00	**6.00**	**10.00**
2444–22	Same	Same	42.32	8.75	7.67
			43.00	**6.00**	**10.00**
1264–21	"Owl Brand" Cotton Seed Meal.	Same	41.32	6.87	10.25
			41.00	**6.00**	**10.00**
1264–21	Same	Same	42.12	7.40	8.55
			41.00	**6.00**	**10.00**
1264–21	Same	Same	41.94	7.12	8.50
			41.00	**6.00**	**10.00**
1264–21	Same	Same	38.25	6.38	11.50
			41.00	**6.00**	**10.00**
1264–21	Same	Same	42.12	7.07	9.75
			41.00	**6.00**	**10.00**
1264–22	Same	Same	37.75	8.66	11.75
			41.00	**6.00**	**10.00**
1264–22	Same	Same	39.50	6.93	11.73
			41.00	**6.00**	**10.00**
1264–22	Same	Same	41.50	7.21	9.55
			41.00	**6.00**	**10.00**
1264–22	Same	Same	40.00	6.89	10.05
			41.00	**6.00**	**10.00**
1264–22	Same	Same	39.06	6.77	10.65
			41.00	**6.00**	**10.00**
1264–22	Same	Same	41.06	6.59	10.01
			41.00	**6.00**	**10.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
2044-21	D. A. Davis & Son..... Jeffersontown.	Cotton seed meal	Below guaranty in protein.
2044-21	Yopp Seed Co..... Paducah.	Same	
2044-21	J. Stotz..... Greenville.	Same	
2044-21	Blue Grass Com. Co.... Lexington.	Same	
2444-21	Summers Coal Co..... Smith's Grove.	Cotton seed	
2444-21	Ed. C. Flowers..... Adairville.	Same	Below guaranty in protein and above in fiber.
2444-22	H. R. Prewitt..... Mt. Sterling.	Same	
2444-22	Same	Same	
2444-22	A. S. Hart..... Mt. Sterling.	Same	
1264-21	E. T. Walker..... Glendale.	Same	
1264-21	C. S. Brent Seed Co.... Lexington.	Same	
1264-21	George Keller ..... Newport.	Same	
1264-21	Amos Yeager ..... Louisville.	Same	Below guaranty in protein and above in fiber.
1264-21	Hayes Bros ..... Hodgenville.	Same	
1264-22	Vine Grove Feed Co.... Vine Grove.	Same	Below guaranty in protein and above in fiber.
1264-22	W. W. Broaddus & Co... Richmond.	Cotton seed	Below guaranty in protein and above in fiber.
1264-22	Bardstown Milling Co... Bardstown.	Same	
1264-22	Eminence Milling Co.... Eminence.	Same	Below guaranty in protein.
1264-22	Same	Same	Below guaranty in protein and above in fiber.
1264-22	Brent & Co..... Paris.	Same	

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
1264–22	"Owl Brand" 41% Cotton Seed Meal	F. W. Brode Corporation, Memphis, Tenn.	42.32	7.19	9.10
			41.00	**6.00**	**10.00**
1264–22	Same	Same	42.38	9.68	6.82
			41.00	**6.00**	**10.00**
1264–22	Same	Same	39.94	6.60	10.45
			41.00	**6.00**	**10.00**
1264–22	Same	Same	40.88	7.94	8.40
			41.00	**6.00**	**10.00**
1264–22	Same	Same	39.94	6.83	10.83
			41.00	**6.00**	**10.00**
1264–22	Same	Same	40.50	6.73	10.38
			41.00	**6.00**	**10.00**
1264–22	Same	Same	41.00	7.22	9.65
			41.00	**6.00**	**10.00**
1264–22	Same	Same	39.38	6.60	10.90
			41.00	**6.00**	**10.00**
1264–22	Same	Same	39.81	7.32	10.05
			41.00	**6.00**	**10.00**
1264–22	Same	Same	40.38	6.77	10.55
			41.00	**6.00**	**10.00**
1264–22	Same	Same	39.88	6.74	11.15
			41.00	**6.00**	**10.00**
1264–22	Same	Same	42.44	6.55	9.05
			41.00	**6.00**	**10.00**
1264–22	Same	Same	38.75	7.96	10.55
			41.00	**6.00**	**10.00**
2200–21	"Eagle Brand" Choice Cotton Seed Meal	The Cotton Seed Products Co., Louisville, Ky.	40.63	6.30	10.56
			41.00	**6.00**	**10.00**
2200–22	Same	Same	42.76	7.31	9.60
			41.00	**6.00**	**10.00**
2200–22	Same	Same	42.12	6.97	9.85
			41.00	**6.00**	**10.00**
2200–22	Same	Same	39.38	6.88	11.10
			41.00	**6.00**	**10.00**
2200–22	Same	Same	41.13	6.57	10.23
			41.00	**6.00**	**10.00**
2200–23	Same	Same	39.56	6.27	11.35
			41.00	**6.00**	**10.00**
2200–23	Same	Same	40.56	6.87	10.80
			41.00	**6.00**	**10.00**
4710–23	Cotton Seed Meal	The Corno Mills Co., E. St. Louis, Ill.	41.13	6.90	9.63
			41.00	**6.00**	**10.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
1264–22	F. P. Spoonamore..... Stanford.	Cotton seed	
1264–22	Blue Grass Com. Co..... Lexington.	Same	
1264–22	Same	Same	Below guaranty in protein.
1264–22	Andrew Briggs ..... Blooomfield.	Same	
1264–22	Ferncliff Feed & Grain Co Louisville.	Same	Below guaranty in protein and above in fiber.
1264–22	City Wood & Coal Co.... Smith's Grove.	Same	
1264–22	Trent & Bruner..... Irvington.	Same	
1264–22	Barkley & Crutchfield. .. Pembroke.	Same	Below guaranty in protein.
1264–22	W. B. Campbell..... Hartford.	Same	Same.
1264–22	Hayden Mill & Grain Co. Springfield.	Same	Below guaranty in protein and above in fiber.
1264–22	N. O. Blair..... Chicago.	Same	Same.
1264–22	Amos Yeager ..... Louisville.	Same	
1264–22	Brent & Co., Inc..... Paris.	Same	Below guaranty in protein and above in fiber.
2200–21	Conrad J. Clausen..... Louisville.	Same	
2200–22	Smith & Smith..... Shepherdsville.	Same	
2200–22	Shepherdsville Roller Mills, Shepherdsville.	Same	
2200–22	J. B. Polk..... Taylorsville.	Same	Below guaranty in protein and above in fiber.
2200–22	J. A. Bennett ..... Taylorsville.	Same	
2200–23	Kentucky Feed & Grain Co., Louisville	Same	Below guaranty in protein and above in fiber. Excess of hulls.
2200–23	Henry Freuchtenicht.... Louisville.	Same	
4710–23	Burg Kinner ..... Greenup.	Same	

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
3804–21	Cotton Seed Meal	Early & Daniel Co. Cincinnati, Ohio.	41.94 **41.00**	7.85 **6.00**	8.50 10.00
1083–20	Choice Cotton Seed Meal	Edinger & Co. Louisville, Ky.	39.88 **41.00**	6.55 **6.00**	10.10 10.00
3533–21	Ox Brand Cotton Seed Meal	Chas. A. Hill & Co. Nashville, Tenn.	40.56 **41.00**	6.10 **6.00**	11.83 10.00
3533–21	Same	Same	36.13 **41.00**	6.56 **6.00**	14.43 10.00
3533–21	Same	Same	39.63 **41.00**	6.49 **6.00**	11.83 10.00
2202–20	Bull Brand Cotton Seed Meal	Humphreys Godwin Co. Memphis, Tenn.	41.26 **43.00**	9.19 **6.00**	7.63 10.00
2202–21	Same	Same	42.56 **43.00**	7.35 **6.00**	8.73 10.00
2202–21	Same	Same	43.26 **43.00**	7.96 **6.00**	7.83 10.00
2202–21	Same	Same	42.76 **43.00**	7.19 **6.00**	8.48 10.00
968–20	"Dixie Brand" Cotton Seed Meal	Same	39.13 **41.00**	7.81 **5.50**	10.71 10.00
968–20	Same	Same	39.63 **41.00**	7.76 **5.50**	9.75 10.00
968–20	Same	Same	41.38 **41.00**	7.35 **5.50**	8.73 10.00
968–20	Same	Same	41.00 **41.00**	6.90 **5.50**	9.85 10.00
968–21	Same	Same	41.82 **41.00**	6.72 **5.50**	9.90 10.00
968–21	Same	Same	42.88 **41.00**	7.27 **5.50**	8.75 10.00
968–22	Same	Same	41.06 **41.00**	6.67 **5.50**	9.85 10.00
968–22	Same	Same	40.00 **41.00**	7.33 **5.50**	10.68 10.00
968–22	Same	Same	40.69 **41.00**	7.26 **5.50**	9.68 10.00
968–22	Same	Same	41.62 **41.00**	7.16 **5.50**	9.93 10.00
968–22	Same	Same	40.13 **41.00**	6.95 **5.50**	10.31 10.00
968–22	Same	Same	38.63 **41.00**	6.59 **5.50**	11.68 10.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
3804–21	Farmers' Union Sup. Co. Georgetown.	Pressed cotton seed	
1083–20	Lake Bros..... Springfield.	Decorticated cotton seed	Below guaranty in protein.
3533–21	Allen Co. Farm Bureau.. Scottsville.	Same	Above guaranty in fiber.
3533–21	W. L. Kimbrough & Son Guthrie.	Same	Inferior to guaranty. Adulterated with cotton seed hulls. Below guaranty in protein and above in fiber.
3533–21	Same	Same	Below guaranty in protein and above in fiber.
2202–20	J. F. Tabb ..... Mt. Sterling.	Pressed cotton seed	Inferior to guaranty. Below guaranty in protein.
2202–21	M. D. Royse..... Winchester.	Same	
2202–21	Fox Caldwell ..... Danville.	Same	
2202–21	Anderson & Spilman.... Danville.	Same	
968–20	Yopp Seed Co..... Paducah.	Same	Below guaranty in protein and above in fiber.
968–20	Buffalo Dairy Association Buffalo.	Same	Below guaranty in protein.
968–20	H. T. Edwards..... Campbellsville.	Same	
968–20	J. B. Penn & Co..... Georgetown.	Same	
968–21	Wilson & Newman..... Russellville.	Same	
968–21	Yopp Seed Co..... Paducah.	Same	
968–22	J. H. Tate & Co..... Monticello.	Same	
968–22	H. T. Edwards..... Campbellsville.	Same	Below guaranty in protein.
968–22	Shepherdsville Roller Mills, Shepherdsville....	Same	
968–22	Allen Co. Farm Bureau.. Scottsville.	Same	
968–22	R. B. Hutchcraft & Co.. Paris.	Same	Below guaranty in protein.
968–22	Greene & Duff..... Mt. Sterling.	Same	Below guaranty in protein and above in fiber. Dark in color.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
968–22	"Dixie Brand" Cotton Seed Meal	Humphreys Godwin Co.	40.69	6.95	10.23
		Memphis, Tenn.	**41.00**	**5.50**	**10.00**
968–22	Same	Same	41.94	7.81	7.85
			41.00	**5.50**	**10.00**
3061–21	Cotton Seed Meal	George Keller	41.63	8.18	9.40
		Newport, Ky.	**43.00**	**6.00**	**9.00**
2162–20	Lovit Brand Cotton Seed Meal	L. B. Lovitt & Co.	41.56	8.78	8.35
		Memphis, Tenn.	**41.00**	**5.00**	**10.00**
2162–20	Same	Same	41.50	7.64	10.20
			41.00	**5.00**	**10.00**
2162–22	Same	Same	41.00	7.06	9.10
			41.00	**5.00**	**10.00**
2162–22	Same	Same	42.88	7.03	8.05
			41.00	**5.00**	**10.00**
3047–21	"Alabama Brand" Cotton Seed Meal	Lyle & Lyle	40.00	7.06	11.25
		Huntsville, Ala.	**41.00**	**6.00**	**10.00**
3047–21	Same	Same	39.00	7.55	11.90
			41.00	**6.00**	**10.00**
3047–21	Same	Same	42.12	7.44	9.20
			41.00	**6.00**	**10.00**
3047–21	Same	Same	40.88	6.79	8.68
			41.00	**6.00**	**10.00**
.....	41% Cotton Seed Meal	McKay-Reece Co.	40.88	6.86	9.93
		Nashville, Tenn.	**41.00**	**6.50**	**10.00**
3733–21	Cotton Seed Meal	The McMillen Co.	43.32	7.37	7.10
		Ft. Wayne, Ind.	**43.00**	**6.00**	**10.00**
4476–22	"White Mule Brand" 43% Cotton Seed Meal	Marianna Cotton Oil Co.	43.62	7.85	7.03
		Memphis, Tenn.	**43.00**	**6.00**	**10.00**
4475–22	"White Mule Brand" 41% Cotton Seed Meal	Same	43.70	7.20	7.85
			41.00	**6.00**	**10.00**
4475–22	Same	Same	42.00	7.75	9.33
			41.00	**6.00**	**10.00**
4475–22	Same	Same	41.76	7.91	8.15
			41.00	**6.00**	**10.00**
4475–22	Same	Same	38.13	6.44	11.65
			41.00	**6.00**	**10.00**
4475–22	Same	Same	40.38	6.38	9.68
			41.00	**6.00**	**10.00**
4475–22	Same	Same	41.76	7.17	8.30
			41.00	**6.00**	**10.00**
4475–22	Same	Same	40.44	6.56	11.55
			41.00	**6.00**	**10.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
968–22	J. F. Tabb..... Mt. Sterling.	Pressed cotton seed	
968–22	F. H. Gordon..... Richmond.	Same	
3061–21	A. Deye ..... Cold Springs.	Cotton seed	Below guaranty in protein.
2162–20	Brent & Co., Inc. ..... Paris.	Cotton seed meal	
2162–20	R. D. Riedling..... Louisville.	Same	Dark in color and contains considerable lint.
2162–22	Brent & Co., Inc. ..... Paris.	Same	
2162–22	E. F. Spears & Son..... Paris.	Same	
3047–21	Conrad J. Clausen..... Louisville.	Decorticated cotton seed	Below guaranty in protein and above in fiber.
3047–21	Edw. M. Riedling..... Louisville.	Same	Same.
3047–21	Oscar Farmer & Sons.... Louisville.	Same	
3047–21	S. B. Jones..... Pembroke.	Same	
.....	W. L. Kimbrough & Son. Guthrie.	Cotton seed	Not labeled with Kentucky labels.
3733–21	Consolidated Coal Co.... McRoberts.	Cotton seed meal	
4476–22	Bonta Bros. ..... Harrodsburg.	Same	
4475–22	Edw. M. Riedling..... Louisville.	Same	
4475–22	Same	Same	
4475–22	J. H. Thurman..... Springfield.	Same	
4475–22	Oakland Milling Co..... Oakland.	Same	Below guaranty in protein and above in fiber.
4475–22	Munfordsville Milling & Supply Co., Munfordsville	Same	Below guaranty in protein.
4475–22	R. D. Robertson..... Mayfield.	Same	
4475–22	J. H. Baughman & Co... Stanford.	Same	Below guaranty in protein and above in fiber.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
4475–22	"White Mule Brand" 41% Cotton Seed Meal	Marianna Cotton Oil Co. Memphis, Tenn.	37.13	7.13	12.60
			41.00	**6.00**	**10.00**
.....	Canary Brand Cotton Seed Meal	C. L. Montgomery & Co. Memphis, Tenn.	40.88	7.49	10.35
			43.00	**9.00**	**10.00**
331–20	Choice Brand Cotton Seed Meal	Same	44.26	8.55	6.85
			41.00	**6.00**	**8.00**
331–20	Same	Same	41.88	6.30	8.15
			41.00	**6.00**	**8.00**
331–21	Same	Same	41.76	6.43	9.89
			41.00	**6.00**	**8.00**
3686–22	"Durham 41"	Memphis Cottonseed Products Co Memphis, Tenn.	38.44	6.72	11.20
			41.00	**6.00**	**10.00**
2465–21	Bee Brand Cotton Seed Meal	W. C. Nothern Memphis, Tenn.	42.12	7.58	9.20
			41.00	**6.00**	**12.00**
2465–21	Same	Same	41.13	7.49	9.65
			41.00	**6.00**	**12.00**
2465–21	Same	Same	40.44	7.53	9.50
			41.00	**6.00**	**12.00**
2465–22	Same	Same	40.13	6.82	10.10
			41.00	**6.00**	**12.00**
2465–22	Same	Same	37.75	6.17	12.69
			41.00	**6.00**	**12.00**
2465–23	Same	Same	40.50	6.48	10.25
			41.00	**6.00**	**12.00**
2465–23	Same	Same	40.63	6.33	10.65
			41.00	**6.00**	**12.00**
2465–23	Same	Same	43.06	6.68	10.90
			41.00	**6.00**	**12.00**
2465–23	Same	Same	40.88	6.56	12.00
			41.00	**6.00**	**12.00**
3088–20	41% Cotton Seed Meal	Owensboro Milling Co. Owensboro, Ky.	40.88	7.31	10.50
			41.00	**6.00**	**10.00**
435–20	Phoenix Choice Cotton Seed Meal	Phoenix Cotton Oil Co. Dyersburg, Tenn.	42.06	7.43	9.85
			41.00	**7.00**	**10.00**
435–20	Same	Same	41.38	7.00	10.50
			41.00	**7.00**	**10.00**
435–20	Same	Same	42.88	7.30	9.76
			41.00	**7.00**	**10.00**
435–20	Same	Same	41.13	6.79	9.24
			41.00	**7.00**	**10.00**
435–22	Same	Same	41.13	6.88	9.35
			41.00	**7.00**	**10.00**
3748–21	43% Cotton Seed Meal	Same	43.00	6.76	9.83
			43.00	**6.00**	**10.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
4475–22	Ferncliff Feed & Grain Co Louisville.	Cotton seed meal.....	Below guaranty in protein and above in fiber. Inferior to claim.
.....	J. D. Clark..... Lexington.	Decorticated cotton seed	Below guaranty in protein.
331–20	Shepherdsville Roller Mills, Shepherdsville.	Pressed cotton seed	
331–20	Marshall Co. Milling Co. Benton.	Same	
331–21	Flavo Grain & Mill Co.. Somerset.	Same	
3686–22	I. H. Hummer..... Scottsville.	Cotton seed	Below guaranty in protein and above in fiber.
2465–21	H. J. Grieve..... Louisville.	Pressed cotton seed	
2465–21	A. B. Wilson..... Cave City.	Same	
2465–21	Martin & Hodgkin Supply Co., Winchester...	Same	Below guaranty in protein.
2465–22	Franklin Elev. & Warehouse Co., Franklin...	Same	Same.
2465–22	Oscar Farmer & Sons.... L uisville.	Same	Below guaranty in protein and above in fiber. Inferior to claim.
2465–23	Martin-Hodgkin Supply ply Co., Winchester...	Same	Below guaranty in protein.
2465–23	Same	Same	
2465–23	Woodford Spears & Sons Paris.	Same	
2465–23	Oscar Farmer & Sons.... Louisville.	Same	
3088–20	Jacob Stotz ..... Greenville.	Cotton seed	Above guaranty in fiber.
435–20	Herbert Hawkins ..... Paducah.	Decorticated cotton seed	
435–20	W. B. Ray Feed Co..... Princeton.	Same	Above guaranty in fiber.
435–20	Browder Milling Co..... Fulton.	Same	
435–20	R. D. Robertson..... Mayfield.	Same	
435–22	J. J. Shaver & Co..... Mayfield.	Same	
3748–21	Browder Milling Co..... Fulton.	Same	

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
3058–22	Cotton Seed Meal	Rapier Sugar Feed Co., Owensboro, Ky.	41.13	6.89	9.63
			41.00	**7.50**	**10.00**
3131–21	"Sansom's Choice 41%" Cotton Seed Meal	J. M. Sansom & Co., Dallas, Texas.	43.75	7.87	9.51
			41.20	**6.00**	**10.00**
2286–19	Atlas Cotton Seed Meal	Southern Seed Co., Louisville, Ky.	41.30	6.35	10.75
			41.00	**6.00**	9.00
2286–23	Same	Same	39.88	6.52	11.05
			41.00	**6.00**	9.00
3120–21	"Texoma Brand" Prime Cotton Seed Meal	Texas Cake & Linter Co., Dallas, Texas.	39.44	12.70	8.10
			43.00	**6.00**	**12.00**
3120–21	Same	Same	44.12	8.05	8.03
			43.00	**6.00**	**12.00**
3404–22	Planet Brand Cotton Seed Meal	A. C. Westervelt & Co., Memphis, Tenn.	42.50	7.48	8.15
			43.00	**6.00**	**10.00**
3404–21	Same	Same	43.00	7.39	8.10
			43.00	**6.00**	**10.00**
3404–22	Same	Same	42.76	7.46	8.13
			43.00	**6.00**	**10.00**
3403–22	Star Brand Cotton Seed Meal	Same	39.75	6.96	10.00
			41.00	**5.50**	**10.00**
3403–22	Same	Same	41.76	7.11	9.15
			41.00	**5.50**	**10.00**
3403–22	Same	Same	42.12	7.33	8.05
			41.00	**5.50**	**10.00**
	Prime C/S Meal				
237–18	Dove Brand Cotton Seed Meal	F. W. Brode & Co., Memphis, Tenn.	39.69	8.55	11.55
			38.62	**6.00**	**12.00**
	C/S Feed.				
2–21	"Surety Brand" Cotton Seed Meal	The American Cotton Oil Co., New York, N. Y.	35.63	6.03	14.23
			36.00	**5.50**	**14.00**
2–21	Same	Same	35.56	5.73	14.03
			36.00	**5.50**	**14.00**
.....	Cotton Seed Feed	Ashcraft & Wilkinson Co., Atlanta, Ga.	33.75	5.81	16.58
			36.00	.....	.....
.....	Same	Same	34.13	5.70	16.35
			36.00	.....	.....
.....	Same	Same	37.88	.....	.....
			36.00	**5.50**	**14.00**
575–19	Cotton Seed Feed	Blue Grass Commission Co., Lexington, Ky.	34.75	5.63	15.32
			36.00	**5.00**	**15.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
3058–22	Star Roller Mills..... Cloverport.	Cotton seed	
3131–21	Headley & Co..... Lexington.	Decorticated cotton seed	
2286–19	S. M. Long & Sons..... Shelbyville.	Cotton seed	Above guaranty in fiber.
2286–23	Glasgow Feed & Produce Co., Glasgow.	Same	Below guaranty in protein and above in fiber.
3120–21	D. A. Davis & Son..... Jeffersontown.	Same	Below guaranty in protein.
3120–21	Hudson & Davis..... Danville.	Same	
3404–22	R. W. Willingham..... Henderson.	Pressed cotton seed	Below guaranty in protein.
3404–21	Summerville Bros. Feed Co., Lewisburg	Same	
3404–22	R. W. Willingham..... Henderson.	Same	
3403–22	Smithfield Milling Co... Smithfield.	Same	Below guaranty in protein.
3403–22	Yopp Seed Co..... Paducah.	Same	
3403–22	Berea College Dairy.... Berea.	Same	
237–18	Acme Mills ..... Hopkinsville.	Cotton seed	Dark brown color.
2–21	George Keller ..... Newport.	Cotton seed meal, cotton seed hulls 23%	
2–21	Hunteman Bros. ..... Newport.	Same	
.....	Blue Grass Com. Co.... Lexington.	Cotton seed	Below guaranty in protein and has an excess of fiber.
.....	Same	Same	Same.
.....	Same	Same	
575–19	Mfrs. Warehouse	Cotton seed meal, cotton seed hulls 25%	Below guaranty in protein.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
2318–18	Jay Brand Cotton Seed Feed.....	F. W. Brode & Co.....	31.50	5.25	16.79
		Memphis, Tenn.	**36.00**	**5.00**	**14.00**
2126–18	"Buckeye" Good Cotton Seed Meal	The Buckeye Cotton Oil Co....	35.25	6.80	13.60
		Cincinnati, Ohio.	**36.00**	**5.00**	**14.00**
1849–18	"Buco" Cotton Seed Feed.....	Same	21.63	3.65	23.70
			20.00	**3.50**	**27.00**
800–19	"Buckeye" Good Cotton Seed Feed	Same	36.69	6.02	14.30
			36.00	**5.00**	**14.00**
800–19	Same	Same	35.88	7.37	12.83
			36.00	**5.00**	**14.00**
850–20	Cotton Seed Feed.....	Chattanooga Feed Co.....	36.13	6.14	14.93
		Chattanooga, Tenn.	**36.00**	**5.50**	**14.00**
850–21	Same	Same	37.25	5.96	14.15
			36.00	**5.50**	**14.00**
4714–23	"White Ribbon" Brand Cotton Seed Meal	R. G. Clarke & Co.....	34.75	5.92	16.38
		Memphis, Tenn.	**36.00**	**5.00**	**15.00**
1420–21	Good Cotton Seed Feed.....	The Cottonseed Products Co....	38.63	6.85	11.94
		Louisville, Ky.	**36.00**	**6.00**	**14.00**
596–21	Same	The Early & Daniel Co.....	42.75	8.95	8.73
		Cincinnati, Ohio.	**36.00**	**5.00**	**15.00**
596–21	Same	Same	34.69	6.02	14.58
			36.00	**5.00**	**15.00**
55–21	Economy Cotton Seed Feed.....	Lyle & Lyle.....	36.13	6.56	15.05
		Huntsville, Ala.	**36.00**	**5.00**	**14.00**
4474–22	"White Mule Brand" Good Cotton Seed Feed	Marianna Cotton Oil Co	37.50	6.71	11.68
		Memphis, Tenn.	**36.00**	**5.00**	**14.00**
4474–22	Same	Same	35.38	6.38	12.85
			36.00	**5.00**	**14.00**
4474–23	Same	Same	35.44	7.05	13.55
			36.00	**5.00**	**14.00**
	Oil Meal.				
395–19	Amco Old Process Linseed Meal & Old Process Screenings Oil Feed	American Milling Co.....	31.44	5.30	10.06
		Peoria, Ill.	**30.00**	**5.00**	**10.00**
395–21	Same	Same	31.88	6.15	9.95
			30.00	**5.00**	**10.00**
395–21	Same	Same	32.13	6.14	9.35
			30.00	**5.00**	**10.00**
395–21	Same	Same	32.38	6.00	9.58
			30.00	**5.00**	**10.00**
2648–21	A–D Old Process Ground Oil Cake	Archer-Daniels Linseed Co.....	36.63	6.88	7.58
		Louisville, Ky.	**34.00**	**6.00**	**10.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
2318–18	Calloway County Farm Bureau, Murray	Cotton seed meal, cotton seed hulls 30%	Excess of hulls. Below guaranty in protein and above in fiber.
2126–18	George Keller, Newport.	Cotton seed meal, cotton seed hulls 20%	Below guaranty in protein.
1849–18	Wm. Addams, Cynthiana.	Cotton seed meal 50%, cotton seed hulls 50%	
800–19	Same	Cotton seed meal, cotton seed hulls 26%	
800–19	Blue Grass Com. Co., Lexington.	Same	
850–20	Flavo Mill & Grain Co., Somerset.	Cotton seed meal, cotton seed hulls 20%	Above guaranty in fiber.
850–21	Geo. P. Taylor Co., Somerset.	Same	
4714–23	Blue Grass Com. Co., Lexington.	Same	Excess of hulls. Below guaranty in protein and above in fiber.
1420–21	Smith & Smith, Shepherdsville.	Same	
596–21	The Dorsel Co., Newport.	Same	
596–21	Goff & Bush, Winchester.	Same	Inferior to guaranty. Below guaranty in protein.
55–21	Blue Grass Com. Co., Lexington.	Cotton seed meal, cotton seed hulls 30%	Above guaranty in fiber.
4474–22	Same	Cotton seed meal, cotton seed hulls 23%	
395–21	George Keller, Newport.	Same	Below guaranty in protein.
4474–23	Blue Grass Com. Co., Lexington.	Same	Same.
395–19	Farmers' Supply Co., Calvert City.	Linseed meal, screenings oil feed	
395–21	George Keller, Newport.	Same	
395–21	Berea College Dairy, Berea.	Same	
395–21	Same	Same	
2648–21	Ritter-Hennings Co., Louisville.	Flaxseed	

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
2648–22	A-D Old Process Ground Oil Cake	Archer-Daniels Linseed Co.....	33.38	6.59	8.58
		Louisville, Ky.	**34.00**	**6.00**	**10.00**
432–19	Oil Meal	The Cincinnati Grain & Hay Co.	36.19	7.49	7.58
		Covington, Ky.	**32.00**	**7.50**	**9.00**
586–20	Old Process Oil Meal.....	The Early & Daniel Co.....	35.38	6.00	8.65
		Cincinnati, Ohio.	**30.00**	**5.00**	**10.00**
586–20	Same	Same	31.88	6.06	9.48
			30.00	**5.00**	**10.00**
586–20	Same	Same	34.94	6.48	8.40
			30.00	**5.00**	**10.00**
70–21	"H & B Co. Brand" Linseed Meal	Hirst & Begley Linseed Co.....	37.88	7.18	7.25
		Chicago, Ill.	**34.00**	**6.00**	**9.00**
1337–21	Oil Meal	Latonia Hay & Grain Co.....	31.50	6.12	9.38
		Covington, Ky.	**30.81**	**6.90**	.....
2343–17	"Midland Brand" Pure Old Process Ground Linseed Cake	Midland Linseed Products Co..	37.94	7.55	6.93
		Minneapolis, Minn.	**32.00**	**5.00**	**9.50**
2361–21	Same	Same	35.50	7.63	8.18
			34.00	**5.00**	**9.50**
2361–21	Same	Same	33.88	7.52	8.98
			34.00	**5.00**	**9.50**
2361–21	Same	Same	34.50	7.65	8.45
			34.00	**5.00**	**9.50**
2361–21	Same	Same	33.63	7.91	8.88
			34.00	**5.00**	**9.50**
133–21	"Nutritia" Old Process Linseed Oil Meal	The Nutritia Co.....	38.75	6.38	7.83
		Cincinnati, Ohio.	**30.00**	**5.00**	**10.00**
1399–22	"Major Brand" Linseed Oil Meal	Toledo Seed Co.....	33.50	6.57	8.85
		Toledo, Ohio.	**33.00**	**5.00**	**10.00**
	Ground Oats.				
4262–22	Acme Ground Oats.....	Acme-Evans Co.....	11.00	3.96	14.90
		Indianapolis, Ind.	**10.00**	**4.25**	**12.00**
1091–21	Ground Oats	Edinger & Co.....	12.44	5.27	9.25
		Louisville, Ky.	**10.40**	**4.10**	**9.40**
4008–21	Same	H. P. Hawkins' Sons.....	12.63	5.53	13.26
		Paducah, Ky.	**11.19**	**4.10**	**11.25**
4185–22	Whole Ground Oats.....	Illinois Feed & Elevator Co....	11.75	5.32	12.13
		Bloomington, Ill.	**11.00**	**4.50**	**11.00**
4185–22	Same	Same	12.50	4.93	11.42
			11.00	**4.50**	**11.00**
4185–22	Same	Same	12.00	5.75	11.23
			11.00	**4.50**	**11.00**
4185–22	Same	Same	10.50	4.44	13.80
			11.00	**4.50**	**11.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
2648–22	Bardstown Milling Co... Bardstown.	Flaxseed	
432–19	Boone Co. Farm Bureau. Florence.	Same	
586–20	Eastern State Hospital.. Lexington.	Same	
586–20	The Dorsel Co..... Newport.	Same	
586–20	J. H. Baughman & Co... Stanford.	Same	
70–21	Blue Grass Comm. Co.... Lexington.	Ground linseed cake	
1337–21	Mfrs. Warehouse	Flaxseed	
2343–17	C. S. Brent Seed Co.... Lexington.	Same	
2361–21	Oscar Farmer & Son.... Louisville.	Same	
2361–21	George Keller ..... Newport.	Same	
2361–21	Berea College Dairy.... Berea.	Same	
2361–21	Oscar Farmer & Sons.... Louisville.	Same	
133–21	M. D. Royse ..... Winchester.	Same	
1399–22	J. H. Baughman & Co . Stanford.	Same	
4262–22	Sandusky Bros. ..... Harrodsburg.	Oats ground	Above guaranty in fiber.
1091–21	Haydon Mill & Grain Co. Springfield.	Oats	Contains wild oats and corn product.
4008–21	J. G. Fleming..... Paducah.	Same	Crushed oats containing a large per cent of wild oats, wheat and barley.
4185–22	Boone Co. Farm Bureau. Burlington.	Whole ground oats	Above guaranty in fiber.
4185–22	Boone Co. Farm Bureau. Florence.	Same	
4185–22	Elmendorf Coal & Feed Co., Lexington.	Same	
4185–22	H. J. Grieve..... Louisville.	Same	Below guaranty in protein and above in fiber. Inferior oats.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
4535–22	Ground Oats	George Keller	11.25	4.41	10.25
		Newport, Ky.	11.88	5.24	13.31
	Rice Bran.				
1798–22	Rice Bran	Aubrey & Co.	14.25	17.13	9.15
		Louisville, Ky.	12.00	12.00	12.00
3085–20	Rice Bran	Cincinnati Grain & Hay Co.	14.06	16.34	12.05
		Covington, Ky.	11.50	11.00	11.00
.....	Rice Bran	Wm. C. Dickinson & Co.	13.00	16.56	12.87
		St. Louis, Mo.	12.00	12.00	12.00
3035–21	Rice Bran	Kentucky Feed & Grain Co.	12.31	11.85	9.98
		Louisville, Ky.	12.00	12.00	12.00
	Rye Middlings.				
4462–22	Rye Middlings	J. F. Bertram	15.94	3.73	5.28
		Vanceburg, Ky.	14.00	3.00	6.00
1805–22	Rye Middlings	The Dewey Bros. Co.	16.38	3.73	5.77
		Blanchester, Ohio.	14.00	3.00	5.00
.....	Low Grade Rye Flour	Eagle Roller Mills	15.88	2.93	3.91
		New Ulm, Minn.	.....	.....	.....
4480–22	Rye Middlings	J. H. Fedders & Sons	16.50	3.80	5.50
		Covington, Ky.	15.19	3.50	5.60
4285–22	Rye Feed	Ferger Bros.	16.38	3.94	6.20
		Cincinnati, Ohio.	14.50	3.00	6.00
140–20	"Nutritia" Rye Middlings & Screenings	The Nutritia Co.	15.88	4.61	5.82
		Cincinnati, Ohio.	15.50	3.00	3.50
1605–19	Rye Middlings & Screenings	M. G. Rankin & Co.	15.75	3.45	5.20
		Milwaukee, Wis.	14.00	3.00	6.00
	Wheat Bran				
1646–19	Aubrey's Wheat Bran and Screenings	Aubrey & Co.	15.94	4.43	9.86
		Louisville, Ky.	14.50	3.70	9.50
1404–22	Wheat Bran and Screenings	Beaver Creek Mills	14.50	4.23	6.35
		Glasgow, Ky.	14.95	4.19	9.83
1346–22	Wheat Bran and Screenings	The Blake Milling Co.	15.25	3.85	10.40
		Edwardsville, Ill.	15.50	4.25	10.00
3219–21	Wheat Bran	B. H. Britton	16.75	4.70	7.13
		Harrodsburg, Ky.	15.50	4.00	9.50
362–22	Bran	Cadick Milling Co.	15.13	4.06	8.40
		Grandview, Ind.	14.50	4.00	10.00
1846–20	Wheat Bran and Screenings	Dahnke-Walker Milling Co.	14.50	4.60	9.45
		Union City, Tenn.	14.50	4.00	10.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
4535–22	Herman Feldmann ..... Newport.	Ground oats	Below guaranty in protein. Ground barley present.
1798–22	Elizabethtown Milling Co Elizabethtown.	Rice bran	
3085–20	Hudson & Farnau..... Lancaster.	Same	Contains rice hulls and ground grains. High in fiber.
.....	Kentucky Feed & Grain Co., Louisville.	Same	
3035–21	Bardstown Milling Co... Bardstown.	Same	Contains rice hulls, ground rice grains and foreign material.
4462–22	Mfrs. Warehouse	Rye middlings	
1805–22	N. D. Tabor..... Olive Hill.	Rye	Above guaranty in fiber.
.....	Edwin C. Hawkins..... Paducah.	Low grade rye flour	Not labeled.
4480–22	Mfrs. Warehouse	Rye middlings	
4285–22	Stagg Bros. Co..... Vanceburg.	Rye	
140–20	Steely & Steely..... Williamsburg.	Rye middlings, ground rye screenings 3%	Above guaranty in fiber. Guaranty in fiber is too low for middlings.
1605–19	Burg Kinner ..... Greenup.	Rye middlings, ground rye screenings 15%	
1646–19	Hayes Bros. ..... Hodgenville.	Wheat bran, ground wheat screenings 3%	
1404–22	Glasgow Feed & Pro. Co. Glasgow.	Wheat bran, unground wheat screenings 15%	
1346–22	Wm. Addams..... Cynthiana.	Wheat bran, ground wheat screenings 7%	
3219–21	Mfrs. Warehouse	Wheat bran	Corn cockle present.
362–22	Mrs. H. G. Greer..... Brandenburg.	Same	Ground wheat screenings present.
1846–20	C. E. Mooney..... Hickman.	Wheat bran, ground wheat screenings 4%	

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
266–21	Wheat Bran	The Early & Daniel Co. Covington, Ky.	16.88 **14.53**	4.43 **4.00**	9.52 **9.08**
2581–20	"We-Kno" Wheat Bran	Oscar Farmer & Sons. Louisville, Ky.	16.00 **14.50**	4.25 **4.00**	10.43 **10.00**
2993–20	Wheat Bran and Screenings	J. H. Fedders & Sons. Covington, Ky.	16.00 **14.50**	3.98 **3.50**	9.70 **10.00**
3113–21	Wheat Bran	Flynn Bros. Co. St. Louis, Mo.	17.50 **14.50**	3.75 **4.00**	7.45 **9.50**
3279–21	Wheat Bran and Screenings	Font Hill Milling Co. Font Hill, Ky.	15.75 **15.25**	4.80 **4.10**	7.85 **10.00**
1473–22	Wheat Bran	Fuhrer-Ford Milling Co. Mt. Vernon, Ind.	14.38 **14.50**	4.08 **3.50**	10.90 **9.50**
.....	American Ace Pure Wheat Bran	The Goerz Flour Mills Co. Newton, Kansas.	17.00 **14.50**	4.55 **3.50**	10.73 **11.00**
1355–22	Wheat Bran and Screenings	Kansas Flour Mills Co. Kansas City, Mo.	17.69 **14.50**	3.67 **3.50**	9.80 **10.00**
487–21	Palace Bran	Kehlor Flour Mills Co. St. Louis, Mo.	17.19 **14.50**	4.15 **4.00**	8.58 **10.00**
487–22	Palace Bran and Screenings	Same	16.88 **14.50**	4.33 **4.00**	9.66 **10.00**
1048–21	Wheat Bran and Screenings	The Larabee Flour Mills Corp. Kansas City, Mo.	17.63 **15.00**	4.83 **3.25**	8.94 **10.00**
416–22	Wheat Bran	Lawrenceburg Milling Co. Lawrenceburg, Ind.	15.50 **15.50**	4.15 **2.00**	9.75 **10.00**
2354–22	Wheat Bran	Leitchfield Milling Co. Leitchfield, Ky.	15.38 **15.65**	4.03 **4.10**	7.15 **9.70**
1769–21	Wheat Bran and Screenings	Lewisburg Milling Co. Lewisburg, Ky.	15.88 **15.19**	4.45 **4.94**	6.30 **6.38**
797–22	Wheat Bran	S. M. Long & Sons. Shelbyville, Ky.	13.38 **17.06**	3.72 **4.15**	10.83 **9.50**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
266–21	Fred Schuerman..... Newport.	Wheat bran	
2581–20	Eastern State Hospital.. Lexington.	Same	Unground wheat screenings present. High in fiber.
2993–20	Youtsey Bros. ..... Alexandria.	Wheat bran, ground wheat screenings 5%	
3113–21	Hulen-Toops Co. ..... Bowling Green.	Wheat bran, ground wheat screenings 8%	Wheat middlings present.
3279–21	Mfrs. Warehouse	Wheat bran, unground wheat screenings 4%	
1473–22	F. H. Vogel..... Henderson.	Soft winter wheat bran.....	High in fiber.
.....	Farmers' Co-operative Store, Alexandria.....	Wheat bran	Not labeled with Kentucky tags.
1355–22	Ritter-Hennings Co.... Louisville.	Wheat bran, ground wheat screenings 10%	
487–21	A. B. Beal & Son..... Murray.	Pure wheat bran.....	
487–22	T. F. Hart..... Henderson.	Pure wheat bran, ground wheat screenings 8%	
1048–21	Henry Paris ..... Marion.	Wheat bran, ground wheat screenings 8%	
416–22	Berea College Dairy..... Berea.	Hard wheat bran, ground wheat screenings 3%	
2354–22	Mfrs. Warehouse	Wheat bran	
1769–21	Summerville Bros..... Lewisburg.	Wheat bran, ground wheat screenings 10%	
797–22	Mfrs. Warehouse	Wheat bran	Adulterated with ground oat hulls. Ground wheat screenings present. Below guaranty in protein and above in fiber.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
1028–21	"Sonny-South" Wheat Bran.....	Louisville Milling Co.	16.75	4.02	9.15
		Louisville, Ky.	14.50	4.00	8.75
1028–22	Same	Same	16.25	4.33	10.53
			14.50	4.00	8.75
3624–21	Wheat Bran	The Lynn Grove Milling Co. ...	14.31	4.16	7.30
		Lynn Grove, Ky.	16.50	4.50	7.50
3148–21	Winter Wheat Bran.....	Marion Milling Co.	15.38	3.18	6.93
		Marion, Ky.	15.00	4.00	9.50
3384–22	Albatross Bran and Screenings...	John F. Meyer & Sons Mlg. Co.	14.63	4.34	9.03
		St. Louis, Mo.	14.50	3.50	9.75
.....	Bran	New Prague Flour Mill.....	16.38	4.93	9.56
		New Prague, Minn.			
3481–21	O-V Standard Feed.....	Ohio Valley Milling & Sup. Co. .	17.31	5.09	8.60
		Ashland, Ky.	18.38	5.77	8.33
1979–20	Wheat Bran	Philpot Mills.....	15.88	4.72	7.04
		Philpot, Ky.	15.25	4.07	8.25
1424–20	Wheat Bran	Richardson Milling Co.	15.25	4.39	5.53
		Horse Cave, Ky.	15.50	4.25	9.00
3497–21	Wheat Bran and Screenings.....	Saxony Mills	15.38	3.73	9.83
		St. Louis, Mo.	14.50	4.00	9.50
3256–21	Wheat Bran	South Fork Roller Mills.....	16.38	3.66	5.98
		Phil, Ky.	15.00	4.00	10.00
25–21	"Try Me" Bran and Screenings..	Sparks Milling Co.	16.38	3.72	8.85
		Alton, Ill.	15.00	3.50	10.00
979–21	Stanard-Tilton Milling Company's Wheat Bran and Screenings....	Stanard-Tilton Milling Co.	17.13	4.19	9.50
		St. Louis, Mo.	14.50	4.00	9.50
4280–22	Wheat Bran and Screenings.....	Willis Norton & Co.	17.69	4.16	9.50
		Topeka, Kans.	14.50	3.50	10.00
4609–22	Wheat Bran	Zula Milling Co.	16.63	5.48	8.05
		Zula, Ky.	15.00	4.25	8.45
	Wheat Middlings				
301–20	Acme Middlings and Screenings..	Acme-Evans Co.	16.25	4.44	6.76
		Indianapolis, Ind.	16.50	4.50	7.50
301–20	Same	Same	16.38	4.35	7.25
			16.50	4.50	7.50
301–21	Same	Same	16.38	3.97	7.50
			16.50	4.50	7.50
301–21	Same	Same	14.81	3.81	7.92
			16.50	4.50	7.50
301–21	Same	Same	15.75	5.11	6.55
			16.50	4.50	7.50

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
1028–21	Shepherdsville Roll. Mills Shepherdsville.	Pure wheat bran.....	
1028–22	Roszell Bros..... Lexington.	Same	High in fiber.
3624–21	Mfrs. Warehouse	Wheat bran	Unground wheat screenings present. Below guaranty in protein. High in fiber.
3148–21	Henry Paris..... Marion.	Winter wheat	Sample is mixed feed from wheat bran, wheat middlings, corn bran, and unground wheat screenings.
3384–22	Fain & Lee..... Murray.	Soft wheat bran, ground wheat screenings 8%	
.....	R. D. Robertson..... Mayfield.	Wheat bran	Not labeled according to law.
3481–21	Big Blaine Produce Co... Blaine.	Wheat bran, ground wheat screenings 12%	Ground weed seeds present. Below guaranty in fat.
1979–20	Mfrs. Warehouse	Wheat bran	Sample composed of wheat bran and wheat middlings.
1424–20	E. M. Ford & Sons..... Cave City.	Same	Corn meal present.
3497–21	L. L. Roberts..... Dawson Springs.	Wheat bran, ground wheat screenings 2%	
3256–21	Mfrs. Warehouse	Wheat bran	Corn cockle present.
25–21	Paducah Elev. & Bonded Warehouse, Paducah....	Wheat bran, ground wheat screenings 2%	
979–21	Covington Bros. ..... Murray.	Wheat bran, ground wheat screenings 5%	
4280–22	Bradley Bros. ..... Paducah.	Wheat bran, ground wheat screenings 8%	Unground wheat screenings present
4609–22	Mfrs. Warehouse	Wheat bran	
301–20	Harvey Stout ..... Fern Creek.	Wheat middlings, ground wheat screenings 5%	
301–20	George P. Taylor Co.... Burnside.	Same	
301–21	N. D. Tabor..... Olive Hill.	Same	Below guaranty in fat.
301–21	United Supply Co..... Lynch.	Same	Excess of ground wheat bran. Below guaranty in protein and fat. Hight in fiber.
301–21	W. T. Sistrunk & Co.... Lexington.	Same	Below guaranty in protein.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
301–22	Acme Middlings and Screenings..	Acme-Evans Milling Co.	16.50	4.66	7.67
		Indianapolis, Ind.	**16.50**	**4.50**	**7.50**
301–22	Same	Same	16.25	4.17	8.93
			16.50	**4.50**	**7.50**
1973–22	Pure Wheat Shorts.....	The Acme Mills.....	16.75	4.83	6.35
		Hopkinsville, Ky.	**16.50**	**5.00**	**7.09**
2680–21	A-1 Trojan Farm Feed.....	The Allen & Wheeler Co.	16.00	5.13	7.20
		Troy, Ohio.	**16.00**	**4.00**	**6.00**
742–22	Trojan Middlings and Screenings.	Same	16.50	4.69	7.20
			16.00	**4.00**	**6.00**
742–22	Same	Same	15.63	5.17	9.08
			16.00	**4.00**	**6.00**
1005–18	William Tell Middlings and Screenings	The Ansted & Burk Co.	16.69	4.15	6.86
		Springfield, Ohio	**14.50**	**4.00**	**7.50**
1352–20	Wheat Middlings and Screenings.	Same	16.13	4.61	5.69
			16.25	**4.00**	**5.75**
3663–21	Wheat Grey Shorts and Scourings.	Arnold-Madaus Milling Co. ...	13.63	4.52	5.98
		Sterling, Kans.	**16.00**	**3.50**	**5.50**
3663–21	Same	Same	16.63	4.27	4.38
			16.00	**3.50**	**5.50**
3663–21	Same	Same	18.13	5.27	6.55
			16.00	**3.50**	**5.50**
2753–21	Beech Nut Standard Middlings and Screenings	Ashland Trading Co.	16.25	4.55	7.53
		Ashland, Ky.	**16.25**	**4.35**	**7.40**
1648–20	Aubrey's Middlings and Screenings	Aubrey & Co.	18.88	4.95	7.63
		Louisville, Ky.	**16.00**	**3.90**	**7.50**
1648–20	Same	Same	19.50	4.66	7.40
			16.00	**3.90**	**7.50**
.....	Same	Same	15.25	6.41	9.98
749–22	Shorts	The Auburn Mills.....	16.63	4.94	5.93
		Auburn, Ky.	**16.25**	**4.50**	**6.50**
3618–21	Pacer Shorts and Screenings.....	Aviston Milling Co.	15.00	3.79	10.00
		Aviston, Ill.	**16.00**	**3.50**	**7.50**
3618–22	Same	Same	15.63	5.53	8.40
			16.00	**3.50**	**7.50**
3639–21	Aviston Gray Middlings.....	Same	17.63	6.30	7.37
			16.00	**3.50**	**7.50**
3639–21	Same	Same	17.50	4.23	6.80
			16.00	**3.50**	**7.50**
547–19	Wheat Middlings and Screenings.	J. J. Badenoch Co.....	17.00	5.56	7.80
		Chicago, Ill.	**15.00**	**5.00**	**9.50**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
301–22	Cole, Hughes & Co. ..... Barbourville.	Wheat middlings, ground wheat screenings 5%	
301–22	John L. Hosman..... Morganfield.	Same	Excess of ground wheat bran. Ground wheat screenings with cheat and chaff present. Above guaranty in fiber.
1973–22	Trigg Co. F. & Pro. Co.. Cadiz.	Wheat shorts	
2680–21	The H. T. Hackney Co. .. Middlesboro.	Wheat middlings, ground wheat screenings 3%	High in fiber.
742–22	Borders & Fannin..... Catlettsburg.	Same	
742–22	Bell Grocery Co. ..... Pineville.	Same	Excess of ground wheat bran. Below guaranty in protein and above in fiber.
1005–18	J. W. Ramey..... Russell.	Wheat middlings, ground wheat screenings 2%	
1352–20	Leslie Bailey..... Corinth.	Same	
3663–21	Bradley Bros..... Paducah.	Wheat shorts, wheat scourings 8%	Below guaranty in protein.
3663–21	W. C. Keller..... Clarkson.	Same	
3663–21	Bradley Bros. ..... Paducah.	Same	Above guaranty in fiber.
2753–21	Miller-Elam Co. ..... Ashland.	Wheat middlings, ground wheat screenings 3%	Excess of ground wheat bran. Corn product and ground weed seeds present. Above guaranty in fiber.
1648–20	The Riverside Co. ..... Beattyville.	Wheat middlings, ground wheat screenings 3%	
1648–20	Sam Nahm & Co. ..... Bowling Green.	Same	
.....	L. Rains ..... Beaver Dam.	Wheat Middlings	Not registered and labeled according to law.
749–22	Same	Wheat	
3618–21	Williams Feed Co. ..... Pikeville.	Wheat shorts, ground wheat screenings 8%	Adulterated with ground wheat bran. Below guaranty in protein and high in fiber.
3618–22	Ky. Feed & Seed Co..... Middlesboro.	Same	Excess of ground wheat bran present. Above guaranty in fiber.
3639–21	Lanham-Terrell Gro. Co... Corbin.	Same	
3639–21	Stagg Bros. Co..... Vanceburg.	Same	
547–19	Williams Feed Co. ..... Pikeville.	Wheat middlings, ground wheat screenings 5%	Ground weed seeds present.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
638–21	Ballard's Kentucky Farm Feed and Screenings	Ballard & Ballard Co. Louisville, Ky.	16.00 **16.00**	3.59 **4.00**	5.70 **6.50**
638–21	Same	Same	16.63 **16.00**	4.17 **4.00**	6.15 **6.50**
638–22	Same	Same	15.13 **16.00**	4.25 **4.00**	6.75 **6.50**
638–22	Same	Same	15.88 **16.00**	3.72 **4.00**	6.43 **6.50**
3019–21	Flour Middlings	Cecilian Milling Co. Cecilia, Ky.	15.00 **16.00**	3.22 **3.50**	1.99 **3.50**
3019–22	Same	Same	13.50 **16.50**	2.46 **3.50**	1.55 **3.50**
2435–17	Shorts	Cedar Hill Roller Mills. Cedar Hill, Tenn.	13.69 **16.00**	4.03 **3.80**	6.68 **8.50**
429–21	Wheat Middlings	Cincinnati Grain & Hay Co. Covington, Ky.	18.50 **16.00**	5.68 **3.50**	6.90 **7.50**
429–21	Same	Same	17.25 **16.00**	5.23 **3.50**	7.18 **7.50**
429–22	Same	Same	16.38 **16.00**	5.07 **3.50**	6.63 **7.50**
429–22	Same	Same	15.63 **16.00**	5.66 **3.50**	8.60 **7.50**
796–21	Shorts	Climax Roller Mills. Shelbyville, Ky.	13.38 **16.41**	4.05 **4.44**	5.50 **7.50**
1534–21	Wheat Middlings and Screenings	The Colton Bros. Co. Bellefontaine, Ohio.	16.38 **16.00**	4.83 **4.50**	6.65 **6.00**
2883–18	Wheat Shorts and Screenings	The Consolidated Flour Mill Co. Hutchinson, Kans.	20.06 **16.00**	4.45 **3.50**	5.20 **8.00**
4150–22	Wheat Middlings and Screenings	Dean Mill Co. Ava, Ill.	15.88 **16.00**	3.98 **3.50**	5.51 **7.50**
.....	Wheat Shorts	M. E. Derryberry Co. Nashville, Tenn.	17.13	4.64	5.40
356–21	Wheat Middlings and Screenings	Diamond Mills Evansville, Ind.	17.00 **16.00**	4.18 **5.00**	9.70 **7.50**
356–22	Same	Same	14.50 **16.00**	3.90 **5.00**	10.38 **7.50**
2060–21	Grey Shorts and Screenings	Same	15.56 **16.00**	3.59 **5.00**	9.05 **7.50**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
638–21	Grigsby & Co. ..... Bardstown.	Grey shorts, cleaned and ground wheat screenings 4½%	
638–21	Foley Bros. ..... Pewee Valley.	Same	
638–22	J. S. Jones..... West Point.	Same	Below guaranty in protein.
638–22	Elkhorn Coal Co. ..... Fleming.	Same	
3019–21	W. C. Keller..... Clarkson.	Flour middlings	Below guaranty in protein.
3019–22	Keller Bros. ..... Clarkson.	Same	Below guaranty in protein and fat.
2435–17	Clarence Howard ..... Russellville.	Wheat, bran, wheat middlings, corn bran, unground wheat screenings 5%.	Wheat bran and wheat screenings present. Below guaranty in protein.
429–21	Edgar Cochran Co..... West Liberty.	Wheat middlings	Ground wheat screenings containing cheat and weed seeds, present.
429–21	R. P. Coffman..... Walton.	Same	Ground wheat screenings present.
429–22	Mfrs. Warehouse	Same	
429–22	Same	Same	Adulterated with ground wheat bran and ground wheat screenings. Below guaranty in protein and above in fiber.
796–21	R. A. Newton & Co. .... Shelbyville.	Wheat shorts	Ground wheat screenings and corn meal present.
1534–21	The Arcade Store..... Barbourville.	Wheat middlings, ground wheat screenings 4%	
2883–18	J. K. Butcher & Co. .... Paintsville.	Wheat shorts, ground wheat screenings 8%	
4150–22	Fulton Mill Co. ..... Fulton.	Wheat middlings, ground wheat screenings 5%	
.....	Henderson & Hackney... Oakland.	Wheat shorts	Contains ground wheat screenings. Not registered and labeled. Sold in violation of the law.
356–21	W. B. Davis Coal & Feed Store, Princeton	Wheat middlings, ground wheat screenings 5%	Adulterated with wheat bran. Excess of fiber.
356–22	Yates & Fowler..... Madisonville.	Same	Adulterated with ground wheat bran.
2060–21	Hulen-Toops Co. ..... Bowling Green.	Wheat shorts, ground wheat screenings 4%	Adulterated with ground wheat bran. Below guaranty in protein and fat and above in fiber.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
2060–22	Grey Shorts and Screenings.....	Diamond Mills	17.13	4.65	7.35
		Evansville, Ind.	**16.00**	**5.00**	**7.50**
2060–22	Same	Same	15.13	4.25	7.45
			16.00	**5.00**	**7.50**
868–21	Middlings	Dunlop Milling Co.	15.69	4.30	7.30
		Clarksville, Tenn.	**16.00**	**4.25**	**6.80**
868–21	Same	Same	15.13	4.51	8.33
			16.00	**4.25**	**6.80**
868–21	Same	Same	15.88	4.08	8.00
			16.00	**4.25**	**6.80**
868–21	Same	Same	16.63	4.48	6.65
			16.00	**4.25**	**6.80**
868–22	Same	Same	15.31	4.51	6.70
			16.00	**4.25**	**6.80**
868–22	Same	Same	15.06	4.42	7.80
			16.00	**4.25**	**6.80**
868–22	Same	Same	14.75	4.62	7.38
			16.00	**4.25**	**6.80**
1093–21	Wheat Middlings and Screenings..	Edinger & Co.	17.75	3.89	9.70
		Louisville	**16.00**	**4.00**	**7.50**
1093–21	Same	Same	17.50	4.20	7.55
			16.00	**4.00**	**7.50**
1093–21	Same	Same	17.13	4.58	7.95
			16.00	**4.00**	**7.50**
1093–22	Same	Same	18.50	4.56	7.23
			16.00	**4.00**	**7.50**
1093–22	Same	Same	16.13	6.09	7.83
			16.00	**4.00**	**7.50**
1093–22	Same	Same	17.00	6.11	8.93
			16.00	**4.00**	**7.50**
1093–22	Same	Same	15.50	6.49	9.25
			16.00	**4.00**	**7.50**
243–20	"We Kno" Wheat Shorts and Screenings	Oscar Farmer & Sons.....	20.25	6.07	5.61
		Louisville, Ky.	**16.00**	**4.00**	**7.50**
243–20	Same	Same	16.75	5.24	9.50
			16.00	**4.00**	**7.50**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
2060–22	Rea & Rice..... Earlington.	Wheat shorts, ground wheat screenings 4%.....	
2060–22	John L. Hosman..... Morganfield.	Same	Below guaranty in protein.
868–21	J. V. Morrow..... Adairville.	Pure wheat middlings.....	Excess of ground bran. Low in protein and high in fiber.
868–21	L. D. McCarley & Co. ... Auburn.	Same	Excess of ground wheat bran. Ground wheat screenings present. Below guaranty in protein and above in fiber.
868–21	J. V. Morrow..... Adairville.	Same	Excess of ground wheat bran. Below guaranty in protein and above in fiber.
868–21	W. L. Kimbrough & Son. Guthrie, Ky.	Same	
868–22	Summerville Bros. ..... Lewisburg.	Same	Ground wheat screenings containing cheat, present. Below guaranty in protein.
868–22	W. L. Kimbrough & Son. Guthrie.	Same	Excess of ground wheat bran. Ground wheat screenings present. Below guaranty in protein and above in fiber.
868–22	R. A. Williams & Son... Trenton.	Same	Below guaranty in protein.
1093–21	Amer. Coal & Feed Co... Louisville.	Wheat middlings, ground wheat screenings 3%	Adulterated with ground wheat bran. High in fiber.
1093–21	Foley Bros. ..... Pewee Valley.	Same	
1093–21	W. F. Casteel..... Cecilia.	Same	
1093–22	Shelbyville Feed & Produce Co., Shelbyville..	Same	
1093–22	J. H. Williams..... London.	Same	Excess of ground wheat bran.
1093–22	Shelbyville Feed & Produce Co., Shelbyville..	Same	Excess of ground wheat bran. Above guaranty in fiber.
1093–22	Allen Co. Farm Bureau.. Scottsville.	Same	Excess of ground wheat bran. Below guaranty in protein and high in fiber.
243–20	W. W. Shadburn..... Louisville.	Wheat shorts, ground wheat screenings 3%	Adulterated with ground wheat bran. Screenings contain weed seeds.
243–20	Same	Same	

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
3895–22	Lucky Hard Wheat Middlings and Screenings	Federal Mill & Elevator Co. Lockport, N. Y.	18.13 **16.50**	4.72 **5.00**	6.60 **7.50**
3682–21	Grey Wheat Shorts	J. H. Fedders & Sons Covington, Ky.	14.63 **18.69**	2.82 **4.35**	0.83 **5.03**
2046–21	Wheat Middlings	Same	16.63 **16.00**	4.43 **3.50**	5.93 **7.50**
2046–21	Same	Same	18.25 **16.00**	4.27 **3.50**	4.85 **7.50**
2046–21	Same	Same	18.69 **16.00**	4.43 **3.50**	5.05 **7.50**
2046–21	Same	Same	17.25 **16.00**	4.68 **3.50**	6.58 **7.50**
2046–21	Same	Same	16.75 **16.00**	4.89 **3.50**	6.60 **7.50**
2046–22	Same	Same	17.50 **16.00**	4.77 **3.50**	7.45 **7.50**
2046–23	Same	Same	15.63 **16.00**	5.55 **3.50**	5.70 **7.50**
2046–23	Same	Same	15.75 **16.00**	5.45 **3.50**	7.75 **7.50**
2046–23	Same	Same	15.88 **16.00**	5.67 **3.50**	6.88 **7.50**
2046–23	Same	Same	14.19 **16.00**	6.31 **3.50**	10.28 **7.50**
4179–22	Wheat Middlings and Screenings	Ferger Bros. Cincinnati, Ohio	15.25 **16.00**	5.21 **3.50**	8.70 **7.50**
4179–22	Same	Same	16.25 **16.00**	5.02 **3.50**	7.58 **7.50**
4179–22	Same	Same	17.50 **16.00**	4.42 **3.50**	6.78 **7.50**
1662–22	Cracker Jack Wheat Shorts	Ferncliff Feed & Grain Co. Louisville, Ky.	18.38 **16.00**	5.58 **4.00**	6.68 **7.00**
1662–22	Same	Same	16.50 **16.00**	4.00 **4.00**	7.35 **7.00**
1662–22	Same	Same	15.88 **16.00**	4.65 **4.00**	5.79 **7.00**
1662–22	Same	Same	16.75 **16.00**	4.02 **4.00**	7.20 **7.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
3895–22	Louisa Flour & Feed Co. Louisa.	Hard wheat middlings, ground wheat screenings 10%	
3682–21	Boone Co. Farm Bureau. Burlington.	Wheat shorts (only)	Low grade flour—not grey shorts. Below guaranty in protein and fat.
2046–21	Henry Kollman Latonia.	Wheat middlings	
2046–21	Henry Deters Covington.	Same	
2046–21	Harry Hartke Covington.	Same	
2046–21	E. L. Webster Walton.	Same	Ground wheat screenings present.
2046–21	G. C. Rothmann Independence.	Same	
2046–22	Boone Co. Farm Bureau. Florence.	Same	
2046–23	H. Rollmann Covington.	Same	Ground wheat screenings containing weed seeds, present.
2046–23	Boone Co. Farm Bureau. Florence.	Same	Made from Durum wheat.
2046–23	Same	Same	Made from Durum wheat. Ground wheat screenings containing ground weed seeds, present.
2046–23	Mrs. Katherine Steenken Covington.	Same	Durum wheat middlings with excess of ground bran. Ground wheat screenings and ground weed seeds present. Below guaranty.
4179–22	Staggs Bros. Co. Vanceburg.	Wheat middlings, ground wheat screenings 11%	Adulterated with ground wheat bran. Below guaranty in protein and above in fiber.
4179–22	Frost & Duvall Lexington.	Same	
4179–22	J. F. Bertram Vanceburg.	Same	
1662–22	G. G. Wood & Co. Carrollton.	Wheat shorts	
1662–22	Ewing & Gray Eminence.	Same	
1662–22	F. P. Spoonamore Stanford.	Same	
1662–22	S. P. Greenwade Mt. Sterling.	Same	

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
1662–22	Cracker Jack Wheat Shorts.....	Ferncliff Feed & Grain Co..... Louisville, Ky.	16.88	5.88	5.83
			16.00	**4.00**	**7.00**
1662–22	Same	Same	15.38	5.67	7.43
			16.00	**4.00**	**7.00**
1662–23	Same	Same	16.13	5.90	7.10
			16.00	**4.00**	**7.00**
3641–22	Wheat Shorts and Screenings ...	Henry Fruechtenicht ..... Louisville	17.38	5.47	8.63
			16.00	**4.00**	**7.00**
3641–21	Same	Fuhrer Ford Milling Co..... Mt. Vernon, Ind.	15.63	4.28	6.00
			16.00	**4.75**	**6.00**
3641–22	Same	Same	15.00	4.65	5.75
			16.00	**4.75**	**6.00**
3641–22	Same	Same	16.00	4.82	5.58
			16.00	**4.75**	**6.00**
2863–21	Wheat Gray Shorts, Low Grade Flour, Wheat Bran and Screenings	General Commission Co..... Kansas City, Mo.	17.56	4.32	6.98
			15.50	**3.50**	**8.50**
2863–22	Same	Same	16.44	3.86	6.55
			15.50	**3.50**	**8.50**
4434–22	White Wheat Shorts.....	Same	17.00	3.52	5.55
			16.00	**3.50**	**6.50**
1484–21	Spring Wheat Shorts and Screenings	Edward F. Goeke Co..... Evansville, Ind.	16.00	4.55	6.77
			16.00	**4.50**	**7.50**
1484–22	Same	Same	16.94	5.31	9.90
			16.00	**4.50**	**7.50**
2815–21	Wheat Shorts	Gordonsville Milling Co..... Gordonsville, Ky.	16.06	4.74	5.95
			16.50	**5.00**	**7.50**
2815–22	Same	Same	16.50	4.66	4.70
			16.50	**5.00**	**7.50**
2815–22	Same	Same	16.50	5.78	5.75
			16.50	**5.00**	**7.50**
4524–22	Grafton Wheat Middlings and Screenings	The Grafton Flour Milling & Grain Elev. Co., Grafton, O.	16.69	5.03	6.25
			16.50	**5.00**	**7.50**
1316–21	Wheat Middlings and Screenings..	Gwinn Bros. & Co..... Huntington, W. Va.	13.13	5.50	6.77
			16.00	**4.00**	**7.50**
1316–21	Same	Same	16.63	5.60	6.90
			16.00	**4.00**	**7.50**
1316–21	Same	Same	13.94	5.46	7.08
			16.00	**4.00**	**7.50**
1316–21	Same	Same	17.69	5.00	8.32
			16.00	**4.00**	**7.50**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
1662–22	Whitesburg Ice & Feed Co., Whitesburg.	Wheat shorts	
1662–22	J. W. Tolliver, Fleming.	Same	Considerable oat product and ground weed seeds present.
1662–23	J. A. Holbrook, Whitesburg.	Same	Ground weed seeds present.
1425–21	M. Pennington, E. Bernstadt.	Wheat middlings, ground wheat screenings 3%	Excess of ground wheat bran. Above guaranty in fiber.
3641–21	Fred H. Vogel, Henderson.	Wheat shorts, ground wheat screenings 5%	Below guaranty in protein.
3641–22	Franklin Elevator & Warehouse Co., Franklin.	Same	Below guaranty in protein.
3641–22	F. H. Vogel, Henderson.	Same	
2863–21	H. P. Hawkins' Sons, Paducah.	Wheat gray shorts, low grade flour, wheat bran, ground wheat screenings 8%.	
2863–22	Dunmor Roller Mills, Dunmor.	Same	No low grade flour present.
4434–22	Edwin C. Hawkins, Paducah.	White wheat shorts, ground wheat screenings 8%	
1484–21	Summerville Bros. Lewisburg.	Spring wheat shorts, ground wheat screenings 3%	
1484–22	Weaverton Milling Co., Henderson.	Same	Adulterated with ground wheat bran. Above guaranty in fiber.
2815–21	J. W. McGehee, Cleaton.	Wheat shorts	
2815–22	C. S. Lyne, Jr., Russellville.	Same	
2815–22	Mfrs. Warehouse	Same	
4524–22	Denues & Cobern Olive Hill.	Wheat middlings, ground wheat screenings 4%	
1316–21	Nunnery & Smith, Prestonsburg.	Wheat middlings, ground wheat screenings 2%	Adulterated with corn product. Below guaranty in protein. Inferior to guaranty.
1316–21	Kentucky Wholesale Co. Pikeville.	Same	
1316–21	H. H. Borders, Catlettsburg.	Wheat middlings, ground wheat ings 2%	Contains corn bran. Below guaranty in protein.
1316–21	The Consolidation Coal Co., Van Lear.	Same	Adulterated with ground wheat bran. Above guaranty in fiber.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
1316–21	Wheat Middlings and Screenings.	Gwinn Bros. & Co.	14.38	5.93	7.40
		Huntington, W. Va.	**16.00**	**4.00**	**7.50**
1316–21	Same	Same	17.38	4.46	8.30
			16.00	**4.00**	**7.50**
1316–21	Same	Same	16.25	6.20	8.23
			16.00	**4.00**	**7.50**
3488–22	Harsha Middlings	P. H. Harsha	16.63	4.59	6.40
		Portsmouth, Ohio.	**16.00**	**3.50**	**7.50**
4251–22	Gray Shorts	Edwin C. Hawkins	16.25	4.13	6.71
		Paducah, Ky.	**16.00**	**3.50**	**7.00**
4251–22	Same	Same	16.50	3.82	5.50
			16.00	**3.50**	**7.00**
4251–22	Same	Same	17.50	4.91	5.30
			16.00	**3.50**	**7.00**
4293–22	Shorts	Hickman Milling & Feed Co.	14.50	2.87	2.75
		Hickman, Ky.	**14.50**	**2.87**	**2.75**
4293–22	Same	Same	15.38	4.26	4.05
			14.50	**2.87**	**2.75**
3531–21	Canary Brand Shorts and Screenings	Chas. A. Hill & Co.	20.13	5.23	5.65
		Nashville, Tenn.	**16.00**	**4.50**	**7.00**
760–21	Middlings and Screenings	Hopkinsville Milling Co.	16.00	4.33	8.20
		Hopkinsville, Ky.	**16.00**	**3.83**	**7.05**
760–22	Same	Same	17.00	4.12	8.13
			16.00	**3.83**	**7.05**
760–22	Same	Same	15.50	4.79	8.35
			16.00	**3.83**	**7.05**
.....	Wheat Middlings and Screenings	Hubbard Milling Co.	16.75	5.34	10.08
		Mankato, Minn.			
505–21	Pure Wheat Middlings	Igleheart Bros.	17.06	4.24	6.99
		Evansville, Ind.	**16.00**	**5.00**	**7.00**
505–21	Same	Same	16.38	4.02	7.37
			16.00	**5.00**	**7.00**
505–22	Same	Same	16.25	4.51	6.83
			16.00	**5.00**	**7.00**
505–22	Same	Same	16.00	4.04	6.68
			16.00	**5.00**	**7.00**
505–22	Same	Same	16.63	4.13	7.17
			16.00	**5.00**	**7.00**
505–22	Same	Same	15.19	3.27	8.23
			16.00	**5.00**	**7.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
1316–21	Mullins & Jackson..... Praise.	Wheat middlings, ground wheat screenings 2%.....	Corn bran present. Below guaranty in protein.
1316–21	Pikeville Grocery Co. ... Pikeville.	Same	Excess of ground wheat bran.
1316–21	The Consolidation Coal Co., Van Lear.	Same	Sample is mixed wheat feed and screenings.
3488–22	F. M. Nelson..... Concord.	Wheat middlings	Wheat screenings present.
4251–22	Mfrs. Warehouse	Wheat shorts, ground wheat screenings 8%	
4251–22	W. B. Ray Feed Co..... Princeton.	Same	
4251–22	Mfrs. Warehouse	Same	
4293–22	Mfrs. Warehouse	Wheat shorts, wheat flour.....	
4293–22	C. A. Trusty..... Hickman.	Same	Above guaranty in fiber.
3531–21	Park City Feed Store... Bowling Green.	Winter wheat shorts, ground wheat screenings 7%	
760–21	Chaplin & Cowherd..... Cadiz.	Wheat middlings, ground wheat screenings 4%	Adulterated with ground wheat bran. Excess of fiber.
760–22	G. Frank Walthal..... Canton.	Same	Above guaranty in fiber.
760–22	Trigg Co. Feed & Produce Co., Cadiz.....	Same	Excess of ground wheat bran. Below guaranty in protein and above in fiber.
.....	United Supply Co..... Lynch.		Not registered and labeled according to law.
505–21	Lewisport Mill Co..... Lewisport.	Winter wheat middlings	Ground wheat screenings present.
505–21	Roszell Bros. ..... Lexington.	Same	Ground wheat screenings present. Below guaranty in fat.
505–22	Smullen & Son ..... Henderson.	Same	Ground wheat screenings present.
505–22	Henderson Feed & Commission Co., Henderson.	Same	Ground wheat screenings present. Below guaranty in fat.
505–22	Trent & Bruner..... Irvington.	Same	Ground wheat screenings present. Below guaranty in fat.
505–22	J. W. Green & Co..... Mayfield.	Same	Excess of ground wheat bran. Ground wheat screenings present.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
505–22	Pure Wheat Middlings.....	Igleheart Bros.	15.94	4.61	6.18
		Evansville, Ind.	**16.00**	**5.00**	**7.00**
.....	Blackhawk Standard Middlings..	International Milling Co.	15.00	5.35	7.72
		Minneapolis, Minn.			
1358–22	Gray Wheat Shorts and Screenings	Kansas Flour Mills Co.	19.88	4.41	6.50
		Kansas City, Mo.	**16.00**	**3.50**	**6.50**
488–21	Rex Middlings and Screenings....	Kehlor Flour Mills Co.	17.00	3.93	5.33
		St. Louis, Mo.	**16.00**	**4.00**	**7.00**
488–22	Rex Grey Hard Wheat Middlings and Screenings.....	Same	17.31	3.87	5.65
			16.00	**3.50**	**5.50**
2305–21	Fancy White Middlings.....	Keister Milling Co.	13.69	3.53	3.81
		Huntington, W. Va.	**16.00**	**5.00**	**4.00**
2305–21	Same	Same	**13.00**	**2.85**	3.54
			16.00	**5.00**	**4.00**
2305–21	Same	Same	**14.13**	4.32	3.68
			16.00	**5.00**	**4.00**
2305–21	Same	Same	13.38	2.55	4.13
			16.00	**5.00**	**4.00**
2305–21	Same	Same	15.50	3.23	3.70
			16.00	**5.00**	**4.00**
2305–21	Same	Same	15.88	3.60	4.85
			16.00	**5.00**	**4.00**
2305–21	Same	Same	14.25	3.62	4.10
			16.00	**5.00**	**4.00**
2305–22	Same	Same	15.25	4.33	5.65
			16.00	**5.00**	**4.00**
194–21	Middlings and Screenings.....	George Keller	16.50	3.74	4.93
		Newport, Ky.	**16.00**	**3.50**	**7.50**
194–21	Same	Same	17.50	4.32	5.10
			16.00	**3.50**	**7.50**
194–22	Same	Same	16.50	5.39	8.95
			16.50	**3.50**	**7.50**
194–22	Same	Same	16.00	5.12	8.60
			16.00	**3.50**	**7.50**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
505–22	G. E. Mansfield..... Madisonville.	Winter wheat middlings.....	
.....	Wheeler Grocery Co. ... Paintsville.	Wheat middlings	Contains excess of ground wheat bran. Ground wheat screenings present. Not labeled in accordance with law.
1358–22	Ritter-Hennings Co. .... Louisville.	Gray wheat shorts, ground wheat screenings 10%	
488–21	R. D. Robertson..... Mayfield.	Pure wheat middlings, ground wheat screenings 8%.....	
488–22	T. F. Hart..... Henderson.	Hard wheat middlings, ground wheat screenings 8%.....	
2305–21	Queen & Turner..... Ashland.	Wheat middlings, low grade flour	Ground wheat screenings and weed seeds present. Below guaranty in protein. Inferior to guaranty.
2305–21	Berry Bros. ..... Ashland.	Same	
2305–21	I. H. Fitzpatrick..... Prestonsburg.	Same	Adulterated with rice bran and hulls. Below guaranty in protein.
2305–21	Burnam Roberts ..... Louisa.	Same	Contains ground screenings and weed seeds. Below guaranty in protein and fat.
2305–21	Paintsville Grocery Co. . Paintsville.	Same	Contains ground wheat screenings. Low in protein.
2305–21	Pikeville Grocery Co. ... Pikeville.	Same	Contains ground wheat screenings. Below guaranty in protein and above in fiber.
2305–21	Nunnery & Smith..... Prestonsburg.	Same	Ground wheat screenings and weed seeds present. Below guaranty in protein and fat.
2305–22	Pure Food Grocery..... Prestonsburg.	Same	Contains ground wheat bran. Below guaranty in protein and above in fiber.
194–21	Fred Schuerman ..... Newport.	Wheat middlings, ground wheat screenings 10%	
194–21	Mrs. Young & Son..... Ft. Thomas.	Same	Excess of ground wheat bran.
194–22	Consolidated Coal Co. ... McRoberts, Ky.	Same	Excess of ground wheat bran. Above guaranty in fiber.
194–22	Mfrs. Warehouse	Same	

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
194–22	Middlings and Screenings.....	George Keller	15.00	5.34	9.03
		Newport, Ky.	**16.00**	**3.50**	**7.50**
1334–21	Wheat Middlings	The Kenton Hay & Grain Co. ..	17.00	4.25	8.60
		Latonia, Ky.	**16.00**	**4.25**	**6.00**
1334–21	Same	Same	15.75	5.61	8.30
			16.00	**4.25**	**6.00**
1572–21	Success Middlings	Kentucky Feed & Grain Co. ..	17.31	4.56	5.75
		Louisville, Ky.	**16.00**	**4.50**	**6.00**
1572–21	Same	Same	16.69	5.94	6.70
			16.00	**4.50**	**6.00**
1572–21	Same	Same	17.75	6.48	6.78
			16.00	**4.50**	**6.00**
1572–22	Same	Same	15.25	6.48	10.20
			16.00	**4.50**	**6.00**
937–19	Pure Wheat Middlings.....	R. U. Kevil & Sons	14.75	3.03	1.55
		Princeton, Ky.	**16.00**	**3.30**	**3.05**
4261–22	Wheat Middlings and Screenings..	Lambert Milling Co.	16.75	5.50	9.55
		Kenova, W. Va.	**16.00**	**4.50**	**7.50**
4261–22	Same	Same	16.25	5.38	8.48
			16.00	**4.50**	**7.50**
1393–19	Wheat Middlings	Latonia Hay & Grain Co.....	16.38	3.68	8.85
		Latonia, Ky.	**16.00**	**4.50**	**7.00**
1393–22	Same	Same	15.75	5.67	8.75
			17.63	**4.65**	**7.28**
1392–19	White Wheat Middlings.....	Same	14.00	2.75	0.65
			14.00	**3.70**	**1.00**
414–21	Snowflake Middlings	Lawrenceburg Roller Mills....	18.13	4.97	5.65
		Lawrenceburg, Ind.	**16.00**	**4.50**	**7.50**
1049–21	Wheat Shorts	The Larabee Flour Mills Corp..	20.00	5.50	5.00
		Kansas City, Mo.	**17.00**	**4.25**	**6.25**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
194–22	Millersburg Coal & Feed Co., Millersburg.....	Wheat middlings, ground wheat screenings 10%.....	Adulterated with ground wheat bran. Below guaranty in protein and above in fiber.
1334–21	Mfrs. Warehouse	Wheat middlings	Excess of ground wheat bran. Ground wheat screenings and weed seeds present.
1334–21	Same	Same	Adulterated with ground wheat bran and ground wheat screenings. Below guaranty in protein and above in fiber.
1572–21	Woosley & Son ..... Elizabethtown.	Wheat middlings	
1572–21	Shelbyville Feed & Produce Co., Shelbyville..	Same	
1572–21	J. E. Buck..... Stanford.	Same	
1572–22	Boston Flour Mills..... Boston.	Same	Adulterated with ground wheat bran. Ground wheat screenings present. Below guaranty in protein and above in fiber.
937–19	Mfrs. Warehouse	Same	Sample is low grade flour.
4261–22	Borders & Fannin..... Catlettsburg.	Wheat middlings, ground wheat screenings 8%	Adulterated with ground wheat bran and weed seeds. Above guaranty in fiber.
4261–22	Cash Grocery ..... Catlettsburg.	Same	Excess of wheat bran. Above guaranty in fiber.
1393–19	Mfrs. Warehouse	Wheat middlings	Excess of ground wheat bran.
1393–22	Same	Same	Adulterated with ground wheat bran and ground wheat screenings. Below guaranty in protein and above in fiber.
1392–19	Same	White wheat middlings.....	Sample is low grade flour.
414–21	Powell-Hackney Gro. Co. Hazard	Soft wheat middlings, ground wheat screenings 2%.....	Ground and unground wheat screenings present.
1049–21	J. H. Wyan ..... London.	Pure wheat shorts.....	

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
4159–22	Liberty Shorts	Liberty Mills, Nashville, Tenn.	15.75	4.22	4.75
			16.00	**3.50**	**6.00**
4123–22	White Cliff Wheat Middlings and Screenings	London Mill Co., London, Ohio.	16.06	4.38	6.15
			16.00	**3.50**	**7.00**
4123–22	Same	Same	14.13	3.74	4.50
			16.00	**3.50**	**7.00**
796–22	Shorts	S. M. Long & Sons, Shelbyville, Ky.	14.75	4.61	6.45
			16.41	**4.44**	**7.50**
796–22	Same	Same	13.50	4.04	8.28
			16.41	**4.44**	**7.50**
1029–21	"Sonny South" Wheat Shorts and Screenings	Louisville Milling Co., Louisville, Ky.	17.25	4.51	7.40
			16.00	**4.00**	**7.50**
1029–21	Same	Same	16.00	3.27	5.20
			16.00	**4.00**	**7.50**
1029–22	Same	Same	17.00	3.79	6.08
			16.00	**4.00**	**7.50**
1029–22	Same	Same	18.00	4.35	6.97
			16.00	**4.00**	**7.50**
1029–22	Same	Same	16.63	4.08	7.10
			16.00	**4.00**	**7.50**
1029–22	Same	Same	16.88	4.97	7.58
			16.00	**4.00**	**7.50**
1029–22	Same	Same	18.50	4.57	7.68
			16.00	**4.00**	**7.50**
1029–22	Same	Same	19.00	4.40	7.30
			16.00	**4.00**	**7.50**
1029–22	Same	Same	18.88	4.66	7.95
			16.00	**4.00**	**7.50**
1029–22	Same	Same	17.00	3.97	6.80
			16.00	**4.00**	**7.50**
1029–22	Same	Same	16.75	4.11	7.83
			16.00	**4.00**	**7.50**
1029–23	Same	Same	17.50	3.84	7.30
			16.00	**4.00**	**7.50**
3622–21	Wheat Shorts and Screenings	The J. C. Lysle Milling Co., Leavenworth, Kan.	16.63	3.77	6.38
			16.00	**4.50**	**5.50**
3622–21	Same	Same	17.38	4.20	6.33
			16.00	**4.50**	**5.50**
3599–21	Wheat Middlings	The Marion National Mill Co., Marion, Ohio	16.25	4.78	6.97
			16.00	**3.50**	**7.50**
3599–21	Same	Same	16.38	4.44	6.35
			16.00	**3.50**	**7.50**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
4159–22	Mayhew & Gilbert..... Franklin.	Pure wheat shorts.	
4123–22	Ashland Supply Co..... Ashland.	Wheat middlings, ground wheat screenings 5%	
4123–22	Louisa Flour & Feed Co. Louisa.	Same	Adulterated with wheat bran and corn meal. Below guaranty in protein.
796–22	Mfrs. Warehouse	Wheat shorts	Ground wheat screenings present. Below guaranty in protein.
796–22	Mfrs. Warehouse	Same	Adulterated with oat hulls and ground wheat screenings. Below guaranty in protein and above in fiber.
1029–21	London Grocery Co..... London.	Wheat shorts, ground wheat screenings 3%	
1029–21	A. Schneider & Sons.... Louisville.	Same	
1029–22	S. Adams & Son..... Torrent.	Same	
1029–22	Kentucky River Coal & Feed Co., Irvine.....	Same	
1029–22	Herndon-Carter Co..... Buechel.	Same	
1029–22	Harrell Bros..... Rockport.	Same	
1029–22	Roszell Bros. ..... Lexington.	Same	
1029–22	Coldstream Farm ..... Lexington.	Same	
1029-22	Dunmor Roller Mills.... Dunmor.	Same	
1029–22	Park City Milling Co.. Bowling Green.	Same	
1029–22	Citizens Milling Co..... Somerset.	Same	
1029–23	Amos Yeager ..... Louisville.	Same	
3622–21	The Eversole Co..... London.	Wheat shorts, ground wheat screenings 8%	Below guaranty in fat and higher in fiber.
3622–21	Bell Grocery Co..... Pineville.	Same	Coarse wheat bran present.
3599–21	Paintsville Grocery Co.. Paintsville.	Wheat middlings	
3599–21	Louisa Flour & Feed Co. Louisa.	Same	

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
3599–21	Wheat Middlings	The Marion National Mill Co...	17.88	5.04	5.40
		Marion, Ohio.	**16.00**	**3.50**	**7.50**
2464–20	Milroy Wheat Middlings and Screenings	Milroy Milling Co.	18.50	5.48	8.10
		Milroy, Ind.	**16.50**	**4.50**	**7.50**
2464–21	Same	Same	17.69	4.74	6.27
			16.50	**4.50**	**7.50**
3037–21	White Rose Shorts	Morganfield Roller Mills	15.25	3.54	2.15
		Morganfield, Ky.	**16.75**	**4.19**	**3.50**
3037–22	Same	Same	15.13	3.74	2.35
			16.75	**4.19**	**3.50**
3037–22	Same	Same	14.38	4.20	2.28
			16.75	**4.19**	**3.50**
3037–22	Same	Same	14.38	3.86	2.07
			16.75	**4.19**	**3.50**
4636–22	Wheat Middlings	Murray Milling Co.	17.00	4.50	3.80
		Murray, Ky.	**16.45**	**5.23**	**6.40**
412–19	Wheat Middlings and Screenings..	National Feed Co.	16.88	3.97	7.50
		St. Louis, Mo.	**16.00**	**4.00**	**7.50**
412–19	Same	Same	15.38	6.44	9.03
			16.00	**4.00**	**7.50**
.....	Middlings	New Prague Flour Mill	17.50	4.89	7.29
		New Prague, Minn.			
141–21	Nutritia Winter Wheat Middlings and Screenings	The Nutritia Co.	17.25	5.41	6.97
		Cincinnati, Ohio	**16.00**	**3.50**	**7.50**
141–21	Same	Same	16.69	5.87	8.40
			16.00	**3.50**	**7.50**
141–21	Same	Same	17.63	5.12	9.73
			16.00	**3.50**	**7.50**
1888–21	Omilco Soft Winter Wheat Shorts	Same	14.63	2.91	1.80
			15.50	**3.07**	**2.70**
3314–21	Grey Shorts and Screenings	Same	15.63	4.28	6.25
			16.00	**4.60**	**6.10**
1156–22	Wheat Shorts and Screenings	Phoenix Flour Mill	15.50	4.79	6.54
		Evansville, Ind.	**16.00**	**4.00**	**7.50**
607–19	Wheat Middlings and Screenings..	Geo. P. Plant Milling Co.	17.50	4.88	6.83
		St. Louis, Mo.	**17.00**	**4.00**	**6.50**
3355–22	"Circle P" Wheat Middlings	Same	18.75	3.26	6.23
			17.00	**4.00**	**6.50**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
3599–21	Louisa Flour & Feed Co. Louisa.	Wheat middlings	
2464–20	A. A. Clay & Sons..... Indian Fields.	Wheat middlings, ground wheat screenings 10%	Excess of ground wheat bran. Ground wheat screenings present.
2464–21	Consolidated Grocery Co. Olive Hill.	Same	
3037–21	Mfrs. Warehouse	Wheat shorts	Below guaranty in protein. Contains low grade flour.
3037–22	R. W. Willingham ..... Henderson.	Same	Below guaranty in protein and fat. Sample is low grade flour.
3037–22	Mfrs. Warehouse	Same	Below guaranty in protein. Sample is low grade flour.
3037–22	H. C. Penticost..... Corydon.	Same	Below guaranty in protein and fat. Contains low grade flour.
4636–22	Mfrs. Warehouse	Wheat middlings	
412–19	Park Feed Co..... Paducah.	Wheat middlings, ground wheat screenings 5%	
412–19	Sweeney & Baxter..... Lawrenceburg.	Same	Adulterated with finely ground wheat bran. Some cockle present. Below guaranty in protein, high in fiber.
.....	R. D. Robertson..... Mayfield.	Wheat middlings	Contains screening and weed seeds. Not labeled according to law.
141–21	H. E. Kidd..... Stearns.	Wheat middlings, ground wheat screenings 3%	
141–21	J. H. Johnson..... Jackson.	Same	Excess of ground wheat bran.
141–21	E. S. Willett & Co..... Maysville.	Same	Adulterated with ground wheat bran.
1888–21	Mfrs. Warehouse	Soft winter wheat shorts.....	Sample is largely wheat flour. Lower in protein than guaranty.
3314–21	Mfrs. Warehouse	Grey shorts, ground wheat screenings 5%	Below guaranty in protein.
1156–22	Midget Milling Co..... Providence.	Wheat shorts, ground wheat screenings 4½%.....	Below guarantee in protein.
607–19	Franklin Elevator & Warehouse Co., Franklin.	Wheat middlings, ground wheat screenings 8%	
3355–22	Covington Bros. & Co.. Murray.	Wheat middlings	Below guaranty in fat.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
3355–22	"Circle P" Wheat Middlings....	Geo. P. Plant Milling Co.....	18.63	3.96	6.85
		St. Louis, Mo.	17.00	4.00	6.50
2860–22	Ideal White Middlings.....	R. C. Poage Milling Co.....	16.00	3.66	4.54
		Ashland, Ky.	16.63	4.90	6.50
4258–22	Randolph Shorts and Screenings..	Randolph Milling Co.....	18.00	5.44	5.08
		Baldwin, Ill.	17.40	4.90	6.00
4279–22	Middlings	Reichert Milling Co.....	16.75	5.02	5.30
		Freeburg, Ill.	16.00	4.00	2.85
1145–21	Alta Middlings	Russell-Miller Milling Co.....	15.63	4.43	10.72
		Minneapolis, Minn.	16.00	4.50	7.50
1145–21	Same	Same	17.88	6.40	7.65
			16.00	4.50	7.50
1145–21	Same	Same	18.13	5.97	7.14
			16.00	4.50	7.50
1145–21	Same	Same	17.31	6.50	6.30
			16.00	4.50	7.50
3496–21	Choice Wheat Middlings.....	Saxony Mills	17.63	4.55	6.25
		St. Louis, Mo.	16.00	4.00	6.00
3750–21	Sunbeam Pure Soft Wheat Middlings and Screenings.....	Schultz-Baujan Co.....	17.38	5.03	7.10
		Beardstown, Ill.	16.00	3.50	7.50
549–21	Economy Wheat Shorts and Screenings	Southern Seed Co.....	17.06	4.24	7.54
		Louisville, Ky.	16.00	4.00	6.00
4465–22	Wheat Middlings and Shorts....	Sparks Milling Co.....	17.88	3.74	4.05
		Alton, Ill.	16.00	4.00	7.50
3758–21	Wheat Middlings	Staggs Bros. Co.....	18.00	5.57	7.67
		Vanceburg, Ky.	16.00	5.00	7.50
2696–20	Wheat Shorts	Stafford Milling Co.....	15.75	3.99	5.23
		Martin, Tenn.	17.11	4.41	5.18
4575–22	Wheat Middlings and Screenings..	G. W. Stamper & Co.....	17.00	5.63	6.13
		Vanceburg, Ky.	16.65	4.55	7.10
3874–21	White Wheat Shorts.....	Standard Roller Mills.....	17.00	5.15	3.84
		Cerulean, Ky.	17.00	5.15	3.84
980–21	Stanard-Tilton Milling Company's Wheat Middlings and Screenings	Stanard-Tilton Milling Co.	17.50	4.38	6.50
		Alton, Ill.	16.00	4.00	6.00
980–21	Same	Same	17.50	4.63	6.05
			16.00	4.00	6.00
1834–22	Wheat Shorts	Star Milling Co.....	17.50	7.05	4.43
		Clinton, Ky.	16.50	4.75	7.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
3355–22	F. M. Holcomb & Son... Murray.	Wheat middlings	
2860–22	Mfrs. Warehouse	Wheat middlings, low grade flour	Below guaranty in protein and fat.
4258–22	Graves Co. Farm Bureau Mayfield.	Wheat shorts, ground wheat screenings 5%	
4279–22	Covington Bros. & Co. . Murray.	Wheat middlings	Above guaranty in fiber, but guaranty is too low.
1145–21	Scottsville Produce Co.. Scottsville.	Wheat middlings, flour middlings	Adulterated with ground wheat bran. Ground wheat screenings present. Below guaranty in protein and above in fiber.
1145–21	Kentucky Feed & Grain Co., Louisville.	Same	
1145–21	Blue Grass Commission Co., Lexington.	Same	No flour middlings present. Ground wheat screenings present.
1145–21	J. C. Everett & Co..... Maysville.	Same	
3496–21	L. L. Roberts..... Dawson Springs.	Wheat middlings, ground wheat screenings 2%	
3750–21	Hess & Racke ..... Alexandria.	Wheat middlings, ground wheat screenings 3%	
549–21	The Riverside Co..... Beattyville.	Wheat shorts, ground wheat screenings 3%	
4465–22	Paducah Elev. & Bonded Warehouse, Paducah	Wheat middlings, wheat shorts..	
3758–21	G. W. Stamper & Co.... Vanceburg.	Wheat middlings	Contains ground weed seeds.
2696–20	C. E. Mooney..... Hickman.	Wheat shorts	Ground wheat screenings present. Much below guaranty in protein.
4575–22	Mfrs. Warehouse	Wheat middlings, ground wheat screenings 10%	
3874–21	Same	Wheat shorts	
980–21	E. N. Handy..... Latonia.	Wheat middlings, ground wheat screenings 5%	
980–21	Ruef Bros. Co..... Covington.	Same	
1834–22	Brummal Bros..... Clinton.	Wheat shorts	

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
1312–20	Wheat Middlings and Screenings..	Tell City Flouring Mills.....	15.13	4.43	7.10
		Tell City, Ind.	**16.00**	**4.00**	**7.50**
1312–21	Same	Same	15.25	3.95	7.65
			16.00	**4.00**	**7.50**
1312–21	Same	Same	14.38	3.35	4.93
			16.00	**4.00**	**7.50**
1312–21	Same	Same	12.63	3.53	4.68
			16.00	**4.00**	**7.50**
1312–22	Same	Same	14.50	3.96	5.55
			16.00	**4.00**	**7.50**
1312–22	Same	Same	14.94	4.33	5.85
			16.00	**4.00**	**7.50**
3890–22	Grey Middlings and Screenings...	Valier & Spies Milling Co.	17.88	4.77	5.98
		St. Louis, Mo.	**16.00**	**3.50**	**7.50**
2823–21	Wheat Middlings and Screenings..	The Washington Milling Co. ...	15.69	3.98	7.48
		Washington C. H., Ohio.	**16.50**	**4.00**	**7.50**
2436–21	Middlings	P. J. Weisenberger & Son.....	18 50	3.91	6.25
		Midway, Ky.	**16.00**	**4.00**	**7.50**
1930–21	Dixie Shorts	Winchester Roller Mills.....	15.75	4.19	6.60
		Winchester, Ky.	**16.35**	**4.05**	**6.03**
1930–21	Same	Same	14.75	4.34	7.12
			16.35	**4.05**	**6.03**
1930–21	Same	Same	14.50	3.93	5.75
			16.35	**4.05**	**6.03**
1930–21	Same	Same	14.88	4.55	6.89
			16.35	**4.05**	**6.03**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
1312–20	W. M. Douthitt..... Hawesville.	Wheat middlings, red dog flour, ground wheat screenings 3%..	No red dog flour present. Corn bran and corn meal present. Below guaranty in protein.
1312–21	Bozarth & Freeman..... Hawesville.	Same	Below guaranty in protein.
1312–21	Same	Same	Adulterated with corn meal. No red dog flour found. Below guaranty in protein and fat. Inferior to guaranty.
1312–21	Same	Same	Same.
1312–22	Joe Uloth ..... Brandenburg.	Same	Sample composed of wheat bran, wheat middlings, ground wheat screenings, corn bran and corn meal. Below guaranty in protein.
1312–22	Douthitt & Freeman.... Hawesville.	Same	Unground wheat screenings, weed seeds, corn bran and corn meal present. No low grade flour found. Below guaranty in protein.
3890–22	J. W. Green & Co..... Mayfield.	Wheat middlings, ground wheat screenings 4%	
2823–21	Ashland Iron & Min. Co. Ashland.	Wheat middlings, wheat screenings 5%	Below guaranty in protein.
2436–21	Mfrs. Warehouse	Wheat middlings	
1930–21	J. R. Blake & Co..... Jackson.	Wheat shorts	Below guaranty in protein and high in fiber. Sample is mixed wheat feed and screenings.
1930–21	H. E. Kidd..... Stearns.	Same	Coarse wheat bran, corn bran and ground wheat screenings present. Below guaranty in protein. Not in accordance with guaranty.
1930–21	S. Adams & Sons..... Torrent.	Same	Same.
1930–21	Jonah Roark & Son..... Poor Fork.	Same	Contains ground wheat bran and unground wheat screenings. Below guaranty in protein and above in fiber. Inferior to guaranty.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
4090–22	Wheat Gray Shorts and Screenings	The Wichita Flour Mills Co. ...	18.75	4.32	5.26
		Wichita, Kans.	16.00	3.50	5.50
	Mixed Wheat Feeds				
76–22	Kentucky's Choice Pure Wheat Mixed Feed	The Acme Mills.....	15.88	4.34	7.43
		Hopkinsville, Ky.	15.00	4.00	8.50
328–21	Shipstuff	Adairville Milling Co.	15.13	4.98	8.39
		Adairville, Ky.	16.05	4.55	8.45
328–22	Same	Same	15.50	5.41	6.60
			16.05	4.55	8.45
741–22	Trojan Mixed Wheat Feed and Screenings	The Allen & Wheeler Co.	16.88	4.66	8.18
		Troy, Ohio.	15.50	4.00	8.50
741–22	Same	Same	15.75	4.81	9.00
			15.50	4.00	8.00
1351–23	Mixed Wheat Feed and Screenings	The Ansted & Burk Co.	15.50	4.12	7.65
		Springfield, Ohio.	15.50	4.00	6.50
4297–22	Mixed Wheat Feed.....	Ashbyburg Flour Mills.....	15.56	4.32	6.55
		Ashbyburg, Ky.	15.50	4.25	8.50
1647–21	Aubrey's Mixed Wheat Feed and Screenings	Aubrey & Co.	17.19	4.93	8.55
		Louisville, Ky.	15.50	3.80	8.50
1647–22	Same	Same	17.25	4.48	8.08
			15.50	3.80	8.50
1647–21	Same	Same	18.50	4.75	8.70
			15.50	3.80	8.50
1647–21	Same	Same	19.00	5.48	5.05
			15.50	3.80	8.50
1647–22	Same	Same	17.25	5.13	7.98
			15.50	3.80	8.50
4349–22	Results Mixed Wheat Feed and Screenings	Aviston Milling Co.	15.75	4.17	9.30
		Aviston, Ill.	15.50	4.00	8.50
637–22	Ballards' Mixed Wheat Feed and Screenings	Ballard & Ballard Co.	15.25	4.58	7.90
		Louisville, Ky.	15.50	4.42	6.95
2038–21	Blanton Mixed Wheat Feed and Screenings	Blanton Milling Co.	15.88	4.00	6.87
		Indianapolis, Ind.	15.70	3.70	8.50
2038–21	Same	Same	15.25	4.66	8.95
			15.70	3.70	8.50
1934–21	Shipstuff	Blue Grass Milling Co.	12.50	3.27	5.50
		Campbellsburg, Ky.	15.75	4.46	7.50
1934–21	Same	Same	14.38	4.70	8.08
			15.75	4.46	7.50
1799–19	Mill Run Feed.....	J. K. Butcher & Co.	18.31	5.03	5.20
		Paintsville, Ky.	15.50	4.50	8.50

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
4090–22	Morehead Grocery Co. .. Morehead, Ky.	Wheat gray shorts, ground wheat screenings 5%	
76-22	Buck & Son..... Guthrie.	Wheat bran, wheat shorts.....	Ground wheat screenings present.
328–21	Mfrs. Warehouse	Wheat bran, wheat middlings...	Below guaranty in protein.
328–22	Same	Same	Same.
741–22	Morgan & Crenshaw .... Georgetown.	Wheat bran, wheat middlings, ground wheat screenings 3%..	
741–22	Borders & Fannin..... Catlettsburg.	Same	Above guaranty in fiber.
1351–23	Ashland Supply Co. .... Ashland.	Wheat bran, wheat middlings, ground wheat screenings 2%..	Same.
4297–22	Corum Bros. ..... Madisonville.	Wheat bran, wheat shorts.....	
1647–21	Lewis Wholesale Co. .... Whitesburg.	Wheat bran, wheat shorts, ground wheat screenings 3%	
1647–22	Elkins & Kimmell..... Greenville.	Same	
1647–21	Lessenberry & Jones.... Glasgow.	Same	
1647–21	Shepherdsville Rol. Mills Shepherdsville.	Same	
1647–22	J. E. M. Milling Co. .... Frankfort.	Same	
4349–22	Kentucky Feed & Seed Co., Middlesboro	Wheat bran, wheat middlings, ground wheat screenings 8%..	Above guaranty in fiber. Excess ground wheat bran present.
637–22	J. S. Jones..... West Point.	Wheat bran, wheat middlings, cleaned and ground wheat screenings 2¼%	Above guaranty in fiber.
2038–21	Woosley & Son ..... Elizabethtown.	Wheat bran, wheat middlings. unground wheat screenings 4%	
2038–21	Laurel Grocery Co..... East Bernstadt.	Same	Below guaranty in protein.
1934-21	Mfrs. Warehouse	Wheat bran, wheat middlings...	Below guaranty in protein. Low grade flour present.
1934–21	Same	Same	Below guaranty in protein and above in fiber.
1799–19	Mfrs. Warehouse	Wheat bran, wheat middlings...	This feed is good clear middlings.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
363–20	Mixed Wheat Feed	Cadick Milling Co.	16.00	4.47	8.45
		Grandview, Ind.	15.50	4.00	8.50
363–22	Same	Same	15.00	4.16	8.25
			15.50	4.00	8.50
363–22	Same	Same	14.75	4.45	7.68
			15.50	4.00	8.50
363–22	Same	Same	15.25	4.24	7.43
			15.50	4.00	8.50
3669–21	Cameron's Shipstuff	Cameron's Mill	14.88	4.05	4.18
		Carrollton, Ky.	16.03	4.13	7.50
2698–21	Shipstuff and Screenings	Cannellton Flour Mills	14.50	3.68	4.25
		Cannellton, Ind.	16.25	4.18	8.50
2698–22	Same	Same	14.00	3.91	3.78
			16.25	4.18	8.50
2698–22	Same	Same	14.13	4.44	5.00
			16.25	4.18	8.50
1715–21	Mixed Wheat Feed	Carey Bros.	14.63	4.28	5.16
		Willisburg, Ky.	15.50	4.50	8.50
2326–21	Wheat Bran and Shorts	Cate Milling Co.	14.56	7.48	6.65
		Hopkinsville, Ky.	16.00	4.50	8.50
2641–21	Shipstuff	Cascade Milling Co.	15.50	4.29	7.90
		Bronston, Ky.	15.50	4.00	8.50
430–21	Mixed Wheat Feed and Screenings	The Cincinnati Grain & Hay Co.	16.75	4.36	8.40
		Covington, Ky.	15.50	4.25	8.00
430–22	Same	Same	16.63	5.00	6.75
			15.50	4.25	8.00
2227–21	Shipstuff and Screenings	R. L. Collins & Son	15.38	4.33	6.95
		Crittenden, Ky.	15.50	4.66	7.50
3614–21	Mixed Wheat Feed	Community Roller Mills	15.25	4.49	6.93
		Calhoun, Ky.	16.10	4.47	8.49
3614–21	Same	Same	14.88	4.62	7.38
			16.10	4.47	8.49
17–13	Shipstuff	Chas. Cummins	14.38	4.01	7.58
		Cumminsville, Ky.	15.37	3.67	
869–22	Mixed Wheat Feed	W. J. Dossey & Sons	16.63	4.94	8.30
		Fountain Run, Ky.	15.75	4.46	8.50
268–21	Mixed Wheat Feed	Early & Daniel Co.	16.88	4.06	8.03
		Covington, Ky.	15.50	4.00	8.50

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
363–20	J. H. Waugh..... Crestwood.	Wheat bran, wheat shorts.....	
363–20	Lancaster-Smith Seed Co. Owensboro.	Same	Below guaranty in protein.
363–22	L. E. Chapman. Owensboro.	Same	Same.
363–22	J. H. Cain ..... Brandenburg.	Same	
3669–21	Mfrs. Warehouse	Wheat bran, wheat middlings...	Below guaranty in protein. Inferior to guaranty.
2698–21	J. W. Quisenberry..... Hawesville.	Middlings, red dog flour, ground wheat screenings 5%.....	Below guaranty in protein. Corn meal present.
2698–22	A. D. Ashcraft..... Irvington.	Same	Below guaranty in protein and fat. Corn bran and corn meal present.
2698–22	S. F. Swihart..... Hawesville.	Same	Below guaranty in protein and fat. Corn bran and corn meal present.
1715–21	Lake Bros..... Springfield.	Wheat bran, wheat middlings...	Below guaranty in protein.
2326–21	Q. F. Combs..... Pembroke.	Wheat bran, wheat shorts.....	Below guaranty in protein. Adulterated with corn bran and corn meal.
2641–21	Mfrs. Warehouse	Wheat bran, wheat middlings....	
430–21	Leslie Bailey ..... Corinth.	Wheat bran, wheat middlings, ground wheat screenings 6%..	
430–22	Alva West & Co..... Maysville.	Same	
2227–21	Mrs. Mary C. McClure .. Crittenden.	Wheat bran, wheat middlings, unground wheat screenings 2%..	Corn bran present.
3614–21	A. C. Harrison..... Calhoun.	Wheat bran, wheat middlings...	Below guaranty in protein.
3614–21	Mfrs. Warehouse	Same	Same.
17–13	Same	Wheat bran, middlings.....	Below guaranty in protein.
869–22	N. Y. Landrum & Co. ... Tompkinsville.	Wheat bran, wheat shorts.....	
268–21	Fred Sauerbeck ..... Newport.	Wheat bran, middlings.....	Unground wheat screenings present.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
268–22	Mixed Wheat Feed	Early & Daniel Co.	16.75	5.64	7.53
		Covington, Ky.	**15.50**	**4.00**	**8.50**
583–21	Same	Same	15.88	4.59	7.99
			15.50	**4.00**	**8.50**
583–22	Same	Same	16.00	4.63	9.10
			15.50	**4.00**	**8.50**
583–22	Same	Same	16.69	5.08	8.70
			15.50	**4.00**	**8.50**
888–22	Shipstuff	Farmers' Milling Co.	14.50	3.60	5.08
		Beaver Dam, Ky.	**15.50**	**4.25**	**7.75**
3254–20	Shipstuff and Screenings	Farmers' Milling Co.	14.75	3.77	7.08
		Russell Springs, Ky.	**15.50**	**4.00**	**8.50**
1556–22	Mixed Wheat Feed and Screenings	Farmers' & Merchants' Milling Co., Brooksville, Ky.	16.13	5.13	7.05
			15.50	**4.25**	**8.25**
1556–22	Same	Same	15.19	4.66	7.35
			15.50	**4.25**	**8.25**
3649–22	Mixed Wheat Feed and Screenings	Flynn Bros. Grain & Feed Co.	16.25	4.31	8.03
		St. Louis, Mo.	**15.50**	**4.00**	**8.50**
3649–22	Same	Same	16.50	3.94	5.58
			15.50	**4.00**	**8.50**
3291–21	Mixed Wheat Feed	Fountain Run Milling Co.	15.50	4.10	7.68
		Fountain Run, Ky.	**15.75**	**4.35**	**8.50**
3755–21	Fruechtenicht's Feed and Screenings	Henry Fruechtenicht	16.88	5.49	8.88
		Louisville, Ky.	**16.00**	**4.00**	**7.00**
2380–22	Shipstuff	Germantown Milling Co.	14.69	4.26	8.83
		Germantown, Ky.	**15.75**	**4.25**	**8.50**
3704–21	Mixed Wheat Feed	J. D. Gossett	15.25	4.28	5.90
		Calhoun, Ky.	**15.75**	**4.51**	**8.25**
3273–21	Shipstuff	Greasy Creek Milling Co.	14.75	4.28	9.10
		Jamestown, Ky.	**16.00**	**4.55**	**8.25**
2375–21	Wheat Bran, Middlings and Screenings	Hardin Milling Co.	14.75	4.51	6.38
		Hardin, Ky.	**15.75**	**4.35**	**8.50**
3163–22	Mixed Wheat Feed and Screenings	Edwin C. Hawkins	16.63	4.11	8.18
		Paducah, Ky.	**15.50**	**4.00**	**8.50**
3705–21	Wheat Mixed Feed	Haydon Mill & Grain Co.	15.00	4.43	6.09
		Springfield, Ky.	**15.71**	**4.45**	**8.45**
1858–21	Pure Bran and Shorts	Horse Cave Mills	16.38	4.06	7.45
		Horse Cave, Ky.	**15.50**	**4.25**	**7.50**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
268–22	J. A. Anderson..... Covington.	Wheat bran, middlings.....	Ground wheat screenings, containing ground weed seeds, present.
583–21	Tom Jameson & Son.... Beattyville.	Same	
583–22	Hill Congleton & Son... Beattyville.	Same	Excess of wheat bran. Above guaranty in fiber.
583–22	Same	Same	Ground wheat screenings and weed seeds present.
888–22	C. B. Carden & Co..... Hartford.	Wheat bran, wheat middlings...	Below guaranty in protein and fat. Unground wheat screenings present.
3254–20	Mfrs. Warehouse	Wheat bran, wheat middlings, ground wheat screenings 6%..	Below guaranty in protein.
1556–22	Same	Wheat bran, middlings, unground wheat screenings 4%.....	
1556–22	Same	Wheat bran, wheat middlings, ground wheat screenings 1%..	
3649–22	Hulen-Toops Co..... Bowling Green.	Wheat bran, wheat middlings, ground wheat screenings 8%..	
3649–22	Louis Cohen ..... Central City.	Same	
3291–21	N. Y. Landrum & Co.... Tompkinsville.	Wheat bran, wheat middlings...	
3755–21	Mfrs. Warehouse	Wheat middlings, fine ground wheat bran, ground wheat screenings 6%	Excess of ground wheat bran. Screenings contain ground weed seeds.
2380–22	Mfrs. Warehouse	Wheat bran, shorts, middlings...	Below guaranty in protein.
3704–21	Mfrs. Warehouse	Wheat bran, wheat middlings...	Below guaranty in protein.
3273–21	Same	Same	Below guaranty in protein and above in fiber. Below standard of shipstuff. Corn cockle present.
2375–21	Mfrs. Warehouse	Wheat bran, wheat middlings, ground wheat screenings 2%..	Below guaranty in protein.
3163–22	J. R. Brandon..... Benton.	Wheat bran, wheat middlings, unground wheat screenings 5%	
3705–21	Lebanon Milling Co. .... Lebanon.	Wheat bran, wheat middlings...	
1858–21	Hulen-Toops Co..... Munfordville.	Wheat bran, shorts	Contains corn bran.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
506–21	Mixed Wheat Feed and Screenings	Igleheart Bros.	16.25	4.00	8.30
		Evansville, Ind.	15.50	4.50	8.50
1841–15	Shipstuff and Screenings	Kearns & Reese	15.31	4.42	7.48
		Jamestown, Ky.	15.50	4.25	8.50
2834–21	Mixed Wheat Feed and Screenings	George Keller	17.13	4.13	7.85
		Newport, Ky.	15.50	4.50	8.50
2834–21	Same	Same	17.38	4.09	7.58
			15.50	4.50	8.50
2834–21	Same	Same	16.38	4.13	8.05
			15.50	4.50	8.50
1050–22	Mixed Wheat Feed and Screenings	Larabee Flour Mills Corporation	17.38	5.08	8.75
		Kansas City, Mo.	16.00	3.75	8.50
1050–22	Same	Same	15.25	4.35	8.58
			16.00	3.75	8.50
1030–21	"Sonny South" Wheat Mixed Feed and Screenings	Louisville Milling Co.	17.25	4.70	7.80
		Louisville, Ky.	15.50	4.00	8.50
1030–21	Same	Same	17.13	4.25	8.78
			15.50	4.00	8.50
1030–22	Same	Same	17.50	3.94	8.95
			15.50	4.00	8.50
1030–22	Same	Same	17.13	4.57	9.70
			15.50	4.00	8.50
1030–22	Same	Same	17.63	4.54	9.15
			15.50	4.00	8.50
1030–23	Same	Same	17.00	4.51	9.50
			15.50	4.00	8.50
2508–21	Mill Run Mixed Wheat Feed and Screenings	Magnolia Flour Mills	15.13	3.77	10.23
		Maysville, Ky.	16.38	4.25	8.48
4482–22	Albatross Mixed Wheat Feed	John F. Meyer & Sons Milling Co., St. Louis, Mo.	15.00	4.52	8.23
			15.50	3.50	8.50
2463–22	Milroy Mixed Wheat Feed and Screenings	Milroy Milling Co.	15.38	4.79	8.18
		Milroy, Ind.	16.50	4.00	8.50
1485–21	Shipstuff	Nolin Milling Co.	14.75	4.54	5.65
		Nolin, Ky.	15.50	4.50	8.50
2794–20	Mixed Wheat Feed and Screenings	Oakland Milling Co.	14.88	4.17	6.33
		Oakland, Ky.	15.50	4.25	8.50
2090–22	Mixed Wheat Feed	Owensboro Milling Co.	16.75	4.43	7.78
		Owensboro, Ky.	15.50	4.15	8.50
4519-22	"Omilco" Wheat Feed	Same	15.75	4.38	7.69
			15.50	3.92	6.75
1902–22	"Omilco" Soft Winter Mixed Wheat Feed	Same	14.81	4.41	7.30
			16.00	4.00	7.85
3129–22	Parson's Mixed Wheat Feed	Pendleton Flour Mills	15.13	4.09	5.78
		Falmouth, Ky.	15.87	4.33	8.50

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
506–21	Young & Bishop..... Providence.	Wheat bran, wheat middlings, ground wheat screenings 1%..	
1841–15	Bernard Bros. ..... Jamestown.	Wheat bran, middlings, ground wheat screenings 5%.....	
2834–21	A. J. Minshall..... Fort Thomas.	Ground wheat bran, wheat middlings, ground wheat screenings 10%	
2834–21	Hunteman Bros. ..... Newport.	Same	
2834–21	E. T. Oldham..... Stamping Ground.	Same	Unground wheat screenings present.
1050–22	Lessenberry & Jones.... Glasgow.	Wheat bran, wheat shorts, mill run screenings 8%.....	No screenings found.
1050–22	R. D. Robertson..... Mayfield.	Same	Below guaranty in protein.
1030–21	H. T. Edwards..... Campbellsville.	Wheat bran, wheat shorts, ground wheat screenings 3%.....	
1030–21	J. A. Bennett..... Taylorsville.	Same	Contains unground wheat screenings.
1030–22	J. H. Grieve..... Louisville.	Same	
1030–22	Roszell Bros. ..... Lexington.	Same	Above guaranty in fiber.
1030–22	Stearns Coal & Lum. Co.. Stearns.	Same	Above guaranty in fiber. Excess wheat bran.
1030–23	C. D. Miller..... Buechel.	Same	Same.
2508–21	Kentucky Feed Co. ..... Flemingsburg.	Wheat bran, wheat middlings, ground wheat screenings 3⅓%	Very little middlings present. Below guaranty in protein and fat and above in fiber.
4482–22	Fain & Lee..... Murray.	Soft wheat bran, soft wheat middlings, ground wheat screenings 8%	Below guaranty in protein.
2463–22	J. C. Everett & Co. .... Maysville.	Wheat bran, wheat middlings, ground wheat screenings 10%.	Below guaranty in protein. Unground wheat screenings present.
1485–21	J. F. Williams & Son.... Elizabethtown.	Wheat bran, wheat shorts.....	Below guaranty in protein.
2794–20	Farmers Union Sup. Co.. Bowling Green.	Wheat bran, wheat shorts, ground wheat screenings 15%.....	Below guaranty in protein. Corn bran present.
2090–22	A. D. White & Co. ..... Hartford.	Soft winter wheat bran, soft winter wheat middlings.....	
4519–22	Dexter & Vincent..... Centertown.	Wheat bran, wheat shorts, red dog flour	Above guaranty in fiber.
1902–22	Corum Bros. ..... Madisonville.	Winter wheat bran and shorts...	Below guaranty in protein.
3129–22	Mfrs. Warehouse	Wheat bran, wheat middlings...	Same.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
1809–20	Ideal Wheat Feed	T. L. Penn	15.75	4.47	8.20
		Kevil, Ky.	16.72	4.77	7.50
1158–22	Mixed Wheat Feed and Screenings	Phoenix Flour Mills	15.63	3.50	7.35
		Evansville, Ind.	15.50	4.00	8.50
608–19	Mixed Wheat Feed and Screenings	Geo. P. Plant Milling Co.	16.13	4.29	8.53
		St. Louis, Mo.	16.00	4.00	9.00
3781–21	Winter Wheat Feed	R. C. Poage Milling Co.	15.69	4.37	6.65
		Ashland, Ky.	15.50	5.00	6.50
1212–19	Buckeye Mixed Wheat Feed	The Quaker Oats Co.	16.88	5.53	8.50
		Chicago, Ill.	15.50	4.50	8.50
1966–22	O-Joy	Randolph Milling Co.	15.25	5.38	6.88
		Bandana, Ky.	15.75	4.50	8.00
484–22	Wheat Bran and Middlings	B. E. Roberts & Son	15.69	4.44	7.20
		Mill Springs, Ky.	15.50	4.00	8.50
3272–21	Shipstuff and Screenings	Russell Springs Roller Mills	14.00	4.17	7.50
		Russell Springs, Ky.	15.50	4.00	8.50
3420–21	Mixed Wheat Feed	Salt Lick Roller Mills	16.25	5.01	8.15
		Salt Lick, Ky.	15.93	4.39	8.50
3752–22	Mixed Wheat Feed and Screenings	Schultz-Baujan & Co.	16.13	5.00	9.13
		Beardstown, Ill.	15.50	3.50	8.50
1064–10	Shipstuff	Snow Milling Co.	16.63	5.00	7.95
		Snow, Ky.	14.75	4.62	
1716–22	Mixed Wheat Feed	South Somerset Mills	16.56	5.23	7.06
		Somerset, Ky.	15.50	4.25	8.00
556–22	Economy Wheat Mixed Feed and Screenings	Southern Seed Co.	17.25	4.33	8.32
		Louisville, Ky.	15.50	4.00	8.00
556–22	Same	Same	17.25	5.02	9.88
			15.50	4.00	8.00
2729–22	Standard Wheat Feed and Screenings	Same	18.50	4.20	7.60
			15.50	4.00	8.50
2729–22	Same	Same	14.88	6.64	11.98
			15.50	4.00	8.50
2729–22	Same	Same	16.13	5.61	9.55
			15.50	4.00	8.50
2729–22	Same	Same	15.50	4.06	8.25
			15.50	4.00	8.50
2729–22	Same	Same	16.75	6.54	8.99
			15.50	4.00	8.50
24–20	Try Me Mixed Wheat Feed and Screenings	Sparks Milling Co.	17.75	3.99	7.63
		Alton, Ill.	16.00	3.50	9.00
24–21	Same	Same	17.13	3.93	7.09
			16.00	3.50	8.50
24–21	Same	Same	18.06	4.09	7.83
			16.00	3.50	8.50

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
1809–20	Mfrs. Warehouse	Wheat bran, middlings	Below guaranty in protein and above in fiber.
1158–22	Midget Milling Co. .... Providence.	Wheat bran, wheat shorts, ground wheat screenings 5%.....	
608–19	Franklin Elev. & Warehouse Co., Franklin...	Wheat bran, wheat middlings, ground wheat screenings 8%..	
3781–21	B. L. Hughes..... Lackey.	Wheat bran, wheat middlings, ground wheat screenings 5%..	
1212–19	Humlong & Wheat..... Germantown.	Wheat bran, wheat middlings, ground wheat screenings 2%..	Oat groats and oat hulls present.
1966–22	R. Graham ..... Grahamville.	Wheat bran, wheat shorts.....	Below guaranty in protein.
484–22	Mfrs. Warehouse	Wheat bran, wheat middlings...	
3272–21	Same	Wheat bran, wheat shorts, unground wheat screenings 4%..	Below guaranty in protein.
3420–21	Allen Points ..... Salt Lick.	Wheat bran, wheat shorts.....	
3752–22	Boone Co. Farm Bureau Florence.	Wheat bran, wheat middlings, wheat screenings 3%.....	Above guaranty in fiber.
1064–10	Mfrs. Warehouse	Bran, shorts, middlings.....	Chaff and corn cockle present.
1716–22	Flavo Mill & Grain Co... Somerset.	Wheat bran, shorts.....	
556–22	Watts, Laws & Preston.. Perryville.	Wheat bran, wheat middlings, ground wheat screenings 3%..	
556–22	Taylor County Milling Co Campbellsville.	Same	Above guaranty in fiber
2729–22	The Riverside Co. ..... Beattyville.	Wheat bran, wheat middlings, ground wheat screenings 3%..	
2729–22	H. C. Terhune..... Talmage.	Wheat shorts, wheat bran, ground wheat screenings 3%.....	Below guaranty in protein and above in fiber. Inferior product.
2729–22	May & Boyle..... Cloverport.	Same	Above guaranty in fiber. Considerable weed seeds present.
2729–22	W. A. Burkhart..... Vine Grove.	Same	
2729–22	The Riverside Co ..... Beattyville.	Same	Ground weed seeds present.
24–20	Owen & Ducker..... Butler.	Wheat bran, middlings, shorts, ground wheat screenings 2%..	
24–21	Paducah Elev. & Bonded Warehouse, Paducah	Same	Unground wheat screenings present.
24–21	F. M. Holcomb..... Murray.	Same	

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
24–22	Try Me Mixed Wheat Feed and Screenings	Sparks Milling Co.	16.75	4.05	7.45
		Alton, Ill.	**16.00**	**3.50**	**8.50**
981–19	Stanard-Tilton Milling Company's Mixed Wheat Feed and Screenings	Stanard Tilton Milling Co.	17.63	4.99	7.63
		Alton, Ill.	**14.50**	**4.00**	**8.00**
2248–21	Bran and Shipstuff	Adam Temple & Son	16.25	4.45	7.50
		Maxon Mills, Ky.	**15.50**	**4.93**	**7.38**
2248–21	Same	Same	14.63	4.46	7.00
			15.50	**4.93**	**7.38**
2372-22	Purity Wheat Feed and Screenings	John Wade & Sons, Inc.	16.50	3.64	7.68
		Memphis, Tenn.	**15.50**	**3.50**	**8.00**
3643–22	Zabel Milling Company's Mixed Wheat Feed and Screenings	Zabel Milling Co.	14.69	5.40	9.00
		New Albany, Ind.	**16.50**	**4 50**	**7.00**
459–22	Shipstuff	Ziliak & Schafer Milling Co.	16.88	4.32	6.80
		Evansville, Ind.	**16.30**	**4.50**	**3.90**
459–22	Same	Same	17.38	5.19	8.13
			16.30	**4.50**	**3.90**
459–22	Same	Same	16.00	4.10	6.61
			16.30	**4.50**	**3.90**
459–22	Shipstuff and Screenings	Same	16.75	5.44	8.93
			16.30	**4.50**	**8.50**
	Miscellaneous Mixed Wheat Feeds				
299–20	Acme Feed	Acme-Evans Co.	17.13	4.25	7.73
		Indianapolis, Ind.	**16.50**	**4.00**	**9.00**
299–21	Same	Same	15.75	4.93	8.11
			16.50	**4.00**	**9.00**
299–21	Same	Same	16.00	4.84	8.23
			16.50	**4.00**	**9.00**
299–21	Same	Same	16.38	4.27	8.45
			16.50	**4.00**	**9.00**
299–21	Same	Same	16.00	4.45	8.00
			16.50	**4.00**	**9.00**
299–22	Same	Same	15.75	4.48	8.90
			16.50	**4.00**	**9.00**
299–22	Same	Same	16.75	4.79	9.43
			16.50	**4.00**	**9.00**
299–22	Same	Same	16.50	4.83	8.28
			16.50	**4.00**	**9.00**
3862–22	Union Feed	American Milling Co.	16.00	5.77	7.25
		Peoria, Ill.	**16.50**	**4.50**	**10.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
24–22	J. C. Wiseman..... Kuttawa.	Wheat bran, middlings, shorts, ground wheat screenings 2%..	
981–19	Ruef Bros. Co. ..... Covington.	Wheat bran, wheat middlings, ground wheat screenings 5%..	
2248–21	Mfrs. Warehouse	Wheat bran, shipstuff.....	Contains corn bran and unground wheat screenings.
2248–21	Same	Same	Same—Below guaranty in protein.
2372–22	Sam Nahm & Co. ..... Bowling Green.	Wheat shorts, wheat bran, low grade flour, ground screenings 8%	
3643–22	J. E. Sego & Son..... Munfordville.	Wheat bran, wheat middlings, crushed wheat screenings 5%..	Not mixed wheat feed, but wheat bran. Below guaranty in protein and above in fiber.
459–22	Yates & Fowler ..... Madisonville.	Wheat bran, wheat middlings...	Considerable ground wheat screenings. Guarantee on fiber is too low. Should be about 8.50%.
459–22	Beaver Dam Coal Co. ... Beaver Dam.	Same	Same.
459–22	W. E. Ellis & Bro. ..... Hartford.	Same	Same.
459–22	East End Milling Co. ... Henderson.	Wheat bran, wheat middlings, ground wheat screenings 5%..	
299–20	Sam Nahm & Co. ..... Bowling Green.	Wheat bran, wheat middlings, ground wheat screenings 10%.	
299–21	Same	Same	Below guaranty in protein.
299–21	Ballard & Masters..... Ravenna.	Same	
299–21	Wm. Addams ..... Cynthiana.	Same	
299–21	Roszell Bros. ..... Lexington.	Same	
299–22	John L. Hosman..... Morganfield.	Same	Below guaranty in protein.
299–22	Owen Grocery Co. ..... Owenton.	Same	
299–22	Park City Feed Store... Bowling Green.	Same	
3862–22	The United Supply Co.. Lynch.	Wheat middlings, finely ground wheat bran, ground wheat screenings 5%	Below guaranty in protein.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
2634–21	Aubrey's Feed and Screenings ..	Aubrey & Co.	17.50	5.00	8.08
		Louisville, Ky.	**16.00**	4.00	10.00
2634–21	Same	Same	18.13	4.52	9.80
			16.00	4.00	10.00
2634–21	Same	Same	16.44	3.74	8.10
			16.00	4.00	10.00
2634–21	Same	Same	16.50	3.85	8.10
			16.00	4.00	10.00
2634–21	Same	Same	16.75	5.34	9.98
			16.00	4.00	10.00
2634–21	Same	Same	16.50	5.58	10.55
			16.00	4.00	10.00
2634–21	Same	Same	17.31	5.40	8.00
			16.00	4.00	10.00
2634–22	Same	Same	16.00	5.79	9.15
			16.00	4.00	10.00
2634–22	Same	Same	17.00	4.87	7.38
			16.00	4.00	10.00
787–21	Bull's Eye Mixed Feed.....	Blish Milling Co.	16.63	4.83	7.96
		Seymour, Ind.	**16.00**	4.40	9.10
787–21	Same	Same	16.75	4.71	8.60
			16.00	4.40	9.10
787–21	Same	Same	16.50	4.34	8.05
			16.00	4.40	9.10
787–22	Same	Same	16.50	4.56	8.05
			16.00	4.40	9.10
3738–21	Clausen Feed and Screenings.....	Conrad J. Clausen.....	17.00	5.16	8.73
		Louisville, Ky.	**15.00**	4.00	10.00
3563–21	Dunlop's Beauty Feed.....	The Dunlop Milling Co.	14.75	4.06	9.10
		Clarksville, Tenn.	**15.00**	4.00	9.50
2577–21	Eadan Kentucky Feed	The Early & Daniel Co.	16.38	4.85	8.75
		Cincinnati, Ohio	**15.00**	3.50	10.00
2577–21	Same	Same	17.25	5.14	7.05
			15.00	3.50	10.00
2503–20	Damon's Feed	Elkton City Roller Mills.....	14.94	4.65	7.99
		Elkton, Ky.	**15.75**	4.25	9.25
4106–22	E-A-Co.'s Feed and Screenings...	Everett, Aughenbaugh & Co...	17.88	5.40	9.08
		Waseca, Wis.	**17.00**	5.00	9.08
1262–19	Gwinn's Dairy Feed.....	The Gwinn Milling Co.	13.38	4.33	5.41
		Columbus, Ohio	**14.00**	4.00	11.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
2634–21	Shepherdsville Rol. Mills Shepherdsville.	Wheat bran, wheat shorts, ground wheat screenings 6%	
2634–21	Dickerson Bros. Glasgow.	Wheat middlings, fine ground wheat bran, ground wheat screenings 6%	Coarse wheat bran present.
2634–21	Woosley & Son Elizabethtown.	Same	
2634–21	Duncan & Co. Pewee Valley.	Same	
2634–21	Taulbee & Co. Hazard.	Same	Adulterated with weed seeds.
2634–21	S. T. Frazier. Whitesburg.	Same	Adulterated with ground weed seeds. Above guaranty in fiber.
2634–21	Dixie Wholesale Gro. Co. Barbourville.	Same	Ground weed seeds present.
2634–22	S. T. Frazier. Whitesburg.	Same	
2634–22	Same	Same	
787–21	Kentucky Feed & Grain Co., Louisville	Wheat bran, wheat middlings	
787–21	London Grocery Co. London.	Same	
787–21	Merrifield & Humphrey Bloomfield.	Same	
787–22	Cogar-Rumley Co. Midway.	Same	
3738–21	Mfrs. Warehouse	Wheat middlings, fine ground wheat bran, ground wheat screenings 6%	
3563–21	Wilson & Newman Russellville.	Wheat bran, wheat shorts, ground wheat screenings 3%	
2577–21	Bacon R. Moore Torrent.	Wheat middlings, ground wheat bran, low grade flour, ground wheat screenings 5%	Ground and unground wheat screenings present.
2577–21	Powell-Hackney Gro. Co. Jackson.	Same	Same.
2503–20	Mfrs. Warehouse	Wheat bran, wheat shorts	Below guaranty in protein.
4106–22	Wm. P. Miller Louisville.	Wheat middlings, ground wheat bran, wheat screenings 6%	
1262–19	J. F. Bertram Vanceburg.	Wheat bran, wheat middlings, ground wheat screenings 10%.	Below guaranty in protein. Ground corn bran and unground wheat screenings present.

TABLE VI.—STRAIGHT FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
2775–21	Standard Feed	Keister Milling Co.	15.06	4.92	7.68
		Huntington, W. Va.	14.00	4.00	10.00
2775–21	Same	Same	15.13	4.84	8.03
			14.00	4.00	10.00
2308–19	Wheat Bran and Shorts	Marshall County Milling Co.	15.13	3.25	5.58
		Benton, Ky.	15.65	4.15	9.25
2659–21	Rankin's Fancy Feed	M. G. Rankin & Co.	18.94	6.10	5.60
		Milwaukee, Wis.	14.00	4.00	9.00
2660–21	Rankin's Standard Feed	Same	17.50	4.92	7.30
			14.00	3.50	11.00
2636–23	Standard Feed and Screenings	Edw. M. Riedling	14.63	6.16	11.60
		Louisville, Ky.	14 00	4.00	11.00
3072–22	R. D's Feed	R. D. Riedling	16.63	5.27	8.48
		Louisville, Ky.	16.00	5.57	8.83
1006–21	Occident Feed	Russell Miller Milling Co.	17.50	6.66	8.23
		Minneapolis, Minn.	15.50	4.50	9.50
2879–21	Big Diamond Brand Feed	Jesse C. Stewart Co.	16.38	5.16	6.67
		Pittsburg, Pa.	16.00	4.50	9.00
2879–21	Same	Same	16.88	4.99	6.85
			16.00	4.50	9.00
2879–22	Same	Same	15.50	5.27	7.53
			16.00	4.50	9.00
2482–21	Shadyside Brand Feed	Same	18.00	4.93	6.79
			14.00	4.00	11.00
1313–21	"A-Mixed-Feed"	Tell City Flouring Mills	14.50	3.60	9.15
		Tell City, Ind.	15.00	4.00	9.00
1313–22	Same	Same	16.50	4.79	8.05
			15.00	4.00	9.00
1313–22	Same	Same	14.50	3.57	7.73
			15.00	4.00	9.00
	Red Dog Flour				
3888–21	Red Dog Flour	R. U. Kevil & Sons	16.13	3.06	1.71
		Princeton, Ky.	15.00	3.03	2.55
3483–22	Red Dog Flour	The Larabee Flour Mills Corp.	17.06	3.25	2.48
		Kansas City, Mo.	15.00	2.50	2.50
3159–22	Red Dog Flour	Rapier Sugar Feed Co.	16.00	2.56	1.85
		Owensboro, Ky.	16.50	4.00	3.50

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
2775–21	J. B. Dixon..... Ashland.	Wheat middlings, ground wheat screenings 5%	
2775–21	Wheeler Grocery Co. ... Paintsville.	Same	Contains ground wheat bran and ground weed seeds.
2308–19	J. R. Brandon..... Benton.	Bran, shorts	Below guaranty in protein. Unground wheat screenings present.
2659–21	Paintsville Grocery Co. . Paintsville.	Wheat middlings, ground wheat screenings 15%	
2660–21	Hampton Grocery Co. ... Allen.	Wheat middlings, ground bran, ground wheat screenings 15%.	This feed is middlings.
2636–23	Mfrs. Warehouse	Wheat middlings, fine wheat bran, ground wheat screenings 15%	Above guaranty in fiber. Sample is Durum wheat bran, not as guaranteed.
3072–22	Same	Wheat bran, wheat middlings, ground wheat screenings 7%..	
1006–21	Cogar Coal, Grain & Feed Co., Harrodsburg	Wheat bran, wheat middlings, red dog flour	No red dog flour present.
2879–21	N. D. Tabor..... Olive Hill.	Wheat bran, wheat middlings, ground wheat screenings 15%.	Sample is wheat middlings.
2879–21	D. W. Spurlock..... Prestonsburg.	Same	Same.
2879–22	Moore & Moore..... Louisa.	Same	Below guaranty in protein.
2482–21	J. Harris ..... Middle Creek.	Same	
1313–21	Bozarth & Freeman..... Hawesville.	Wheat bran, wheat middlings, ground wheat screenings 5%..	Considerable oat hulls present. Below guaranty in protein.
1313–22	G. H. Harris..... Cloverport.	Same	
1313–22	Joe Uloth ..... Brandenburg.	Same	Below guaranty in protein and fat.
3888–21	W. B. Ray Feed Co..... Princeton.	Red dog	
3483–22	Owensboro Milling Co.. . Owensboro.	Low grade flour.....	
3159–22	James Roberts ..... Lewisport.	Same	

TABLE VII.—MIXED FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
	Brewers' Dried Grains.				
2253–17	Dried Brewers' Grains.....	Evansville Dry Malt & Feed Co. Evansville, Ind.	19.50 **24.00**	6.19 **5.00**	16.31 **16.00**
3506–21	Brewers' Dried Grains.....	Falls City Ice & Beverage Co... Louisville, Ky.	18.75 **18.00**	5.70 **6.93**	17.20 **17.70**
4385–22	Barley Malt Feed	Same	13.44 **12.56**	2.38 **2.30**	5.05 **5.00**
2000–20	Brewers' Dried Grains.....	The Hiland Dairy Co. ..... Newport, Ky.	25.50 **20.27**	9.64 **5.66**	15.60 **23.52**
	Barley & Oat Feed.				
2683–21	Barley & Oat Feed.....	The Cincinnati Grain & Hay Co. Covington, Ky.	13.38 **11.88**	3.78 **3.00**	12.50 **9.10**
	Corn and Oat Chops.				
3793–21	Corno Corn & Oat Chops.....	The Corno Mills Co. ..... St. Louis, Mo.	10.31 **10.00**	4.25 **4.00**	3.70 **9.00**
1816–20	Cerealia Rex Chops.....	The Early & Daniel Co. ..... Cincinnati, Ohio.	10.00 **10.00**	4.56 **5.00**	5.05 **4.00**
1247–21	Crushed Feed	Henry Fruechtenicht ..... Louisville, Ky.	10.00 **9.80**	4.20 **3.88**	4.00 **6.50**
3709–22	Big Gee Corn & Oat Chop.....	Edward F. Goeke Co. ..... Evansville, Ind.	10.63 **8.00**	4.36 **4.00**	5.85 **5.00**
4536–23	Oat & Corn Chop.....	George Keller ..... Newport, Ky.	9.88 **10.69**	4.55 **4.95**	8.28 **6.92**
	Matzos Feed.				
3281–21	Matzos Feed	Latonia Hay & Grain Co. ..... Latonia, Ky.	11.50 **11.75**	1.05 **1.93**	1.45 **1.37**
4047–22	Matzos Sweepings	The B. Manischewitz Co. ..... Cincinnati, Ohio.	10.00 **11.75**	1.27 **1.93**	0.80 **1.37**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
2253–17	R. P. Sisco..... Marion.	Barley malt, corn flakes, corn grits	Below guaranty in protein. Inferior to guaranty.
3506–21	Geo. F. Korfhage & Co. . Louisville.	Barley malt	
4385–22	Conner-Haydon & Co. .. Bardstown.	Same	
2000–20	George B. Moock..... Newport.	Barley rice	Sample is distiller's dried grains.
2683–21	J. B. Penn & Co. ..... Georgetown.	Ground barley, ground wild oats.	Above guaranty in fiber.
3793–21	Union Transfer Co. .... Lexington.	Corn, whole oats.....	Guaranty on fiber is too high.
1816–20	Manchester Grocery Co.. Manchester.	Corn, oats	High in fiber.
1247–21	J. F. Griffin & Son..... Mt. Vernon.	Corn, oats	Contains pin oats and wild oats crushed.
3709–22	Sturgis Feed Co. ..... Sturgis.	Crushed corn, crushed oats.....	
4536–23	Mfrs. Warehouse	Ground oats, ground corn.....	Excess of oat hulls. Below guaranty in protein and high in fiber.
3281–21	Mfrs. Warehouse	Ground crackers and bread scraps	Below guaranty in fat.
4047–22	A. Bickers ..... Bellevue.	Ground bread scraps from flour..	Below guaranty in protein and fat.

TABLE VII.—MIXED FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
	Wheat and Corn By-Products				
316–21	Acme Farm Feed	Acme-Evans Co.	10.88	3.88	3.08
		Indianapolis, Ind.	**12.00**	**5.00**	**7.00**
316–22	Same	Same	11.25	3.23	3.35
			12.00	**5.00**	**7.00**
316–22	Same	Same	10.88	3.70	3.38
			12.00	**5.00**	**7.00**
316–22	Same	Same	12.00	3.92	5.78
			12.00	**5.00**	**7.00**
763–22	Anderson & Spilman Feed	Anderson & Spilman	14.56	3.96	6.33
		Danville, Ky.	**13.50**	**3.68**	**5.60**
750–21	Mill Run Feed	The Auburn Mills	15.75	4.33	8.60
		Auburn, Ky.	**15.75**	**4.35**	**8.00**
751–21	Mixed Feed	Same	14.13	4.52	9.53
			14.50	**4.25**	**9.75**
4075–22	"Rich As Gold"	Aviston Milling Co.	11.50	3.85	3.55
		Aviston, Ill.	**14.00**	**5.00**	**6.50**
4075–22	Same	Same	12.25	3.95	3.33
			14.00	**5.00**	**6.50**
3200–21	Royal Mill Feed	Bardstown Milling Co.	14.75	5.52	8.00
		Bardstown, Ky.	**14.75**	**4.25**	**10.25**
3853–22	Nox-All Mixed Feed	Baskett Grain Co.	12.88	3.86	4.32
		Henderson, Ky.	**14.50**	**4.00**	**8.50**
3853–22	Same	Same	10.94	4.84	3.83
			14.50	**4.00**	**8.50**
1163–22	Mixed Feed	Beaty Bros.	14.56	5.25	8.00
		Science Hill, Ky.	**14.50**	**5.69**	**9.43**
4157–22	"Boyle" Mixed Feed	Boyle Roller Mills	11.75	4.21	3.58
		Junction City, Ky.	**13.94**	**4.15**	**7.25**
4157–22	Same	Same	13.25	4.68	2.57
			13.94	**4.15**	**7.25**
774–22	XX Mixed Feed	Chas. Broeker & Co.	14.75	6.73	6.15
		Owensboro, Ky.	**13.00**	**4.00**	**8.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
316–21	W. T. Sistrunk & Co. ... Lexington.	Corn, wheat bran, wheat middlings, hominy meal, salt.....	Below guaranty in protein and fat.
316–22	B. L. Mattingly..... Ekron.	Same	No hominy meal found. Below guaranty in protein and fat.
316–22	J. H. Baughman & Co... Stanford.	Same	Below guaranty in protein and fat. Inferior to claim.
316–22	Morgan & Crenshaw.... Georgetown.	Same	Corn product present is corn feed meal.
763–22	New Crescent Lumber Co Danville.	Wheat bran, wheat middlings, low grade flour, ground and unground screenings 10%, corn bran	Corn meal present. No low grade flour used.
750–21	B. V. Hunt..... Franklin.	Wheat bran, wheat middlings, corn bran 3%, ground wheat screenings 3%	
751–21	W. A. Chambers Co..... Russellville.	Wheat bran, corn bran, ground wheat screenings 3%.....	
4075–22	Lanham-Terrell Gro. Co. Corbin.	Corn oil meal, hominy feed, corn meal, wheat middlings (with ground screenings)	Below guaranty in protein and fat, inferior to claim. The difference is probably due to the use of too much corn meal for oil meal and hominy feed.
4075–22	London Grocery Co..... London.	Same	Below guaranty in protein and fat. Inferior to guaranty.
3200–21	Mfrs. Warehouse	Wheat bran, wheat middlings, corn bran 10%, ground wheat screenings 5%	
3853–22	Rea & Rice..... Earlington.	Wheat bran, wheat middlings, wheat shorts, hominy meal, ground wheat screenings 2%..	Below guaranty in protein—Not properly labeled. Corn product is corn meal and not hominy meal.
3853–22	Fortney & Pulley..... Central City.	Wheat bran, wheat middlings, hominy chop	Below guaranty in protein and above in fiber. Inferior article to guarantee.
1163–22	Breeden & Ward ..... Science Hill.	Wheat middlings, wheat bran, corn bran, wheat shorts.....	
4157–22	George H. Simpson..... Shelby City.	Wheat bran, wheat shorts, ground corn, ground wheat screenings 2%	Below guaranty in protein. Contains too much corn product for guarantee.
4157–22	Coffee & Van Hook..... Moreland.	Same	Below guaranty in protein.
774–22	Henderson Feed Store... Owensboro.	Wheat bran, shipstuff, hominy feed, ground wheat screenings 1%	

TABLE VII.—MIXED FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
774–22	XX Mixed Feed	Chas. Broeker & Co.	14.31	5.76	6.93
		Owensboro, Ky.	**13.00**	**4.00**	**8.00**
774–22	Same	Same	14.25	5.96	6.48
			13.00	**4.00**	**8.00**
4–22	Mixed Feed	Browder Milling Co.	14.50	4.96	6.07
		Fulton, Ky.	**15.28**	**4.68**	**9.00**
770–22	Mixed Feed	Burnside Roller Mills	14.00	5.34	6.68
		Burnside, Ky.	**15.00**	**4.00**	**8.50**
340–21	Mixed Feed	Cannellton Flour Mills	15.25	3.55	7.73
		Cannellton, Ind.	**14.43**	**3.45**	**10.00**
1854–21	Mixed Feed	Cecilian Milling Co.	16.19	4.96	7.75
		Cecilia, Ky.	**14.37**	**4.15**	**5.00**
1854–22	Same	Same	14.88	4.80	5.48
			14.37	**4.15**	**5.00**
3642–21	"Wheato" Mixed Feed	Cedar Hill Roller Mills	15.00	3.31	6.60
		Cedar Hill, Tenn.	**13.38**	**4.33**	**6.83**
1953–21	Mixed Feed	Central Milling Co.	13.63	4.10	5.90
		Brodhead, Ky.	**15.45**	**4.40**	**8.90**
4597–22	Red Star Fine Feed	Chattanooga Feed Co.	14.88	3.84	9.07
		Chattanooga, Tenn.	**14.00**	**4.50**	**9.50**
857–21	Peerless Feed	Clay Flour Mills	12.75	4.55	5.35
		Clay, Ky.	**13.94**	**3.58**	**5.05**
857–22	Same	Same	13.94	4.12	5.38
			13.94	**4.58**	**5.05**
4099–22	Mixed Feed	Clay City Roller Mills	14.25	3.95	6.05
		Clay City, Ky.	**15.50**	**3.75**	**8.50**
2818–21	Mixed Feed	Clell Coleman & Sons	14.63	4.70	8.03
		Burgin, Ky.	**14.25**	**4.25**	**9.50**
2818–22	Same	Same	15.63	4.55	7.83
			14.25	**4.25**	**9.50**
1535–20	King Chop Feed	The Colton Bros. Co.	10.13	3.68	5.68
		Bellefontaine, Ohio.	**12.00**	**4.50**	**6.00**
4063–22	Mixed Feed	Community Roller Mills	12.50	4.35	4.73
		Calhoun, Ky.	**13.93**	**4.29**	**7.27**
848–20	Mixed Feed	Crab Orchard Milling Co.	15.38	3.62	6.95
		Crab Orchard, Ky.	**15.22**	**4.28**	**8.50**
878–19	Mixed Feed	Dawson Milling Co.	12.25	5.77	6.93
		Dawson Springs, Ky.	**14.94**	**4.08**	**7.50**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
774–22	T. R. Franklin. Dawson Springs.	Wheat bran, shipstuff, hominy feed, ground wheat screenings 1%	
774–22	Shannon-Mercer & Co. Depoy.	Same	
4–22	J. M. McNeilly. Fulton.	Soft winter wheat bran, soft winter wheat middlings, corn bran, ground wheat screenings 7½%	Below guaranty in protein.
770–22	Geo. P. Taylor Co. Somerset.	Wheat bran, corn bran, unground wheat screenings 1%	Below guaranty in protein.
340–21	A. D. Ashcraft. Irvington.	Wheat bran, corn bran, wheat middlings, ground wheat screenings 5%	
1854–21	J. F. Williams & Son. Elizabethtown.	Wheat bran, shorts, corn, corn bran	Above guaranty in fiber.
1854–22	Woosley & Son. Elizabethtown.	Same	
3642–21	Wilson & Newman. Russellville.	Wheat middlings, wheat bran, corn bran, corn meal	No corn meal or corn bran present.
1953–21	D. C. Poynter. Mt. Vernon.	Wheat bran, wheat shorts, corn bran	Corn meal and ground wheat screenings present. Below guaranty in protein.
4597–22	The Bryant Feed Co. Corbin.	Wheat bran, wheat shorts, corn bran, corn hearts, wheat and corn screenings 10%	Below guaranty in fat.
857–21	Mfrs. Warehouse	Wheat bran, corn bran	Below guaranty in protein. Wheat middlings and corn bran present.
857–22	Same	Same	
4099–22	Same	Wheat bran, wheat middlings, wheat shorts, corn bran, ground wheat screenings 2%	Below guaranty in protein. Corn meal present.
2818–21	Same	Shipstuff, corn bran, wheat screenings 10%	
2818–22	S. A. Rankin. Monticello.	Same	
1535–20	Lanham-Terrell Gro. Co. Corbin.	Reground corn bran, corn meal, wheat bran	Below guaranty in both protein and fat. Considerable ground oats and oat hulls present.
4063–22	J. D. Gossett. Calhoun.	Wheat bran, wheat middlings, corn meal	Below guaranty in protein.
848–20	J. F. Griffin & Son. Mt. Vernon.	Wheat bran, wheat shorts, corn bran	Below guaranty in fat.
878–19	Mfrs. Warehouse	Wheat bran, corn bran, unground wheat screenings 3%	Corn bran and corn meal present. Below guaranty in protein. Inferior to guaranty.

TABLE VII.—MIXED FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
319–21	Dorsel's Special Feed	The Dorsel Co. Newport, Ky.	14.63	3.97	6.98
			15.00	4.00	8.00
319–22	Same	Same	17.25	5.11	7.95
			15.00	4.00	8.00
1021–18	Dorsel's Mixed Brans	Same	13.50	4.12	10.20
			14.00	4.00	9.50
3053–21	Tuxedo White Middlings & Corn Flour	The Early & Daniel Co. Cincinnati, Ohio.	12.81	3.69	3.20
			15.00	4.00	8.00
3397–21	Mixed Feed	The Elite Roller Mills. Elkton, Ky.	14.63	5.53	8.09
			15.45	4.55	9.18
91–21	Leader Mixed Feed	Eminence Milling Co. Eminence, Ky.	15.25	4.63	7.60
			15.00	4.50	9.00
91–21	Same	Same	14.88	4.47	6.90
			15.00	4.50	9.00
91–21	Same	Same	13.56	4.54	6.13
			15.00	4.50	9.00
91–22	Same	Same	14.63	5.09	7.60
			15.00	4.50	9.00
91–22	Same	Same	14.50	5.50	7.75
			15.00	4.50	9.00
3658–21	Kentucky Pride	The Eversole Co. London, Ky.	14.13	5.22	6.57
			15.50	4.45	8.75
892–22	Mixed Brans & Screenings	Exchange Milling Co. Sturgis, Ky.	14.13	4.16	5.95
			14.50	5.00	8.50
1503–21	Mixed Feed	W. M. Farless. Henderson, Ky.	14.38	4.13	6.53
			15.00	4.00	9.00
1503–21	Same	Same	14.13	4.11	6.93
			15.00	4.00	9.00
886–21	Jersey Feed	Faywood Milling Co. Versailles, Ky., R. F. D. 1.	14.69	4.02	9.13
			15.45	4.10	8.75
886–21	Same	Same	13.19	3.86	6.70
			15.45	4.10	8.75
851–22	Mixed Brans	Franklin Kentucky Mills Co. Franklin, Ky.	13.75	5.12	5.45
			16.13	4.51	5.42
3070–21	Common Sense Feed	Henry Fruechtenicht Louisville, Ky.	14.13	5.87	6.85
			13.00	5.60	8.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
319–21	Fred Schuerman ..... Newport.	Wheat middlings, fine corn bran 10%	Ground wheat screenings containing cheat and weed seeds present.
319–22	Same	Same	No corn bran present. Ground wheat screenings found.
1021–19	Louis Kuechler ..... Newport.	Wheat bran, corn bran.....	Below guaranty in protein and above in fiber.
3053–21	J. W. Rink..... Walton.	Wheat flour middlings, corn flour.	Much below guaranty in protein and much inferior to quality.
3397–21	Mfrs. Warehouse	Wheat bran, wheat middlings, corn bran	Below guaranty in protein.
91–21	Ewing & Gray ..... Eminence.	Wheat bran, wheat middlings, corn bran 2%, ground wheat screenings 5%	Screenings contain weed seeds and cheat.
91–21	F. J. Porter..... Bloomfield.	Same	Unground wheat screenings found.
91–21	Ewing & Gray ..... Eminence.	Same	Below guaranty in protein. Inferior to guaranty.
91–22	New Castle Implement Co New Castle.	Same	
91–22	Lon Ewing ..... Eminence.	Same	Below guaranty in protein.
3658–21	Mfrs. Warehouse	Wheat shorts, wheat bran, corn bran	Same.
892–22	West Kentucky Coal Co.. Sturgis.	Wheat bran, corn bran, unground wheat screenings 8%	Below guaranty in fat.
1503–21	J. H. Willingham..... Henderson.	Wheat bran, corn bran 5%. Ground wheat screenings 3%..	Below guaranty in protein.
1503–21	T. F. Hart ..... Henderson.	Same	Below guaranty in protein. Corn meal found. Contains considerable cheat and chaff.
886–21	Mfrs. Warehouse	Wheat bran, wheat shorts, corn bran 3%	Below guaranty in protein and above in fiber.
886–21	Cogar-Rumley Co. ..... Midway.	Same	No wheat bran found. Below guaranty in protein and fat.
851–22	Park City Feed Store.... Bowling Green.	Wheat bran, corn bran, ground wheat screenings 2%	Considerable corn meal and low grade wheat flour present. Below guaranty in protein.
3070–21	Chappell Grocery Co. ... Pineville.	Wheat bran, hominy feed.....	Contains ground wheat screenings.

TABLE VII.—MIXED FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
259–22	Mixed Feed	Garrard Milling Co.	11.38	4.46	4.28
		Lancaster, Ky.	**13.75**	**4.85**	**9.85**
259–22	Same	Same	11.88	4.46	5.16
			13.75	**4.85**	**9.85**
259–22	Same	Same	13.19	3.22	5.35
			13.75	**4.85**	**9.85**
909–21	Glass Hi-Grade Feed	Glass Milling Co.	14.06	4.78	8.03
		Wilmore, Ky.	**15.70**	**4.25**	**7.70**
909–21	Same	Same	12.25	2.93	4.95
			15.70	**4.25**	**7.70**
909–21	Same	Same	12.25	2.98	4.65
			15.70	**4.25**	**7.70**
909–22	Same	Same	14.38	5.14	7.10
			14.15	**3.95**	**7.38**
1454–20	Mixed Feed	Gordonsville Milling Co.	14.63	3.60	8.85
		Gordonsville, Ky.	**14.41**	**5.03**	**8.25**
4003–21	Mixed Feed	Green Bros.	15.25	4.10	8.70
		Falls of Rough, Ky.	**15.36**	**4.41**	**9.25**
3656–21	Farm Feed	Gwinn Bros. Co.	14.00	4.82	7.32
		Huntington, W. Va.	**14.00**	**4.00**	**8.50**
3656–22	Same	Same	14.50	6.42	6.98
			14.00	**4.00**	**8.50**
3786–21	Mixed Feed	Hardin Milling Co.	10.50	3.81	6.98
		Hardin, Ky.	**11.38**	**4.10**	**3.98**
961–21	Mixed Feed	Hardinsburg Mill & Elevator Co.	13.50	3.85	6.85
		Hardinsburg, Ky.	**14.75**	**4.25**	**9.75**
4234–22	"Harlomco" Mixed Feed	Harlan-Lowe Milling Co.	15.44	4.49	6.53
		Bardwell, Ky.	**15.50**	**4.60**	**6.82**
4234–22	Same	Same	14.00	4.17	6.85
			15.50	**4.60**	**6.82**
71–21	Feed Stuff	Same	15.56	4.58	6.90
			14.00	**4.20**	**8.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
259–22	Mfrs. Warehouse	Wheat bran, wheat shorts, corn bran, ground wheat screenings 3%	Below guaranty in protein. Too much corn product used for the guarantee.
259–22	J. S. Duke..... Crab Orchard.	Same	Same.
259–22	J. S. Rowe ..... Livingston.	Same	Below guaranty in protein. Inferior product.
909–21	F. K. Tribble ..... Danville.	Wheat bran, wheat middlings shipstuff, corn bran, unground wheat screenings 3%	Below guaranty in protein and above in fiber.
909–21	Turner & Ham Co. ..... Somerset.	Same	Below guaranty in both protein and fat. Inferior to guaranty.
909–21	I. E. Payne ..... Eubank.	Same	Made of whole ground barley, corn feed meal, ground wheat screenings containing cheat, ground oats and is not the feed claimed. Misbranded.
909–22	Flavo Grain & Mill Co. .. Somerset.	Same	
1454–20	C. S. Lyne, Jr. ..... Russellville.	Wheat bran, corn bran, whole wheat screenings 2%	Below guaranty in fat and above in fiber.
4003–21	T. J. Whittinghill..... Fordsville.	Wheat bran, corn bran, ground wheat screenings 1%, middlings	Ground and unground wheat screenings in excess of 1%
3656–21	H. H. Borders..... Catlettsburg.	Wheat bran, wheat middlings (with ground screenings), corn flour, corn bran	No corn flour present.
3656–22	R. T. Elswick & Co. .... Praise.	Same	
3786–21	Mfrs. Warehouse	Wheat bran, wheat middlings, cracked corn ground wheat screenings 7%	Below guaranty in protein and fat and above in fiber.
961–21	J. H. Roberts..... Fordsville.	Wheat bran, shipstuff, corn bran, ground wheat screenings 5% ..	Below guaranty in protein. Corn meal found.
4234–22	Ballard Mercantile Co. .. Wickliffe.	Wheat bran, middlings, shorts, ground wheat screenings 3%, corn bran.	Unground wheat screenings containing cheat present.
4234–22	Same	Same	Below guaranty in protein. Much inferior to claim.
71–21	Ballard Mercantile Co. .. Wickliffe.	Wheat bran, corn bran, ground & unground wheat screenings 3%	

TABLE VII.—MIXED FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
1193–22	Empress	R. L. Harrison & Sons. Bagdad, Ky.	13.81	4.79	8.30
			15.38	**3.85**	**6.93**
1193–22	Same	Same	14.25	4.55	7.48
			15.38	**3.85**	**6.93**
962–20	Mixed Feed	Hickman Milling Co. Nicholasville, Ky.	12.81	4.19	7.84
			14.00	**3.50**	**8.25**
3361–21	Superior Mixed Feed	Horse Cave Mills. Horse Cave, Ky.	13.25	4.64	6.88
			15.75	**4.50**	**8.50**
3008–21	Mixed Feed	Hustonville Roller Mills. Hustonville, Ky.	15.00	4.25	7.00
			14.30	**3.90**	**10.40**
3086–20	Lyon Mixed Feed	Keith Bros. Buffalo, Ky.	14.63	5.00	7.60
			15.25	**4.35**	**10.50**
500–22	Mixed Feed	R. U. Kevil & Sons. Princeton, Ky.	15.25	4.76	7.15
			15.00	**4.25**	**8.50**
500–22	Same	Same	15.31	4.83	7.87
			15.00	**4.25**	**8.50**
324–22	Mixed Feed	Kuttawa Milling Co. Kuttawa, Ky.	14.00	5.57	6.75
			13.90	**3.52**	**8.50**
324–22	Same	Same	14.00	6.15	5.88
			13.90	**3.52**	**8.50**
3774–22	La Fayette Feed	La Fayette Corn Flour Mills. Louisville, Ky.	11.88	7.20	5.45
			12.00	**6.50**	**6.00**
3774–22	Same	Same	12.13	7.16	5.40
			12.00	**6.50**	**6.00**
3774–22	Same	Same	12.88	6.26	4.75
			12.00	**6.50**	**6.00**
752–22	Mixed Feed	Lancaster Milling Co. Lancaster, Ky.	14.25	4.52	7.28
			16.00	**5.38**	**9.00**
397–21	Thoroughbred Feed	Lexington Roller Mills Co. Lexington, Ky.	16.00	4.55	7.90
			15.50	**4.50**	**8.00**
397–22	Same	Same	15.00	3.78	7.08
			15.50	**4.50**	**8.00**
397–22	Same	Same	15.00	4.49	7.65
			15.50	**4.50**	**8.00**
1038–22	Farmers Choice	Lewisport Mill Co. Lewisport, Ky.	14.75	4.81	6.98
			14.00	**4.25**	**9.50**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
1193–22	R. A. Newton & Co. .... Shelbyville.	Wheat bran, wheat shorts, corn bran, ground wheat screenings 10%	Below guaranty in protein and above in fiber. Too much corn bran used.
1193–22	Shelbyville Feed & Produce Co., Shelbyville..	Same	Below guaranty in protein and above in fiber. Unground wheat screenings present.
962–20	C. T. Ashley Co. ..... Nicholasville.	Wheat bran, corn bran 5%, ground wheat screenings 5%...	Much too low in protein. Corn meal present.
3361–21	Hulen-Toops Co. ..... Munfordville.	Wheat bran, wheat middlings, corn bran, ground wheat screenings 5%	Below guaranty in protein. Corn meal present.
3008–21	Reynolds & Burleson.... Waynesburg.	Wheat bran, wheat shorts, corn bran, ground wheat screenings 15%	
3086–20	J. W. Mahoney..... New Haven.	Wheat bran, wheat shorts, corn bran, ground screenings 3% ..	Below guaranty in protein.
500–22	McLin Bros. ..... Princeton.	Wheat bran, corn bran, ground wheat screenings 4%.....	
500–22	W. B. Ray..... Princeton.	Same	
324–22	E. O. Harrell..... Eddyville.	Shipstuff, corn bran, wheat bran.	
324–22	Mfrs. Warehouse	Same	Corn meal present.
3774–22	Jellico Grocery Co. ..... Corbin.	Hominy feed, wheat middlings...	
3774–22	Bell Grocery Co. ..... Pineville.	Same	
3774–22	Mahan Co. ..... Winchester.	Same	
752–22	Mfrs. Warehouse	Wheat bran, corn bran.....	Inferior feed, unground wheat screenings containing pin oats, cheat, cockle.
397–21	J. P. Oney ..... West Liberty.	Wheat bran, wheat middlings, ground wheat screenings 3%, corn bran 2%	
397–22	Caudill, Hall & Co. ..... Morehead.	Same	
397–22	Stearns Coal & Lumber Co., Stearns	Same	Below guaranty in protein.
1038–22	W. M. Gordon..... Maceo.	Shipstuff, corn bran, ground wheat screenings 2%	Corn meal present.

TABLE VII.—MIXED FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
287–22	Ideal Cow Feed	Lone Mountain Milling Co.	11.88	4.23	5.15
		Middlesboro, Ky.	**13.00**	**4.50**	**7.00**
406–21	Nonesuch Feed	The Louisville Cereal Mill Co.	11.75	5.72	4.68
		Louisville, Ky.	**11.62**	**6.00**	**6.50**
1073–22	Mixed Feed	McKinney Milling Co.	15.75	4.48	7.80
		McKinney, Ky.	**14.25**	**4.70**	**9.15**
1072–22	Madison Feed	Madison Milling Co.	15.38	4.18	6.36
		Richmond, Ky.	**15.50**	**4.75**	**8.50**
752–21	Mixed Feed	F. B. Marksbury & Co.	14.56	4.65	5.74
		Lancaster, Ky.	**16.00**	**5.38**	**9.00**
158–21	Mixed Feed	Mayfield Milling Co.	14.00	5.20	7.03
		Mayfield, Ky.	**14.50**	**4.95**	**7.87**
158–21	Same	Same	16.25	4.83	7.75
			14.50	**4.95**	**7.87**
158–22	Same	Same	13.50	4.60	6.08
			14.50	**4.95**	**7.87**
158–22	Same	Same	13.94	4.77	7.84
			14.50	**4.95**	**7.87**
158–22	Same	Same	15.75	4.26	8.53
			14.50	**4.95**	**7.87**
1319–20	Mixed Feed	Model Mills, Ward Bros., Props.	15.25	4.95	7.34
		Georgetown, Ky.	**15.69**	**4.56**	**8.50**
1956–21	White Rose Mixed Feed	Morganfield Roller Mills	11.88	3.59	4.50
		Morganfield, Ky.	**12.00**	**4.00**	**10.00**
1956–22	Same	Same	16.75	4.07	2.63
			12.00	**4.00**	**10.00**
1956–22	Same	Same	12.25	4.61	5.05
			12.00	**4.00**	**10.00**
1956–22	Same	Same	15.00	4.12	7.23
			12.00	**4.00**	**10.00**
1956–22	Same	Same	13.00	4.03	6.13
			12.00	**4.00**	**10.00**
1956–22	Same	Same	12.75	4.35	6.08
			12.00	**4.00**	**10.00**
1956–22	Same	Same	12.38	4.28	5.80
			12.00	**4.00**	**10.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
287–22	Pineville Produce Co. .. Pineville.	Wheat bran, wheat shorts, corn bran, feed meal, ground wheat screenings 6%	Below guaranty in protein and fat.
406–21	Joe Lovett ..... Williamsburg.	Hominy meal, wheat bran.....	
1073–22	Breeden & Ward..... Science Hill.	Wheat bran, wheat shorts, corn bran, ground wheat screenings 3%	No corn bran present.
1072–22	Creech Bros. ..... Poor Fork.	Wheat bran, wheat middlings, corn bran, ground wheat screenings 5%	No corn bran present. Unground wheat screenings found.
752–21	M. S. Burton ..... Mt. Vernon.	Wheat bran, corn bran.....	Below guaranty in protein and fat.
158–21	F. M. Holcomb..... Murray.	Wheat bran, corn bran, shorts, ground wheat screenings 3%.	Below guaranty in protein. Corn meal present.
158–21	Mfrs. Warehouse	Same	
158–22	Graves Co. Farm Bureau. Mayfield.	Same	Below guaranty in protein.
158–22	J. J. Shaver..... Mayfield.	Same	Below guaranty in protein. Unground wheat screenings containing cheat in excess of guarantee.
158–22	Same	Same	Above guarantee in fiber. Unground wheat screenings in excess of 3% present.
1319–20	R. A. Dodd..... Nicholasville.	Wheat bran, wheat middlings, corn bran, ground wheat screenings 3%	
1956–21	S. Grayson ..... Corydon.	Wheat bran, corn bran, ground wheat screenings 3%	Considerable corn meal present.
1956–22	John L. Hosman..... Morganfield.	Same	Sample is wheat middlings and not mixed feed.
1956–22	W. B. Davis..... Princeton.	Same	Corn meal present. Ground wheat screenings contain cheat.
1956–22	J. H. West ..... Dawson Springs.	Same	
1956–22	Mfrs. Warehouse	Same	Corn meal present. Unground wheat screenings, containing cheat, in excess of 3%.
1956–22	H. C. Penticost..... Corydon.	Same	
1956–22	Jacob Stotz ..... Greenville.	Same	Same.

TABLE VII.—MIXED FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
1081–22	Fine Feed	Mountain City Mill Co.	10.13	4.54	3.21
		Chattanooga, Tenn.	**15.00**	**7.75**	8.00
1081–22	Same	Same	14.06	4.49	5.31
			15.00	**4.50**	8.00
1081–22	"Blue Cow" Fine Feed	Same	14.63	4.46	6.70
			11.00	**4.50**	8.00
250–22	Mixed Feed	Murray Milling Co.	14.38	4.93	7.73
		Murray, Ky.	**15.00**	**4.00**	8.25
2793–20	Mixed Feed	J. C. Nelson	13.75	3.46	5.58
		Jamestown, Ky.	**12.31**	**3.01**	6.50
1131–21	Mixed Feed	W. N. Neville	14.50	4.15	6.93
		Arlington, Ky.	**15.00**	**3.00**	7.98
1131–21	Same	Same	15.25	3.98	6.93
			15.00	**3.00**	7.98
1131–22	Same	Same	12.88	4.65	6.75
			15.00	**3.00**	7.98
3261–23	Mill Feed	New Era Milling Co.	14.75	3.26	5.75
		Sadieville, Ky.	**15.25**	**4.00**	8.50
2035–23	Ideal Feed	E. F. Ogden & Son	14.50	3.67	6.00
		Slaughters, Ky.	**13.00**	**4.00**	12.00
3165–21	Mixed Feed	Owenton Roller Mills	13.94	4.19	8.05
		Owenton, Ky.	**15.50**	**4.09**	7.91
3165–21	Same	Same	14.75	4.07	7.05
			15.50	**4.09**	7.91
1936–21	Mixed Feed	Paducah Milling Co.	15.13	4.33	5.80
		Paducah, Ky.	**15.50**	**4.50**	**9.50**
1936–22	Same	Same	13.69	4.33	11.23
			15.50	**4.50**	**9.50**
1936–22	Same	Same	13.38	4.54	5.05
			15.50	**4.50**	**9.50**
1936–23	Same	Same	14.38	4.51	6.98
			15.50	**4.50**	**9.50**
1711–21	Mixed Feed	Paris Milling Co.	15.25	4.83	8.40
		Paris, Ky.	**15.00**	**4.75**	**10.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
1081–22	Middlesboro Wholesale Grocery Co., Middlesboro	Wheat shorts, wheat middlings, ground wheat bran, ground wheat screenings 2%, corn bran, hominy feed, corn oil cake, corn meal.	Below guaranty in protein and fat. Inferior to guaranty.
1081–22	Whitley Grocery Co. ... Corbin.	Same	Below guaranty in protein.
1081–22	Middlesboro Wholesale Gro. Co., Middlesboro.	Same	
250–22	Mfrs. Warehouse	Wheat bran, wheat middlings, corn bran 10%	Below guaranty in protein.
2793–20	Mfrs. Warehouse	Wheat bran, corn bran, ground wheat screenings 3%	
1131–21	Lee & Moss Wickliffe.	Wheat bran, wheat shorts, corn bran, unground wheat screenings 1%	Below guaranty in protein. Screenings present in excess of guaranty.
1131–21	Mfrs. Warehouse	Same	Considerable cheat present.
1131–22	Same	Same	Much below guaranty in protein, and inferior to claim.
3261–23	Farmers Union Supply Co Cynthiana.	Shipstuff, corn bran	Below guaranty in protein and fat. Corn meal present.
2035–23	G. E. Mansfield Madisonville.	Wheat bran, corn bran, shipstuff, unground wheat screenings 10%	
3165–21	Mfrs. Warehouse	Corn bran, wheat bran, wheat middlings, ground wheat screenings 3%	Below guaranty in protein.
3165–21	Same	Same	Below guaranty in protein. Unground wheat screenings present.
1936–21	Claud Harris Paducah.	Wheat bran, wheat shorts, ground wheat screenings 7%, corn bran	Corn meal present.
1936–22	Mfrs. Warehouse	Same	Below guaranty in protein and above in fiber. Oat product present.
1936–22	F. M. Holcomb & Son... Murray.	Same	Much below guaranty in protein. Contains corn meal though not declared on label. Inferior to official guarantee.
1936–23	T. G. Stevenson Paducah.	Same	Below guaranty in protein. Corn meal present.
1711–21	W. G. Blair & Co. West Liberty.	Soft winter wheat bran, wheat shorts, wheat middlings, corn bran, ground wheat screenings 3%	

TABLE VII.—MIXED FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
929–22	Mixed Feed	Park City Milling Co.	14.56	5.90	6.90
		Bowling Green, Ky.	**15.19**	**4.17**	**8.50**
1423–22	A No. 1 Mill Feed	Parks & Son	12.75	6.52	6.50
		Richmond, Ky.	**13.63**	**4.25**	**8.50**
2550–22	Mixed Feed	The Peoples Roller Mills, G. T. Carnal, Prop., Sebree, Ky.	13.25	2.92	3.18
			13.50	**4.50**	**8.00**
1268–21	Mill Feed	Peoples Roller Mills Co.	14.25	5.10	7.73
		Georgetown, Ky.	**14.50**	**4.10**	**8.25**
1268–21	Same	Same	14.88	4.91	7.49
			14.50	**4.10**	**8.25**
1436–21	Oswegon Feed	Peters & Bradley Mill Co.	13.56	4.37	8.30
		Knoxville, Tenn.	**14.00**	**4.00**	**6.50**
1434–20	Mixed Feed	Poole Milling Co.	16.06	3.94	5.86
		Poole, Ky.	**15.00**	**3.25**	**7.43**
1434–22	Same	Same	14.38	4.73	7.18
			15.00	**3.25**	**7.43**
1216–22	Pott's Reground Mixed Feed	R. L. Potts & Sons	13.18	4.55	8.37
		White's Station, Ky.	**13.13**	**5.85**	**8.20**
967–22	Mixed Feed	Riverside Mills	14.63	4.98	6.75
		Adairville, Ky.	**15.25**	**4.45**	**8.50**
2888–20	Mixed Feed	Scottsville Milling Co.	11.69	4.00	4.25
		Scottsville, Ky.	**15.25**	**4.45**	**10.00**
1882–22	Cream Patent Feed	Sebree Roller Mills	14.75	4.57	6.75
		Sebree, Ky.	**15.43**	**4.23**	**9.50**
1560–21	Mixed Feed	Smithfield Milling Co.	14.75	4.47	8.57
		Smithfield, Ky.	**15.00**	**4.50**	**7.00**
1560–22	Same	Same	14.31	4.84	8.85
			15.00	**4.50**	**7.00**
900–21	So-mil-co Mixed Feed	Somerset Milling Co.	12.63	4.63	4.82
		Somerset, Ky.	**15.00**	**4.75**	**7.40**
900–21	Same	Same	12.38	4.04	4.75
			15.00	**4.75**	**7.40**
1194–21	Mixed Feed	E. F. Spears & Son	14.75	5.05	7.70
		Paris, Ky.	**14.50**	**4.50**	**7.50**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
929–22	J. L. Jenkins..... Bowling Green.	Wheat bran, shorts, corn bran, ground wheat screenings 5%..	Below guaranty in protein. Wormy and has mouldy odor.
1423–22	Mfrs. Warehouse	Corn bran, wheat bran, wheat shorts, ground wheat screenings 5%	Below guaranty in protein. Corn meal present.
2550–22	Robert Jackson Hdw. Co. Dixon.	Wheat bran, corn meal, corn bran	Below guaranty in fat. Considerable fine middlings or low grade flour present.
1268–21	Mfrs. Warehouse	Wheat bran, wheat shorts, corn bran	
1268–21	Smith & Mitchell..... Georgetown.	Same	
1436–21	Smith-Chadwell & Co. ... Middlesboro.	Wheat bran, wheat shorts, ground wheat screenings 5%, corn bran, corn meal, ground wheat screenings 2%	Below guaranty in protein and above in fiber.
1434–20	Henderson Feed & Commission Co., Henderson	Wheat bran, wheat middlings, corn bran	
1434–22	Mfrs. Warehouse	Same	Below guaranty in protein.
1216–22	F. H. Gordon..... Richmond.	Wheat bran, wheat middlings, corn bran, ground wheat screenings 5%, ground corn screenings 2%	
967–22	J. R. Tully ..... Adairville.	Wheat bran, wheat middlings, corn bran	Below guaranty in protein.
2888–20	Mfrs. Warehouse	Wheat bran, corn bran, ground wheat screenings 5%.....	Wheat middlings and corn meal present. Much too low in protein. Inferior to guarantee.
1882–22	Tapp & Townsend..... Tilden.	Wheat bran, corn bran, unground wheat screenings 5%.....	Below guaranty in protein.
1560–21	Ballard Bros. ..... LaGrange.	Wheat bran, wheat shorts, corn bran, ground wheat screenings 2%	Above guaranty in fiber.
1560–22	Mfrs. Warehouse	Same	Below guaranty in protein and above in fiber.
900–21	Lester Crawford & Baugh Science Hill.	Wheat bran, wheat middlings, corn bran, ground wheat screenings 5%	Below guaranty in protein. Inferior to guaranty. Corn meal present.
900–21	R. T. Elliott..... Somerset.	Same	In addition to guaranty this feed contains corn meal. Below guaranty in both protein and fat.
1194–21	James Drake ..... Campton.	Wheat bran, wheat shorts, wheat middlings, corn bran 5%, ground wheat screenings 3%	

TABLE VII.—MIXED FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
1194–22	Mixed Feed	E. F. Spears & Son	14.25	3.68	6.45
		Paris, Ky.	14.50	4.50	7.50
1465–22	Mixed Feed	Star Milling Co.	13.88	5.20	8.40
		Clinton, Ky.	13.25	4.40	9.50
1465–22	Same	Same	13.38	5.14	10.40
			13.25	4.40	9.50
1465–20	Same	Same	15.19	4.47	7.75
			14.50	4.00	8.50
1465–21	Same	Same	13.88	4.66	9.18
			14.50	4.00	8.50
1465–21	Same	Same	13.25	4.15	5.75
			14.25	4.40	9.50
325–22	Mixed Feed	Star Roller Mills	13.25	5.69	6.13
		Cloverport, Ky.	14.50	4.25	9.25
1504–22	Mixed Feed	Stephensport Mill & Elev. Co.	13.38	3.95	7.75
		Stephensport, Ky.	13.75	4.10	9.25
1504–22	Same	Same	13.63	3.30	7.40
			13.75	4.10	9.25
3149–21	Tate & Co.'s Feed	J. H. Tate & Co.	15.25	4.68	6.78
		Monticello, Ky.	15.31	4.45	9.65
907–19	Purity Mill Feed	Van Hoose Adams Co.	12.31	5.86	8.30
		Ashland, Ky.	14.31	6.71	8.25
285–21	Woolcott's Mixed Feed	Woolcott Flour Mills	14.63	3.90	6.69
		Lexington, Ky.	15.50	3.73	7.78
285–21	Same	Same	14.69	3.65	6.30
			15.50	3.73	7.78
285–21	Same	Same	14.50	3.72	6.35
			15.50	3.73	7.78
285–22	Same	Same	14.50	3.81	6.88
			15.50	3.73	7.78
285–22	Same	Same	13.88	4.80	6.35
			15.50	3.73	7.78

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
1194–22	Mfrs. Warehouse	Wheat bran, wheat shorts, wheat middlings, corn bran 5%, ground wheat screenings 3%.	
1465–22	Jewell Bros. ..... Clinton.	Soft winter wheat bran, soft winter wheat middlings, corn bran, ground corn, ground wheat screenings 2%	Below guaranty in protein. No wheat middlings found. Unground wheat screenings containing cheat, in excess of 2%.
1465–22	W. T. Grissom..... Hickman.	Same	Above guaranty in fiber.
1465–20	Mfrs. Warehouse	Same	Unground wheat screenings present.
1465–21	J. A. Shaver & Co. ..... Mayfield.	Same	Below guaranty in protein and above in fiber. No wheat middlings found. Unground wheat screenings in excess of 2%.
1465–21	Mfrs. Warehouse	Same	Below guaranty in protein. Feed contains corn meal and unground wheat screenings.
325–22	Mfrs. Warehouse	Wheat bran, wheat middlings, corn bran, wheat screenings 5%	Below guaranty in protein. Corn meal present.
1504–22	Stearman & Harsley.... Garfield.	Middlings, bran, corn bran, ground wheat screenings 5%.....	Below guaranty in protein. Ground wheat screenings in excess of 5%.
1504–22	Geo. J. Neff..... Guston.	Same	Below guaranty in fat. Ground wheat screenings in excess of 5%.
3149–21	Mfrs. Warehouse	Wheat bran, wheat middlings, corn bran, ground wheat screenings 2%	
907–19	Mfrs. Warehouse	Wheat middlings, wheat bran, corn bran	Below guaranty in both protein and fat.
285–21	Caudill, Hall & Co. ..... Morehead.	Wheat bran, wheat shorts, wheat middlings, corn bran, ground wheat screenings 2%	Below guaranty in protein.
285–21	R. P. Coffman..... Walton.	Same	Below guaranty in protein. Unground wheat screenings containing cheat present.
285–21	Rowlett & Sons ..... Beattyville.	Same	Below guaranty in protein. Unground wheat screenings present.
285–22	Hill Congleton & Son... Beattyville.	Same	Same.
285–22	Powell Mercantile Co. .. Stanton.	Same	Below guaranty in protein.

TABLE VII.—MIXED FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
285–22	Woolcott's Mixed Feed.....	Woolcott Flour Mills.....	13.38	4.32	6.98
		Lexington, Ky.	**15.50**	**3.73**	**7.78**
285–23	Same	Same	13.38	4.09	5.95
			15.50	**3.73**	**7.78**
4015–22	Mixed Mill Feed	P. J. Weisenberger & Son.....	14.38	5.11	6.38
		Midway, Ky.	**14.87**	**4.85**	**10.00**
4015–22	Same	Same	13.81	4.91	7.77
			14.87	**4.85**	**10.00**
1226–21	Cream Feed	Same	14.44	4.73	6.05
			14.71	**5.16**	**10.25**
1964–22	National	A. P. White & Co.	15.38	4.69	7.33
		Cadiz, Ky.	**15.00**	**4.50**	**8.25**
22–21	Mixed Feed	Winchester Roller Mills.....	15.25	4.12	6.37
		Winchester, Ky.	**15.50**	**4.00**	**7.50**
22–22	Same	Same	15.00	4.67	7.72
			15.50	**4.00**	**7.50**
22–22	Same	Same	14.38	4.22	7.95
			15.50	**4.00**	**7.50**
22–23	Same	Same	14.13	5.34	6.85
			15.50	**4.00**	**7.50**
3054–22	"Winner Brand" Fine Feed.....	Winer Mill Co.	14.38	4.40	7.70
		Chattanooga, Tenn.	**14.00**	**5.00**	**6.00**
1564–22	Mixed Feed	Young & Bishop.....	14.63	4.23	7.13
		Providence, Ky.	**13.00**	**5.00**	**7.00**
1699–22	Bonanza	J. W. Zaring Grain & Mill Co..	14.38	5.90	6.98
		Richmond, Ky.	**15.50**	**4.75**	**8.50**
	Mixed Middlings.				
2665–20	Fancy White Wheat & Rye Middlings and Screenings.....	Gwinn Bros. & Co.	12.38	4.67	4.53
		Huntington, W. Va.	**16.00**	**4.00**	**7.50**
2665–20	Same	Same	15.38	4.15	4.40
			16.00	**4.00**	**7.50**
2665–20	Same	Same	14.13	4.36	4.88
			16.00	**4.00**	**7.50**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
285–22	J. P. Wright..... Salt Lick.	Wheat bran, wheat shorts, wheat middlings, corn bran, ground wheat screenings 2%.....	Below guaranty in protein.
285–23	Owen & Ducker ..... Butler.	Same	Below guaranty in protein. Unground wheat screenings, barley hulls and chaff present. Inferior to guaranty.
4015–22	Roszell Bros..... Lexington.	Wheat bran, wheat middlings, corn bran, ground wheat screenings 15%	Corn meal present.
4015–22	O. N. Smith & Co. ..... Frankfort.	Same	Below guaranty in protein.
1226–21	Same	Wheat bran, corn bran.....	Wheat middlings and unground wheat screenings present.
1964–22	Trigg County Feed & Produce Co., Cadiz.	Wheat bran, corn bran, wheat middlings, shipstuff, ground wheat screenings 2%	Unground wheat screenings present.
22–21	Morehead Produce Co. .. Morehead.	Wheat bran, corn bran, ground wheat screenings 5%.....	Wheat middlings present.
22–12	John Roark & Son ..... Poor Fork.	Same	Below guaranty in protein.
22–22	B. Tipton ..... Ravenna.	Same	Below guaranty in protein. Wheat middlings present.
22–23	Acme By-Products Coal Co., Fleming.	Same	Much below guaranty in protein. Corn meal present.
3054–22	Jellico Grocery Co. ..... Harlan.	Wheat bran, wheat shorts, corn feed meal	Below guaranty in fat and above in fiber.
1564–22	J. B. Benjamin & Son... Providence.	Wheat bran, corn bran, ground wheat screenings 5%.....	Below guaranty in fat.
1699–22	J. C. Howerton..... Beattyville.	Wheat bran, wheat middlings, corn bran, ground wheat screenings 5%	Below guaranty in protein. Corn meal present.
2665–20	Nunnery & Smith..... Prestonsburg.	Wheat middlings, rye middlings, low grade flour, ground wheat screenings 2%	Adulterated with ground corn bran and corn meal. Low in protein. Inferior to guaranty.
2665–20	The Consolidation Coal Co., Van Lear.	Same	Below guaranty in protein. Adulterated with corn bran and corn meal.
2665–20	Same	Same	No rye middlings found. Corn meal and corn bran present. Below guaranty in protein. Not as guaranteed.

TABLE VII.—MIXED FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
2665–21	Fancy White Wheat and Rye Middlings and Screenings.....	Gwinn Bros. & Co.....	13.63	4.36	3.80
		Huntington, W. Va.	16.00	4.00	7.50
1266–21	Lotus Wheat & Rye Middlings...	Keister Milling Co.	14.63	3.86	6.77
		Huntington, W. Va.	15.00	3.75	4.00
1266–21	Same	Same	14.50	3.68	6.80
			15.00	3.75	4.00
1266–21	Same	Same	16.50	4.76	6.97
			15.00	3.75	4.00
1266–21	Same	Same	16.56	4.09	7.17
			15.00	3.75	4.00
	Palmo Middlings.				
1878–20	Palmo Middlings	Newsome Feed & Grain Co. ..	16.25	7.38	6.25
		Pittsburg, Pa.	16.00	7.00	9.00
1878–22	Same	Same	14.25	4.55	7.53
			16.00	7.00	9.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
2665–21	H. H. Borders..... Catlettsburg.	Wheat middlings, rye middlings, low grade flour, ground wheat screenings 2%	No rye middlings found. Adulterated with ground corn bran. Inferior to guaranty. Below guaranty in protein.
1266–21	Pikeville Grocery Co. ... Pikeville.	Wheat middlings, rye middlings.	Excess of ground wheat bran, ground wheat screenings, ground barley, ground weed seeds, oat hulls, and corn product present.
1266–21	Wheeler Grocery Co. ... Paintsville.	Same	Contains ground wheat bran, ground barley, ground wheat screenings, corn product and oat hulls.
1266–21	Burnam Roberts ..... Louisa.	Same	Ground wheat screenings containing ground weed seeds, present. High in fiber.
1266–21	F. F. Williams..... Garrett.	Same	Above guaranty in fiber.
1878–20	H. T. Edwards..... Campbellsville.	Wheat middlings, rye middlings, palm oil	
1878–22	Eminence Milling Co. ... Eminence.	Same	Below guaranty in protein and fat.

TABLE VIII.—POULTRY FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
	Poultry Grains.				
308–21	E-Z Scratch Feed (without grit)	Acme-Evans Co.	9.88	2.92	2.64
		Indianapolis, Ind.	**10.00**	**2.50**	5.00
4501–23	"Diamond D" Chick Feed.....	Alfocorn Milling Co.	10.38	3.41	2.10
		St. Louis, Mo.	**10.00**	**2.50**	5.00
3742–22	High Fly Scratch Feed.....	Same	9.13	3.14	2.50
			9.00	**3.00**	4.50
3578–22	Red Dot Scratch Feed.....	Same	10.25	3.42	3.05
			10.00	**3.00**	4.50
3578–22	Same	Same	9.25	3.75	2.45
			10.00	**3.00**	4.50
388–22	Tip Top Scratch Feed.....	American Milling Co.	10.63	3.58	3.25
		Peoria, Ill.	**10.00**	**2.50**	5.00
388 23	Same	Same	10.38	3.69	3.30
			10.00	**2.50**	5.00
392–23	Tip Top Chick Feed.....	Same	11.38	4.18	3.23
			10.00	**2.50**	5.00
1354–22	H. D. Scratch Feed (No Grit)....	The Ansted & Burk Co.	10.19	3.05	2.58
		Springfield, Ohio.	**11.00**	**3.00**	4.00
700–22	Sunkist Scratch Feed.....	Arcady Farms Milling Co.	10.63	3.27	4.25
		Chicago, Ill.	**10.00**	**2.50**	5.00
700–22	Same	Same	10.00	4.04	2.85
			10.00	**2.50**	5.00
700–22	Same	Same	9.63	3.99	2.90
			10.00	**2.50**	5.00
700–22	Same	Same	9.75	3.22	2.75
			10.00	**2.50**	5.00
1783–22	Sunkist Baby Chick Feed.....	Same	11.00	4.37	2.50
			10.00	**2.50**	5.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
308–21	Harvey Stout ..... Fern Creek.	Wheat, corn, kaffir corn, barley, oats	
4501–23	W. T. Sistrunk & Co.... Lexington.	Corn, wheat, millet seed.....	Feed is not as guaranteed. 85% cracked corn. Wild buckwheat, weed seeds, wild and pin oats and flax seed present.
3742–22	W. L. Kimbrough & Son. Guthrie.	Cracked corn, kaffir corn, milo maize, barley, oats (rolled), sunflower seed.....	Feed is not as guaranteed. 85% is cracked corn. No sunflower seed, kaffir or milo present.
3578–22	Yopp Seed Co. ..... Paducah.	Cracked corn, kaffir corn, milo maize, rolled barley, rolled oats	
3578–22	T. E. Furrie..... West Point.	Same	Below guaranty in protein.
388–22	Tunis & Co ..... Lexington.	Wheat, corn, kaffir, barley, oats, wild buckwheat, sunflower seed.	Ingredients not as guaranteed. Pin oats, wild oats and wheat screenings present.
388–23	Kenton Hay & Grain Co. Covington.	Same	Ingredients not as guaranteed. No sunflower seed found. Pin oats, wheat screenings and weed seeds present.
392–23	Tunis & Co. ..... Lexington.	Cracked wheat, cracked corn, cracked kaffir, millet, pigeon grass, wild buckwheat.....	Ingredients not as guarteed. Weed seeds, wild oats, pin oats, barley, and flax seed found but not guaranteed.
1354–22	Ashland Supply Co..... Ashland.	Wheat, corn kaffir corn, milo maize, barley, sunflower seed, wheat screenings 5%, buckwheat	Below guaranty in protein.
700–22	Brown, Bell & Cowgill.. Lexington.	Wheat, cracked corn, kaffir corn, barley, oats, recleaned wheat screenings 10%, sunflower seed.	No sunflower seed found. Weed seeds present.
700–22	Cynthiana Grocery Co. .. Cynthiana.	Same	84% of this feed is corn. No sunflower seed found. Weed seed present.
700–22	Arnold, Hamilton & Luxon, Richmond	Same	Same .....
700–22	Cynthiana Grocery Co... Cynthiana.	Same	85% of this feed is corn. Pin oats, wild oats, weed seeds found. No sunflower seed found.
1783–22	D. R. Blythe..... Burlington.	Cracked corn, cracked wheat, cracked kaffir corn, recleaned wheat screenings 25%, millet seed, oat groats.....	Weed seeds present.

TABLE VIII.—POULTRY FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
1783–22	Sunkist Baby Chick Feed.....	Arcady Farms Milling Co.....	11.00	3.63	3.58
		Chicago, Ill.	**10.00**	**2.50**	5.00
3543–21	Aubrey's Scratch Feed.....	Aubrey & Co.	9.94	4.19	2.00
		Louisville, Ky.	**10.00**	**3.00**	6.00
3543–22	Same	Same	10.19	3.88	2.48
			10.00	**3.00**	6.00
3543–22	Same	Same	10.13	3.83	2.90
			10.00	**3.00**	6.00
3543–23	Same	Same	10.00	2.98	2.50
			10.00	**3.00**	6.00
3543–23	Same	Same	10.31	3.67	3.25
			10.00	**3.00**	6.00
534–20	Daily Egg Poultry Feed (No Grit)	J. J. Badenoch Co.	10.25	3.31	3.18
		Chicago, Ill.	**9.50**	**2.50**	5.00
2034–22	Ballard's Scratch Feed.....	Ballard & Ballard Co.	10.13	4.29	3.45
		Louisville, Ky.	**10.00**	**2.50**	5.00
4076–22	Profit Scratch Feed.....	Black & White Milling Co.	10.13	3.32	2.45
		E. St. Louis, Ill.	**10.00**	**2.50**	4.00
572–19	Perfection Chick Feed.....	Blue Grass Commission Co. ...	9.75	3.59	2.43
		Lexington, Ky.	**10.85**	**3.10**	2.93
4542–22	"Diamond F" Scratch Feed.....	Chapman-Doake Co.	10.63	2.98	2.45
		Decatur, Ill.	**10.00**	**3.00**	10.00
1972–17	Little Chick Feed.....	Cincinnati Grain & Hay Co. ...	11.13	4.03	3.53
		Covington, Ky.	**10.85**	**3.95**	1.85
209–21	"Diamond C" Hen Feed.....	The Corno Mills Co.	9.88	3.68	2.90
		St. Louis, Mo.	**10.00**	**3.00**	3.50
231–21	Corno Hen Feed.....	Same	8.46	2.89	2.32
			10.00	**3.00**	3.50
232–22	Corno Chick Feed.....	Same	9.69	3.45	2.85
			10.00	**3.00**	3.50
205–21	Nutro Hen Feed.....	Same	9.88	3.76	2.35
			10.00	**3.00**	3.50

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
1783–22	The Kenton Hay & Grain Co., Covington	Cracked corn, cracked wheat, cracked kaffir corn, recleaned wheat screenings 25%, millet seed, oat groats	Weed seeds present. Oats present are pin oats.
3543–21	Duncan & Co. Pewee Valley	Wheat, corn, oats, kaffir corn, milo maize, sunflower seed	
3543–22	Lewis & Drye Lebanon.	Same	A large per cent is cracked corn. No sunflower seed present.
3543–22	G. M. Lawson Hazard.	Same	Feed not as guaranteed. 82% is cracked corn. Wild oats, pin oats, and weed seeds present. No sunflower seed found.
3543–23	M. Woosley & Son Elizabethtown.	Same	74% is cracked corn. Wheat of inferior grade used. Wild oats found.
3543–23	Franklin Kentucky Mills Co., Franklin	Same	Not as guaranteed. Cracked corn in large amount. Wheat of inferior grade. Millet, wild buckwheat, weed seeds, flax seed, wild and pin oats present but not guaranteed.
534–20	Bush & Prichard Ashland.	Wheat, cracked corn, kaffir corn, barley, oats, sunflower seed, milo	Oats are pin oats and wild oats.
2034–22	G. C. Shaw Frankfort.	Cracked corn, wheat, clipped oats, barley, buckwheat, milo, sunflower seed	70% is cracked corn. Wheat screenings and cheat present.
4076–22	J. H. Fedders & Son Covington.	Cracked corn, milo maize, kaffir corn, barley, wheat, buckwheat, sunflower seed.	
572–19	Mfrs. Warehouse	Cracked wheat, cracked kaffir corn, cracked corn, hulled oats, millet seed, grit 5%	Below guaranty in protein.
4542–22	Cincinnati Grain & Hay Co., Covington	Screened cracked corn, kaffir milo, wheat, barley, sunflower seed.	Wild oats, pin oats, and corn cockle present but not guaranteed. No sunflower seed.
1972–17	Boone Co. Farm Bureau. Burlington.	Cracked corn, wheat, kaffir corn, milo maize, millet seed	Above guaranty in fiber. Weed seeds present.
209–21	Joe Lovett Williamsburg.	Wheat, cracked corn, barley, oats, kaffir corn	Buckwheat present.
231–21	The H. T. Hackney Co. Middlesboro.	Cracked corn, wheat, kaffir, barley, sunflower seed	Buckwheat present but not guaranteed. Below guaranty in protein.
232–22	Same	Cracked corn, cracked wheat, cracked kaffir, millet	
205–21	Wm. Addams Cynthiana.	Wheat, cracked corn, barley, oats, kaffir corn	

TABLE VIII.—POULTRY FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
3657–22	Evansville Scratch Feed.....	Diamond Mills	10.25	4.52	2.80
		Evansville, Ind.	**9.00**	**2.00**	**7.00**
3657–22	Same	Same	11.38	3.97	3.65
			9.00	**2.00**	**7.00**
3657–21	Red Crown Scratch Feed.....	Same	10.13	4.15	4.53
			9.00	**2.00**	**7.00**
3566–22	Rex Scratch Feed.....	Early & Daniel Co.	10 38	2.70	2.68
		Cincinnati, Ohio.	**10.00**	**2.50**	**5.00**
599–20	Tuxedo Scratch Feed.....	Same	10.25	3.07	2.43
			10.00	**2.50**	**5.00**
4289–22	Tuxedo Pigeon Feed.....	Same	13.94	5.52	4.53
			10.00	**2.50**	**5.00**
4408–22	"We-Kno" Scratch Feed.....	Oscar Farmer & Sons.....	10.25	3.78	3.09
		Louisville, Ky.	**10.00**	**2.50**	**5.00**
2233–22	P. D. Q. Scratch Feed.....	Ferncliff Feed & Grain Co.	10.50	3.27	3.20
		Louisville, Ky.	**10.00**	**2.50**	**5.00**
4162–23	P. D. Q. Chick Feed.....	Same	10.13	3.16	1.90
			10.00	**2.00**	**5.00**
1974–21	Energy Scratch Feed.....	Golden Grain Milling Co.	9.13	3.16	2.35
		E. St. Louis, Ill.	**10.00**	**3.00**	**6.00**
3825–22	King Bee Scratch Feed.....	Harrison Milling Co.	10.13	3.23	2.79
		Harrison, Ohio.	**10.00**	**3.00**	**5.00**
1239–21	Peerless Scratch Feed.....	P. H. Harsha	11.13	3.02	3.10
		Portsmouth, Ohio.	**11.30**	**2.60**	**5.40**
971–19	Golden Scratch Feed (No Grit)..	W. E. Hess & Co.	10.00	4.20	2.70
		Louisville, Ky.	**10.39**	**3.19**	**3.50**
2998–21	Homestead Scratch Feed.....	Illinois Feed & Elevator Co. ...	10.75	3.76	4.40
		Bloomington, Ill.	**9.00**	**3.50**	**7.00**
2998–22	Same	Same	10.81	3.30	2.73
			9.00	**3.50**	**7.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
3657–22	Finley Hardware Co.... Madisonville.	Wheat, corn, kaffir, milo, sunflower seed, miscellaneous weed seeds 8%.....	Large per cent is cracked corn. No sunflower seed present.
3657–22	Ira Rea ..... Earlington.	Same	Same .....
3657–21	Finley Hardware Co.... Madisonville.	Same	
3566–22	The Mahan Co. ..... Winchester.	Wheat, corn, oats, buckwheat, kaffir corn, barley.....	75% is cracked corn. Small per cent cheat present.
599–20	Kentucky River Coal & Feed Co., Irvine.....	Corn, wheat, oats, sunflower seed, barley, buckwheat, kaffir corn.	Wheat screenings, pin oats, and small per cent weed seeds present.
4289–22	G. C. Shaw..... Frankfort.	Canada peas, milo, kaffir corn, wheat, buckwheat, hemp, millet, cracked corn.....	No cracked corn present. Approximately 60% of sample is milo and kaffir.
4408–22	O. N. Smith & Co..... Frankfort.	Wheat, corn, kaffir corn, barley, oats, sunflower seed.....	No sunflower seed present. 70% of sample is corn.
2233–22	Geo. W. Riedling..... Louisville.	Cracked corn, wheat, milo maize, barley, oats, wild buckwheat, wheat screenings 20%.....	Ingredients not as guaranteed.
4162–23	D. A. Davis & Son..... Jeffersontown.	Cracked wheat, millet, cracked corn, cracked kaffir, wild buckwheat.	75% is cracked corn Weed seeds, flax seed, pin oats and wild oats present, but not guaranteed.
1974–21	Renfro Supply Co..... Williamsburg.	Wheat, cracked corn, kaffir corn, barley, milo maize, whole buckwheat.	Below guaranty in protein. No buckwheat present.
3825–22	Kenton Hay & Grain Co. Covington.	Cracked corn, barley, wheat, oats, cane seed, buckwheat, sunflower seed.	No sunflower seed found. No cane seed found. Pin oats, wild oats, and wheat screenings present.
1239–21	Burg Kinner ..... Greenup.	Cracked corn, wheat, barley, kaffir corn, cane seed, sunflower seed, wheat screenings 3%....	No barley, cane seed or sunflower seed present. Composed largely of wheat and cracked corn. Wheat screenings contain dirt and corn cockle.
971–19	Mfrs. Warehouse	Cracked corn, wheat, oats, milo, sunflower seed, buckwheat....	Pin oats present.
2998–21	Crown Jewel Mill. Co. .. Cynthiana.	Cracked corn, wheat, barley, clipped oats, buckwheat, milo maize, sunflower seed.....	Large per cent cracked corn present. Pin oats, wild oats, weed seeds, and wheat screenings present, but not guaranteed. Poor feed and not in accordance with guarantee.
2998–22	Cincinnati Grain & Hay Co., Covington	Same	No sunflower seed present.

TABLE VIII.—POULTRY FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
3486–22	Special Scratch Feed.....	Illinois Feed & Elevator Co.... Bloomington, Ill.	9.38 **9.00**	4.12 **3.00**	3.45 **5.00**
1002–20	International Jewel Chick Feed..	International Sugar Feed No. 2 Co., Minneapolis, Minn.	11.75 **10.00**	3.44 **3.00**	4.38 **5.00**
3386–21	Kentucky Star Scratch Feed....	Kentucky Feed & Grain Co. ... Louisville, Ky.	9.75 **9.00**	3.37 **2.50**	2.18 **5.00**
3386–21	Same	Same	9.50 **9.00**	3.31 **2.50**	2.53 **5.00**
3386–21	Same	Same	9.31 **9.00**	3.42 **2.50**	2.95 **5.00**
3386–23	Same	Same	9.63 **9.00**	2.61 **2.50**	2.28 **5.00**
4415–22	Sedan Scratch Feed.....	Same	9.75 **9.00**	4.28 **2.50**	2.83 **5.00**
1761–22	Premo Scratch Feed.....	Same	10.00 **9.00**	3.43 **2.50**	2.35 **5.00**
2670–21	Premo Baby Chick Feed.....	Same	12.75 **10.00**	4.74 **2.50**	3.80 **5.00**
2670–21	Same	Same	9.63 **10.00**	3.14 **2.50**	3.33 **5.00**
2670–23	Same	Same	9.88 **10.00**	3.68 **2.50**	3.90 **5.00**
2670–23	Same	Same	10.31 **10.00**	3.84 **2.50**	3.25 **5.00**
2670–23	Same	Same	10.38 **10.00**	3.88 **2.50**	3.20 **5.00**
407–21	Nonesuch Poultry Feed.....	Louisville Cereal Mill Co. ..... Louisville, Ky.	10.38 **10.00**	3.73 **2.50**	2.61 **4.00**
407–22	Same	Same	10.63 **10.00**	3.18 **2.50**	2.50 **4.00**
407–23	Same	Same	10.13 **10.00**	2.98 **2.50**	2.13 **4.00**
407–23	Same	Same	10.25 **10.00**	3.35 **2.50**	2.28 **4.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
3486–22	Covington Grain & Hay Co., Covington	Wheat, cracked corn, barley, buckwheat, milo, sunflower seed.	
1002–20	M. T. Henderson, Owensboro.	Cracked corn, cracked wheat, kaffir corn, oats, millet, grain screenings 10%.	Considerable weed seeds and pin oats present.
3386–21	Engle & Given Coal Co., Inc., Lexington	Cracked corn, milo, clipped barley, wheat	Inferior wheat used.
3386–21	Same	Same	
3386–21	Woosley & Son, Elizabethtown.	Same	
3386–23	Edward Oehrle, Louisville.	Same	73% is cracked corn. Small amount of oats used.
4415–22	Midget Milling Co, Providence.	Clipped barley, kaffir, oats, cracked corn	85% is cracked corn. Wheat, wild oats and small amount weed seeds present, but not guaranteed.
1761–22	Lexington Seed Co, Lexington.	Wheat, cracked corn, kaffir corn, barley, sunflower seed.	Oats present but not guaranteed.
2670–21	Perry Feed & Com. Co., Hazard.	Wheat, cracked corn, oats, kaffir corn, barley, sunflower seed.	Adulterated with 35% weed seeds.
2670–21	Lexington Seed Co, Lexington.	Cracked wheat, cracked corn, cracked kaffir corn, whole millet.	No kaffir corn found. Weed seeds present.
2670–23	C. D. Miller, Louisville.	Same	75% is cracked corn. Weed seeds, and pin oats present.
2670–23	E. S. Ferrell, Buffalo.	Same	75% is cracked corn. Wheat of inferior grade. Wild buckwheat, weed seeds, flax seed and pin oats present.
2670–23	M. Woosley & Son, Elizabethtown.	Same	Same
407–21	R. J. Smith Co, Somerset.	Wheat, cracked corn, oats, kaffir corn, barley, sunflower seed.	No barley present. Weed seeds and wheat screenings present.
407–22	Jellico Grocery Co, Corbin	Same	Wheat used is of inferior grade. No barley found. Small amount weed seeds present.
407–23	Frank Kernen, Louisville.	Same	74% is cracked corn. No sunflower seed present. Weed seeds present.
407–23	Enterprise Gro. & Feed Co., Buechel	Same	75% of sample is cracked corn. No oats or sunflower seed found.

TABLE VIII.—POULTRY FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
4707–23	Nonesuch Baby Chick Feed.....	Louisville Cereal Mill Co.....	10.38	2.82	2.00
		Louisville, Ky.	11.40	2.75	2.66
3269–21	Grade A Scratch Feed.....	Miller McConnel Grain Co.	10.38	3.15	2.41
		Kansas City, Kans.	10.00	2.50	4.50
3269–21	Same	Same	10.00	3.08	2.45
			10.00	2.50	4.50
3270–21	Grade A Chick Feed.....	Same	9.88	3.45	2.25
			10.00	2.50	4.50
145–21	Park Scratch Grains.....	The Nutritia Co.	10.38	2.87	2.86
		Cincinnati, Ohio.	10.00	3.00	7.00
3541–22	Pioneer Hen Scratch.....	Omaha Alfalfa Milling Co.....	9.63	3.46	2.15
		Omaha, Neb.	10.00	2.50	6.00
3717–22	Plymouth Rock Hen Scratch.....	Same	10.13	3.42	3.50
			10.00	2.50	6.00
1151–20	Red Ribbon Chick Feed.....	The Park & Pollard Co.	9.63	2.41	1.80
		Chicago, Ill.	10.00	2.00	5.00
4356–22	Peter's Cheep Chick Scratch Poultry Feed	M. C. Peters Mill Co.	11.75	3.71	3.15
		Omaha, Neb.	10.00	3.00	5.00
4356–22	Same	Same	11.50	4.33	3.38
			10.00	3.00	5.00
2689–21	Red Crown Scratch Feed.....	Prairie State Milling Co.	10.63	3.61	2.68
		Chicago, Ill.	9.00	2.50	4.00
4406–22	"Circle A" Scratch Feed.....	Pratt Food Co.	10.50	3.46	2.77
		Philadelphia, Pa.	10.00	2.50	5.00
4393–22	Pratt's Supreme Large Size Scratch	Same	11.38	3.26	2.77
			10.00	2.50	5.00
4202–22	Victory Scratch Feed,—Large Size	Same	11.13	3.91	2.88
			10.00	2.50	5.00
4699–23	Hexite Chick Feed.....	Purity Oats Co.	9.50	2.10	1.58
		Chicago, Ill.	9.00	2.50	5.00
835–21	Ful-O-Pep Scratch Grains.....	The Quaker Oats Co.	9.56	1.89	1.88
		Chicago, Ill.	10.00	2.50	5.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
4707–23	Harvey Stout & Sons.... Buechel.	Fine ground kaffir corn, fine ground corn, fine ground wheat.	Below guaranty in protein. 75% of sample is cracked corn.
3269–21	Edwin C. Hawkins..... Paducah.	Cracked corn, kaffir, milo, barley, sunflower seed, unground wheat screenings 5%.....	No sunflower seed present. Damaged wheat used in the form of screenings.
3269–21	Same	Same	Same.
3270–21	Same	Cracked corn, cracked kaffir, cracked milo, millet seed, unground wheat screenings 5%.	Damaged wheat used in the form of screenings.
145–21	T. L. Hardy..... Berry.	Wheat, cracked corn, oats, kaffir corn, sunflower seed, barley.	Buckwheat present. Inferior grade of wheat used.
3541–22	J. W. James Grocery Co. Franklin.	Corn, oats, barley, kaffir, milo, wheat	
3717–22	J. B. Evans, Jr..... Clinton.	Corn, oats, barley, milo, kaffir, wheat	
1151–20	George Keller..... Newport.	Cracked corn, cracked wheat, cracked oats, cracked kaffir corn, whole millet seed.	85% is cracked corn. Not as guaranteed. Buckwheat and weed seeds present. No millet, no oats present.
4356–22	The Mahan Co..... Winchester.	Corn, wheat, kaffir, milo, wild buckwheat	60% is cracked corn. Small amount weed seeds present.
4356–22	Owensboro Milling Co... Owensboro.	Same	Weed seeds present.
2689–21	Kenton Hay & Grain Co. Latonia.	Wheat, sifted cracked corn, barley, oats, kaffir corn, buckwheat, sunflower seed.....	The wheat used is of poor grade.
4406–22	Louisville Hay & Gr. Co. Louisville.	Cracked corn, wheat, buckwheat, milo, kaffir, barley, sunflower seed.	Large per cent of the sample is cracked corn. Only a trace of sunflower seed and oats present.
4393–22	Same	Wheat, oats, cracked corn, barley, kaffir, milo, buckwheat, sunflower seed.	Same.
4202–22	Same	Same	A large per cent of sample is cracked corn. Only a trace of oats and kaffir present.
4699–23	Oscar Farmer & Sons.... Louisville.	Cracked wheat, cracked kaffir corn, cracked corn, millet.....	75% of sample is cracked corn. Small amount millet present. Small amount weed seed found but not guaranteed.
835–21	A. Schneider Sons..... Louisville.	Whole wheat, whole barley, whole kaffir, cracked Indian corn, whole buckwheat, sunflower seed ½%.	

TABLE VIII.—POULTRY FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
296–20	Purina Scratch Feed	Ralston Purina Co.	10.13	3.33	3.49
		St. Louis, Mo.	**10.00**	**2.50**	4.00
2604–20	Purina Hen Chow (Scratch Feed)	Same	10.63	3.36	3.40
			10.00	**2.50**	4.00
298–20	Purina Chick Feed	Same	10.13	2.63	2.04
			10.00	**2.50**	4.00
2603–20	Purina Baby Chick Chow Feed	Same	10.19	2.86	2.06
			10.00	**2.50**	4.00
427–21	Rapier's Blue Hen Scratch Feed	Rapier Sugar Feed Co.	10.50	3.37	2.85
		Owensboro, Ky.	**10.00**	**2.00**	5.00
427–22	Same	Same	10.06	2.91	2.96
			10.00	**2.00**	5.00
427–22	Same	Same	10.50	3.21	2.23
			10.00	**2.00**	5.00
427–22	Same	Same	9.63	3.74	3.13
			10.00	**2.00**	5.00
2936–22	Magnolia Scratch Feed	R. D. Riedling	10.63	4.03	2.33
		Louisville, Ky.	**10.19**	**2.67**	4.85
2936–22	Same	Same	10.50	4.03	2.58
			10.19	**2.67**	4.85
4183–22	Magnolia Chick Feed	Same	11.63	2.87	3.53
			10.52	**4.31**	4.11
1166–22	Shur-Pleez Scratch Feed	Ritter-Hennings Co.	11.63	3.37	3.20
		Louisville, Ky.	**10.53**	**3.83**	3.53
1174–22	Pleez-O-Scratch Feed	Same	11.00	3.87	3.48
			10.00	**3.12**	4.29
1167–23	Shur Pleez Baby Chick Feed	Same	12.13	5.78	5.65
			10.53	**3.83**	5.99
4147–23	Velvet Chick Feed	Robey Mills	12.50	5.29	4.38
		Chicago, Ill.	**10.00**	**2.50**	5.00
4147–23	Same	Same	11.00	5.16	4.28
			10.00	**2.50**	5.00
4778–23	Rough Rider Scratch Feed	The Roosevelt Mills	9.50	2.88	2.45
		Chicago, Ill.	**9.50**	**1.50**	5.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
296–20	Carter Supply Co..... Lexington.	Wheat, corn, barley, kaffir, milo, buckwheat, sunflower seed...	
2604–20	Martin & Hodgkin Supply Co., Winchester...	Same	
298–20	Carter Supply Co..... Lexington.	Wheat, corn, kaffir, milo, millet..	
2603–20	Jellico Grocery Co..... Harlan.	Same	
427–21	Trent & Bruner..... Irvington.	Corn, wheat, barley, oats, kaffir, sunflower seed	
427–22	Woosley & Son..... Elizabethtown.	Same	Cracked corn present in large amount. The wheat is of inferior grade.
427–22	Trent & Bruner..... Irvington.	Same	Cracked corn present in large amount. No sunflower seed present.
427–22	Bell Grocery Co..... Pineville.	Same	Large per cent is cracked corn. Poor grade of wheat used. Only a trace of sunflower seed.
2936–22	W. W. Shadburne..... Louisville.	Corn, wheat, barley, kaffir, oats..	75% of sample is cracked corn. No barley or oats present.
2936–22	Mfrs. Warehouse	Same	80% is cracked corn. No barley or oats.
4183–22	Same	Cracked corn, cracked wheat, millet seed, flax seed, weed seed 5%.	15% wild buckwheat present. Cracked rye and pin oats present but not guaranteed. Below guaranty in fat.
1166–22	Same	Sunflower seed, wheat, cracked corn, kaffir corn, barley.....	Feed is not as guaranteed. Rye, weed seeds, and wheat screenings present but not guaranteed.
1174–22	Same	Kaffir corn, oats, cracked corn, sorghum seed, sunflower seed, wheat screenings 15%, wheat, barley.	Feed is not as guaranteed. No sorghum seed found. Rye and weed seeds present.
1167–23	Same	Millet seed, cracked wheat, pin head oats, flax seed, cracked corn, recleaned screenings and wild grass seed 25%.....	Feed is not as guaranteed. Adulterated with 20% weed seeds.
4147–23	Cynthiana Grocery Co... Cynthiana.	Cracked wheat, cracked corn, cracked kaffir corn, millet, cracked milo maize, hulled oats, wheat and barley screenings 10%	Weed seeds present.
4147–23	Arnold, Hamilton & Luxon Richmond.	Same	Same.
4778–23	George Keller ..... Newport.	Cracked corn, wheat, kaffir corn, barley, oats, milo maize.....	77% of sample is cracked corn. Small per cent buckwheat present.

TABLE VIII.—POULTRY FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
2685–23	Advance Chick Scratch Feed (No Grit)	Rosenbaum Bros. Chicago, Ill.	10.25 **10.00**	3.75 **2.00**	1.80 6.00
1271–19	Vitality Scratch Feed	Same	10.69 **10.00**	2.83 **2.50**	2.83 5.00
3776–22	Everyday Scratch Feed	Rudy-Patrick Seed Co. Kansas City, Mo.	10.38 **8.50**	3.97 **3.00**	2.93 3.50
3777–22	Everyday Chick Feed	Same	9.63 **9.00**	3.68 **3.45**	2.60 4.00
3777–22	Same	Same	10.13 **9.00**	3.25 **3.45**	3.30 4.00
3573–21	Shield Brand Baby Chick Feed	A. W. Schisler F. & G. Seed Co. St. Louis, Mo.	11.81 **10.00**	3.69 **2.50**	3.75 5.00
1491–23	Atlas Chick Feed	Southern Seed Co. Louisville, Ky.	11.75 **10.00**	4.71 **3.00**	3.13 6.00
3458–22	"Diamond S" Scratch Feed	Same	10.31 **10.00**	4.05 **2.50**	2.34 6.00
3458–21	Same	Same	9.81 **10.00**	3.05 **2.50**	1.95 6.00
3875–21	King Bee Scratch Feed	N. E. Squibb & Co. Cincinnati, Ohio.	10.50 **10.00**	3.65 **3.00**	2.55 5.00
2019–23	Ideal Scratch Feed	The Sugarine Co., Inc. Owensboro, Ky.	9.75 **10.00**	3.17 **2.50**	3.30 5.00
4102–22	Ideal Chick Feed	Same	10.88 **10.00**	3.71 **2.50**	3.25 5.00
4102–22	Same	Same	10.94 **10.00**	3.83 **2.50**	4.74 5.00
4102–22	Same	Same	11.00 **10.00**	3.84 **2.50**	3.45 5.00
4102–22	Same	Same	11.13 **10.00**	3.90 **2.50**	4.97 5.00
4102–22	Same	Same	10.00 **10.00**	3.17 **2.50**	2.05 5.00
4102–22	Same	Same	10.13 **10.00**	3.65 **2.50**	1.85 5.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
2685–23	Woodford Spears & Sons Paris.	Cracked wheat, sifted cracked corn, cracked kaffir, millet seed.	
1271–19	J. H. Fedders & Sons... Covington.	Wheat, sifted cracked corn, kaffir corn, barley, oats, sunflower seed, buckwheat.....	The wheat used is of poor grade.
3776–22	Smith & enrod..... Greenville.	Milo maize, kaffir corn, wheat, wheat screenings 20%.....	
3777–22	Edwin C. Hawkins..... Paducah.	Cracked corn, cracked milo maize, cracked kaffir corn, cracked cane, millet, cracked wheat, wheat screenings 20%.	Wheat screenings contain weed seeds.
3777–22	Same	Same	Not labeled acording to law.
3573–21	E. L. Martin & Co..... Lexington.	Corn, wheat, milo, kaffir, millet, clover, screenings 5%.....	Contains wheat screenings and clover screenings, with considerable weed seeds, in excess of 5% ....
1491–23	Watts, Laws & Preston.. Perryville.	Wheat, corn, oats, millet, kaffir corn, milo maize, recleaned wheat screenings unground 15%.	Contains 5% weed seeds. No recleaned unground wheat screenings found.
3458–22	Same	Wheat, corn, oats, kaffir corn, milo maize, recleaned wheat screenings 10%, sunflower seed.	A large per cent is cracked corn. No sunflower seed found.
3458–21	Farmers' Milling Co.... Somerset.	Same	Only a trace of oats and sunflower seed.
3875–21	Kroger Grocery Co..... Newport.	Cracked corn, barley, wheat, oats, milo, kaffir corn, sunflower seed, buckwheat.	No sunflower seed present.
2019–23	Lexington Seed Co..... Lexington.	Wheat, cracked corn, kaffir, barley, buckwheat, sunflower seed.	97% of sample is cracked corn, and barley, 1% wheat, 1% kaffir corn, 1% buckwheat. No sunflower seed found.
4102–22	Anderson & Spilman.... Danville.	Corn, kaffir, wheat, wild buckwheat, millet	Oat groats and barley present. The wheat used is of inferior grade.
4102–22	Elkin & Kimmel..... Greenville.	Same	Weed seeds present.
4102–22	C. S. Brent & Co..... Lexington.	Same	Inferior wheat used. Contains some weed seeds.
4102–22	S. A. Glass..... Lexington.	Same	Same.
4102–22	Sandusky Bros. Co..... Harrodsburg.	Same	80% of sample is cracked corn, wheat used is of inferior grade. Contains a small amount weed seeds.
4102–22	Anderson & Spilman.... Danville.	Same	Same.

TABLE VIII.—POULTRY FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
4102–22	Ideal Chick Feed	The Sugarine Co., Inc. Owensboro, Ky.	10.00 10.00	3.42 2.50	2.08 5.00
4102–23	Same	Same	9.75 10.00	2.87 2.50	2.00 5.00
4102–23	Same	Same	10.13 10.00	1.81 2.50	2.33 5.00
4102–23	Same	Same	9.88 10.00	3.19 2.50	2.05 5.00
4102–23	Same	Same	9.75 10.00	3.02 2.50	1.88 5.00
1191–20	Prize Poultry Feed	Sutherland Flour Mills Co. Cairo, Ill.	10.25 10.00	2.79 3.50	3.43 6.00
3343–21	Ubiko Scratch Feed	The Ubiko Milling Co. Cincinnati, Ohio.	10.75 10.00	3.55 2.50	3.15 5.00
3343–21	Same	Same	10.38 10.00	3.86 2.50	3.30 5.00
2569–22	Special Scratch Feed	Wood, Stubbs & Co. Louisville, Ky.	11.31 9.00	3.44 2.00	3.18 4.75
1751–21	200 Egg Scratch Feed	Same	10.75 10.00	4.24 2.50	3.40 4.00
1751–21	Same	Same	10.44 10.00	3.23 2.50	3.50 4.00
1750–19	200 Egg Chick Feed	Same	11.00 10.00	3.81 3.00	2.70 4.00
1750–20	Same	Same	10.69 10.00	3.54 2.50	2.05 4.00
	Poultry Mashes.				
4310–22	Acme Egg Mash (With Milk Albumen)	Acme-Evans Co. Indianapolis, Ind.	19.38 15.50	4.99 3.50	5.80 7.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
4102–22	Pendleton Flour Mills... F'almouth.	Corn, kaffir, wheat, wild buckwheat, millet	Same.
4102–23	R. J. Smith & Co..... Somerset.	Same	Same.
4102–23	Amos Yaeger ..... Louisville.	Same	80% of sample is cracked corn. Small amount of weed seeds present.
4102–23	Lexington Seed Co..... Lexington.	Same	80% of sample is cracked corn. Small amount of weed seeds and pin oats present.
4102–23	Bryan Hunt Co..... Lexington.	Same	80% of sample is cracked corn. Small amount of flax seed and weed seeds. Wheat of inferior quality used. Not as guaranteed.
1191–20	Wilson-Butt Co..... Hickman.	Cracked corn, wheat, barley.....	Below guaranty in fat. Wheat of inferior quality used.
3343–21	J. H. Fedders & Sons.... Covington.	Corn, wheat, oats, barley, buckwheat, kaffir corn, sunflower seed.	Only a trace of sunflower seed. Not in appreciable amount and therefore regarded as not present.
3343–21	J. S. Wilson & Son..... Paris.	Same	70% of sample is cracked corn.
2569–22	Eminence Milling Co.... Eminence.	Corn, kaffir, milo maize, wheat, oats, recleaned grain screenings 30%.	74% of sample is cracked corn. The remainder appears to be screenings from the following grains: 4% oats, 4% barley, 4% rye, 2% cheat, 2% buckwheat, 1% kaffir and milo, 2% wheat, 2% wheat screenings, 1% foreign matter and weed seeds, 4% cow peas and soy beans.
1751–21	W. L. Kimbrough & Son. Guthrie.	Corn, kaffir, milo maize, wheat, barley, buckwheat, sunflower seed.	
1751–21	H. J. Grieve..... Louisville.	Same	
1750–19	W. L. Kimbrough & Son. Guthrie.	Corn, kaffir corn, steel cut oats, millet, wheat screenings 40%..	Considerable weed seeds and some pin oats present.
1750–20	Danville Ice & Coal Co.. Danville.	Same	Weed seeds present.
4310–22	Latonia Hay & Grain Co. Latonia.	Milk albumen, corn meal, corn feed meal, hominy meal, wheat bran, wheat middlings, alfalfa meal, beef scraps, linseed oil meal, ground oats.....	

TABLE VIII.—POULTRY FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
3796–21	High Fly Poultry Mash.....	Alfocorn Milling Co.....	17.13	5.22	11.45
		St. Louis, Mo.	**19.00**	**5.00**	**10.00**
4020–22	Alfocorn Poultry Mash.....	Same	21.38	5.45	10.97
			20.00	**5.00**	**10.00**
4198–22	Arcady Wonder Mash with Buttermilk	Arcady Farms Milling Co.....	19.75	4.09	8.50
		Chicago, Ill.	**20.00**	**4.50**	**8.00**
4836–23	Aubrey's Laying Mash.....	Aubrey & Co.	18.56	4.56	6.63
		Louisville, Ky.	**20.00**	**4.00**	**10.00**
2169–19	Egg-A-Day Dry Mash.....	J. J. Badenoch Co.....	21.00	3.94	12.40
		Chicago, Ill.	**18.00**	**3.00**	**11.00**
2169–19	Same	Same	22.38	4.03	8.56
			18.00	**3.00**	**11.00**
2656–20	Ballard's Poultry Mash.....	Ballard & Ballard Co.....	21.88	5.04	7.40
		Louisville, Ky.	**20.00**	**4.00**	**8.00**
3865–21	Egg Insurance Feed.....	Same	24.19	4.74	6.09
			20.00	**4.00**	**8.00**
3865–21	Same	Same	22.63	6.45	6.60
			20.00	**4.00**	**8.00**
3865–21	Same	Same	21.38	5.21	6.23
			20.00	**4.00**	**8.00**
3520–21	Purity Egg Mash.....	Baskett Grain Co.	19.75	7.63	4.93
		Henderson, Ky.	**22.00**	**3.00**	**5.00**
2792–22	Egg Maker Poultry Mash.....	Blue Grass Commission Co.....	19.94	4.97	12.03
		Lexington, Ky.	**25.81**	**4.58**	**11.98**
4541–22	Lay More Egg Mash	Chapman-Doake Co.....	15.13	5.47	8.60
		Decatur, Ill.	**18.00**	**4.00**	**10.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
3796–21	W. E. Cook..... Whitesburg.	Wheat bran, wheat middlings, corn meal, rice meal, alfalfa flour, old process linseed meal, granulated meat, salt ½%....	Below guaranty in protein and above in fiber. Alfalfa meal and brewers' dried grains present.
4020–22	W. T. Sistrunk & Co.... Lexington.	Wheat middlings, wheat bran, corn meal, corn gluten feed, alfalfa flour, O. P. linseed oil meal, granulated meat, salt ½%.	Above guarantee in fiber. Alfalfa meal and not alfalfa flour used.
4198–22	Kenton Hay & Grain Co. Covington.	Meat scraps, corn gluten feed, wheat bran and wheat middlings (with ground screenings), oat meal, alfalfa meal, corn feed meal, cotton seed meal, old process linseed oil meal, dried buttermilk, bone meal, salt ½%.	
4836–23	Franklin Ky. Mills Co.. Franklin.	Wheat shorts, wheat bran, wheat middlings, meat meal, alfalfa meal, linseed oil meal, corn feed meal, charcoal, salt ½%..	Below guaranty in protein. Unground wheat screenings present.
2169–19	Bush & Prichard..... Ashland.	Fish meal, meat meal, bone, wheat, oats, barley, wheat bran, wheat middlings, alfalfa meal, buckwheat feed, milo maize, corn feed meal, ground grain screenings 5%, calcium phosphate 1%, calcium carbonate 1%, salt.....	Above guaranty in fiber.
2169–19	J. M. Bush..... Ashland.	Same	Ground grain screenings containing considerable weed seeds present. Linseed oil meal present.
2656–20	Henry E. Eilers & Son.. Louisville.	Wheat bran, wheat middlings, corn meal, ground oats, linseed meal, meat meal.....	Alfalfa meal and wheat screenings present. No ground oats found.
3865–21	G. C. Shaw..... Frankfort.	Dried buttermilk, meat meal, wheat bran, wheat middlings, old process linseed meal, alfalfa meal, corn feed meal, charcoal ½%, salt ½%.....	
3835–21	H. E. Eilers & Son..... Louisville.	Same	
3865–21	Louis Diemer ..... Louisville.	Same	
3520–21	Mfrs. Warehouse	Wheat bran, wheat middlings, corn feed meal, digester tankage, salt 1%.....	Below guaranty in protein.
2792–22	Same	Wheat middlings, meat scraps, linseed meal, charcoal, alfalfa meal, corn meal.	This feed is very much below guaranty in protein.
4541–22	The Dorsel Co..... Newport.	Powdered buttermilk, meat scraps, feed meal, bran, wheat middlings, ground oats, alfalfa meal, oil meal.....	No linseed oil meal found. Inferior to guaranty.

TABLE VIII.—POULTRY FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
3164–21	"No Better" Dry Egg Mash....	Cincinnati Grain & Hay Co.... Cincinnati, Ohio.	21.25 **18.37**	4.60 **4.25**	8.41 **14.40**
2578–21	Corno Laying Mash.....	The Corno Mills Co..... St. Louis, Mo.	16.88 **20.00**	4.57 **4.75**	6.42 **9.00**
2578–21	Same	Same	18.75 **20.00**	4.92 **4.75**	6.71 **9.00**
2889–20	Noco Laying Mash.....	Same	20.19 **20.00**	5.65 **4.75**	6.50 **9.00**
598–22	Ce-Re-A-Lia Egg Mash.....	Early & Daniel Co..... Cincinnati, Ohio.	21.00 **20.00**	4.86 **5.00**	7.82 **7.50**
598–22	Same	Same	20.06 **20.00**	5.65 **5.00**	7.20 **7.50**
4113–22	Tuxedo Buttermilk Growing Mash	Same	19.63 **17.00**	4.95 **4.50**	6.28 **8.00**
2911–21	P. D. Q. Egg Mash.....	Ferncliff Feed & Grain Co..... Louisville, Ky.	20.94 **21.00**	5.29 **3.50**	9.26 **9.50**
2911–22	Same	Same	19.88 **21.00**	4.20 **3.50**	8.80 **9.50**
2911–22	Same	Same	17.94 **21.00**	5.26 **3.50**	9.83 **9.50**
4751–23	Blue Grass Poultry Mash.....	Henry Fruechtenicht ..... Louisville, Ky.	22.88 **20.30**	4.58 **3.80**	11.20 **11.40**
4013–22	Eg-Maker Dry Mash.....	Golden Grain Milling Co..... E. St. Louis, Ill.	20.25 **18.00**	5.47 **4.00**	7.24 **7.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS--VARIANCE FROM GUARANTY
3164–21	Walton Sanitary Flour Mills, Walton.	Meat scraps, oil meal, rice meal, alfalfa meal, wheat bran, wheat middlings, corn feed meal, ground barley feed.....	
2578–21	City Scales ..... Lexington.	Corn meal, oat meal, choice alfalfa meal, wheat bran, linseed meal, meat scraps, charcoal 1%.....	Much below guaranty in protein. Only a trace linseed oil meal found.
2578–21	Louisa Flour & Feed Co.. Louisa.	Same	Below guaranty in protein.
2889–20	Knox Grocery Co..... Barbourville.	Fine white hominy feed, oat meal, choice alfalfa meal, wheat bran, linseed meal, meat scraps, charcoal 1%.....	Considerable corn gluten feed present. No charcoal found.
598–22	Farmers' Union Supply Co., Sadieville.....	Alfalfa leaf meal, linseed oil meal, corn meal, wheat bran, wheat middlings, ground oats, oat meal, beef meal.....	Alfalfa meal and not alfalfa leaf meal used. Ground barley present.
598–22	Greene & Duff..... Mt. Sterling.	Same	Feed not as guaranteed but made from following ingredients: wheat middlings, corn gluten feed, corn feed meal, ground oats, ground barley, meat scraps with bone, cotton seed meal, alfalfa meal, wheat bran.
4113–22	W. T. Sistrunk & Co.... Lexington.	Gluten meal, wheat flour, ground oats, oat meal, old process linseed oil meal, alfalfa leaf meal, meat meal, corn meal, wheat middlings, dried buttermilk.	Alfalfa meal and not alfalfa leaf meal used.
2911–21	Ross & Zeitz..... Louisville.	Meat meal, wheat bran, wheat middlings, corn meal, corn gluten feed, fine ground alfalfa meal.	Only a trace of alfalfa meal found. No wheat bran or corn gluten feed found. Considerable ground screenings containing kaffir corn, oat hulls, cheat, weed seeds, wheat, and peanut hulls present.
2911–22	J. H. Cain..... Brandenburg.	Meat meal, wheat bran, wheat middlings, corn meal, fine ground alfalfa meal.	Below guaranty in protein.
2911–22	Same	Same	Inferior to guaranty. Much below guaranty in protein.
4751–23	Boston Flour Mills..... Boston.	Wheat shorts, wheat bran, alfalfa meal, feed meal, oil meal, tankage.	
4013–22	Conrad J. Clausen..... Louisville.	Dried buttermilk, ground meat scraps, steamed bone meal, O. P. linseed oil meal, corn gluten feed, corn feed meal, wheat middlings alfalfa leaf meal, oat meal.	Alfalfa meal and not alfalfa leaf meal present.

TABLE VIII.—POULTRY FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
4214–22	Wonderfat Shipping Feed.....	Golden Grain Milling Co.....	15.06	6.40	4.66
		E. St. Louis, Ill.	**12.50**	**4.50**	**7.00**
4214–22	Same	Same	15.75	7.53	4.50
			12.50	**4.50**	**7.00**
4213–22	Wonderfat Station Feed.....	Same	16.25	5.66	4.90
			12.50	**4.50**	**6.00**
4213–22	Same	Same	15.00	5.61	3.93
			12.50	**4.50**	**6.00**
2633–22	Nutritia Egg Mash.....	The Hawthorne Co.....	18.13	3.96	8.93
		Cincinnati, Ohio.	**12.00**	**4.00**	**12.00**
2011–16	Hess Egg Mash.....	W. E. Hess & Co.....	15.44	4.30	8.60
		Louisville, Ky.	**17.75**	**5.43**	**9.00**
2217–19	International Jewel Egg Mash....	International Sugar Feed No.	18.47	4.52	7.65
		Two Co., Memphis, Tenn.	**18.00**	**5.00**	**11.00**
2217–19	Same	Same	18.25	7.20	7.85
			18.00	**5.00**	**11.00**
3721–21	Premo Poultry Mash.....	Kentucky Feed & Grain Co....	23.88	7.68	6.55
		Louisville, Ky.	**20.00**	**8.00**	**8.00**
3721–21	Same	Same	18.88	5.54	5.15
			20.00	**8.00**	**8.00**
3721–21	Same	Same	24.44	6.75	5.30
			20.00	**8.00**	**8.00**
3721–21	Same	Same	24.98	8.25	5.65
			20.00	**8.00**	**8.00**
3721–21	Same	Same	25.00	6.77	6.65
			20.00	**8.00**	**8.00**
3721–21	Same	Same	21.75	8.72	7.00
			20.00	**8.00**	**8.00**
3879–21	Kibler's Poultry Mash.....	F. W. Kibler Milling Co.....	19.88	5.25	4.58
		Mt. Orab, Ohio.	**18.00**	**3.00**	**10.00**
4137–22	Kookoo Egg Mash.....	Chas. A. Krause Milling Co....	21.00	5.52	6.63
		Milwaukee, Wis.	**20.00**	**5.25**	**6.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
4214–22	Conrad J. Clausen..... Louisville.	Rolled oats, corn oil cake meal, old process linseed oil meal, flour, ground white corn, wheat middlings, corn feed meal.	
4214–22	Same	Same	
4213–22	S. H. Grinstead Co..... Lebanon.	Rolled oats, corn oil cake meal, oat meal, old process linseed oil meal, meat scraps, fine ground white corn.....	
4213–22	Conrad J. Clausen..... Louisville.	Same	
2633–22	R. P. Coffman..... Walton.	Wheat bran, wheat middlings, corn meal, old process oil meal, fine ground alfalfa meal, meat scraps.	
2011–16	Mfrs. Warehouse	Alfalfa meal, bran, cotton seed meal, shorts, feed meal, beef scraps, bone meal, ground oats.	Below guaranty in protein and fat, only a trace of beef scraps and bone meal, no bran or cotton seed meal found.
2217–19	Calloway County Farm Bureau, Murray.	Meat meal, alfalfa meal, linseed oil meal, corn gluten feed, cotton seed meal, wheat red dog flour, corn feed meal, rice bran, wheat shorts, wheat bran, salt ½% buttermilk.	
2217–19	Henderson Feed Store.. Owensboro.	Same	Ground oats and ground wheat screenings present.
3721–21	Engle & Given Coal Co., Inc., Lexington.	Meat meal, grey shorts, corn feed meal, ground oats, wheat bran.	No ground oats found. Rice bran containing rice hulls present.
3721–21	Vine Grove Feed Co.... Vine Grove.	Same	Below guaranty in both protein and fat.
3721–21	H. G. Holkamp..... Louisville.	Same	
3721–21	J. B. Penn & Co..... Georgetown.	Same	No ground oats found. Rice bran containing rice hulls and ground rice grains present.
3721–21	Bokhara Seed Co..... Falmouth.	Same	Rice bran, rice hulls and ground wheat screenings present.
3721–21	Perry Feed & Commission Co., Hazard.	Same	Rice hulls and rice bran present.
3879–21	R. M. Harrison & Son... Maysville.	Meat scraps, oil meal, corn gluten feed, corn meal, wheat bran, wheat middlings, hominy feed, alfalfa meal, dried buttermilk..	No alfalfa meal present.
4137–22	Borders & Fannin..... Catlettsburg.	Algaroba meal, meat scraps, fish meal, dried buttermilk, corn flour, wheat bran, wheat middlings (with screenings) corn meal, fine alfalfa meal, hominy feed, bone meal, salt.....	Corn gluten feed, oat hulls, ground weed seeds present in addition to guaranteed ingredients.

TABLE VIII.—POULTRY FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
4137–22	Kookoo Egg Mash	Chas. A. Krause Milling Co....	21.06	5.78	5.30
		Milwaukee, Wis.	20.00	5.25	6.00
1607–23	Supreme-Poultry Fattening Food.	Louisville Cereal Mill Co.....	24.88	4.97	7.90
		Louisville, Ky.	19.96	5.08	7.18
1607–22	Same	Same	25.38	5.35	5.95
			19.96	5.08	7.18
3784–21	Wayne Egg Mash With Dried Buttermilk	The McMillen Co.....	20.00	4.12	7.96
		Ft. Wayne, Ind.	18.00	3.75	10.00
4092–22	Laying Mash	Morganfield Roller Mills.....	17.38	5.86	5.65
		Morganfield, Ky.	28.50	4.95	7.80
2633–20	Nutritia Egg Mash.....	The Nutritia Co.....	22.06	5.04	7.03
		Cincinnati, Ohio.	20.00	4.00	10.00
4421–22	Omilco Laying Mash.....	Owensboro Milling Co.....	23.63	5.15	6.98
		Owensboro, Ky.	20.00	4.00	6.50
1576–21	"Lay or Bust" Dry Mash.....	Park & Pollard Co.....	22.50	4.68	7.83
		Chicago, Ill.	18.00	1.50	12.00
1149–22	"Growing Feed"	Same	15.38	3.93	3.46
			10.00	1.50	8.00
439–22	Pratt's Supreme Laying Mash...	Pratt Food Co.....	20.38	5.41	7.00
		Philadelphia, Pa.	19.00	4.00	9.00
4441–22	Victory Laying Mash With Buttermilk	Same	22.00	5.46	6.85
			17.00	4.00	9.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
4137–22	Borders & Fannin..... Catlettsburg.	Algaroba meal, meat scraps, fish meal, dried buttermilk, corn flour, wheat bran, wheat middlings (with screenings) corn meal, fine alfalfa meal, hominy feed, bone meal, salt.....	No bone meal or algaroba meal found. Some corn gluten feed present.
1607–23	S. H. Grinstead & Co.... Lebanon.	Corn meal, hominy meal, shorts, peanut meal, meat scraps, alfalfa meal, charcoal.	
1607–22	Same	Same	
3784–21	Ashland Milling Co..... Ashland.	Dried buttermilk, meat scraps, wheat bran, wheat middlings, corn gluten feed, corn feed meal, cotton seed meal, linseed oil meal, ground barley, alfalfa meal, molasses.	
4092–22	W. B. Davis..... Princeton.	Meat scraps, bone meal, tankage, wheat middlings, rye middlings alfalfa meal, corn grits, wheat, wheat bran.	Inferior to guaranty. Below guaranty in protein. Wheat screenings found. Only a trace of alfalfa meal present.
2633–22	Glass Milling Co..... Wilmore.	Wheat middlings, hominy meal, bran, linseed oil meal, alfalfa meal, beef scraps, salt.....	No linseed oil meal present. Ground wheat screenings present.
4421–22	Mfrs. Warehouse	Buttermilk, meat meal, corn feed meal, alfalfa meal, wheat bran, wheat shorts, red dog flour, linseed oil meal.	Considerable oat hulls present.
1576–21	Yates & Fowler..... Madisonville.	Ground wheat, ground barley, ground kaffir corn, corn feed meal, ground milo maize, ground oats, alfalfa meal, ground grain screenings 20%, buckwheat grits, wheat bran, wheat middlings, meat, bone, calcium phosphate ½%, calcium carbonate ½%, dried fish salt.	
1149–22	Geo. Keller ..... Newport.	Ground wheat, ground barley, ground kaffir corn, corn feed meal, ground milo maize, ground oats, ground grain screenings 20%, buckwheat grits, wheat bran, wheat, middlings, meat, bone, calcium phosphate ½%, calcium carbonate ½%, salt.	No wheat bran found. Only a trace of ground wheat, barley and kaffir corn.
439–22	Louisville Hay & Grain Co., Louisville.	Dried buttermilk, ground clipped oats, corn meal, O. P. linseed oil meal, wheat middlings, meat scraps, corn feed meal, wheat bran, alfalfa, fish meal.	
4421–22	Same	Corn feed meal, wheat middlings, ground oats, wheat bran, dried buttermilk, fish meal, meat scraps, O. P. linseed meal, alfalfa meal.....	

TABLE VIII.—POULTRY FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
834–20	Ful-O-Pep Dry Mash.....	The Quaker Oats Co.....	22.38	5.80	7.73
		Chicago, Ill.	**20.00**	**4.00**	10.00
834–20	Same	Same	22.00	5.30	7.40
			20.00	**4.00**	10.00
1337–22	Ful-O-Pep Growing Mash.....	Same	20.88	5.59	4.70
			17.00	**5.25**	9.00
294–19	Purina Chicken Chowder Feed....	Ralston Purina Co.....	19.88	4.84	8.74
		St. Louis, Mo.	**19.00**	**4.00**	10.00
294–19	Same	Same	19.81	4.55	9.28
			19.00	**4.00**	10.00
294–22	Purina Chicken Chowder (With Charcoal	Same	20.25	4.87	9.70
			19.00	**4.00**	10.00
1549–19	Shur Pleez Buttermilk Baby Chick Starting Food	Ritter-Hennings Co.....	14.06	5.42	4.58
		Louisville, Ky.	**14.02**	**4.38**	3.58
1169–21	Shur-Pleez Egg and Growing Mash	Same	19.25	4.53	9.75
			19.10	**4.12**	9.97
1169–21	Same	Same	16.38	4.75	10.24
			19.10	**4.12**	9.97
4264–22	Vitality Growing Mash (With Dried Buttermilk	Rosenbaum Bros.	17.50	5.19	5.18
		Chicago, Ill.	**18.00**	**4.50**	5.50
3499–22	Vitality Egg Mash (With Dried Buttermilk	Same	19.50	5.27	6.78
			20.00	**5.00**	8.00
3499–21	Same	Same	20.94	5.73	6.20
			20.00	**5.00**	8.00
1959–22	Decko Poultry Fattening Feed...	Simmons Milling Co.....	15.06	9.71	6.70
		Cincinnati, Ohio.	**17.00**	**6.00**	7.00

ANALYSES OF INSPECTORS' SAMPLES

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
834–20	A. Schneider Sons..... Louisville.	Meat scraps, fish meal, oatmeal, alfalfa meal, wheat bran, hominy feed, yellow hominy feed, corn gluten feed, ground grain screenings 10%, bone meal, cotton seed meal.	
834–20	Consolidated Coal Co.... Jenkins.	Same	
1337–22	M. T. Henderson..... Owensboro.	Meat scraps, oatmeal, fish meal, corn gluten feed, hominy feed, yellow hominy feed, wheat bran, alfalfa meal, bone meal, ground puffed wheat, ground corn puffs.	
294–19	Martin & Hodgkin Supply Co., Winchester.	Wheat middlings, wheat bran, gluten feed from corn, corn meal, alfalfa flour, linseed flour, granulated meat, salt 1%, charcoal 1%.	Only a trace of corn gluten feed.
294–19	Carter Supply Co..... Lexington.	Same	
294–22	W. W. Broaddus & Co.. Richmond.	Same	
1549–19	Mfrs. Warehouse	Dried buttermilk, corn meal, middlings, pulverized bone meal, gentian, sulphate of iron, sulphur, salt.	Above guaranty in fiber. Some ground wheat screenings present.
1169–21	Same	Coarse bran, feed meal, middlings beef scraps, ground bone meal, alfalfa meal, corn gluten meal.	No coarse wheat bran found.
1169–21	American Coal & Feed Co. Louisville.	Same	Much below guaranty in protein and above in fiber.
4264–22	Edw. M. Riedling..... Louisville.	Pure dried buttermilk, fine ground meat scraps, bone meal, old process linseed oil meal, corn feed meal, wheat bran, wheat flour middlings, pure ground oats, pure ground barley, corn gluten feed, calcium carbonate 3%.	
3499–22	J. H. Fedders & Sons.... Covington.	Dried buttermilk, meat scraps, bone meal, old process linseed oil meal, corn feed meal, wheat bran, standard wheat middlings ground oats, fine ground alfalfa meal, corn gluten feed, calcium carbonate 2%, ground barley	
3499–21	Same	Same	
1959–22	N. Y. Landrum & Co.... Tompkinsville.	Oat meal, peanut meal, gluten feed, hominy feed, copra meal, wheat middlings, corn meal, sterilized meat product, charcoal.	Not as guaranteed. Below guaranty in protein. Considerable rice bran present. No linseed oil meal, peanut oil meal, copra meal, or charcoal present.

TABLE VIII.—POULTRY FEEDS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
1959–22	Decko Poultry Fattening Feed...	Simmons Milling Co..... Cincinnati, Ohio.	16.50 17.00	5.73 6.00	5.15 7.00
1501–13	Atlas Chicken Mash.....	Southern Seed Co..... Louisville, Ky.	17.81 15.00	4.33 3.50	11.88 12.00
3381–22	Sugarine Chick Starter.....	The Sugarine Co..... Owensboro, Ky.	19.75 20.00	5.09 5.00	4.58 9.00
2022–21	Sugarine Poultry Mash.....	Same	18.25 17.00	4.24 5.50	5.85 8.00
2022–21	Same	Same	15.94 17.00	4.55 5.50	5.13 6.00
2022–21	Same	Same	16.50 17.00	4.64 5.50	6.40 6.00
3697–21	Sugarine Crate Fattener.....	Same	14.31 12.00	4.78 5.00	6.65 7.00
1988–22	Ubiko Buttermilk Growing Mash.	The Ubiko Milling Co..... Cincinnati, Ohio.	16.13 15.00	4.32 3.00	4.05 6.00
1987–22	Ubiko Buttermilk Egg Mash.....	Same	22.13 20.00	3.70 4.00	5.75 6.00
4347–22	Wilkes Station Ration Poultry Fattener	J. H. Wilkes & Co..... Nashville, Tenn.	16.38 15.50	5.14 4.25	4.15 5.50

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
1959–22	Star Produce Co..... Maysville.	Oat meal, peanut meal, gluten feed, hominy feed, copra meal, wheat middlings, corn meal, sterilized meat product, charcoal	Below guaranty in protein. No corn gluten feed found.
1501–13	R. S. Van Arsdale & Bro. Harrodsburg.	Wheat bran, corn meal, beef scraps, alfalfa meal, linseed oil meal, charcoal, salt.	
3381–22	Lexington Seed Co..... Lexington.	Dried buttermilk, blood flour, bone meal, linseed meal, peanut meal, wheat middlings, wheat bran, corn meal, calcium carbonate 1% salt.....	
2022–21	Thompson Grocery Co... Pineville.	Wheat bran, linseed meal, wheat middlings, dried buttermilk, Calcium carbonate ½%, salt ½%, corn feed meal, alfalfa meal, meat scraps.....	
2022–21	Lake Bros. ..... Springfield.	Same	Below guaranty in both protein and fat.
2022–21	Sandusky Bros..... Harrodsburg.	Same	Below guaranty in protein.
3697–21	Renaker Bros..... Richmond.	Corn feed meal, hominy feed, ground wild buckwheat and wheat, wheat middlings.	A large amount of oat product and linseed oil meal present but not guaranteed. No ground wild buckwheat found.
1988–22	J. H. Fedders & Sons... Covington.	Meat meal, bone meal, corn meal, wheat bran, wheat middlings, whole ground oats, ground barley, old process linseed meal, dried buttermilk.	No unground wheat bran found. Some ground wheat screenings present.
1987–22	Same	Meat meal, bone meal, corn meal, wheat bran, wheat middlings, whole ground oats, gluten feed, old process linseed meal, dried buttermilk.	
4347–22	Scotsville Produce Co... Scotsville.	Wheat bran, oat meal, corn germ oil meal, corn meal, barley meal, wheat flour, linseed meal, meat scraps, gluten feed.....	

TABLE IX.—MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
	Misc. Mixed Feed.				
318–19	Acme Dairy Feed	Acme-Evans Co.	25.63	5.84	9.49
		Indianapolis, Ind	**25.00**	**5.00**	**9.00**
3845–21	Butter Nut Dairy Feed	Acme Mills	23.13	4.99	8.10
		Hopkinsville, Ky.	**24.00**	**5.50**	**9.00**
3845–21	Same	Same	23.63	2.77	7.52
			24.00	**5.50**	**9.00**
2711–21	Heavy Work Horse and Mule Sweet Feed	Same	9.02	3.42	6.23
			9.50	**3.25**	**8.75**
80–21	Supreme Hog Feed	Same	15.25	4.65	4.83
			17.00	**5.50**	**6.00**
80–21	Same	Same	17.63	4.50	4.85
			17.00	**5.50**	**6.00**
80–21	Same	Same	16.44	4.20	4.75
			17.00	**5.50**	**6.00**
466–21	Alfocorn Dairy Feed	Alfocorn Milling Co.	26.25	5.75	8.68
		St. Louis, Mo.	**25.00**	**7.00**	**10.00**
466–21	Same	Same	27.19	4.99	8.30
			25.00	**5.00**	**10.00**
3293–21	Butter Ball Dairy Feed	Same	21.75	6.68	9.40
			20.00	**5.00**	**12.00**
4502–22	Diamond "D" Dairy Feed	Same	15.75	3.07	8.73
			16.00	**3.75**	**12.00**
4515–22	Diamond Sweet Dairy Feed	Same	20.50	4.73	11.30
			20.00	**4.50**	**12.00**
4515–22	Same	Same	20.50	5.42	11.45
			20.00	**4.50**	**12.00**
479–20	Full Pail Dairy Feed	Same	19.63	6.47	8.60
			16.00	**4.50**	**12.00**
2456–20	Alfogreen Horse & Mule Feed	Same	10.44	2.67	7.28
			9.00	**1.50**	**15.00**
4478–22	Diamond "D" Horse & Mule Feed	Same	8.67	3.14	6.48
			9.00	**2.00**	**13.50**
4499–22	Diamond Special Horse & Mule Feed	Same	10.27	2.90	6.57
			9.00	**2.00**	**13.50**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
318-19	Sharp & McCreary ..... Corbin.	Linseed oil meal, corn gluten feed, wheat bran, cotton seed meal, dried brewer's grains, salt.	
3845-21	J. W. Davis ..... Elkton.	Old process oil meal, alfalfa meal, corn gluten feed, shipstuff, corn meal, cotton seed meal, cane molasses, salt 1%	Below guaranty in protein and fat.
3845-21	S. B. Jones..... Pembroke.	Same	Below guaranty in fat.
2711-21	Forbes Manufacturing Co. Hopkinsville.	Corn, oats, alfalfa meal, molasses, salt ½%	
80-21	S. B. Jones ..... Pembroke.	Digester tankage, corn meal, wheat shorts	Below guaranty in protein and fat.
80-21	J. W. Davis ..... Elkton.	Same	Below guaranty in fat.
80-21	T. M. Wooldridge..... Hopkinsville.	Same	Below guaranty in protein and fat. Ground kaffir, milo and barley present.
466-21	Ruef Bros. Co. ..... Covington.	Cotton seed meal, corn gluten feed, brewer's dried grains, rice bran, wheat bran, salt ½% ..	Below guaranty in fat
466-21	W. T. Sistrunk & Co. ... Lexington.	Cotton seed meal, corn gluten feed, brewer's dried grains, wheat bran, wheat middlings, O. P. linseed oil meal, salt ½%.	Below guaranty in fat No linseed oil meal found.
3293-21	The Mahan Co..... Hazard.	Cotton seed meal, corn gluten feed, brewer's dried grains, rice bran, wheat bran, alfalfa meal, molasses, salt ½%	No corn gluten feed present. Ground weed seed present.
4502-22	W. T. Sistrunk & Co.... Lexington.	Cotton seed meal, corn feed meal, alfalfa meal, rice bran, wheat bran, molasses, salt ½%	Below guaranty in fat. No rice bran found. Ground barley present.
4515-22	Same	Cotton seed meal, corn gluten feed, brewers' dried grains....	No corn gluten feed found. Wheat bran alfalfa meal and weed seeds present.
4515-22	Same	Same	No corn gluten feed found. Wheat bran and alfalfa meal present.
479-20	Same	Cotton seed meal, brewer's dried grains, alfalfa meal, corn gluten feed, rice bran, wheat bran, molasses, salt ½%	No brewer's dried grains found.
2456-20	G. W. Stamper & Co. ... Vanceburg.	Alfalfa meal, crushed whole oats, crushed whole corn, molasses, salt 1%	
4478-22	W. T. Sistrunk & Co. ... Lexington.	Cracked corn, rolled oats, alfalfa meal, molasses, salt ½%.....	
4499-22	S. M. Moloney..... Torrent.	Same	Guarantee in fiber is too high.

TABLE IX.—MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
377–22	Kick-A-Poo Horse Feed	American Milling Co.	9.50	3.37	6.75
		Peoria, Ill.	**10.00**	**2.50**	10.00
.....	Cooked Cow Feed	American Steam Feed Co.	21.63	7.10	12.94
		Nashville, Tenn.	**26.00**	**7.50**	7.00
1815–21	Ashland Special Feed	Ashland Milling Co.	12.19	5.45	5.61
		Ashland, Ky.	**14.37**	**3.89**	7.37
1506–21	Aubrey's Dairy Feed	Aubrey & Co.	15.51	1.94	22.69
		Louisville, Ky.	**16.50**	**3.50**	16.00
3612–21	Dandy Dairy Feed	Same	21.75	5.66	10.92
			20.00	**4.00**	18.00
4440–23	85% Grain Horse Feed	Same	9.50	3.16	6.40
			9.00	**2.00**	14.00
3378–21	95% Grain Horse Feed	Same	9.36	3.70	4.68
			8.00	**2.00**	10.00
3378–21	Same	Same	9.15	3.54	3.89
			8.00	**2.00**	10.00
3378–21	Same	Same	9.35	3.65	5.41
			8.00	**2.00**	10.00
3378–22	Same	Same	10.00	3.89	5.23
			8.00	**2.00**	10.00
2799–20	Dairy Feed (24% Protein)	Ballard & Ballard Co.	24.19	5.53	8.70
		Louisville, Ky.	**24.00**	**5.00**	12.00
3864–21	Milk Insurance Feed	Same	22.94	4.96	8.56
			24.00	**4.50**	10.00
3362–21	Royal Dairy Feed	Bardstown Milling Co.	17.50	5.07	8.15
		Bardstown, Ky.	**18.00**	**5.00**	7.52
3501–22	Royal Pig Meal	Same	17.50	5.13	5.90
			16.75	**4.82**	4.95
573–21	Peerless Cow Feed	Blue Grass Commission Co.	19.38	4.67	7.69
		Lexington, Ky.	**19.50**	**5.45**	7.60
573–21	Same	Same	20.38	4.86	6.64
			19.50	**5.45**	7.60
573–22	Same	Same	20.00	4.74	8.25
			19.50	**5.45**	7.64

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
377–22	C. L. Osborne ..... Prestonsburg.	Corn, oats, barley, alfalfa, molasses, salt 1%.....	Below guaranty in protein.
.....	C. C. Tatum ..... Russellville.	Cotton seed meal, hominy feed, barley sprouts, peanut meal, brewer's dried grains, salt	Below guaranty in protein and above in fiber. Corn feed meal and not hominy feed present.
1815–21	J. Harris ..... Prestonsburg.	Rye middlings, wheat middlings, ground corn bran, corn flour, red dog flour	Below guaranty in protein.
1506–21	J. H. White ..... Rineyville.	Cotton seed meal, distiller's dried grains, linseed meal, alfalfa meal, ground and bolted wheat screenings 10%, cane molasses, salt 1%	Below guaranty in protein and fat and above in fiber. Ingredients not as guaranteed. Inferior feed.
3612–21	Hazard Poultry & Supply Co., Hazard.	Alfalfa meal, wheat bran, wheat middlings, brewer's grains, cotton seed meal, feed meal, molasses, salt ½%	No corn feed meal found.
4440–23	Lewis & Co. ..... Viper.	Cracked corn, oats, alfalfa meal, molasses	Small amount of alfalfa meal present.
3378–21	Pineville Produce Co. ... Pineville.	Cracked corn, crushed oats, molasses	
3378–21	H. W. Hogg, Jr. ..... Poorfork.	Same	
3378–21	S. T. Frazier ..... Whitesburg.	Same	
3378–22	Same	Same	
2799–20	Louisa Flour & Feed Co.. Louisa.	Wheat bran, wheat middlings, cotton seed meal, maltose process gluten feed from corn and barley, germ oil meal, dried brewer's grains, old process linseed meal, ground grain screenings 5%, salt 1%.	
3864–21	Smith Chadwell & Co. .. Middlesboro.	Wheat bran, wheat middlings cotton seed meal, corn gluten feed, corn feed meal, old process linseed meal, dried brewer's grain, salt 1%.....	Below guaranty in both protein and fat.
3362–21	Mfrs. Warehouse	Corn meal, ground oats, wheat bran, cotton seed meal, linseed meal, salt	Below guaranty in protein and above in fiber.
3501–22	Same	Corn meal, ground oats, wheat bran, wheat middlings, wheat shorts, meat meal, salt 1%....	Above guaranty in fiber.
573–21	Lewell Ford & Co. ..... Jackson.	Cotton seed meal, shipstuff, corn, oats, barley	Below guaranty in fat.
573–21	Miss Ella E. Berry ..... Lexington.	Same	Kaffir and milo present.
573–22	J. R. Blake ..... Jackson.	Same	Below guaranty in fat.

TABLE IX.—MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
4018–22	Bradley's Big 4 Dairy Feed.....	Bradley Bros.	9.88	3.30	18.06
		Paducah, Ky.	**11.00**	**3.83**	5.50
2675–22	Peerless Hog Feed.....	Cate Milling Co.	15.38	8.79	5.43
		Hopkinsville, Ky.	**23.00**	**5.50**	4.67
4617–22	Diamond F Dairy Feed.....	Chapman-Doake Co.	15.75	5.20	7.30
		Decatur, Ill.	**16.00**	**3.50**	15.00
2427–17	Vigor Horse & Mule Feed.....	Same	9.75	3.63	5.60
			8.00	**2.00**	17.00
4616–22	Diamond F Hog Feed.....	Same	16.31	6.51	5.30
			18.00	**4.00**	15.00
111–21	"No Better" Horse and Mule Feed	The Cincinnati Grain & Hay Co.	18.50	4.27	8.68
		Covington, Ky.	**19.00**	**5.50**	12.50
112–21	Same	Same	16.25	4.73	7.28
			19.00	**5.50**	12.50
112–22	Same	Same	19.75	4.74	7.18
			19.00	**5.50**	12.50
112–23	Same	Same	18.88	6.54	7.45
			19.00	**5.50**	12.50
2951–22	"No Better" Dry Dairy Ration..	Same	19.25	5.24	8.30
			21.24	**6.60**	12.30
111–21	"No Better" Horse and Mule Feed	Same	10.54	4.04	8.25
			10.50	**4.00**	8.00
111–21	Same	Same	10.25	3.54	7.76
			10.50	**4.00**	8.00
111–21	Same	Same	10.63	3.05	8.75
			10.50	**4.00**	8.00
111–23	Same	Same	10.38	3.51	7.10
			10.50	**4.00**	8.00
111–23	Same	Same	10.25	3.44	6.95
			10.50	**4.00**	8.00
2315–20	"No Better" Hog Ration.....	The Cincinnati Hay & Grain Co.	13.63	5.38	7.08
		Cincinnati, Ohio	**19.10**	**10.91**	16.34
3565–21	King Dairy Feed	The Colton Bros. Co.....	11.00	4.94	5.58
		Bellefontaine, Ohio.	**12.00**	**4.50**	6.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
4018–22	Mfrs. Warehouse	Corn meal, ground oats, alfalfa meal, beet molasses.....	Below guaranty in protein and fat and above in fiber. No oats used but adulterated with oat hulls.
2675–22	Same	Reground corn hearts, shipstuff, digester tankage, rice bran....	Below guaranty in protein and a much inferior product to guaranty.
4617–22	The Dorsel Co. ..... Newport.	Feed meal, wheat bran, wheat shorts, cotton seed meal, alfalfa meal, molasses, corn gluten feed, salt ½%	No corn gluten feed found.
2427–17	Same	Cracked corn, oats, alfalfa meal, molasses, salt ½%.....	
4616–22	Same	Corn gluten feed, feed meal, wheat shorts, tankage, oil meal, salt ½%	Below guaranty in protein. No corn gluten feed found.
112–21	Mrs. H. Steenken..... Covington.	Brewer's dried grains, cotton seed meal, gluten feed, hominy meal, wheat bran, molasses, salt ½%	Below guaranty in protein and fat.
112–21	H. B. Ringo ..... Mt. Sterling.	Same	Same.
112–22	Hazard Blue Grass Coal Corporation, Hazard.	Same	Below guaranty in fat.
112–23	Boone County Farm Bureau, Florence.	Same	
2951–22	Alva West & Co. ..... Maysville.	Gluten feed, brewer's dried grains, cotton seed meal, linseed meal, hominy meal, wheat bran, wheat middlings, salt ½% ...	Below guaranty in protein and fat. Inferior to guarantee. Rye middlings present. No oil meal found.
111–21	J. H. Hanley & Bro. .... Lexington.	Cracked corn, crushed oats, ground alfalfa meal, molasses, salt ½%	
111–21	Cynthiana Coal Co. .... Cynthiana.	Same	Wild oats and wheat bran present.
111–21	H. B. Ringo ..... Mt. Sterling.	Same	
111–23	J. H. Johnson ..... Jackson.	Same	Wheat bran present, also kaffir and milo screenings.
111–23	R. F. Collier & Co..... Paris.	Same	Below guaranty in fat.
2315–20	Alva West & Co. ..... Maysville.	Tankage, linseed oil meal, palmo middlings, whole ground barley feed, gluten feed, wheat middlings, fine ground alfalfa, corn meal.	Below guaranty in fat. Fat guarantee evidently too high.
3565–21	Flannery Bros. & Branch Olive Hill.	Reground corn grits, oats, wheat bran, corn bran, ground wheat screenings 5%	Below guaranty in protein.

TABLE IX.—MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
3565–21	King Dairy Feed	The Colton Bros. Co. Bellefontaine, Ohio.	11.00 **12.00**	5.42 **4.50**	6.38 **6.00**
3565–21	Same	Same	11.75 **12.00**	6.18 **4.50**	6.40 **6.00**
2533–21	King Mixed Feed	Same	13.88 **15.75**	3.49 **4.05**	8.98 **9.20**
2533–21	Same	Same	13.56 **15.75**	3.64 **4.05**	9.29 **9.20**
2533–22	Same	Same	15.75 **15.00**	4.86 **4.05**	7.48 **9.20**
230–22	Corno Dairy Feed	The Corno Mills Co. St. Louis, Mo.	23.50 **24.00**	5.49 **4.50**	8.50 **9.50**
230–22	Same	Same	25.88 **24.00**	5.88 **4.50**	7.69 **9.50**
235–21	Noco Dairy Feed	Same	23.00 **24.00**	4.95 **4.50**	9.00 **9.50**
3048–22	Corno Premium Feed	Same	11.25 **9.50**	3.22 **3.25**	6.98 **7.50**
3048–22	Same	Same	10.00 **9.50**	4.15 **3.25**	5.68 **7.50**
3374–21	Noco Premium Feed	Corno Mills Co. (National Oats Co.), St. Louis, Mo	10.38 **9.50**	3.29 **3.25**	5.78 **7.50**
3374–21	Same	Same	9.44 **9.50**	4.08 **3.25**	5.59 **7.50**
4290–22	Pawnee Premium Feed	Same	10.02 **9.50**	3.94 **3.25**	6.28 **7.50**
216–22	Pawnee Sweet Feed	Same	9.78 **10.00**	4.23 **2.50**	6.76 **15.00**
2952–22	Shamrock Premium Feed	The Corno Mills Co. (Shamrock Mills), East St. Louis, Ill.	9.69 **9.50**	3.76 **3.25**	6.20 **7.50**
3226–21	Dairy Feed	D. A. Davis & Son. Jeffersontown, Ky.	22.50 **23.38**	8.48 **6.68**	8.71 **8.19**
9–21	Diamond Cow Feed	Diamond Mills Evansville, Ind.	24.44 **24.00**	5.73 **5.00**	9.30 **14.00**
3399–21	Ideal Dairy Ration	Same	17.13 **16.50**	4.22 **3.50**	9.58 **12.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
3565-21	Thompson Grocery Co. .. Pineville.	Reground corn grits, oats, wheat bran, corn bran, ground wheat screenings 5%	Below guaranty in protein.
3565-21	J. H. Fedders & Sons ... Covington.	Same	Same.
2533-21	Flannery Bros. & Branch Olive Hill.	Wheat bran, ground white oats, recleaned wheat screenings 13%	Below guaranty in protein and fat.
2533-21	Ashland Supply Co. ..... Ashland.	Same	Same.
2533-22	Thompson Grocery Co. .. Pineville.	Same	No ground oats present.
230-22	J. H. West ..... Dawson Springs.	Gluten feed, hominy feed, cotton seed meal, linseed meal, wheat bran, wheat middlings, salt 1%.	Below guaranty in protein.
230-22	Alva West & Co. ..... Maysville.	Same	
235-21	Knox Grocery Co. ..... Barbourville.	Gluten feed, cotton seed meal, wheat bran, linseed meal, wheat middlings, salt 1%	Below guaranty in protein.
3048-22	The H. T. Hackney Co. .. Middlesboro.	Whole oats, alfalfa meal, rolled corn, molasses	
3048-22	Ritter-Hennings Co..... Louisville.	Same	
3374-21	Joe Lovett ..... Williamsburg.	Whole oats crushed, alfalfa meal, wheat bran, molasses, cracked corn.	
3374-21	Same	Corn, whole oats, alfalfa meal, wheat bran, molasses.....	
4290-22	F. D. Turner ..... Jackson.	Corn, whole oats, alfalfa meal, molasses	
216-22	Sharp & McCreary ..... Corbin.	Corn, whole oats, alfalfa meal, molasses	
2952-22	Ritter-Hennings Co. .... Louisville.	Same	
3226-21	Mfrs. Warehouse	Cotton seed meal, ground corn, wheat bran, wheat middlings, rice bran, oil meal	Below guaranty in protein. Contains corn bran in addition to guaranteed ingredients.
9-21	W. L. Kimbrough & Son. Guthrie.	Cotton seed meal, wheat middlings, wheat bran, alfalfa meal, molasses, linseed oil meal, corn feed meal, hominy feed, salt ½%	Ground wheat screenings present.
3399-21	Q. F. Combs..... Pembroke.	Processed wheat, wheat bran, corn feed meal, cotton seed meal, linseed oil meal, alfalfa meal, miscellaneous seeds screenings 25%, molasses, salt ½%	No processed wheat found.

TABLE IX.—MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
8–21	Diamond Hog and Pig Meal.....	Diamond Mills	18.00	5.01	8.13
		Evansville, Ind.	**20.00**	**5.00**	8.00
4685–23	Rival Dairy Feed	Albert Dickinson Co.	16.00	5.25	10.28
		Chicago, Ill.	**16.00**	**4.00**	10.00
36–20	Dixie Cow Feed	Dixie Mills Co.	24.06	4.89	9.80
		East St. Louis, Ill.	**24.00**	**4.50**	13.50
38–19	Polo Hog Feed.....	Same	17.00	7.05	10.40
			18.00	**4.00**	10.00
3899–21	Burt's Cereal Feed.....	The Early & Daniel Co.	19.00	3.06	17.98
		Covington, Ky.	**18.00**	**2.50**	16.00
263–21	Cerealia Sweets for the Dairy....	Same	22.00	5.36	8.10
			20.00	**4.50**	10.00
568–22	Same	The Early & Daniel Co.	24.50	5.76	6.58
		Cincinnati, Ohio.	**20.00**	**4.50**	10.00
568–22	Same	Same	20.63	5.30	6.35
			20.00	**4.50**	10.00
3756–21	"Dairy Tuxedo"	Same	21.38	4.21	8.00
			24.00	**5.00**	9.00
3846–21	Same	The Early & Daniel Co.	23.00	4.76	6.75
		Covington, Ky.	**24.00**	**5.00**	9.00
3687–21	Eadan Dairy Feed.....	Same	17.63	5.07	8.85
			14.00	**4.00**	10.00
3687–21	Same	Same	18.50	5.07	7.65
			14.00	**4.00**	10.00
3687–22	Same	Same	16.56	3.98	6.70
			14.00	**4.00**	10.00
3687–22	Same	Same	17.00	4.68	7.28
			14.00	**4.00**	10.00
3687–22	Same	Same	15.00	4.68	6.58
			16.00	**4.00**	10.00
1816–22	Cerealia Rex Chop.....	Same	9.38	4.72	4.28
			10.00	**5.00**	4.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
8-21	Henry Paris ..... Marion.	Ground oats, ground kaffir corn, digester tankage, wheat middlings, linseed oil meal, cotton seed meal, corn	Below guaranty in protein. No ground kaffir found. Wheat screenings present.
4685-23	Edw. M. Riedling ..... Louisville.	Gluten feed, ground barley, linseed oil meal, cotton seed meal, wheat bran, corn feed meal, wheat middlings ground screenings from wheat, oats, barley and kaffir 30%, salt 1%	Ground weed seeds present.
36-20	Ruef Bros. & Co..... Covington.	Brewer's dried grains, corn gluten feed, cotton seed meal, ground alfalfa, hominy feed, old process linseed oil meal, molasses, salt 1%	
38-19	W. B. Ray Feed Co. .... Princeton.	Corn gluten feed, copra meal, wheat middlings, rice bran, corn feed meal, ground flax screenings 10%	Below guaranty in protein.
3899-21	Mfrs. Warehouse	Wheat and barley by-product obtained in the manufacture of cereal beverage, molasses	Above guaranty in fiber.
263-21	Fred Schuerman ..... Newport.	Brewer's grains, cotton seed meal, corn meal, old process oil meal, wheat bran, wheat middlings, corn gluten feed, molasses ..	
568-22	S. T. Frazier ..... Whitesburg.	Same	
568-22	F. P. Spoonamore ..... Stanford.	Same	
3756-21	Henry Decker ..... Covington.	Corn gluten meal, corn gluten feed, old process oil meal, wheat bran, wheat middlings, cotton seed meal, brewer's grains, corn meal, hominy feed, cane molasses	Much below guaranty in protein, and inferior to claim.
3846-21	Joe Kahmann ..... Covington.	Same	Below guaranty in protein. Ground barley present.
3687-21	J. R. List ..... Latonia.	Wheat bran, brewer's grains, cane molasses, cotton seed meal, corn meal, hominy feed.	No hominy feed found. Linseed meal present.
3687-21	Mrs. H. Steenken..... Covington.	Same	
3687-22	J. W. Rink ..... Walton.	Same	
3687-22	W. H. Schoborg ..... Independence.	Same	
3687-22	Ben Jansen ..... Newport.	Same	Below guaranty in protein and inferior to claim.
1816-22	Superior Oil Corporation Bell Point.	Corn, oats	Below guaranty in protein.

TABLE IX.--MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
262–21	Tuxedo Chop	The Early & Daniel Co.	11.63	3.91	7.58
		Covington, Ky.	10.00	3.00	12.00
389–23	Same	The Early & Daniel Co.	10.38	3.87	6.45
		Cincinnati, Ohio.	10.00	3.00	12.00
2309–20	Tuxedo Hog Ration	Same	16.00	4.58	6.21
			14.50	3.50	7.00
2309–22	Same	Same	16.00	4.15	5.65
			14.50	3.50	7.00
1176–21	"Elmendorf Barley Corn" Cow Feed	Same	17.69	4.59	10.68
			16.37	4.18	11.30
1176–22	Same	Same	17.88	4.04	12.88
			16.37	4.18	11.30
1172–22	Elmendorf Tango Horse Chop	Same	9.33	3.05	10.85
			11.63	3.51	11.20
3251–23	Leader Dairy Feed	Eminence Milling Co.	16.13	5.11	7.08
		Eminence, Ky.	17.50	4.00	7.83
3698–22	Kentucky Pride Horse and Mule Molasses Chop	The Eversole Co.	9.13	3.70	9.05
		London, Ky.	9.00	3.00	10.00
2658–22	Butternut Dairy Feed	Ferncliff Feed & Grain Co.	15.38	3.34	8.15
		Louisville, Ky.	16.00	2.00	16.00
2658–22	Same	Same	16.13	3.45	16.33
			16.00	2.00	16.00
2080–21	Cracker Jack Dairy Ration	Same	20.94	4.25	14.09
			21.00	3.50	14.00
2080–22	Same	Same	20.25	5.42	8.25
			21.00	3.50	12.50
2079–22	Cracker Jack Dairy Feed	Same	18.50	4.23	8.15
			18.00	3.00	12.00
2079–22	Same	Same	16.38	3.56	10.70
			18.00	3.00	12.00
2084–22	P. D. Q. Dairy Feed	Same	17.44	4.16	10.80
			15.00	3.00	15.00
2084–23	Same	Same	14.63	3.79	11.10
			15.00	3.00	15.00
2865–21	"Logan" Dairy Feed	Same	16.88	3.65	12.43
			12.00	1.50	18.50

ANALYSES OF INSPECTORS' SAMPLES

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
262–21	Dave Caldwell ..... Williamstown.	Corn, oats, alfalfa meal, wheat bran, brewer's grains, molasses.	
389–23	Hill Congleton & Sons.. Beattyville.	Same	
2309–20	The Dorsel Co. ..... Newport.	Digester tankage, ground barley, ground oats, corn meal, wheat middlings, old process linseed oil meal, gluten feed, alfalfa meal, cane molasses	
2309–22	Hudson & Farnau..... Lancaster.	Same	No ground barley found.
1176–21	Mfrs. Warehouse	Rolled oats, cracked corn, wheat bran, alfalfa meal, cotton seed meal	
1176–22	Same	Same	Above guaranty in fiber. Barley and weed seeds present.
1172–22	Carey-Reed Co. ..... Lexington.	Rolled oats, cracked corn, alfalfa meal, cane molasses, wheat bran	Ground hay and chaff present in addition to declared ingredients.
3251–23	Mfrs. Warehouse	Cotton seed meal, ground barley, corn meal, ground oats, mill feed, salt	Below guaranty in protein. Unground wheat screenings present.
3698–22	Mfrs. Warehouse	Corn, oats, alfalfa meal, molasses, salt ½%	
2658–22	Garrard Milling Co. .... Lancaster.	Cotton seed meal, alfalfa meal, wheat bran, corn bran, cane molasses, salt 1%	Below guaranty in protein. No alfalfa meal found.
2658–22	Herndon Carter Co. .... Buechel.	Cotton seed meal, alfalfa meal, wheat bran, corn bran, cane molasses, salt 1%	
2080–21	R. B. Hayes ..... Hodgenville.	Corn gluten feed, old process linseed oil meal, cotton seed meal, alfalfa meal, wheat bran, salt 1%	
2080–22	J. E. M. Milling Co. .... Frankfort.	Cotton seed meal, alfalfa meal, wheat bran, wheat middlings, corn meal, salt 1%	Ground oats present.
2079–22	E. T. Oldham ..... Stamping Ground.	Cotton seed meal, alfalfa meal, cane molasses, wheat bran, wheat middlings, corn meal, salt 1%	Kaffir corn and whole oats present.
2079–22	Blackey Flour & Feed Co. Blackey.	Same	Below guaranty in protein. Oat hulls, buckwheat hulls and barley hulls present.
2084–22	J. H. Cain ..... Brandenburg.	Cotton seed meal, wheat bran, corn feed meal, alfalfa meal, cane molasses, ground grain screenings 35%, salt 1%	
2084–23	C. E. Johnson ..... Thornton.	Same	
2865–21	Cameron's Mill ..... Carrollton.	Wheat bran, cotton seed meal, alfalfa meal, cane molasses, salt 1%	

TABLE IX.—MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
2077–23	Cracker Jack Horse and Mule Feed	Ferncliff Feed & Grain Co..... Louisville, Ky.	10.75 10.00	3.68 3.00	10.25 12.00
1665–22	"Cracker Jack Special" Feed....	Same	9.82 10.00	3.72 3.00	4.91 10.00
1245–20	Blue Grass Dairy Feed.....	Henry Fruechtenicht ..... Louisville, Ky.	21.10 18.00	4.59 3.00	10.96 18.00
1244–21	Blue Grass Horse Feed.....	Same	9.21 10.00	3.07 2.50	7.19 16.00
4418–22	"Glass" Pig Feed.....	Glass Milling Co. ..... Wilmore, Ky.	10.31 9.38	2.91 2.01	4.48 4.50
4418–22	Same	Same	8.94 9.38	3.39 2.01	3.40 4.50
4418–22	Same	Same	9.88 9.38	3.20 2.01	4.38 4.50
2521–20	Crescent Dairy Feed Ration.....	Edward F. Goeke Co. ..... Evansville, Ind.	18.75 17.00	4.68 4.00	13.83 16.00
953–21	Butterfat Dairy Feed.....	Golden Grain Milling Co. .... E. St. Louis, Ill.	24.06 20.00	5.13 4.00	12.40 12.00
2028–19	Guaranteed Dairy Feed.....	Same	22.63 24.00	5.75 4.50	13.80 12.00
4711–23	Golden Grain Milk Producer....	Same	25.56 24.00	5.36 4.50	13.07 12.00
4711–23	Same	Same	24.50 24.00	5.53 4.50	13.83 12.00
919–21	Golden Grain Horse and Mule Feed	Same	8.60 9.00	3.04 3.00	5.34 10.00
3487–21	Lumber Jack Horse and Mule Feed	Same	9.20 9.00	3.10 3.00	5.49 10.00
3487–21	Same	Same	8.55 9.00	2.94 3.00	4.65 10.00
3179–22	Templar Horse and Mule Feed.. .	Grain Belt Mills Co. ..... St. Joseph, Mo.	9.88 9.00	3.76 2.00	5.68 12.00
626–21	Greenleaf Alfalfa Molasses Feed..	Same	12.03 10.00	0.97 0.75	17.70 26.00
1975–19	Tiger Alfalfa Molasses Feed.....	Same	8.33 10.00	0.91 0.50	17.07 24.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
2077-23	Geo. W. Riedling ..... Louisville.	Whole cracked corn, whole rolled oats, alfalfa meal, cane molasses, wheat bran, salt 1%	
1665-22	Dudley Coal Co. ..... Walbolt.	Cracked corn, oats, wheat bran, molasses, salt 1%.....	
1245-20	Mfrs. Warehouse	Corn meal, cotton seed meal, molasses, bran, alfalfa meal.....	Brewer's dried grains and dried blood present, but not guaranteed.
1244-21	Same	Corn, oats, alfalfa, molasses.....	Below guaranty in protein.
4418-22	I. E. Payne ..... Eubank.	Ground corn, ground barley, shipstuff	Ground wheat screenings present.
4418-22	Mills & Tribble ..... Danville.	Same	Same.
4418-22	Flavo Grain & Mill Co.. Somerset.	Same	Same.
2521-20	W. R. Woods ..... Sebree.	Cotton seed meal, linseed meal, brewers' dried grains, alfalfa meal, molasses, ground flax seed screenings 20%, toasted wheat feed, wheat mixed feed.	Corn product present.
953-21	Paintsville Grocery Co.. Paintsville.	Dried beet pulp, cotton seed meal, corn oil cake meal, old process linseed oil meal, copra meal, fine ground alfalfa meal, molasses, salt ½%	Wheat middlings, wheat bran and ground wheat screenings present, but not guaranteed.
2028-19	Conrad J. Clausen ..... Louisville.	Cotton seed meal, alfalfa meal, O. P. linseed oil meal, corn oil cake meal, copra meal, molasses, salt ½%	Above guaranty in fiber.
4711-23	Same	Cotton seed meal, alfalfa leaf meal, old process linseed oil meal, corn oil cake meal, O. P. cocoanut oil cake meal, corn gluten meal, alfalfa meal, cane molasses, salt ½%	Alfalfa meal and not alfalfa leaf meal present. Above guaranty in fiber.
4711-23	Farmers' Union Supply Co., Winchester.	Same	Above guaranty in fiber.
919-21	Middlesboro Wholesale Grocery Co., Poor Fork	Cracked corn, oats, alfalfa meal, molasses, salt ½%.....	
3487-21	Bell Grocery Co. ..... Pineville.	Same	Pin oats present.
3487-21	Renfro Supply Co. ..... Williamsburg.	Same	
3179-22	Edwin C. Hawkins ..... Paducah.	Corn, oats, alfalfa meal, molasses, salt ½%	
626-21	Same	Alfalfa meal, molasses, salt ½%.	
1975-19	Blue Grass Commission Co., Lexington.	Alfalfa meal, molasses, salt.....	Below guaranty in protein and inferior to guarantee.

TABLE IX.—MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
1975–19	Tiger Alfalfa Molasses Feed.....	Grain Belt Mills Co.....	8.16	0.80	14.17
		St. Joseph, Mo.	**10.00**	**0.50**	**24.00**
3495–21	Make Milk Dairy Feed.....	Gwinn Bros. & Co.	25.00	6.33	9.47
		Huntington, W. Va.	**24.00**	**4.00**	**10.00**
3495–21	Same	Same	22.75	5.60	8.21
			24.00	**4.00**	**10.00**
685–19	King Falfa Horse Feed.....	Hales & Edwards Co.	9.78	3.02	6.85
		Chicago, Ill.	**10.00**	**2.00**	**15.00**
2178–21	Halliday's Standard Dairy Feed..	H. L. Halliday Milling Co.	19.63	3.42	9.58
		Cairo, Ill.	**16.50**	**4.00**	**15.00**
4512–22	Pickwick Horse and Mule Feed...	Harrison Milling Co.	9.60	3.20	6.22
		Harrison, Ohio.	**10.00**	**2.30**	**12.00**
957–22	Golden Grain	Edwin C. Hawkins	9.56	3.11	5.69
		Paducah, Ky.	**10.33**	**3.05**	**9.78**
147–22	Nutritia Dairy Feed	The Hawthorne Milling Co. ...	16.50	5.02	9.25
		Cincinnati, Ohio.	**20.00**	**4.00**	**12.00**
3196–22	Manowar Chop	Same	9.90	3.19	6.84
			9.00	**3.00**	**12.00**
340–21	"Milky Way" Dairy Feed.....	Henson & Lynes	21.56	5.18	6.95
		Clarksville, Tenn.	**23.50**	**5.25**	**10.00**
.....	Best Yet Dairy Feed.....	Hermitage Mills	16.25	3.07	14.63
		Nashville, Tenn.	**17.00**	**3.25**	**15.00**
997–19	International Milk Made Dairy Feed	Same	25.06	6.88	8.80
			24.00	**5.00**	**15.00**
997–20	Same	Same	26.50	6.31	7.80
			24.00	**5.00**	**15.00**
1004–19	"Makemeat" Hog Feed.....	Same	13.75	7.44	9.75
			15.00	**5.00**	**12.50**
3354–22	International Makemeat Hog Feed	Same	12.88	8.28	8.40
			15.00	**5.00**	**12.50**
4301–22	Cyclone Horse and Mule Feed....	Jellico Grocery Co.	9.45	3.61	9.71
		Jellico, Tenn.	**9.00**	**3.00**	**10.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
1975–19	Blue Grass Commission Co., Lexington.....	Alfalfa meal, molasses, salt.....	Below guaranty in protein. Alfalfa meal of a poor quality.
3495–21	Williams Feed Co. ..... Pikeville.	Wheat bran, wheat middlings, (with screenings), cotton seed meal, ground barley, corn flour, salt	Ground oats present.
3495–21	H. H. Borders ..... Catlettsburg.	Same	Below guaranty in protein.
685–19	C. S. Brent Seed Co.... Lexington.	Alfalfa, molasses, cracked corn, oats, barley	Wild oats present.
2178–21	J. P. Page ..... Barlow.	Cotton seed meal, corn meal, alfalfa, bran, molasses.....	Corn gluten feed present.
4512–22	Blackey Flour & Feed Co. Blackey.	Ground corn, oats, ground alfalfa, molasses	Oat hulls and pin oats present.
957–22	J. R. Brandon ..... Benton.	Corn, alfalfa meal, molasses.....	Below guaranty in protein.
147-22	Pineville Produce Co. .. Pineville.	Distiller's grains, hominy feed, cotton seed meal, malt sprouts, old process linseed oil meal, whole ground barley, fine ground alfalfa meal, corn meal, wheat bran, wheat middlings ..	Ground wheat screenings and ground weed seeds present. Below guaranty in protein.
3196–22	Lexington City Scales .. Lexington.	Cracked corn, crimped oats, distiller's grains, ground light oats, molasses, salt 1%	Oats are pin oats.
340–21	A. B. Wilkins ..... Elkton.	Linseed meal, peanut meal, cotton seed meal, corn hearts, wheat bran, wheat middlings, salt 1%	Below guaranty in protein. Corn feed meal present.
.....	Farmers' Union Supply Co., Franklin.	Cotton Seed meal, wheat bran, ground kaffir, alfalfa meal, oat feed, molasses, salt 1%	Below guaranty in protein.
997–19	Calloway County Farm Bureau, Murray.	Cotton seed meal, wheat bran, rice bran, wheat shorts, corn gluten feed, linseed oil meal, wheat, red dog flour, corn feed meal, salt ½%	No linseed oil meal found.
997–20	Frost & Duvall ..... Lexington.	Same	Guarantee on fiber is too high.
1004–19	Graves County Farm Bureau, Mayfield.	Linseed oil meal, digester tankage, ground and bolted grain screenings 50%, wheat bran and shorts, rice bran, corn feed meal, red dog flour, corn gluten feed, salt	Below guaranty in protein.
3354–22	W. N. Neville ..... Arlington.	Digester tankage, linseed oil meal, red dog flour, corn gluten feed, wheat bran, rice bran, corn feed meal, ground and bolted screenings from wheat 20%, salt ½%	Below guaranty in protein. Inferior to claim.
4301–22	Mfrs. Warehouse	Corn, oats, alfalfa meal, molasses, salt ½%	

TABLE IX.—MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
3224–21	Jersee Milk Food Compound.....	The Jersee Co.	17.13	4.95	5.93
		Minneapolis, Minn.	9.00	4.50	6.00
1381–19	Just Dairy Feed.....	Just Mills	24.38	5.19	10.09
		Nashville, Tenn.	24.00	4.10	12.00
1265–20	Lotus Dairy Feed.....	Keister Milling Co.	14.31	5.24	6.24
		Huntington, W. Va.	14.00	4.00	7.50
1265–20	Same	Same	15.56	4.13	6.44
			14.00	4.00	7.50
2876–21	Marshall's 24% Dairy Feed.....	Kentucky Feed & Grain Co. ...	16.13	6.20	8.40
		Louisville, Ky.	24.00	4.50	14.00
2876–22	Same	Same	23.88	7.95	11.03
			24.00	4.50	14.00
2876–22	Same	Same	23.88	7.23	10.55
			24.00	4.50	14.00
2876–22	Same	Same	19.69	6.72	9.30
			24.00	4.50	14.00
2876–22	Same	Same	20.81	7.26	11.15
			24.00	4.50	14.00
2876–22	Same	Same	22.50	6.64	11.13
			24.00	4.50	14.00
2876–22	Same	Same	18.75	7.15	11.75
			24.00	4.50	14.00
2876–22	Same	Same	24.38	6.76	10.00
			24.00	4.50	14.00
2876–22	Same	Same	20.25	8.35	9.08
			24.00	4.50	14.00
2876–23	Same	Same	22.38	8.52	10.60
			24.00	4.50	14.00
2876–23	Same	Same	23.25	6.37	10.35
			24.00	4.50	14.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
3224–21	Ewing & Gray ..... Eminence.	Cotton seed meal, old process lin- Powdered milk, St. John's bread, salt, starch, sugar, corn flour, flour middlings, dried blood, oxide iron, anise, calcium phosphate.	
1381–19	Jellico Grocery Co. .... Middlesboro.	seed oil meal, gluten feed from corn, hominy feed, ground alfalfa, molasses, salt 1%	
1265–20	Queen & Turner ..... Ashland.	Wheat bran, corn bran, wheat middlings, barley meal, ground screenings 2%	Corn feed meal present. No barley meal found.
1265–20	Burnam Roberts ..... Louisa.	Same	
2876–21	J. F. Griffin & Son ..... Mt. Vernon.	Cotton seed meal, linseed meal, alfalfa meal, wheat bran, corn feed meal, kaffir corn meal, rice bran, cane molasses, salt ½%	Below guaranty in protein. Contains barley, rice and oat hulls. No linseed oil meal found.
2876–22	E. S. Ferrell & Sons .... Buffalo.	Same	
2876–22	Sam Carpenter & Co. ... Maysville.	Same	
2876–22	J. A. Bennett ..... Taylorsville.	Same	Below guaranty in protein. No linseed oil meal found. Inferior product to guarantee.
2876–22	F. P. Spoonamore ..... Stanford.	Same	Below guaranty in protein. No linseed oil meal or kaffir corn meal found.
2876–22	Engle & Given Coal Co., Inc., Lexington.	Same	Below guaranty in protein.
2876–22	East End Milling Co. ... Henderson.	Same	Below guaranty in protein. No linseed oil meal or corn feed meal found. Wheat screenings and weed seeds present.
2876–22	Jellico Grocery Co. ..... Corbin.	Same	Peanut oil meal found.
2876–22	Anderson & Spilman.... Danville.	Same	Much below guaranty in protein. Oat product found. No linseed oil meal found.
2876–23	Boston Flour Mills ..... Boston.	Same	Below guaranty in protein.
2876–23	Perry Feed & Commission Co., Hazard.	Same	Below guaranty in protein. No linseed oil meal present. Oat hulls, rice hulls, and peanut oil meal present.

TABLE IX.—MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
2876–23	Marshall's 24% Dairy Feed.....	Kentucky Feed & Gain Co..... Louisville, y.	21.00 **24.00**	4.89 **4.50**	8.93 **14.00**
2489–22	Premo Dairy Feed.....	Same	18.56 **16.50**	7.20 **3.00**	11.30 **15.00**
2489–22	Same	Same	17.82 **16.50**	6.94 **3.00**	10.78 **15.00**
2489–23	Same	Same	18.88 **16.50**	8.78 **3.00**	11.65 **15.00**
2489–23	Same	Same	17.75 **16.50**	8.78 **3.00**	11.68 **15.00**
2489–23	Same	Same	18.88 **16.50**	7.70 **3.00**	10.80 **15.00**
2489–23	Same	Same	18.13 **16.50**	4.63 **3.00**	6.98 **15.00**
4032–22	Success 24% Dairy Feed.....	Same	19.88 **24.00**	6.03 **4.50**	9.65 **14.00**
3678–21	Premo Cattle Fatner.....	Same	15.38 **12.00**	5.75 **6.00**	7.10 **8.00**
3678–21	Same	Same	14.38 **12.00**	5.60 **6.00**	7.30 **8.00**
3678–22	Same	Same	14.25 **12.00**	4.90 **6.00**	5.10 **8.00**
3679–21	Marshall's Horse and Mule Feed..	Same	9.03 **9.00**	3.16 **3.00**	8.22 **10.00**
613–21	Success Horse and Mule Feed....	Same	10.75 **9.00**	4.06 **3.00**	6.28 **10.00**
613–22	Same	Same	11.13 **9.00**	3.28 **3.00**	11.05 **10.00**
613–22	Same	Same	9.99 **9.00**	3.37 **3.00**	9.62 **10.00**
613–22	Same	Same	9.39 **9.00**	3.52 **3.00**	5.65 **10.00**
613–22	Same	Same	9.79 **9.00**	3.70 **3.00**	7.51 **10.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
2876-23	Hazard Poultry & Supply Co., Hazard.	Cotton seed meal, linseed meal, alfalfa meal, wheat bran, corn feed meal, kaffir corn meal, rice bran, cane molasses, salt ½%	Below guaranty in protein.
2489-22	J. B. Penn & Co. ..... Georgetown.	Cotton seed meal, linseed meal, alfalfa meal, wheat bran, rice bran, corn feed meal, cane molasses, salt ½%	Unground wheat screenings, whole oats and kaffir corn product present. Ingredients not as guaranteed.
2489-22	Same	Same	
2489-23	Same	Same	Considerable rye middlings, oat hulls and ground weed seeds present. Ingredients not as guaranteed.
2489-23	Lewis Wholesale Co. .... Whitesburg.	Same	Oat hulls, peanut oil meal and rice hulls present.
2489-23	Hodgkin Grocery Co. ... Winchester.	Same	Ingredients not as guaranteed. Considerable rye middlings and weed seeds present.
2489-23	J. H. Johnson ..... Jackson.	Same	No rice bran found. Rye middlings present.
4032-22	Lexington Seed Co. .... Lexington.	Cotton seed meal, linseed meal, alfalfa meal, wheat bran, corn feed meal, kaffir corn meal, rice bran, cane molasses, salt 1%	Below guaranty in protein. Much inferior to guaranty.
3678-21	E. T. Walker & Co. ..... Glendale.	Cotton seed meal, corn feed meal, grey middlings, molasses, rice bran	Rice bran contains rice hulls and rice grains. Screenings from kaffir or milo, barley, alfalfa and wheat used.
3678-21	Sam Carpenter .... Maysville.	Same	In addition to guaranteed ingredients the feed contains ground oats, ground kaffir and milo and ground wheat screenings.
3678-22	Vine Grove Feed Co. ... Vine Grove.	Same	Below guaranty in fat. Contains oat hulls, wheat screenings. No rice bran found.
3679-21	Lexington Seed Co. .... Lexington.	Corn, oats, alfalfa meal, molasses, salt ½%	
613-21	George Keith ..... Whitley City.	Same	In addition to guaranteed ingredients this feed contains wild oats, pin oats, barley and wheat.
613-22	Engle & Given Coal Co., Inc., Lexington.	Same	Above guaranty in fiber.
613-22	Harlan Grocery & Grain Co., Harlan.	Same	
613-22	Engle & Given Coal Co., Inc., Lexington.	Same	
613-22	J. B. Penn & Co. ..... Georgetown.	Same	

TABLE IX.—MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
613–22	Success Horse and Mule Feed....	Kentucky Feed & Grain Co....	10.24	4.15	8.31
		Louisville, Ky.	**9.00**	**3.00**	**10.00**
3307–21	Premo Hog Meal	Same	15.38	5.80	6.64
			12.00	**4.00**	**8.00**
3307–21	Same	Same	13.50	6.62	8.15
			12.00	**4.00**	**8.00**
3307–21	Same	Same	14.69	8.21	8.50
			12.00	**4.00**	**8.00**
3307–21	Same	Same	14.38	6.50	8.30
			12.00	**4.00**	**8.00**
3307–21	Same	Same	15.63	7.48	7.50
			12.00	**4.00**	**8.00**
3307–22	Same	Same	12.63	4.61	5.13
			12.00	**4.00**	**8.00**
3307–22	Same	Same	14.63	4.59	5.10
			12.00	**4.00**	**8.00**
3307–23	Same	Same	12.13	7.87	6.80
			12.00	**4.00**	**8.00**
3307–23	Same	Same	12.25	8.49	6.85
			12.00	**4.00**	**8.00**
3307–23	Same	Same	11.63	9.61	7.95
			12.00	**4.00**	**8.00**
4288–22	White Mule Molasses Feed.....	Wm. H. Kramer.....	7.65	2.57	10.00
		Cincinnati, Ohio.	**9.00**	**2.00**	**15.00**
4288–22	Same	Same	8.11	2.58	7.48
			9.00	**2.00**	**15.00**
3856–21	Badger Kramco Dairy Feed.....	Chas. A. Krause Milling Co. ..	20.38	4.84	9.70
		Milwaukee, Wis.	**20.00**	**4.00**	**11.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
613–22	J. B. Blanton Co. ..... Frankfort.	Corn, oats, alfalfa meal, molasses, salt ½%	
3307–21	J. B. Penn & Co. ..... Georgetown.	Linseed meal, wheat middlings, corn feed meal, rice bran, ground barley, cane molasses, salt 1%	The rice bran contains rice hulls and rice grain ground. Kaffir corn or milo maize product present.
3307–21	Engle & Given Coal Co., Inc., Lexington.	Same	
3307–21	P. J. Weisenberger & Son Midway.	Same	
3307–21	Williams Feed Co. ..... Pikeville.	Same	Rice bran contains rice hulls and rice grains. Oats, wheat bran, weed seeds and wheat screenings present in addition to guaranteed ingredients.
3307–21	Lexington Seed Co. ..... Lexington.	Same	No ground barley present. Whole oats found.
3307–22	W. C. Wallace ..... Caneyville.	Same	No rice bran present. Wheat bran, peanut meal, oat hulls and wheat screenings present in addition to guaranteed ingredients.
3307–22	Woosley & Co..... Elizabethtown.	Same	Moldy odor, wheat bran, oats, kaffir corn and wheat screenings present in addition to guaranteed ingredients.
3307–23	Boston Flour Mills ..... Boston.	Same	No barley found. Considerable rice hulls in rice bran. Oats, cotton seed meal and wheat screenings present.
3307–23	Bohannon & Stedman ... Versailles.	Same	Considerable rice hulls and grain present. No barley found. Oats, ground weed seeds and ground wheat screenings found.
3307–23	R. F. Collier & Co. ..... Paris.	Same	Oat hulls present.
4288–22	J. E. Stone & Co. ..... Lexington.	Cracked corn, crushed oats, alfalfa meal	Only a trace of alfalfa meal present. Wheat bran found. Below guaranty in protein and much inferior to claim.
4288–22	Bedford & Tuttle ..... Winchester.	Same	Below guaranty in protein and inferior to guarantee.
3856–21	Flannery Bros. & Branch Olive Hill.	Hominy feed, dried beet pulp, old process linseed oil meal, cotton seed meal, gluten feed, Distiller's dried grains, malt sprouts, wheat middlings, wheat bran (with screenings), corn feed meal, salt	No linseed oil meal present.

TABLE IX.—MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
4136–22	Krause Dairy Feed	Chas. A. Krause Milling Co....	22.88	5.88	9.30
		Milwaukee, Wis.	**24.00**	**5.00**	**10.00**
2829–20	Badger Gain-Mor Feed.....	Same	11.75	3.74	3.25
			12.00	**4.00**	**4.00**
4180–22	Same	Same	11.75	4.72	4.30
			12.00	**3.50**	**4.00**
2394–21	Record Maker Dairy Feed.....	Ladish Milling Co.	26.88	5.57	9.92
		Milwaukee, Wis.	**24.00**	**4.50**	**12.00**
1841–21	Larro Feed	Larrowe Milling Co.	20.38	3.83	13.22
		Detroit, Mich.	**20.00**	**3.50**	**14.00**
1841–21	Same	Same	21.19	3.97	11.40
			20.00	**3.50**	**14.00**
1841–23	Same	Same	21.00	4.67	11.10
			20.00	**4.00**	**12.00**
3146–21	Gold Medal Dairy Feed.....	Louisville Seed Co.	18.53	5.84	13.28
		Louisville, Ky.	**16.50**	**3.00**	**15.00**
4027–22	Paragon Dairy Feed	Same	20.55	5.54	12.30
			24.00	**4.50**	**14.00**
4027–22	Same	Same	23.63	7.39	9.58
			24.00	**4.50**	**14.00**
4028–22	Paragon Horse and Mule Feed....	Same	10.04	3.53	7.36
			9.00	**3.00**	**12.00**
3339–21	Wayne Special Horse Feed.....	The McMillen Co.	9.56	3.35	6.50
		Ft. Wayne, Ind.	**9.00**	**3.00**	**10.00**
4585–22	Marathon Dairy Feed	Nowak Milling Co.	22.63	5.52	10.35
		Buffalo, N. Y.	**22.00**	**4.00**	**12.00**
147–21	"Nutritia" Dairy Feed	The Nutritia Co.....	19.38	5.47	7.33
		Cincinnati, Ohio.	**20.00**	**5.00**	**10.50**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
4136–22	Borders & Fannin ..... Catlettsburg.	Distiller's grains, copra meal, gluten feed, old process linseed oil meal, malt sprouts, cotton seed meal, hominy feed, wheat bran, wheat middlings (with screenings), salt	Below guaranty in protein.
2829–20	Same	Maize flour, wheat middlings (with wheat screenings) ground kaffir corn	
4180–22	Same	Corn flour, wheat middlings, ground wheat screenings 8%, salt 1%	Considerable corn bran present.
2394–21	Queen & Turner ..... Ashland.	Cotton seed meal, linseed meal, corn gluten feed, copra meal, ground oats, alfalfa meal, wheat bran (with ground screenings), molasses, salt	Corn feed meal present. Not guaranteed.
1841–21	Patterson & Williams Feed Co., Russell.	Cotton seed meal, corn gluten feed, old process linseed oil meal, dried beet pulp, wheat middlings, wheat bran, salt 1%	
1841–21	Ritter-Hennings Co. .... Louisville.	Same	
1841–23	Pikeville Grocery Co. .. Pikeville.	Same	
3146–21	Turner & Carty ..... Barboursville.	Cotton seed meal, linseed meal, alfalfa meal, wheat bran, molasses, salt ½%	In addition to guaranteed ingredients this feed contains rice bran containing rice hulls, corn product, kaffir or milo product, unground wheat screenings, oats and oats hulls.
4027–22	Same	Cotton seed meal, linseed meal, alfalfa meal, wheat bran, corn feed meal, kaffir corn meal, rice bran, cane molasses, salt 1%	Below guaranty in protein.
4027–22	R. A. Dodd ..... Nicholasville.	Cotton seed meal, linseed meal, alfalfa meal, wheat bran, corn feed meal, kaffir corn meal, rice bran, cane molasses, salt ½%	
4028–22	Turner & Carty ..... Barbourville.	Corn, oats, alfalfa meal, molasses, salt ½%	
3339–21	Consolidated Grocery Co. Olive Hill.	Rolled corn, rolled oats, alfalfa, molasses	
4585–22	R. D. Taylor Feed & Supply Co., Ashland.	Corn gluten meal, cocoanut oil meal, wheat bran, wheat middlings, corn gluten feed, cotton seed meal, linseed oil meal, dried yeast grains, salt ¼% ..	No cocoanut oil meal found.
147–21	J. H. Johnson ..... Jackson.	Brewer's grains, malt sprouts, hominy meal, wheat mixed feed, linseed oil meal, gluten meal, cotton seed meal, corn meal, barley middlings, salt	Below guaranty in protein.

TABLE IX.—MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
148–21	Sunshine Dairy Feed	The Nutritia Co. Cincinnati, Ohio.	17.75 16.00	4.61 3.00	7.70 12.00
142–21	York Dairy Feed	Same	17.13 16.00	4.29 3.00	10.93 12.00
143–21	Nutritia Horse Feed	Same	11.13 10.50	3.00 3.50	9.33 10.00
1132–20	"Sunny South" Horse and Mule Feed	Ohio Valley Seed Co. Evansville, Ind.	10.75 10.00	1.80 2.50	16.45 14.00
1108–20	Cream Alfalfa Dairy No. 2	Omaha Alfalfa Milling Co. Omaha, Neb.	16.13 16.00	2.03 2.50	15.90 18.00
1117–22	Alfalco Horse and Mule Feed	Same	9.50 10.00	4.00 2.00	3.03 12.00
1118–19	Grainfalmo Horse and Mule Feed	Same	11.58 10.00	1.26 2.00	14.03 15.00
1114–19	Perfection Horse and Mule Feed	Same	9.78 10.00	3.36 2.00	7.30 12.00
1115–19	Peerless Horse and Mule Feed	Same	10.81 10.00	2.41 2.00	9.54 12.00
4579–22	Omilco 24% Dairy Feed	Owensboro Milling Co. Owensboro, Ky.	25.50 24.00	5.17 5.00	8.10 12.00
4580–22	Star Dairy Feed	Same	17.63 18.00	5.48 4.50	6.88 12.00
4306–22	Day's Work Horse and Mule Feed	Same	10.06 10.20	3.95 4.27	4.48 6.70
4306–22	Same	Same	11.38 10.20	3.85 4.27	5.38 6.70
1215–19	Steven's "44" Dairy Ration	Park & Pollard Co. Chicago, Ill.	23.63 24.00	4.72 5.00	13.08 14.00
1215–20	Same	Same	23.25 24.00	5.27 5.00	10.55 14.00
4357–22	High Score Dairy Feed	M. C. Peters Mill Co. Omaha, Neb.	23.94 24.00	6.36 5.00	8.60 10.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
148–21	W. M. Wells ..... Hazard.	Hominy meal, wheat bran, wheat middlings, cotton seed meal, linseed oil meal, alfalfa meal brewer's grain, molasses, salt	Distiller's dried grains and not brewer's dried grain. No linseed oil meal found.
142–21	I. E. Payne ..... Eubank.	Ground oats, wheat mixed feed, malt sprouts, Brewer's grains, cotton seed meal, corn meal, barley middlings, gluten meal, corn bran, linseed oil meal, salt	Whole oats used. No corn gluten feed or linseed oil meal found. Cocoanut oil meal and kaffir or milo screenings found.
143–21	Crown Jewel Milling Co. Cynthiana.	Oats, crushed corn, wheat bran, alfalfa meal, cotton seed meal, brewer's grains, molasses, salt.	
1132–20	Henderson Feed & Commission Co., Henderson.	Corn, oats, alfalfa, molasses.....	Below guaranty in fat and above in fiber. Crimped barley present.
1108–20	Mayhew & Gilbert ..... Franklin.	Alfalfa meal, corn meal, cotton seed meal, wheat bran, molasses	
1117–22	Edw. M. Riedling ..... Louisville.	Alfalfa meal, molasses, corn, oats.	Below guaranty in protein. No alfalfa meal found.
1118–19	Same	Same	Below guaranty in fat. This feed is principally alfalfa meal.
1114–19	David C. Frost & Duvall. Lexington.	Same	
1115–19	Edw. M. Riedling ..... Louisville.	Same	
4579–22	Mfrs. Warehouse	Cotton seed meal, O. P. linseed oil meal, wheat bran, wheat shorts, corn feed meal, ground oats, ground barley, salt 1%..	Unground wheat screenings found.
4580–22	Yates & Fowler ..... Madisonville.	Cotton seed meal, wheat bran, wheat shorts, corn feed meal, ground oats, ground barley, salt 1%	No ground oats or barley found.
4306–22	J. D. Whittaker..... Livermore.	Corn, oats, barley, wheat bran...	
4306–22	J. D. Williams & Sons .. Beaver Dam.	Same	
1215–19	George Keller ..... Newport.	Oil meal, cotton seed meal, wheat bran, corn gluten feed, cocoanut oil meal, pea meal, brewer's dried grains, ground barley, wheat middlings, hominy meal, corn feed meal, buckwheat grits, malt sprouts, soybean meal, salt	
1215–20	Same	Same	Below guaranty in protein.
4357–22	The Mahan Co. ..... Winchester.	Corn gluten feed, cotton seed meal, corn oil cake meal, linseed oil meal, bran, shorts, ground oats, hominy feed, corn feed meal	

TABLE IX.—MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
3239–21	Peters "24" Dairy Feed.....	M. C. Peters Mill Co.....	23.75	5.54	8.80
		Omaha, Neb.	**24.00**	**4.50**	**10.00**
3237–22	Ivanhoe Horse and Mule Feed...	Same	10.63	3.68	6.55
			9.00	**3.50**	**8.00**
643–20	Peters' Arab Horse Feed.....	Same	9.90	2.50	8.89
			10.00	**2.00**	**15.00**
643–21	Same	Same	10.42	2.79	11.30
			10.00	**2.00**	**15.00**
645–20	Peters' King Corn Horse and Mule Feed	Same	10.50	2.06	14.15
			10.00	**1.50**	**18.00**
3504–21	"Poage's" Stock Feed.....	R. C. Poage Milling Co.	14.75	4.82	9.25
		Ashland, Ky.	**12.50**	**4.00**	**11.00**
3504–21	Same	Same	16.25	4.48	8.00
			12.50	**4.00**	**11.00**
3504 21	Same	Same	15.63	4.98	8.07
			12.50	**4.00**	**11.00**
3550–21	Polo Dairy Feed	Polo Mills Co.	20.25	4.98	13.68
		E. St. Louis, Ill.	**20.00**	**3.50**	**16.50**
3555–21	Holsum Horse Feed	Same	8.23	2.00	9.18
			9.00	**1.00**	**16.00**
3333–21	American Molasses Horse Feed...	Prairie State Milling Co.	10.23	3.33	6.55
		Chicago, Ill.	**9.00**	**2.50**	**8.00**
3333–21	Same	Same	11.25	3.70	7.95
			9.00	**2.50**	**8.00**
4368–22	Pratt's Supreme Dairy Ration...	Pratt Food Co.	19.38	5.15	7.90
		Philadelphia, Pa.	**20.00**	**4.00**	**10.00**
833–21	Schumacher Calf Meal	The Quaker Oats Co.	19.81	9.03	2.90
		Chicago, Ill.	**18.00**	**8.00**	**4.00**
1269–20	Schumacher Little Pig Meal.....	Same	19.25	7.05	2.50
			17.00	**6.00**	**4.00**
1478–19	Purina Cow Chow Feed.....	Ralston Purina Co.	25.63	4.93	10.09
		St. Louis, Mo.	**24.00**	**4.30**	**12.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
3239–21	Owensboro Milling Co... Owensboro.	Cotton seed meal, corn feed meal, ground barley, oil meal, alfalfa meal, molasses	Below guaranty in protein. Considerable wheat bran present. Wheat screenings and kaffir or milo screenings present.
3237–22	American Coal & Feed Co., Louisville.	Corn, oats, alfalfa, molasses.....	
643–20	Laurel Grocery Co. ..... East Bernstadt.	Same	
643–21	Louis Des Cognets & Co. Lexington.	Same	
645–20	Powell Hackney Grocery Co., Hazard.	Same	
3504–21	Caudill-Blair Co. ..... Morehead.	Ground wheat bran, wheat middlings, ground weed seeds, ground wheat screenings 5%..	Oat product present.
3504–21	J. W. Thornsbury..... Regina.	Same	
3504–21	P. E. Caldwell ..... Catlettsburg.	Same	
3550–21	W. B. Ray Feed Co. .... Princeton.	Cotton seed meal, brewer's dried grains, corn gluten feed, alfalfa meal, molasses	Corn feed meal present.
3555–21	J. H. White ..... Rineyville.	Corn, oats, alfalfa meal, screenings from corn, oats, barley and kaffir 15%, molasses	Below guaranty in protein.
3333–21	Glass Milling Co. ..... Wilmore.	Pure crimped oats, cracked corn, molasses, barley, bran, alfalfa meal	
3333–21	J. H. Fedders & Sons ... Covington.	Same	Oats used are pin oats.
4368–22	Louisville Hay & Grain Co., Louisville.	Corn feed meal, wheat bran, O. P. linseed oil meal, ground oats, corn gluten feed, cocoanut oil meal, cotton seed meal, ground grain screenings 13%, salt	
833–21	Williams Feed Co. ..... Pikeville.	Oatmeal, ground flaxseed, milk albumen, old process linseed oil meal, bolted and sterilized blood flour, bicarbonate of soda ½%, ground puffed rice	
1269–20	Same	Ground puffed wheat, ground flaxseed, old process linseed oil meal, hominy feed, yellow hominy feed, digester tankage, milk albumen, oatmeal, oat middlings, bicarbonate of soda ½%, calcium phosphate ½%, salt ½%	
1178–19	Martin & Hodgkin Supply Co., Winchester.	Linseed oil meal, (old process), gluten feed from corn, hominy feed, cotton seed meal, ground alfalfa, molasses, salt 1%	

TABLE IX.—MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
1478–21	Purina Cow Chow Feed.....	Ralston Purina Co. ..... St. Louis, Mo.	25.00 **24.00**	5.30 **4.30**	10.25 **12.00**
1478–22	Same	Same	25.13 **24.00**	4.87 **4.30**	9.70 **12.00**
557–21	Purina O-Molene Feed.....	Same	10.17 **9.70**	3.16 **3.20**	7.82 **8.00**
557–22	Same	Same	10.28 **9.70**	3.55 **3.20**	8.49 **8.00**
2727–20	Star Special Feed	Same	10.13 **9.70**	3.38 **3.20**	6.95 **8.00**
1233–21	Purina Pig Chow	Same	19.88 **20.00**	4.51 **3.20**	6.38 **8.00**
1233–21	Same	Same	20.50 **15.00**	2.72 **2.50**	7.55 **9.00**
1233–21	Same	Same	22.13 **20.00**	4.37 **3.20**	6.77 **8.00**
3659–21	Rapier's 24% Protein Dairy Feed	Rapier Sugar Feed Co. ..... Owensboro, Ky.	22.56 **24.00**	5.38 **4.75**	11.00 **12.00**
3659–22	Same	Same	26.13 **24.00**	4.72 **4.75**	11.90 **12.00**
422–21	Rapier's Creamo Dairy Feed.....	Same	16.50 **16.50**	2.99 **3.50**	16.15 **16.00**
422–22	Same	Same	19.38 **16.50**	3.88 **3.50**	8.90 **16.00**
422–22	Same	Same	17.00 **16.50**	2.90 **3.50**	12.30 **16.00**
422–22	Same	Same	17.00 **16.50** **16.50**	3.25 **3.50** **3.50**	13.08 **16.00** **16.00**
422–22	Same	Same	19.75 **16.50**	4.39 **3.50**	10.83 **16.00**
422–23	Same	Same	17.00 **16.50**	3.87 **3.50**	10.98 **16.00**
3448–21	Rapier's 90% Horse and Mule Feed	Same	10.45 **10.00**	3.98 **4.00**	6.91 **10.00**
3448–23	Same	Same	10.00 **10.00**	3.92 **4.00**	5.75 **10.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
1478–21	W. W. Broaddus & Co... Richmond.	Old process linseed oil meal, gluten feed from corn, hominy feed, corn feed meal, cotton seed meal, ground alfalfa, molasses, salt 1%	
1478–22	J. H. Fedders & Sons ... Covington.	Same	
557–21	Martin & Hodgkin Supply Co., Winchester.	Oats, cracked corn, molasses, ground alfalfa, salt 1%.....	
557–22	W. W. Broaddus & Co. .. Richmond.	Oats, cracked corn, old process linseed oil meal, ground alfalfa, molasses, salt 1%	
2727–20	Manchester Grocery Co.. Manchester.	Cracked corn, oats, ground alfalfa, molasses, salt 1%.....	
1233–21	Paducah Elev. & Bonded Warehouse, Paducah...	Hominy feed, cane molasses, corn meal, gluten feed from corn, digester tankage, old process linseed oil meal, wheat middlings, ground alfalfa, charcoal 1%, salt 1%	
1233–21	W. W. Broaddus & Co... Richmond.	Same	
1233–21	Same	Same	
3659–21	Sharp & McCreary ..... Corbin.	Linseed meal, cotton seed meal, corn feed meal, wheat bran, peanut meal, cane molasses, alfalfa meal, salt 1%	Below guaranty in protein. No corn feed meal found.
3659–22	Elkins & Kimmel ..... Greenville.	Same	
422–21	Glendale Mill & Elevator Co., Glendale.	Cotton seed meal, linseed meal, alfalfa meal, molasses, ground and bolted wheat and corn screenings 35%, salt 1%	
422–22	Trent & Bruner ..... Irvington.	Same	
422–22	Taulbee & Co. ..... Hazard.	Same	Oat hulls present. Below guaranty in fat.
422–22	F. J. Porter ..... Bloomfield.	Same	Ground oat hulls and unground weed seeds present.
422–22	Jas. H. Albro & Co. .... Caneyville.	Same	No linseed oil meal found. Peanut meal and oat hulls present.
422–23	Harlan Grocery & Grain Co., Harlan.	Same	Oat hulls and ground weed seeds found.
3448–21	Bell Grocery Co. ..... Pineville.	Corn, oats, alfalfa, molasses, salt ½%	Pin oats present.
3448–23	Harlan Grocery & Grain Co., Harlan.	Same	

TABLE IX.—MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
420–22	Rapier's Red Wing Horse and Mule Feed	Rapier Sugar Feed Co. Owensboro, Ky.	11.50 **9.00**	2.80 **2.00**	15.13 **15.00**
420–22	Same	Same	11.00 **9.00**	3.34 **2.00**	12.08 **15.00**
423–19	Rapier's Pig Meal	Same	13.00 **12.00**	4.39 **2.50**	6.63 **12.00**
423–19	Same	Same	13.81 **12.00**	1.77 **2.50**	7.73 **12.00**
423–19	Same	Same	12.63 **12.00**	2.98 **2.50**	7.73 **12.00**
1601–18	Rapier's Honey Meal	Same	11.37 **9.00**	0.91 **1.00**	16.63 **18.00**
2918–20	Advance Dairy Feed	Rosenbaum Bros. Chicago, Ill.	17.81 **16.00**	3.68 **3.50**	8.60 **14.00**
2322–23	Roszbro Horse Feed	Roszell Bros. Lexington, Ky.	9.88 **9.00**	3.85 **3.00**	6.70 **12.00**
370–21	"Security" Dairy Feed	Security Mills & Feed Co. Knoxville, Tenn.	24.31 **24.00**	4.63 **4.75**	8.05 **10.00**
3700–21	Big H Horse and Mule Feed	Same	9.90 **10.50**	3.71 **4.00**	6.75 **9.00**
3700–21	Same	Same	10.04 **10.50**	3.61 **4.00**	6.30 **9.00**
3700–21	Same	Same	10.22 **10.50**	3.93 **4.00**	12.35 **9.00**
1232–20	Hog Feed	The Simmons Milling Co. Cincinnati, Ohio.	20.19 **20.00**	5.61 **5.00**	6.33 **7.00**
4304–22	Simco Buttermilk Hog Feed	Same	20.13 **20.00**	5.05 **5.00**	5.18 **7.00**
494–20	Atlas Dairy Feed	Southern Seed Co. Louisville, Ky.	21.81 **18.00**	5.70 **3.00**	10.40 **18.00**
4107–22	Diamond Dairy Feed	Same	22.75 **20.00**	5.79 **3.50**	9.38 **10.00**
2945–21	Standard Horse and Mule Feed	Same	9.75 **9.00**	3.70 **2.50**	4.85 **12.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
420–22	The Lynn Mills ..... Hodgenville.	Cracked corn, alfalfa meal, oats, cane molasses, salt 1%.....	
420–22	Fortney & Pulley ..... Central City.	Same	
423–19	R. W. Jones & Son .... Hardinsburg.	Louisiana cane molasses, alfalfa leaf meal, old process linseed oil meal, recleaned ground wheat and corn screenings 35%, corn feed meal, salt 1%	No linseed oil meal present. Oat hulls present.
423–19	Franklin Mills Co. ..... Franklin.	Same	Below guaranty in fat. Alfalfa meal and not alfalfa leaf meal used. Moldy odor.
423–19	F. J. Porter ..... Bloomfield.	Same	Alfalfa meal and not alfalfa leaf meal used.
1601-18	Smullen & Son ..... Henderson.	Cane molasses, alfalfa meal, salt ½%	
2918–20	Roszell Bros. ..... Lexington.	O. P. linseed oil meal, cotton seed meal, corn feed meal, ground wheat, barley and kaffir corn screenings 35%, alfalfa meal, calcium carbonate 1%, salt, molasses	Oat hulls present.
2322–23	Same	Oats, cracked corn, molasses, alfalfa, salt 1%.....	
370–21	Pineville Produce Co. .. Pineville.	Linseed meal, wheat bran, wheat shorts, corn meal, corn hearts, brewer's dried grains, cotton seed meal, molasses, salt ½%	Corn gluten and oat product present.
3700–21	The H. T. Hackney Co... Middlesboro.	Corn, oats, brewer's dried grains, alfalfa meal, molasses, salt ½%	Below guaranty in protein and fat.
3700–21	The H. T. Hackney Co... Harlan.	Same	
3700–21	Same	Same	
1232–20	Hess & Racke..... Alexandria.	Corn gluten feed, wheat middlings, corn meal, hominy feed, oil meal, digester tankage, copra meal, peanut kernel meal	Not tagged, sold in violation of the law.
4304–22	Alva West & Co. ..... Maysville.	Dried buttermilk, corn gluten feed, wheat middlings, corn meal, hominy feed, old process linseed oil meal, blood and meat digester tankage, copra meal, peanut kernel meal, salt	
494–20	Elkhorn Coal Corporation Fleming.	Alfalfa meal, cotton seed meal, corn meal, molasses, salt ½%	Brewer's grains, cotton seed meal and wheat middlings present.
4107–22	Powell-Hackney Co. .... Hazard.	Wheat middlings, cotton seed meal, corn meal, rolled oats, cracked corn, salt ½%	No cracked corn found.
2945–21	Woodson Coal & Feed Co. Middlesboro.	Corn, oats, alfalfa meal, molasses, salt ½%	

TABLE IX.—MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
2971–21	Molasses Chop Feed.....	Southern Seed Co.....	9.50	3.77	3.78
		Louisville, Ky.	**8.00**	**2.50**	**8.00**
4103–22	The National Dairy Feed.....	The Sugarine Co.	21.13	4.24	6.73
		Owensboro, Ky.	**20.00**	**4.50**	**12.00**
4103–22	Same	Same	20.63	5.18	8.23
			20.00	**4.50**	**12.00**
6078–22	Universal Dairy Feed	Same	19.00	3.72	8.53
			16.50	**3.00**	**12.00**
3078–22	Same	Same	18.00	3.53	10.00
			16.50	**3.00**	**12.00**
3078–23	Same	Same	17.25	3.48	9.83
			16.50	**3.00**	**12.00**
2014–21	Suco Dairy Feed	Same	22.00	4.51	9.52
			20.00	**4.00**	**10.00**
2014–21	Same	Same	21.56	4.49	7.02
			20.00	**4.00**	**10.00**
2014–21	Same	Same	22.13	4.26	9.88
			20.00	**4.00**	**10.00**
4104–22	Sugarine Record Dairy Feed.....	Same	21.44	5.64	8.48
			24.00	**4.50**	**10.00**
2868–21	Hi-Grain Alfalfa Horse Feed.....	Same	10.25	3.09	7.68
			10.00	**2.50**	**12.00**
2868–21	Same	Same	10.31	3.89	8.06
			10.00	**2.50**	**12.00**
2868–22	Same	Same	9.56	3.53	7.96
			10.00	**2.50**	**12.00**
2015–21	Sugarine Alfalfa Horse Feed.....	Same	10.19	3.53	8.58
			10.00	**2.50**	**12.00**
2015–22	Same	Same	9.54	3.46	5.19
			10.00	**2.50**	**12.00**
2015–22	Same	Same	10.08	3.28	9.11
			10.00	**2.50**	**12.00**
4101–22	Sugarine Record Horse Feed.....	Same	9.15	2.91	6.95
			10.00	**2.50**	**11.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
2971–21	Woodson Coal & Feed Co Middlesboro.	Corn, oats, molasses.....	
4103–22	Wisconsin Steel Co. ..... Benham.	Cotton seed meal, copra meal, peanut meal, hominy, wheat bran, grain screenings 15%, ground oats, alfalfa meal, molasses, salt, calcium carbonate ½%	Corn gluten feed present. No copra meal or alfalfa meal found.
4103–22	Jellico Grocery Co. ..... Barbourville.	Same	
6078–22	J. H. Fedders & Sons ... Covington.	Cotton seed meal, copra meal, gluten feed, corn meal, alfalfa meal, wheat bran, molasses, salt ½%	
3078–22	Boone County Farm Bureau, Florence.	Same	No copra meal found.
3078–23	Same	Same	Same.
2014–21	Thompson Grocery Co... Pineville.	Wheat bran, linseed meal, prime cotton seed meal, prime peanut meal, cocoanut meal, corn feed meal, molasses, alfalfa meal, calcium carbonate ½%, salt ½%	
2014–21	Jellico Grocery Co. ..... Corbin.	Same	
2014–21	Wisconsin Steel Co. .... Benham.		
4104–22	Anderson & Spilman.... Danville.	Cotton seed meal, linseed meal, copra meal, peanut meal, alfalfa meal, wheat bran, ground oats, hominy feed, molasses, calcium carbonate ½%, salt ½%	Much below guaranty in protein. Ground wheat screenings present.
2868–21	Thompson Grocery Co... Pineville.	Molasses, alfalfa, corn, barley, oats	
2868–21	Jellico Grocery Co. .... Corbin.	Same	
2868–22	The Mahan Co. ..... Hazard.	Molasses, alfalfa, corn, barley, oats	
2015–21	Crescent Milling Co. ... Cynthiana.	Molasses, alfalfa, corn, oats, barley, salt ½%.....	The oats used in this feed are wild and pin head oats.
2015–22	Jellico Grocery Co. .... Barbourville.	Corn, oats, alfalfa, molasses, salt.	Excess of cracked corn.
2015–22	The Dorsel Co. ..... Newport.	Same	
4101–22	Jellico Grocery Co..... Harlan.	Cracked corn, oats, alfalfa, molasses, salt	Below guaranty in protein.

TABLE IX.—MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
2020–22	Sugarine Hog Meal	The Sugarine Co. Owensboro, Ky.	15.94 **18.00**	4.00 **4.00**	5.85 **6.00**
2023–20	Sugarine Calf Meal	Same	19.25 **18.00**	3.53 **4.00**	4.20 **6.00**
2023–20	Same	Same	18.25 **18.00**	4.02 **4.00**	4.48 **6.00**
4409–22	Sugar Jack Dairy Feed	Tri-State Vegi Feed Co. Cincinnati, Ohio.	18.13 **18.00**	4.16 **4.00**	11.30 **12.00**
4409–22	Same	Same	18.50 **18.00**	4.31 **4.00**	11.38 **12.00**
4409–23	Same	Same	18.00 **18.00**	3.76 **4.00**	12.88 **12.00**
131–21	"Union Grains" Ubiko Biles Ready Dairy Ration	The Ubiko Milling Co. Cincinnati, Ohio.	23.63 **24.00**	5.69 **5.00**	8.38 **10.00**
131–21	Same	Same	24.25 **24.00**	5.58 **5.00**	8.15 **10.00**
131–21	Same	Same	24.13 **24.00**	5.65 **5.00**	8.85 **10.00**
4374–22	Crusader Horse Feed	Same	10.24 **10.00**	4.32 **3.00**	7.25 **10.00**
4374–22	Same	Same	10.26 **10.00**	4.28 **3.00**	7.03 **10.00**
1984–20	Ubiko Pig Meal	Same	18.88 **18.00**	6.67 **5.00**	6.83 **8.00**
4569–22	Weaverton Dairy Feed	Weaverton Milling Co. Henderson, Ky.	15.25 15.56	5.95 4.67	8.53 9.15
3713–22	Perfection Dairy Feed	Winchester Roller Mills. Winchester, Ky.	21.00 **20.00**	4.54 **4.00**	7.88 **10.00**
3713–22	Same	Same	20.50 **20.00**	4.05 **4.00**	7.93 **10.00**

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
2020–22	Lake Bros. ..... Springfield.	Cocoanut meal, germ oil meal, ground oats, corn meal, linseed meal, ground and bolted wild buckwheat and wheat, blood flour, peanut meal, alfalfa meal, molasses, calcium carbonate ½%, salt ½%	Below guaranty in protein. Corn gluten feed present. No germ oil meal, linseed meal or peanut meal found.
2023–20	Pendleton Flour Mills .. Falmouth.	Blood flour, bone meal, soluble starch, malt flour, dried skim milk, corn feed meal, linseed meal, wheat middlings	Ground wheat screenings and salt present.
2023–20	Amos Yeager ..... Louisville.	Same	Considerable ground wheat screenings present.
4409–22	Perry Feed & Commission Co., Hazard.	Corn, oats, barley, wheat bran, alfalfa, cotton seed meal, old process linseed oil meal, malt, salt	
4409–22	Roszell Bros. ..... Lexington.	Same	
4409–23	Blackey Flour & Feed Co., Blackey.	Same	Above guaranty in fiber.
131–21	Danville Ice & Coal Co.. Danville.	Corn distiller's dried grains, choice cotton seed meal, O. P. linseed meal, white wheat middlings, winter wheat bran, hominy meal, corn germ meal, corn gluten feed, brewer's dried grains, fine table salt ½%	
131–21	J. H. Fedders & Sons ... Covington.	Same	
131–21	J. S. Wilson & Bro. ..... Paris.	Same	
4374–22	J. H. Fedders & Sons .. Covington.	Corn, oats, alfalfa, molasses.....	
4374–22	Boone County Farm Bureau, Florence.	Same	
1984–20	Danville Ice & Coal Co.. Danville.	Digester tankage, wheat middlings, hominy feed, cocoanut oil meal, germ oil meal, old process linseed meal, rye middlings, salt	Corn cob present.
4569–22	Mfrs. Warehouse	Wheat bran, alfalfa meal, corn feed meal, wheat shorts, cotton seed meal	
3713–22	J. R. Blake ..... Jackson.	Wheat bran, linseed meal, prime cotton seed meal, prime peanut meal, cocoanut meal, corn feed meal, molasses, alfalfa meal, calcium carbonate ½%, salt ½%	Corn gluten feed and oat hulls present but not guaranteed. Cocoanut meal and alfalfa meal guaranteed but not found.
3713–22	C. S. Cartee ..... Olive Hill.	Same	No peanut meal, cocoanut meal or alfalfa meal found. Gluten feed and oat hulls and wheat screenings found.

TABLE IX.—MISCELLANEOUS MIXED FEEDS COMPOSED OF STRAIGHT BY-PRODUCTS.

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
.....	O-Kay Horse and Mule Feed.....	Winchester Roller Mills.....	8.25	2.82	10.28
		Winchester, Ky.	....	....	....
3185–21	P. P. P. 24% Molasses Dairy Feed	Wood, Stubbs & Co.	19.19	7.08	11.10
		Louisville, Ky.	**24.00**	**4.50**	14.00
4436–22	Yellow Diamond Dairy Feed.....	Woolcott Flour Mills	25.56	7.99	9.40
		Lexington, Ky.	**21.13**	**5.72**	9.84
4436–22	Same	Same	18.00	4.00	11.60
			21.13	**5.72**	9.84
4435–22	Green Diamond Horse Feed.....	Same	9.16	3.67	7.77
			9.89	**3.96**	11.40
4435–22	Same	Same	10.19	3.94	7.68
			9.89	**3.96**	11.40
4171–21	Imperial Dairy Feed.....	Ziliak & Schafer Milling Co. ..	11.14	2.75	9.65
		Evansville, Ind.	**15.00**	**2.00**	17.00
4170–22	Elite Pig Meal.....	Same	17.75	4.75	4.58
			17.00	**3.50**	8.00

ANALYSES OF INSPECTORS' SAMPLES.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
.....	Marion Coal Co..... Blackey.		Not labeled in accordance with law.
3185–21	D. H. Prewitt ..... Danville.	Cotton seed meal, linseed oil meal, alfalfa meal, wheat bran, corn meal, cane molasses, salt ½%	Pin oats present. Below guaranty in protein.
4436–22	Junior Feed Store ..... Hazard.	Alfalfa meal, corn feed meal, cotton seed meal, linseed meal, wheat bran, rice bran, kaffir corn meal, cane molasses, salt ½%	
4436–22	S. L. Cummins ..... Crab Orchard.	Same	Contains clipped oat by-product or oat feed (oat hulls and oat middlings), also ground and botted grain screenings.
4435–22	M. R. Wheldon ..... Waynesburg.	Alfalfa meal, corn, oats, molasses, salt ½%	Below guaranty in protein.
4435–22	Junior Feed Store..... Hazard.	Same	
4171–22	J. F. Whitsell ..... Sturgis.	Wheat bran, hominy feed, corn feed meal, cotton seed meal, linseed oil meal, alfalfa meal, molasses	Below guaranty in protein and a very inferior product to guaranty.
4170–22	City Feed Co. ..... Lexington.	Wheat middlings, corn feed meal, Hominy feed, tankage, salt ..	Linseed oil meal present.

TABLE X.—MISCELLANEOUS MIXED FEEDS CONTAINING

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
312-22	Acme Stock Feed.....	Acme-Evans Co. ..... Indianapolis, Ind.	8.56 9.00	3.06 3.50	12.10 10.00
312–22	Same	Same	8.75 9.00	3.68 3.50	11.45 10.00
312-23	Same	Same	7.00 9.00	3.41 3.50	15.40 10.00
3595-23	High Flow Dairy Feed.....	Alfocorn Milling Co. ..... St. Louis, Mo.	10.63 9.00	3.57 1.50	13.68 13.50
3094–21	"High-Kick" Horse & Mule Feed	Same	9.60 9.00	3.03 1.50	10.08 15.00
373-22	Sucrene Dairy Feed.....	American Milling Co..... Peoria, Ill.	19.13 16.50	4.54 3.50	13.30 12.00
373-22	Same	Same	17.38 16.50	4.48 3.50	11.63 12.00
2833-22	Empire 20% Dairy Feed.....	Same	21.63 20.00	4.67 4.00	10.20 12.00
4623-22	Amco Chop Feed.....	Same	8.13 8.00	3.46 3.00	9.95 12.00
379-22	Sucrene Horse & Mule Feed.....	Same	8.33 9.00	2.43 2.50	9.43 12.00
4064-23	Red "A" Dairy Feed.....	Aubrey & Co. ..... Louisville, Ky.	12.88 12.00	3.27 2.00	17.73 25.00
4065–22	Monarch Dairy Feed.....	Same	16.44 16.00	3.95 3.00	14.43 20.00

A Material of Little or No Feeding Value.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
312–22	W. E. Wilson ..... Russellville.	Corn, homlik, corn feed meal, wheat bran, wheat middlings, hominy meal, oat middlings and oat hulls, 30%, salt	Below guaranty in protein and fat and above in fiber.
312–22	Powell-Hackney Grocery Co., Jackson.	Same	Above guaranty in fiber. No wheat bran or wheat middlings present.
312–23	Lanham-Terrell Grocery Co., Corbin.	Same	Below guaranty in protein and above in fiber. No wheat bran or wheat middlings present. Inferior product.
3595–23	Chappell Grocery Co.... Pineville.	Corn gluten feed, whole ground yellow corn meal, wheat middlings, reground and bolted wheat screenings 20%, oat middlings, oat shorts and oat hulls 20%, sugar cane molasses, salt ½%	Ground weed seeds present.
3094–21	J. S. Holland Co. ..... Jackson.	Cracked corn, alfalfa meal, oat middlings, oat shorts and oat hulls 10%, rice bran, molasses, salt ½%	No rice bran present. Ground weed seeds, barley product, and wheat bran present but not guaranteed.
373–22	Jas. A. Wallace ..... Irvine.	Corn distiller's dried grains, prime cotton seed meal, linseed oil meal, cocoanut oil meal, corn gluten feed, corn feed meal, wheat bran, ground and bolted grain screenings 15%, clipped oat by-product 15%, molasses, salt 1%, calcium carbonate 1%	Above guaranty in fiber.
373–22	David C. Frost & Duvall Lexington.	Same	
2833–22	R. C. Poage Milling Co... Ashland.	Wheat bran, linseed oil meal, prime cotton seed meal, prime peanut oil meal, cocoanut oil meal, corn gluten feed, corn distiller's dried grains, corn feed meal, molasses, clipped oat by-products 10%, salt 1%, calcium carbonate 1%	
4623–22	Staggs Bros. Co. ..... Vanceburg.	Corn feed meal, oat shorts, oat middlings and oat hulls 35%.	
379–22	T. L. Hardy ..... Berry.	Molasses, corn, oats, oat middlings, oat shorts and oat hulls 45% barley, salt ½%	Wild oats present. Below guaranty in protein.
4064–23	M. Woosley & Son..... Elizabethtown.	Cotton seed meal, alfalfa meal, cotton seed hulls 20%, Flax plant by-product 5%, clipped oat by-product 10%, brewers' grains, molasses, salt ½% ..	Corn feed meal found. No brewers' dried grains present. Fiber guarantee is too high.
4065–22	Blackey Flour & Feed Co. Blackey.	Brewers' dried grain, cotton seed meal, alfalfa meal, cotton seed hulls 10%, flax plant by-product 10%, clipped oat by-product 5%, molasses, salt	Wheat bran and corn meal present, oat by-product in excess of 5% as claimed.

TABLE X.—MISCELLANEOUS MIXED FEEDS CONTAINING

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
3611–22	Dandy Horse Feed.....	Aubrey & Co.	8.36	3.14	6.80
		Louisville, Ky.	**8.00**	**2.00**	**16.00**
3611–23	Same	Same	8.63	3.60	7.68
			8.00	**2.00**	**16.00**
3823–22	Horse, Mule and Dairy Feed.....	Beaty Bros.	8.38	3.86	5.80
		Science Hill, Ky.	**9.19**	**4.54**	**6.28**
2493–21	Pawnee Sweet Dairy Feed.....	The Corno Mills Co.	20.63	3.68	11.52
		St. Louis, Mo.	**20.00**	**3.50**	**13.50**
2357-20	Nutro Sweet Dairy Feed.....	Same	18.38	3.73	11.60
			16.00	**3.50**	**16.50**
2357-22	Same	Same	18.38	3.65	14.58
			16.00	**3.50**	**16.50**
2357-22	Same	Same	17.00	3.63	13.25
			16.00	**3.50**	**16.50**
228-21	Corno Horse & Mule Feed.....	Same	8.88	2.75	17.55
			10.00	**3.50**	**15.00**
3827–22	Corno Stock Feed.....	Same	9.00	3.98	11.80
			9.00	**5.00**	**12.50**
3827–22	Same	Same	8.25	3.19	9.88
			9.00	**5.00**	**12.50**
3827 22	Same	Same	8.25	4.44	11.00
			9.00	**5.00**	**12.50**
3827–22	Same	Same	7.63	3.47	14.00
			9.00	**5.00**	**12.50**
4615-22	Corno Oat By-Product Feed.....	Same	6.38	2.08	28.45
			6.00	**2.00**	**28.00**
3405-22	Noco Stock Feed.....	The Corno Mills Co. (National	8.50	2.90	8.70
		Oats Co.) St. Louis, Mo.....	**9.00**	**5.00**	**12.50**
4127-22	Shamrock Stock Feed.....	The Corno Mills Co., (Sham-	7.75	4.17	14.65
		rock Mills) E. St. Louis, Ill..	**9.00**	**5.00**	**12.50**
4093–22	"Double D" Special Dairy Feed..	D. A. Davis & Son.....	15.63	5.82	17.15
		Jeffersontown, Ky.	**17.63**	**7.55**	**14.10**
1766-21	Red Crown Horse & Mule Feed...	Diamond Mills	10.94	3.20	8.13
		Evansville, Ind.	**9.00**	**2.00**	**15.00**

A Material of Little or No Feeding Value.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
3611–22	Hazard Poultry & Supply Co., Hazard.	Oats, corn, alfalfa meal, oat middlings and oat hulls, 25%, salt ½% molasses	Guarantee in fiber is too high.
3611–23	Lewis & Co. ..... Viper.	Same	No alfalfa meal present.
3823–22	C. E. Cain ..... Whitley City.	Crushed corn, crushed cob 8%, oats	Inferior to guarantee. Below guarantee in both protein and fat.
2493–21	Powell-Hackney Grocery Co., Hazard.	Gluten feed, cotton seed meal, wheat bran, oat middlings, oat shorts and oat hulls, 14%, choice alfalfa meal, linseed meal, molasses, salt 1%	Corn product present.
2357–20	Wm. Addams ..... Cynthiana.	Wheat bran, cotton seed meal, oat middlings, oat shorts and oat hulls, 20%, alfalfa meal, molasses	Rice bran present. No alfalfa meal found.
2357–22	F. B. Marksbury & Co... Lancaster.	Wheat bran, cotton seed meal, oat middlings, oat shorts and oat hulls 15%, alfalfa meal, molasses	
2357–22	Powell-Hackney Co. .... Hazard.	Same	Corn feed meal present.
228–21	W. L. Kimbrough & Son. Guthrie.	Ground alfalfa, cracked corn, ground whole oats, hominy feed, cotton seed meal, oat middlings, oat shorts and oat hulls, 15%	Inferior product. Below guaranty in protein and fat and above in fiber.
3827–22	D. Ballard Masters Co. .. Ravenna.	Hominy feed, corn meal, oat middlings, oat shorts and oat hulls, 25%, ground wheat screenings 5%, salt 1%	
3827–22	Cumberland Grocery Co. Junction City.	Same	Below guaranty in protein and fat.
3827–22	London Grocery Co. .... London.	Same	Below guaranty in protein and fat.
3827–22	W. L. Kimbrough & Son. Guthrie.	Same	Inferior product. Much below guaranty in protein and fat and above in fiber.
4615–22	Dennes-Cobern & Co. ... Olive Hill.	Oat middlings, oat shorts, oat hulls	
3405–22	Lanham-Terrell Grocery Co., Corbin.	Same	Below guaranty in protein.
4127–22	The Mahan Co. ..... Hazard.	Same	Excess of oat hulls present. Below guaranty in protein and fat, and above in fiber.
4093–22	Mfrs. Warehouse	Rice bran, cotton seed meal, oil meal, oat hulls 25%, oat middlings, oat shorts, ground corn, salt ½%	Inferior product. Below guaranty in protein and fat and above in fiber.
1766–21	Corum Bros. ..... Madisonville.	Corn, oats, alfalfa meal, molasses, clipped oat by-product 10% ...	

TABLE X.—MISCELLANEOUS MIXED FEEDS CONTAINING

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
3753-22	P. D. Q. Special Feed.....	Ferncliff Feed & Grain Co. .... Louisville, Ky.	9.22 **9.00**	2.88 **1.50**	7.37 **16.00**
591-20	Golden Grain Mills Dairy Feed...	Golden Grain Milling Co. .... E. St. Louis, Ill.	13.60 **15.00**	1.98 **2.50**	13.54 **15.00**
689–19	Gold Flake Dairy Feed.....	Hales & Edwards Co. ..... Chicago, Ill.	17.50 **16.00**	3.56 **3.50**	10.21 **15.00**
689–19	Same	Same	13.73 **16.00**	2.97 **3.50**	11.97 **15.00**
689-19	Same	Same	13.50 **16.00**	3.40 **3.50**	12.08 **15.00**
689–23	Same	Hales & Hunter Co. ..... Chicago, Ill.	10.12 **16.00**	2.48 **3.50**	17.42 **15.00**
4459–22	H. & H. White Stock Feed.....	Same	9.50 **10.00**	3.32 **2.50**	9.38 **12.00**
3490-21	Special Dairy Feed.....	P. H. Harsha ..... Portsmouth, Ohio	16.19 **15.00**	7.84 **4.50**	12.31 **12.50**
1005-20	International Special Dairy Feed..	International Sugar Feed No. 2 Co., Memphis, Tenn.	17.13 **15.00**	3.49 **4.50**	8.36 **12.50**
3352–22	Same	Same	16.88 **15.00**	3.60 **4.50**	9.40 **12.50**
3352–22	Same	Same	17.88 **15.00**	5.20 **4.50**	11.90 **12.50**
3352–22	Same	Same	15.63 **15.00**	4.58 **4.50**	13.08 **12.50**
989–20	International Jewel Dairy Feed..	Same	10.42 **9.00**	2.71 **2.00**	13.84 **15.00**

A Material of Little or No Feeding Value.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
3753–22	C. L. Winn ..... Irvington.	Cracked corn, white oats, alfalfa meal, cane molasses, oat middlings, oat shorts and oat hulls, 25%	Considerable kaffir or milo screenings present.
591–20	Middlesboro Wholesale Grocery Co., Poor Fork	Cotton seed meal, alfalfa meal, clipped oat by-product 20%, molasses, salt ½%	**Below guaranty in protein and fat.**
689–19	Edw. M. Riedling ..... Louisville.	Cotton seed meal, corn gluten feed, linseed oil meal, molasses, clipped oat by-product 25%, ground and bolted wheat, barley and kaffir corn screenings 25%, salt	Ground weed seeds present.
689–19	C. S. Brent Seed Co. .... Lexington.	Cotton seed meal, corn gluten feed, linseed oil meal, molasses, clipped oat by-product 25%, ground and bolted wheat, barley and kaffir corn screenings 25%, salt	No linseed oil meal present. Below guaranty in protein and fat. Inferior to claims.
689–19	Kentucky Feed Co. .... Flemingsburg.	Same	No corn gluten feed or linseed oil meal present. Below guaranty in protein. A very inferior product to guaranty.
689–23	C. S. Brent Seed Co..... Lexington.	Same	Ground weed seeds present. Corn meal used, no gluten feed used as claimed. Below guaranty in protein and fat and above in fiber. Inferior product to guarantee.
4459–22	Edw. M. Riedling ..... Louisville.	Corn feed meal, hominy feed, red dog flour, oat middlings, oat shorts and oat hulls 25%	Below guaranty in protein.
3490–21	Burg Kinner ..... Greenup.	Corn gluten feed, wheat bran, molasses, old process linseed oil meal, cotton seed meal, ground clipped oat by-product 15%, ground grain screenings 35%, salt	Excess of clipped oat by-product and grain screenings used. Large per cent weed seeds present. No corn gluten feed found.
1005–20	Graves County Farm Bureau, Mayfield.	Cotton seed meal, molasses, ground clipped oat by-product 15%, ground and bolted grain screenings 35%, linseed oil meal, corn gluten feed, wheat bran, salt ½%	Below guaranty in fat.
3352–22	Calloway County Farm Bureau, Murray	Same	Below guaranty in fat.
3352–22	J. J. Shaver & Co. ..... Mayfield.	Same	
3352–22	Y. J. H. Lancaster ..... Wingo.	Same	Above guaranty in fiber No corn gluten feed found, but corn meal instead.
989–20	W. N. Neville ..... Arlington.	Corn feed meal, clipped oat by-product 60%, alfalfa meal, cotton seed meal, molasses, salt.	Ground weed seeds present. No corn product found.

TABLE X.—MISCELLANEOUS MIXED FEEDS CONTAINING

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
3732–21	Kentucky Star Dairy Feed.....	Kentucky Feed & Grain Co. .. Louisville, Ky.	13.00 12.00	2.90 3.00	12.20 14.00
3732–22	Same	Same	16.63 12.00	5.59 3.00	11.28 14.00
3732–22	Same	Same	19.81 16.50	4.82 3.50	10.38 15.00
3732–22	Same	Same	17.25 16.50	7.90 3.50	10.77 15.00
3510–21	Kentucky Star Horse and Mule Feed	Same	8.44 8.00	2.64 1.50	10.45 14.00
3510–21	Same	Same	8.13 8.00	2.98 1.50	9.89 14.00
4802–23	Sedan Horse and Mule Feed.....	Same	9.25 8.00	3.91 2.00	5.83 12.00
4464–22	Bingo Dairy Feed.....	Chas. A. Krause Mil. Co. .... Milwaukee, Wis.	9.50 12.00	4.25 3.00	22.60 15.00
4464–22	Same	Same	12.00 12.00	5.88 3.00	15.68 15.00
4139–22	Badger 16½% Sweet Dairy Feed.	Same	16.81 16.50	4.54 3.50	15.90 18.00
4139–22	Same	Same	16.63 16.50	6.49 3.50	14.65 18.00
4139–23	Same	Same	15.50 16.50	6.20 3.50	15.49 18.00
1705–22	Badger Stock Feed.....	Same	7.75 10.00	3.00 3.25	10.92 10.00

A Material of Little or No Feeding Value.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
3732–21	Mfrs. Warehouse	Cotton seed meal, corn feed meal, wheat bran, oat middlings and oat hulls 20%	
3732–21	Engle & Given Coal Co.. Lexington.	Same	Alfalfa meal and whole oats present but not included in ingredients.
3732–22	R. D. Riedling ..... Louisville.	Cotton seed meal, alfalfa meal, palmo middlings, rice bran, peanut meal, oat middlings and oat hulls 20%, molasses	No rice bran present. Wheat bran, corn meal and linseed oil meal found but not guaranteed.
3732–22	D. B. Sutherland & Sons. Bloomfield.	Same	No peanut meal present.
3510–21	Ross & Zeitz ..... Louisville.	Alfalfa meal, whole oats, corn, oat middlings and oat hulls, 20%, molasses, salt	
3510–21	Perry Feed & Commission Co., Hazard.	Same	
4802–23	The Eversole Co. ..... London.	Cracked corn, white oats, oat middlings and oat hulls 20%, molasses, salt 1%	
4464–23	Ashland Supply Co. ..... Ashland.	Molasses, malt sprouts, whole ground and bolted wheat screenings 40%, oat middlings, oat shorts and oat hulls 35%, salt	Considerable ground weed seeds present. Below guaranty in protein and above in fiber. Inferior product.
4464–22	Borders & Fannin ..... Catlettsburg.	Same	Above guaranty in fiber. No malt sprouts found. Ground weed seeds, flax plant by-product, corn meal and wheat bran present, but not guaranteed.
4139–22	Van Hoose Adams Co. .. Ashland.	Cotton seed meal, malt sprouts, ground and bolted wheat screenings 30%, molasses, flax plant by-products 20%, oat middlings, oat shorts and oat hulls 35%, alfalfa meal, salt	Considerable weed seeds present. Flax plant by-product in excess of guarantee.
4139–22	Ashland Supply Co. .... Ashland.	Same	Considerable weed seeds present. No malt sprouts found. Corn meal and wheat bran present but not included in ingredients.
4139–23	R. D. Taylor Feed & Supply Co., Ashland.	Same	Considerable weed seeds present. No malt sprouts found. Corn meal and wheat bran present, but not guaranteed. Below guaranty in protein.
1705–22	J. M. Bush ..... Ashland.	Hominy feed, oat middlings, oat shorts, and oat hulls 35%, salt.	Corn product is corn feed meal instead of hominy feed. Below guaranty in protein and fat and above in fiber. A very inferior product.

TABLE X.—MISCELLANEOUS MIXED FEEDS CONTAINING

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
1705–22	Badger Stock Feed	Chas. A. Krause Mill. Co.	8.38	2.97	14.45
		Milwaukee, Wis.	**10.00**	**3.25**	**10.00**
2427–21	National Stock Feed	Ladish Milling Co.	11.25	2.79	10.83
		Milwaukee, Wis.	**9.00**	**3.00**	**12.00**
4518–22	Jefferson Farm Feed	Lafayette Corn Flour Mills	10.50	5.65	12.25
		Louisville, Ky.	**12.50**	**4.50**	**15.00**
4302–22	Radio Horse and Mule Feed	Louisville Seed Co.	10.75	3.50	8.98
		Louisville, Ky.	**8.00**	**1.50**	**14.00**
4024–22	Jumbo Dairy Feed	The McMillen Co.	15.25	3.35	14.55
		Ft. Wayne, Ind.	**16.00**	**3.50**	**12.00**
4024–22	Same	Same	15.00	3.75	14.43
			16.00	**3.50**	**12.00**
4069–22	Jumbo Stock Feed	Same	8.38	3.34	12.13
			9.00	**3.50**	**12.00**
3552–21	Diamond Dairy Feed	Polo Mills Co.	16.25	8.71	11.68
		E. St. Louis, Ill.	**16.50**	**3.50**	**17.00**
3552–21	Same	Same	16.25	7.03	13.50
			16.50	**3.50**	**17.00**
3552–21	Same	Same	18.25	6.53	15.69
			16.50	**3.50**	**17.00**
4821–23	Economic Horse Feed	Prairie State Milling Co.	7.74	2.25	12.41
		Chicago, Ill.	**7.00**	**0.50**	**15.00**
1723–22	Green Cross Horse Feed	Quaker Oats Co.	10.02	2.95	11.61
		Chicago, Ill.	**10.00**	**2.50**	**12.00**

A Material of Little or No Feeding Value.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
1705–22	Ashland Supply Co. ..... Ashland.	Hominy feed, oat middlings, oat shorts, and oat hulls, 35%, salt.	Corn product is corn feed meal instead of hominy feed. Below guaranty in protein and above in fiber, inferior product.
2427–21	Queen & Turner ..... Ashland.	Cotton seed meal, corn feed meal, oat middlings, oat shorts and oat hulls, 13%, salt	Oat hulls in excess of guarantee.
4518–22	Chappell Grocery Co. ... Pineville.	Wheat middlings, hominy feed, oat middlings, oat shorts and oat hulls, 25%	Below guaranty in protein. Inferior to claims.
4302–22	Sandy Valley Grocery Co. Paintsville.	Alfalfa meal, whole oats, corn, oat middlings and oat hulls, 20%, molasses, salt 1%	Peanut oil meal and ground weed seeds present.
4024–22	Consolidated Grocery Co. Jenkins.	Malt sprouts, brewers' dried grains, wheat bran, cotton seed meal, linseed oil meal, corn meal, oat middlings, oat shorts and oat hulls 10%, ground and bolted screenings from wheat, corn, oats, barley, kaffir, buckwheat and flax 10%, molasses, salt 1%	Below guaranty in protein and above in fiber.
4024–22	Moore & Moore ..... Louisa.	Same	Same.
4069–22	Poage-Wall Milling Co... Catlettsburg.	Ground corn, ground oats, ground barley, ground kaffir, corn feed meal, ground and bolted screenings from wheat, corn, oats, barley, kaffir, buckwheat, millet and sunflower seed 10%, oat middlings, oat shorts and oat hulls, 10%	Below guaranty in protein. Oat by-product and corn product are the chief ingredients from which feed is made.
3552–21	Henry E. Eilers & Son.. Louisville.	Cotton seed meal, clipped oat by-product 30%, ground flax seed screenings 40%, molasses	Corn feed meal, rice bran and wheat screenings present but not guaranteed.
3552–21	Marion Milling Co. ..... Marion.	Same	Wheat screenings present.
3552–21	Rea & Rice ..... Earlington.	Same	Considerable barley product, kaffir or milo product, and corn product present. Large amount of weed seeds present. Little if any flaxseed product present.
4821–23	Kentucky River Coal & Feed Co., Irvine.	Crimped oats cracked corn, barley, alfalfa meal, clipped oat by-product 10%, oat shorts, oat middlings and oat hulls, 10%, Molasses.	Guaranty in fiber is too high.
1723–22	Leslie Bailey ..... Corinth.	Cracked corn, crushed oats, cotton seed meal, alfalfa meal, molasses, oat middlings, oat shorts and oat hulls 14%, salt ¾%	Weed seeds present.

TABLE X.—MISCELLANEOUS MIXED FEEDS CONTAINING

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
840–21	Schumacher Feed	Quaker Oats Co. Chicago, Ill.	12.25 10.00	4.01 8.25	12.61 12.00
3576–22	Sugared Schumacher Feed	Same	9.38 10.00	4.52 3.25	11.78 12.00
3576–22	Same	Same	10.13 10.00	3.66 3.25	12.01 12.00
3576–22	Same	Same	9.88 10.00	3.48 3.25	10.08 12.00
3631–22	Rapier's Fat Maker No. 2	Rapier Sugar Feed Co. Owensboro, Ky.	14.13 12.50	3.25 2.50	8.20 10.00
4838–23	Magnolia Dairy Feed	R. D. Riedling Louisville, Ky.	16.88 16.50	4 48 3.50	10.58 15.00
4839–23	Magnolia Horse and Mule Feed	Same	8.88 8.00	3.65 1.50	9.90 14.00
3885–21	"Old Black Joe" Sweet Feed	Royal Feed & Milling Co. Memphis, Tenn.	11.00 9.00	3.50 1.50	11.28 20.00
2731–23	Economy Dairy Feed	Southern Feed & Grain Co. Louisville, Ky.	16.25 16.00	4.13 3.00	17.20 20.00
2731–23	Same	Same	16.38 16.00	4.33 3.00	17.55 20.00
160–20	Eagle Dairy Feed	Southern Seed Co. Louisville, Ky.	11.31 12.00	2.34 2.00	25.09 25.00
160–22	Same	Same	13.94 12.00	2.95 2.00	16.98 25.00
160–23	Same	Same	14.38 12.00	4.04 2.00	20.45 25.00

A Material of Little or No Feeding Value.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
840–21	T. W. Pollock..... Wickliffe.	Ground corn hominy feed, yellow hominy feed, ground barley, cotton seed meal, old process linseed oil meal, low grade wheat flour, wheat bran, wheat middlings, oat middlings, oat shorts and oat hulls 29%, salt ¾%	
3576–22	Leslie Bailey ..... Corinth.	Ground corn, hominy feed, yellow hominy feed, barley meal, molasses, cotton seed meal, old process linseed oil meal, low grade wheat flour, wheat middlings, with screenings, oats middlings, oat shorts and oat hulls 29%, salt ¾%	Below guaranty in protein.
3576–22	Gentry McCauley ..... Versailles.	Same	
3576–22	J. H. Fedders & Sons ... Covington.	Same	
3631–22	C. L. Jewell ..... Horse Cave.	Cotton seed meal, clipped oat by-products 20%, ground and bolted wheat and corn screenings 30%, alfalfa meal, cane molasses, salt 1%	
4838–23	Mfrs. Warehouse	Cotton seed meal, alfalfa meal, palmo middlings, rice bran, peanut meal, oat middlings and oat hulls 20%, molasses.	No rice bran or peanut oil meal present. Corn meal and wheat bran present but not guaranteed.
4839–23	Same.	Alfalfa meal, whole oats corn, oat middlings and oat hulls 20%, molasses, salt 1%	
3885–21	H. P. Hawkins' Sons ... Paducah.	Corn, alfalfa meal, clipped oat by-products 20%, rice bran, cotton seed meal, molasses, salt 1%.....	Considerable unground wheat screenings present. Kaffir corn and milo maize present.
2731–23	Bush Coal Co. ..... Winchester.	Cotton seed meal, alfalfa meal, corn meal, shorts, middlings, flax plant by-products 15%, clipped oat by-products 15%, molasses, salt ½%.....	Ground weed seeds present. Clipped oat by-product and flax plant by-product both present in excess of 15%.
2731–23	W. W. Stephens ..... Stearns.	Same	Ground weed seeds present. Clipped oat by-product and flax plant by-product both present in excess of 15%.
160–20	C. Shimfessel ..... Clay City.	Cotton seed meal, alfalfa meal, cotton seed hulls 20%, flax plant by-product 5%, clipped oat by-product 10%, brewers' grains, molasses, salt ½%.....	Below guaranty in protein. Clipped oat by-products in excess of 10%. Flax plant by-product in excess of 5% .....
160–22	Leach & Rowe ..... Rowletts.	Cotton seed meal, alfalfa meal, corn meal, shorts, middlings, flax plant by-product 20%, clipped oat by-product 15%, molasses, salt ½%	No wheat product present.
160–23	Glass Milling Co. ..... Wilmore.	Same	Fiber guarantee too high. Ground weed seeds, clipped oat by-product in excess of 15% .....

TABLE X.—MISCELLANEOUS MIXED FEEDS CONTAINING

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
2731–21	Economy Dairy Feed.....	Southern Seed Co. ..... Louisville, Ky.	15.06 16.00	3.63 3.00	19.60 20.00
3548–21	Ideal Horse and Mule Feed	Same	8.75 8.00	3.02 2.00	8.50 16.00
3548–23	Same	Same	8.50 8.00	2.79 2.00	9.18 16.00
2013–21	Sugarine Dairy Feed.....	The Sugarine Co. ..... Owensboro, Ky.	19.25 16.50	3.91 3.50	11.43 12.00
2013–21	Same	Same	19.13 16.50	4.35 3.50	11.23 12.00
2013–22	Same	Same	16.88 16.50	4.68 3.50	11.35 12.00
4626–22	Gordon Dairy Ration.....	Same	18.50 16.50	4.41 3.50	10.55 12.00
2599–22	Ideal Horse and Mule Feed	Same	7.75 10.00	2.87 2.50	12.45 12.00
2599–23	Same	Same	7.63 10.00	2.80 2.50	11.55 12.00
2235–21	Ideal Sugared Feed.....	Same	15.75 14.00	3.81 3.00	12.05 12.00
2235–22	Same	Same	16.25 14.00	4.53 3.00	12.90 12.00
1421–22	Velvet Molasses Feed.....	Sutherland Flour Mills Co. .... Cairo, Ill.	8.50 9.00	2.81 2.00	7.80 12.00
1421–22	Same	Same	8.50 9.00	2.09 2.00	13.94 12.00

A Material of Little or No Feeding Value.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
2731–21	Farmers Milling Co. .... Somerset.	Brewers' dried grains, cotton seed meal, alfalfa meal, cotton seed hulls 10%, flax plant by-product 10%, clipped oat by-products 5%, molasses, salt ½%	Below guaranty in protein.
3548–21	The Riverside Co. ..... Beattyville.	Corn, oats, alfalfa meal, oat middlings and oat hulls, 25%, flax plant by-product 5%, salt ½%, molasses	
3548–23	Powell-Hackney Grocery Co., Jackson.	Same	No alfalfa meal present.
2013–21	Sandusky Bros. ..... Harrodsburg.	Wheat bran, prime cotton seed meal, cocoanut meal, ground and bolted grain screenings 28%, clipped oat by-products 20%, corn feed meal, molasses, calcium carbonate ½%, salt ½%	
2013–21	Hardinsburg Mill & Elevator Co., Hardinsburg.	Same	
2013–22	Lake Bros. ..... Springfield.	Same	Weed seeds present.
4626–22	F. H. Gordon ..... Richmond.	Wheat bran, cotton seed meal, peanut meal, copra meal, corn meal, ground and bolted grain screenings 25%, clipped oat by-product 20%, molasses, calcium carbonate ½%, salt ½%.	No copra meal found. Corn gluten feed and corn meal present.
2599–22	Conner-Hayden & Co. ... Bardstown.	Barley, molasses, oat shorts, oat middlings and oat hulls, 15%, alfalfa meal, salt ½%	Not in accordance with guaranty. Consists of oat hulls and middings and cracked corn with alfalfa and molasses. No barley present. Below guaranty in protein. Very inferior product.
2599–23	R. J. Smith Co. ..... Somerset.	Corn, molasses, oat shorts, oat middlings and oat hulls 15%, salt ½%	Wild oats present. Much below guaranty in protein and inferior to claim.
2235–21	Drakesboro Mill & Feed Co., Drakesboro.	Molasses, ground and bolted grain screenings 20%, clipped oat by-product 25%, wheat bran, cotton seed meal, cocoanut meal, calcium carbonate 1%, salt 1%	Corn product, peanut oil meal and weed seeds present.
2235–22	R. J. Smith Co. ..... Somerset.	Same	Above guaranty in fiber. The screenings contain weed seeds.
1421–22	Covington Bros. & Co. .. Mayfield.	Cracked corn, alfalfa meal, ground grain screenings 10%, oat middlings, oat shorts and oat hulls 10%, molasses, salt ½%, oats..	Below guaranty in protein.
1421–22	J. W. Moss ..... Bardwell.	Same	Oat product in excess of 10%. Below guaranty in protein and above in fiber.

TABLE X.—MISCELLANEOUS MIXED FEEDS CONTAINING

Reg. No.	NAME OF FEED	MANUFACTURER	Analysis		
			Prot.	Fat	Fiber
1985–20	Fourex Dairy Ration.....	The Ubiko Milling Co.	21.06	4.83	12.00
		Cincinnati, Ohio.	20.00	4.00	12.00
3711–21	O-Kay Dairy Feed.....	Winchester Roller Mills	18.00	5.03	12.03
		Winchester, Ky.	16.50	3.50	12.00
3711–22	Same	Same	16.75	4.18	11.40
			16.50	3.50	12.00
4598–22	Alpine Dairy Feed.....	Woolcott Flour Mills	18.00	3.82	11.00
		Lexington, Ky.	16.50	3.50	12.00
4598–22	Same	Same	16.75	4.88	12.98
			16.50	3.50	12.00

A Material of Little or No Feeding Value.

Reg. No.	SAMPLE TAKEN FROM	INGREDIENTS GUARANTEED	REMARKS—VARIANCE FROM GUARANTY
1985–20	Danville Ice & Coal Co... Danville.	Cotton seed meal, old process linseed meal, hominy feed, wheat bran, wheat middlings, gluten feed, oat middlings and oat hulls 10%, rye middlings, malt sprouts, salt.....	Oat product in excess of 10%. Unground wheat screenings present.
3711-21	S. Adams & Sons ..... Torrent.	Wheat bran, prime cotton seed meal, cocoanut meal, ground and bolted grain screenings 25%, clipped oat by-products 20%, corn feed meal, molasses, calcium carbonate ½%, salt ½%	
3711–22	B. Tipton ..... Ravenna.	Same	Not the feed guaranteed. Made up entirely of different ingredients.
4598–22	R. P. Coffman ..... Walton.	Wheat bran, cotton seed meal, peanut meal, copra meal, corn meal, ground and bolted grain screenings 25%, clipped oat by-product 20%, molasses, calcium carbonate ½%, salt ½%.....	Not the feed guaranteed. Made up entirely of different ingredients.
4598–22	J. S. Oaks ..... Stanton.	Same	

Kentucky
Agricultural Experiment Station

University of Kentucky

CALCIUM METABOLISM IN THE LAYING HEN

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1. Effect of minerals on the production of eggs and on their composition.
2. Effect of minerals on the composition of the bones and carcass.
3. Behavior of grit in the gizzard.
4. Tabulated data.

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SUMMARY

1. Calcium in rock phosphate (tricalcium phosphate) can be utilized by the hen for the growth of bone but not in the formation of eggshell.

2. In the absence of sufficient calcium carbonate, fewer eggs are produced than where the supply of available calcium is adequate.

3. In the absence of sufficient calcium carbonate, the eggshells become progressively thinner; the percentage composition of the shells, however, remains constant.

4. Deficiency of calcium apparently has little or no influence on the weight of the liquid part of the egg, under the conditions of this experiment, nor upon the percentages of calcium, magnesium and phosphorous in the liquid part.

5. Deficiency of calcium retards development of bone.

6. Crushed limestone of good quality (nonmagnesian) and crushed oyster shells serve equally well as sources of calcium for laying hens.

7. Deficiency of calcium in the diet of the hen is not the primary cause of the production of shell-less (soft shell) eggs.

8. Calcium in calcium carbonate can be utilized by the hen in the formation of both eggshell and bone.

9. The absence of grit from the diet of hens in confinement during the first eight months of their laying period does not affect their egg production nor their physical condition.

10. The growth of bone in the lot which received rock phosphate (tricalcium phosphate) was greater than that in the lots which received limestone and oyster shell (calcium carbonate).

11. Limestone, oyster shell and rock phosphate do not function permanently as grinders.

BULLETIN NO. 250

(Research Bulletin)

Calcium Metabolism in the Laying Hen

By G. D. BUCKNER, J. HOLMES MARTIN and A. M. PETER*

It is well known that calcium and phosphorous are of the greatest importance in building the skeleton of growing fowls and that calcium is essential for the formation of egg shells, which are composed almost entirely of calcium carbonate. Chemical analyses of the grains commonly fed to poultry show that they contain relatively less calcium than phosphorus, which suggests that grains alone do not supply enough calcium.

The improvement of domestic fowls has increased their egg-laying power greatly. Some hens have laid 300 eggs or more in a year and, inasmuch as the normal egg shell contains about 2.4 grams of calcium oxide, this implies a calcium requirement of about 720 grams of calcium oxid annually, or nearly 1,300 grams of calcium carbonate, for the production of the shells, under maximum egg production.

Common experience teaches that calcium in some concentrated form, such as oyster shells or ground limestone, must be given to poultry, in addition to the ordinary feeds, in order to supply the large amount of calcium necessary for maximum egg production and for their general welfare. It is customary, likewise, to give fowls a siliceous grit, usually crushed granite, its principal function being to aid and hasten digestion by helping the grinding process in the gizzard.

In 1920, Buckner and Martin[1] published the results of some experiments conducted at this station, from which they con-

*Due credit is given by the authors to Mr. W. C. Pierce, formerly Assistant Chemist, for a large share in the chemical work reported in the bulletin.

[1] Buckner, G. D., and Martin, J. H., Jour. Biol. Chem., Vol. XLI, No. 2, Feb., 1920, p. 195.

cluded that, during calcium starvation, hens continue laying eggs until there is a general depletion of calcium, magnesium and phosphorus in their bones and thinning of the egg shells, followed by a cessation of egg laying. They further showed that the percentages of calcium, magnesium and phosphorus in the contents of the egg remained constant during calcium starvation and that no shell-less eggs were laid under this restriction.

Wheeler,[2] also, has published some interesting results showing a thinning of the egg shells following a long continuance of a diet low in calcium, and that calcium is removed freely from the bones for shell formation.

Riddle and Hanke,[3] find that the percentage of inorganic matter in dry shells remains unchanged under extra feeding of calcium salts and state that "the production of inadequate shells . . . is probably not caused by deficient calcium supply in the foods," and that the feeding of organic calcium salts to female ring-doves failed appreciably to strengthen their egg shells.

THE EXPERIMENT

In order to verify the results of the experiments concerning the metabolism of laying hens as affected by inorganic materials, previously made at this Station, and to throw further light on the subject, six lots, each containing ten seven-months-old White Leghorn pullets which came from the same parent stock, hatched in an incubator the same day and raised under identical conditions, were fed a uniform diet of dry mash and grain, supplemented by mineral substances as follows:

Lot 1—No mineral matter.

Lot 2—Granite grit, *ad libitum*.

Lot 3—Granite grit and oyster shell, *ad libitum*.

Lot 4—Granite grit and limestone, *ad libitum*.

Lot 5—Limestone, *ad libitum*.

Lot 6—Rock phosphate, *ad libitum*.

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[2] Wheeler, W. P., Bull. N. Y. Agri. Expt. Sta. (Geneva), 1919, No. 468.

[3] Riddle, O., and Hanke, M. C. E., Am. Jour. Physiol., Vol. LVII, No. 2, Sept., 1921, p. 264.

The dry mash consisted of corn meal 6 parts, bran 3, middlings 3, ground oats 3, tankage 5 and charcoal 1, and was before the hens at all times.

The grain mixture, which consisted of cracked corn 2 parts and oats 1 part, was fed twice a day, in the morning and evening, by scattering it in the straw on the floor.

The mineral substances were accessible to the hens of the appropriate pens at all times, in hoppers. The grit and oyster shell were the commercial materials such as are commonly used by poultrymen, the former being a gray granite. The limestone had been crushed to about ¼-inch size, and the dust removed by running it over a fine screen. It was obtained from a commercial crusher near Lexington, using the Trenton limestone of this vicinity. The rock phosphate was from the workings at Wallace's Station in Woodford county, Ky., and had been prepared by crushing to about ¼-inch size and washing out the fine dust. This stone is somewhat softer than the limestone and quite porous.

Analyses of the Feeds—Analyses made of the feeds and of the mineral supplements used are given in Table 1. The mineral substances were analyzed by digestion in strong hydrochloric acid and determination by the usual methods.

Table 1—Analyses of Feeds and Mineral Supplements, in percentage of the Material as Fed

Material	Crude ash	Calcium oxid (CaO)	Magnesium oxid (MgO)	Phosphorus pentoxid (P_2O_5)	Excess CaO after combining P_2O_5 with Mg and Ca*
Grain	2.05	.09	.12	.74	Deficit 0.56
Mash	8.02	1.81	.30	2.91	Deficit 1.96
Straw (litter)	3.89	.28	.09	.45	0
Grit		2.42	1.10	.02	2.42
Oyster shell		54.33	.18	.07	54.33
Limestone		49.14	1.78	.01	49.14
Rock phosphate		50.72	1.36	36.50	9.92

*As tribasic phosphates.

The figures in the last column show that the grain and mash do not contain enough calcium to form tricalcium phosphate with the phosphorous present. The rock phosphate contains an excess of calcium, part of which is in the form of carbonate and part in the form of fluorid. Boiling a finely ground portion with solution of ammonium chlorid dissolved calcium equivalent to 1.25 per cent of calcium carbonate. Similar treatment of the tankage used in the mash dissolved the equivalent of nearly 3 per cent of calcium carbonate, and a qualitative test showed the presence of carbonate in the tankage.

This experiment started December 1, 1920, and ended July 31, 1921. During these eight months the pullets were confined in a house with a concrete floor and at no time allowed access to the ground, thereby excluding any chance of their getting materials containing calcium, magnesium or phosphorus other than those supplied. No milk or green foods were fed during the experiment.

The presentation and discussion of results has been divided into four parts; the first deals with the effect of the inorganic supplements on the number of eggs laid and the composition of the egg shells and their contents; the second deals with the effect of these factors on the composition of the bones and carcasses of the hens; the third deals with the behavior of grit in the gizzards of the hens and the quantity of inorganic materials consumed, and the fourth part contains tabulations of original data obtained in the experiment. Occasional reference to these tables will be made in the discussion.

Part I.

EFFECT OF MINERALS ON THE PRODUCTION OF EGGS AND ON THEIR COMPOSITION

A trap-nest record was kept of each hen. Eggs laid on the floor were included in the total counts but were not analyzed.

Table 2 gives a summary of the average egg production, change in weight of the hens, and mortality. In computing the average number of eggs per hen, hens that died during the experiment were given credit in proportion to the time they lived,

and hens that did not lay more than five eggs were excluded from the average.

Several common diseases of poultry appeared in all pens and the death rate was high in all lots but not uniform in the several lots. However, it did not seem to be correlated with the kind of minerals received by the several lots.

All the hens that received rock phosphate were slightly affected with diarrhoea, a condition which was not prevalent in the other lots. This may have been caused by the phosphate and may have had much to do with the low egg production of this lot, the lowest of all.

All lots gained weight in December and all lots except No. 6 were heavier on December 31 than at the end of the experiment.

Table 2—Average Egg Production, Mortality and Gain in Weight

Lot number	1	2	3	4	5	6
Minerals fed	None	Grit	Grit and oyster shell	Grit and lime-stone	Lime-stone	Rock phos-phate
Eggs per hen	34.5	39.7	53.2	56.6	61.8	21.6
Number of deaths	8.	4.	6.	3.	6.	5.
Gain in weight of the sur-vivors, per cent	19.	26.	—3.	9.	20.	21.

The lot which received no mineral matter in addition to the grain and mash fed, laid 34.5 eggs per hen in eight months, or nearly 60 per cent more than the number laid by the lot that received rock phosphate. This indicates that the calcium in rock phosphate cannot be utilized by the hen in the production of eggs, calcium being the limiting factor in the case under consideration, but the result may have been influenced by the detrimental effect which the phosphate seems to have had upon the health of the hens.

The lot which received grit alone laid 5 eggs per hen more than that which received no mineral supplement, or 15 per cent more. The presence of a small proportion of available calcium (2.42% CaO dissolved by HCl) in the granite grit consumed

by these hens may have contributed to this result. Inasmuch as an egg contains about 2.5 grams of CaO, 5 eggs require for their formation about 12.5 grams of CaO. This amount could be supplied by 517 grams, or about a pound of grit if the 2.42 per cent found by analysis is wholly available. A lower availability is offset by the consideration that the hens of this pen actually took from the hopper 10.2 lbs. of grit per hen, in 8 months (Table 13, Part III). The hens in all pens developed an abnormal appetite for the mineral supplement.

The average number of eggs laid during the 8 months by the lots which received oyster shell and limestone, with or without grit, were quite similar, indicating that limestone and oyster shell serve the same purpose as sources of calcium and to the same extent, and that the grit consumed by the hens of lots 3 and 4 did not increase their production of eggs. Indeed, the fact that the lot which received limestone but no grit produced five eggs more per hen, in 8 months, than the lot which had free access to both limestone and grit shows that the absence of grit from the diet of laying hens, under the conditions of this experiment, does not decrease the production of eggs. The lot which received limestone alone, however, used almost twice as much limestone per hen as the lot which received both limestone and grit.

Analyses of the Eggs—The first three eggs laid each month by each hen, or as many as she laid, if fewer than three, were analyzed for calcium, magnesium and phosphorus, using the composite samples of the shells and contents which had been carefuly separated. The shell membranes were not removed but were analyzed with the shells, a somewhat different procedure from that followed in the previous experiment. Inasmuch as the quantities of calcium, magnesium and phosphorus contained in the small quantity of the white adhering to the shells after careful draining may be considered negligible, this was left with the shell. The shells were dried at 100° C. for 24 hours, weighed after cooling and burned until white. The determinations of CO_2-free ash, calcium, magnesium and phosphorus were made with this dry material, after grinding and mixing.

Considerable difficulty was experienced in ashing the egg contents and after many experiments it was found that the best results, accuracy and speed being considered, were obtained by placing the liquid contents of the eggs composing the sample in a porcelain evaporating dish and thoroly mixing with 5 cc. per egg of a hot solution of sodium carbonate (80 grams of calcium-free Na_2CO_3 dissolved in hot distilled water to 200 cc.). The mass was then dried at 120° C. and ashed in a platinum dish, a small quantity being placed in the dish at a time. The residue obtained in this manner was easily brought into solution with hot water and hydrochloric acid. The solution was made to 100 cc. and an aliquot taken for the determination of calcium and magnesium according to the method of McCrudden,[4] while phosphorus was determined in another portion by the volumetric method of the Association of Official Agricultural Chemists.[5]

The findings are summarized in Tables 3 to 8, which contain averages for the entire experiment. The results in more detail are given in Part IV.

Table 3—Average Weights of the Contents and of the Mineral Substances Contained Therein, Expressed as Grams per Egg, for 8 Months

	Lot 1 No Mineral Supplement	Lot 2 Grit	Lot 3 Grit Shell	Lot 4 Grit Limestone	Lot 5 Limestone	Lot 6 Rock Phosphate
Contents	41.19	43.26	42.70	44.28	43.47	40.80
Calcium oxid, CaO	0.028	0.031	0.032	0.034	0.032	0.032
Magnesium oxid, MgO	0.009	0.009	0.009	0.010	0.009	0.010
Phosphorus pentoxid, P_2O_5	0.182	0.204	0.213	0.217	0.215	0.196

Table 4—Average Percentages of Mineral Substances in the Contents, for 8 Months

	Lot 1 No Mineral Supplement	Lot 2 Grit	Lot 3 Grit Shell	Lot 4 Grit Limestone	Lot 5 Limestone	Lot 6 Rock Phosphate
Calcium oxid, CaO	0.068	0.072	0.075	0.077	0.074	0.078
Magnesium oxid, MgO	0.022	0.021	0.021	0.023	0.021	0.025
Phosphorus pentoxid, P_2O_5	0.44	0.47	0.50	0.49	0.50	0.48

[4] McCrudden, F. H., Jour. Biol. Chem., 1909-10, Vol. VII, p. 83.
[5] Methods of Analysis, A. O. A. C. Revised to Nov. 1, 1919, p. 3.

Table 5—Average Weights of CO_2-free Shell Ash and Mineral Contents Thereof, Expressed as Grams per Egg, for 8 Months

	Lot 1 No Mineral Supplement	Lot 2 Grit	Lot 3 Grit Shell	Lot 4 Grit Limestone	Lot 5 Limestone	Lot 6 Rock Phosphate
Shell ash	1.93	1.99	2.49	2.46	2.60	1.81
Calcium oxid, CaO	1.878	1.937	2.433	2.403	2.540	1.774
Magnesium oxid, MgO	0.028	0.029	0.032	0.034	0.035	0.028
Phosphorus pentoxid, P_2O_5	0.014	0.013	0.014	0.015	0.016	0.008

Table 6—Average Percentages of Mineral Substances in the CO_2-free Shell Ash for 8 Months

	Lot 1 No Mineral Supplement	Lot 2 Grit	Lot 3 Grit Shell	Lot 4 Grit Limestone	Lot 5 Limestone	Lot 6 Rock Phosphate
Calcium oxid, CaO	97.31	97.34	97.70	97.69	97.70	98.00
Magnesium oxid, MgO	1.45	1.46	1.28	1.38	1.35	1.55
Phosphorus pentoxid, P_2O_5	0.73	0.65	0.56	0.61	0.62	0.44

Table 7—Average Weights and Mineral Content of the Whole Egg, for 8 Months, Expressed in Grams

	Lot 1 No Mineral Supplement	Lot 2 Grit	Lot 3 Grit Shell	Lot 4 Grit Limestone	Lot 5 Limestone	Lot 6 Rock Phosphate
Whole egg	45.88	47.94	48.46	49.76	49.20	45.16
Calcium oxid, CaO	1.906	1.968	2.464	2.448	2.573	1.806
Magnesium oxid, MgO	0.037	0.039	0.041	0.043	0.044	0.038
Phosphorus pentoxid, P_2O_5	0.193	0.216	0.227	0.232	0.230	0.204

Table 8—Average Percentages of Mineral Substances in the Whole Egg, for 8 Months

	Lot 1 No Mineral Supplement	Lot 2 Grit	Lot 3 Grit Shell	Lot 4 Grit Limestone	Lot 5 Limestone	Lot 6 Rock Phosphate
Calcium oxid, CaO	4.15	4.11	5.08	4.92	5.23	4.00
Magnesium oxid, MgO	0.081	0.081	0.085	0.086	0.089	0.084
Phosphorus pentoxid, P_2O_5	0.42	0.45	0.47	0.47	0.47	0.45

The average weights of the egg contents for 8 months of lots 1 and 6 are appreciably less than those of lots 2, 3, 4 and 5. This seems to be accidental and may not be connected with the inorganic intake of the hens, since the range of variation is considerable in all lots, and if the lack of calcium was the cause of smaller contents, lot 2, which received grit alone, would have been considerably smaller than lots 3, 4 and 5, which received calcareous supplements. In the lots which received calcium carbonate a slight increase in the weight of the egg contents from month to month is noticeable in the first four or five months which is not apparent in lots 1 and 6, but the increase is not maintained to the end.

The average number of grams and the percentages of CaO, MgO and P_2O_5 in the contents of the eggs laid by the several lots varied only slightly during the 8 months, showing that the intake of calcium, magnesium and phosphorus in the minerals supplied has practically no influence on the content of these elements in the liquid part of the eggs. (See Part IV, Tables 16 to 22.)

Table 5 shows that the average weight of CO_2-free ash in the egg shells per lot for 8 months, is appreciably less in lots 1, 2 and 6 than in lots 3, 4 and 5. In lots 1 and 2 there is a gradual thinning of the shells of the eggs as compared with those of lots 3, 4 and 5. The average weights of CaO in the CO_2-free ash of these lots ran parallel with the CO_2-free ash, since the percentages were practically constant.

The average monthly weights and percentages of MgO and P_2O_5 in the shells are reasonably constant, since the variation in the six lots is about the same as is the monthly variation of each lot. (See Part IV, Tables 24 to 29.)

Table 7 shows that the average weight of the egg is less in lots 1 and 6 than in the other lots. The average weight of CaO is distinctly larger in lots 3, 4 and 5 than in the other lots, and is least in lot 1, which received no minerals, whereas the quantities and percentages of MgO and P_2O_5 in the whole eggs vary but little in the six lots, tho they are a little larger in lots 3, 4 and 5 than in the others.

During this experiment no shell-less (soft shelled) eggs were laid in any of the six lots.

Some of the hens in each lot were slightly affected with vent gleet, chickenpox and other diseases. The analyses of the eggs from the hens thus affected show no significant variation in composition from the normal.

Part II.

EFFECT OF MINERALS ON THE COMPOSITION OF THE BONES AND CARCASS

At the beginning of the experiment, December 1, 1920, two representative hens from the same hatching as those used in the experiment were killed and their femurs and tibias dissected out and, after separately weighing, the CO_2-free ash and the CaO, MgO and P_2O_5 contained therein were determined. On August 1, 1921, another hen of the same lot, which received the same treatment as those in the experiment up to December 1, 1920, but which, from that time until August 1, 1921, had been allowed the normal freedom of a meadow and been fed the same as lot 3, was killed and similarly dissected as were the early controls just mentioned. All hens remaining in the six lots at the close of the experiment were killed and treated individually in the same way.

Analyses of the Leg Bones—The results in Table 9 show that the average total weight of the 4 large leg bones was approximately the same in the six lots, whereas that of the first controls was less, these hens being 8 months younger than the others. The weight of the leg bones in the second control exceeded any of the averages, tho equaled or exceeded by three or four individuals in the experiment. This may be an individual variation or because conditions were more favorable for growth with the hen running at large than with those confined in the house.

The average weights of the CO_2-free ash of the leg bones from lots 1 and 2 were less than those from lots 3, 4, 5 and 6, which received the concentrated calcium materials, and the ash

from lot 6, which received rock phosphate, was heavier than that from any of the other lots, tho less than the ash from the second control. This agrees with the results published by D'Auchald,[6] in 1904, who obtained a heavier skeleton by adding daily 4 grams of powdered bone per hen to an ordinary poultry feed.

The average weights of CaO in the leg bones of the hens of lots 1 and 2 are appreciably less than those of the other lots and the average weight for lot 6 is the greatest of any except the second control. The average percentages of CaO in the ash of the leg bones of all lots, Table 10, are approximately the same, tho a little less in lots 1 and 2 than in the others.

The average weights of MgO in the leg bones of lots 1 and 2 are somewhat less than in the other lots, while the percentage in the ash is reasonably constant for all lots.

The average weights of P_2O_5 in the leg bones of lots 1 and 2 are less than those of the other four lots, but the percentage in the ash varies between narrow limits.

It would seem that in calcium starvation as exemplified in the pullets of lots 1 and 2, a smaller amount of ash, CaO, MgO and P_2O_5 is deposited in the leg bones than is deposited when the supply of calcium is adequate, but the percentage composition of the bones varies very little. The percentage of calcium oxid in the ash, however, is consistently, tho slightly, larger in the lots which received calcareous supplements than in lots 1 and 2 and the first controls, as is, also, the excess of CaO remaining after combining the P_2O_5 with MgO and CaO as tribasic phosphates, indicating that more calcium carbonate was deposited in the bones of the hens receiving calcareous materials than was the case in the absence of the calcareous supplement. These relations appeared more strikingly in the experiment of 1918-19 than in the present one.[7]

The average weights of CaO and P_2O_5 in the leg bones of the hens of lot 6 are somewhat larger than those of the other lots, except the second control. This would indicate that a larger growth of bone is caused by the addition of tricalcium phosphate

[6] D'Auchald, H., J. Ag'e Prat., 1904, VII, 619.
[7] Buckner, G. D. and Martin, J. H., loc. cit.

to the ration than by the addition of calcium carbonate; however, the difference in this case may have been caused by the greater egg production of lots 3, 4 and 5, which laid many more eggs than did lot 6, thereby, perhaps, diverting calcium from the production of bone to the production of eggs. This further indicates that the calcium in tricalcium phosphate is available for the growth of bones but cannot be utilized in the formation of egg shells.

Table 9—Average Weights of 4 Leg Bones and of Mineral Substances Contained Therein, Expressed in Grams

Date	Lot	Wt. of 4 Leg Bones		CO_2-free Ash	Calcium Oxid, CaO	Magnesium Oxid, MgO	Phosphorus Pentoxid, P_2O_5	No. of Hens in the Average
		Fresh	Dried at 120° C.					
Dec. 1, 1920	1st controls	22.34	13.85	5.13	3.090	0.075	2.341	2
Aug. 1, 1921	1. No minerals	30.36	16.77	7.97	4.332	0.098	3.274	3
do	2. Grit	31.95	19.09	8.80	4.793	0.104	3.582	6
do	3. Grit, shell	31.30	21.07	10.59	5.789	0.125	4.288	3
do	4. Grit, limestone	30.73	21.26	10.18	5.612	0.123	4.172	5
do	5. Limestone	30.54	19.86	10.69	5.885	0.123	4.365	4
do	6. Rock phosphate	33.12	21.15	11.20	6.165	0.137	4.542	5
do	2nd control	36.98	23.30	11.94	6.557	0.143	4.880	1

Table 10—Average Percentages of Ash in the Leg Bones, and of Mineral Substances in the Ash

Date	Lot	Percentage of CO_2-free Ash in the Leg Bones		Percentage in the CO_2-free Ash of the Leg Bones				
		Fresh	Dried at 120° C.	Calcium Oxid, CaO	Magnesium Oxid, MgO	Phosphorus Pentoxid, P_2O_5	Total	Excess, CaC
Dec. 1, 1920	1st controls	25.24	40.84	54.88	1.34	41.58	97.80	7.53
Aug. 1, 1921	1. No minerals	26.35	47.78	54.33	1.23	41.08	96.64	7.41
do	2. Grit	27.57	46.10	54.44	1.18	40.70	96.32	7.90
do	3. Grit, shell	33.81	50.17	54.68	1.18	40.49	96.35	8.39
do	4. Grit, limestone	32.50	47.82	55.21	1.19	41.04	97.44	9.29
do	5. Limestone	34.66	53.48	55.02	1.15	40.87	97.04	8.24
do	6. Rock phosphate	33.64	53.01	55.02	1.21	40.56	96.79	8.69
do	2nd control	32.29	51.24	54.92	1.20	40.87	96.99	8.21

Analyses of the Carcasses—At the time the leg bones were dissected out, the head, skin, feathers, feet and intestines, with the contents and the lining of the gizzard, were removed and discarded to eliminate any extraneous matter which might vitiate the comparative analyses. The remaining carcass, including all the flesh and bones of the body and neck and the flesh of the legs, was carefully ashed and analyzed, in the same manner as the leg bones.

Tables 11 and 12 contain a synopsis of the results.

Table 11—Average Weights of the Hens, of the Carcasses as Analyzed,* and of the Mineral Matter in the Carcass, Expressed as Grams

Date	Lot	Hens as Received	Carcasses as Analyzed	CO_2-free Ash of Carcasses	Calcium Oxid, CaO	Magnesium Oxid, MgO	Phosphorus Pentoxid, P_2O_5	No. of Hens in the Average
Dec. 1, 1920	1st controls	840	485	16.75	7.043	0.334	7.301	2
Aug. 1, 1921	1. No minerals	1203	694	23.62	10.031	0.441	10.350	3
do	2. Grit	1292	844	25.58	10.668	0.443	10.975	6
do	3. Grit, shell	1212	758	27.60	12.815	0.436	11.389	3
do	4. Grit, limestone	1321	804	27.32	12.473	0.466	11.736	5
do	5. Limestone	1138	717	26.16	12.184	0.422	11.091	4
do	6. Rock phosphate	1380	840	28.93	13.466	0.473	12.283	5
do	2nd control	1490	963	28.17	12.246	0.507	12.127	1

Table 12—Average Percentages of Ash in the Carcasses and of Mineral Substances in the Ash, and Oxygen ratio

Date	Lot	CO_2-free Ash	Percentages in the CO_2-free Ash			O of P_2O_5 / O of CaO+MgO
			Calcium Oxid, CaO	Magnesium Oxid, MgO	Phosphorus Pentoxid, P_2O_5	
Dec. 1, 1920	1st controls	3.45	41.98	1.99	43.58	1.92
Aug. 1, 1921	1. No minerals	3.41	42.48	1.87	43.84	1.92
do	2. Grit	3.07	41.70	1.73	42.93	1.92
do	3. Grit, shell	3.69	44.37	1.58	41.42	1.75
do	4. Grit, limestone	3.41	45.05	1.62	42.79	1.78
do	5. Limestone	3.69	46.62	1.62	42.35	1.71
do	6. Rock phosphate	3.43	46.41	1.64	42.57	1.72
do	2nd control	2.93	43.47	1.80	43.05	1.86

*See preceding paragraph.

Apparently calcium starvation did not influence the average total weights of the pullets in lots 1 and 2, nor did it influence very greatly the quantity of CO_2-free ash in them, tho lots 1 and 2 have distinctly less ash than the lots which received calcareous supplements. The comparatively small quantity of ash in the hens of lot 5 may have been due to the larger number of eggs laid by them.

The average number of grams of CaO and P_2O_5 in the carcasses is less in lots 1 and 2 than in the remaining lots, while the quantity of MgO seems to be about the same in all lots, tho largest in the second control.

The percentage of MgO varies but little in all lots. The percentage of CaO is less in lots 1 and 2 than in the others, a further indication that in calcium starvation a smaller amount of calcium and phosphorus is deposited in the body of laying hens than would occur in the presence of an abundance of calcium carbonate.

The percentage of phosphorus pentoxid is somewhat less in the lots which received calcareous supplements than in those which did not, and the oxygen ratio approaches that of tricalcium phosphate (1:1.67) more nearly in the former than in the latter.

Part III.

BEHAVIOR OF GRIT IN THE GIZZARD

It is generally accepted as a fact that the chief function of grit is to aid the gizzard in crushing and grinding the food and it is held by some poultry experts that grit is essential to the well-being of poultry. In another paper,[8] the subject of the function of grit in the gizzard of the chicken has been discust at length.

At the beginning of this experiment, when the first controls were killed for analysis, the contents of their gizzards were separated and all mineral particles the size of sand and larger,

[8] Buckner, G. D., and Martin, J. H., Poultry Science, April-May, 1922.

were carefully separated from the food and washed, dried, weighed and examined. On August 1, 1921, when the experiment ended, the contents of the gizzards of the hens remaining in the six lots and of the second control hen were similarly treated.

To determine if the limestone and rock phosphate contained any material which might function as grit, 50 grams of each, just as fed, were treated with hydrochloric acid and the residues washed with water by decantation. The limestone yielded 1.37 per cent of siliceous material, and the rock phosphate 0.82 per cent. From each of these residues six pieces of cherty material were selected which seemed large enough to serve as grit in the gizzard. In weight they corresponded to 0.84 per cent and 0.65 per cent, respectively, of the original stone. The rest of the insoluble matter was sand, fragments of siliceous fossils and a little pyrite. The oyster shell was not tested.

Table 13—Weights of Grit in Gizzards of Hens When Killed and of the Mineral Material Consumed per Hen by Each Lot in 8 Months

Date	Lot No.	Hen No.	Grit in the Gizzard		Mineral Materials Consumed in 8 Months*			
			From Each Hen	Average Per hen	Grit	Osyter-shell	Lime-stone	Rock Phos-phate
			Gms.	Gms.	Lbs.	Lbs.	Lbs.	Lbs.
Dec. 1, 1920	1st controls	A	16.20	18.4	.....	.....	.....	.....
		B	20.60					
Aug. 1, 1921	2nd control	C	23.00	23.0	.....	.....	.....	.....
Aug. 1, 1921	1	5	13.51					
"	No minerals	6	10.30	12.4	0	0	0	0
"		7	10.87					
"		8	15.10					
"	2	2	11.83					
"		3	21.97					
"	Grit	4	15.03	14.3	10.2	0	0	0
"		5	8.69					
"		7	14.20					
"		9	13.79					
"	3	1	11.15					
"	Grit, shell	8	11.05	9.7	6.4	6.5	0	0
"		9	6.92					
"	4	1	11.44					
"		5	12.90					
"	Grit, limestone	6	12.64	12.1	3.3	0	2.9	0
"		7	13.59					
"		8	11.63					
"		10	10.34					
"	5	1	3.70					
"	Limestone	5	4.50	4.4	0	0	4.5	0
"		7	6.31					
"		10	2.92					
"	6	1	4.70					
"		3	3.83					
"	Rock phosphate	5	6.21	5.3	0	0	0	4.0
"		6	5.30					
"		7	6.31					

*The figures represent the quantities of the different materials taken from the hoppers by the hens; an undetermined part of this was not swallowed, but dropt upon the floor.

Table 13 shows the actual number of grams of grit recovered from the gizzard of each hen, with the average for each lot and the weight per hen of the mineral materials taken from the

hoppers by each lot during eight months. We cannot say exactly how much of the latter was swallowed by the hens, because it was not possible to keep account of pieces of mineral dropt on the floor after having been picked from the hoppers.

The first controls had an average of 18.4 grams of grit in their gizzards and lots 1, 2, 3 and 4 had nearly as much, whereas lots 5 and 6 had only about one-fourth as much as the controls. The last control, which had been hatched at the same time as the hens in the experiment but had been allowed the run of a pasture and free access to grit and oyster shell, had 23 grams of grit in its gizzard, considerably more than any other hen except No. 3 in lot 2, which had about 22 grams. That this may have been an exceptionally large amount is suggested by the observation that 4 grams of it consisted of pieces of glass, perhaps picked up because of their bright appearance.

The grit in the gizzards of the hens of lots 2, 3 and 4 was mainly light-colored granitic material, evidently derived from the granite grit to which these hens had access, but included some of the other substances observed in lots 1, 5 and 6. Only a few pieces of shell in lot 3 and limestone in lot 4 were found. The material from lot 1 included siliceous gravel, chert, granitic material, anthracite, glass and one steel thumb-tack. The materials from lots 5 and 6 and from the controls were similar in character. Only a few pieces of limestone were found in lot 5 and of rock phosphate in lot 6. Assuming that the hens started with an average of about 18 grams of grit, as shown by the first two controls, those of lot 1 retained about 70 per cent of the original grit, since they received none during the experiment. This shows that a hen will retain the quantity of grit necessary for the purpose it serves and it appears to be as effective as new grit, at least for the time covered by this experiment. The 30 per cent loss, or part of it, may have been caused by the wearing away of the grit.

In lot 2 the hens which were given free access to grit had only 80 per cent of the quantity of grit assumed to be in their gizzards at the beginning of the experiment. The character of the grit in the hens of lot 2, however, was distinctly different

from that in lot 1, granitic material having taken the place of quartz gravel, chert and other materials which were prominent in lots 1, 5 and 6. It is remarkable that the quantity retained by the hens in this pen is only slightly more than that remaining in the no-grit hens. Only one of the six hens in this pen had more grit in her gizzard than the first two controls and she did not have as much as the last control. Considering the large quantity of grit handled by the hens of this pen, the suggestion is that the character of the grit may not have been attractive to them and they may have rejected some on that account, after having picked it from the hopper. The presence of glass in the gizzard of control C, and the predominance of white and light-colored gravel in the gizzards of all the controls suggests that the gray granite supplied to the hens in pens 2, 3 and 4 may not have been the kind most attractive to them. It should be stated, however, that only very little grit was seen on the floor about the hoppers at any time.

Lots 3 and 4, which received the grit and oyster shell or limestone, respectively, retained about the same quantity of grit as lot 1. One explanation of this is that during the experiment oyster shell and limestone would reach the gizzard in solid form and the hen not being able to distinguish between grit and the soluble or soft material, would pass both out regardless of selection, so that only an average quantity of grit was retained.

In lots 5 and 6, which received no grit, the hens retained about one-fourth the quantity of grit which they are supposed to have had at the beginning of the experiment. Pieces of limestone and phosphate rock should become dissolved or disintegrated rather rapidly in the gizzard, both because they are softer than the grit and because the liquid present is acid. This view is substantiated by the observation that only very little limestone, oystershell and phosphate rock could be found in the gizzards of the hens that received these materials. If, however, the gizzard should become overcharged with pieces of limestone or of phosphate rock, in addition to the grit already present, as

might happen from the ingestion of too much of these materials at one time, it is conceivable that the excess might be allowed to escape, limestone fragments and pieces of grit passing out together indiscriminately, before the former have become softened or pulverized. Action of this kind would account for the small quantity of grit remaining in the gizzards of the hens of lots 5 and 6.

The control hen killed August 1, 1921, had 23 grams of grit in its gizzard. This larger quantity may be explained by the fact that this hen was eight months older and the gizzard larger, as contrasted with the hens that were examined December 1, 1920. She also lived on a sod range and in the natural process of obtaining food would be apt to gather grit and pebbles along with the foraged food.

The pieces of grit in the gizzards of all hens examined were well rounded at the edges and were somewhat smaller in the hens in captivity than in the controls.

Under the circumstances, it may not be fair to use the weight of grit in the controls as normal for the hens in confinement. The amount found in the hens of lots 3 and 4, which received both calcareous and siliceous materials *ad libitum,* may be the better basis of comparison. The average weight per hen in these two lots, taken together, is 11.3 grams. The average weights of grit for lots 5 and 6 are 39 per cent and 47 per cent of this amount, respectively, whereas lots 2 and 1 had about 26 per cent and 10 per cent more, respectively, than this assumed normal.

The hens in lot 2 took from the hoppers considerably more grit during their eight months of confinement than did those in lots 3 and 4; obviously this was caused by their desire and efforts to obtain calcium.

The quantity of limestone taken from the hoppers by lot 5 was about the same as the quantity of rock phosphate taken by lot 6.

The quantity of grit taken by lot 3 is about the same as the quantity of oyster shell taken. This would signify the inability of the hens to distinguish between the two materials which were

placed before them in adjoining hoppers. This is shown to hold true in the case of lot 4, also, which took about the same quantity of grit as of limestone.

The hens of lot 4 took from the hoppers only about half as much grit and limestone as the hens of lot 3 took of grit and shell; a striking difference for which no explanation occurs to us.

It is proper to note that the limestone and phosphate rock consumed by lots 5 and 6 in eight months may have supplied 17 grams and 12 grams of grit, respectively, according to the experiment described on page 19.

Part IV.

TABULATED DATA

For convenience of reference and for the purpose of presenting the chemical analyses adequately, the principal data obtained in the experiment described in the foregoing pages have been arranged in the following tables.

Table 14 gives the number of eggs laid each month by each hen. The letter "D," followed by a date, shows when a hen died.

Table 15 shows how the average egg production was computed from the data in table 14, after excluding all hens that laid not more than 5 eggs during the time they were in the experiment. If a hen died, she was counted N/30 of a hen for the month in which she died, "N" being the number of days she lived in that month. Strictly speaking, the "months" were 30 day periods.

Tables 16 to 37, inclusive, contain results of the laboratory work done on the eggs. The first three eggs laid by each hen in each lot, each month, or all she laid, if fewer than three, were taken as the sample for analysis. Bearing this in mind, it is possible to ascertain by consulting Table 16 how many hens, eggs and analyses each monthly average represents. For example, the first number in Table 16, 40.18, is the average weight of one egg, computed from the weight of 14 eggs from 7 hens. Simi-

larly, the first number in Table 17, 0.03, is the average weight of calcium oxid per egg, computed from 7 independent determinations of calcium in the contents of 14 eggs from 7 hens. The lowest numbers averaged were in July, when the samples from lots 1 and 3, respectively, consisted of 6 eggs from two hens, and the samples from lot 5 consisted of 7 eggs from 3 hens. We desire to call attention to the considerable number of independent determinations represented by each monthly average, because this adds weight to the averages. The size of the tables would be increased unduly, however, if all determinations represented in each average were stated.

Tables 37 to 40, inclusive, relate to the analyses of the leg bones and carcasses. They are self-explanatory.

Table 41 gives the average amounts of feeds and supplements consumed, expressed as pounds per hen. The same system of computation was used as in table 15.

Table 42 gives the monthly weights, in grams, of the hens that lived thru the experiment. It was not thought necessary to include the weights of hens that died before the close of the experiment.

Table 14—Individual Egg and Mortality Record

Lot 1. No Minerals.

Hen No.	Dec. 1920	Jan. 1921	Feb.	Mar.	Apr.	May	June	July	Total
1	6	7	2	8	5	1	1	D July 3	30
2	1	1	D Jan. 27	....	—	....	....	....	2
3	6	5	5	3	1	D Apr. 19	....	....	20
4	11	13	10	6	6	D Apr. 29	....	....	46
5	....	1	....	....	....	....	....	D July 29	1
6	1	2	3	4	3	2	4	9	28
7	2	1	1	2	1	....	....	8	15
8	....	....	....	1	1	1	1	D July 14	5
9	1	....	4	....	....	D Apr. 27	....	....	5
10	....	2	....	....	D Mar. 11	....	....	....	2
Floor	3	....	....	....	....	....	....	....	3
Total	31	32	26	24	17	4	6	17	157

Lot 2. Granite Grit.

1	6	7	11	13	13	9	2	D June 18	61
2	5	2	10	16	5	1	7	3	49
3	5	4	6	9	9	5	4	6	48
4	....	6	6	11	7	5	4	6	45
5	6	1	3	5	5	3	1	....	24
6	5	6	3	9	5	D Apr. 22	....	....	28
7	....	....	1	3	2	....	....	2	8
8	....	D Dec. 13	....	....	....	....	....	....	....
9	....	6	1	5	4	4	7	6	33
10	....	3	3	4	2	....	D May 23	....	12
Floor	6	....	1	2	1	....	6	2	18
Total	33	35	45	77	53	27	31	25	326

Lot 3. Grit and Oystershell.

Hen No.	Dec. 1920	Jan. 1921	Feb.	Mar.	Apr.	May	June	July	Total
1	8	4	10	17	11	14	5	9	78
2	3	5	1	7	8	4	3	....	31
3	11	7	11	7	....	D Apr. 14	....	....	36
4	3	7	4	5	5	2	D May 27	....	26
5	4	5	....	D Feb. 1	....	....	....	....	9
6	....	....	10	12	10	5	D May 26	....	37
7	....	....	....	D Feb. 1	....	....	....	....	....
8	....	1	9	8	19	6	16	17	76
9	....	3	....	6	9	2	4	....	24
10	....	3	1	4	6	8	....	D June 4	22
Floor	4	1	7	5	....	7	1	....	25
Total	33	36	53	71	68	48	29	26	364

Lot 4. Grit and Limestone.

1	12	9	12	7	15	7	10	7	79
2	12	15	16	10	18	5	5	....	81
3	....	2	....	....	....	D Apr. 17	....	....	2
4	....	8	5	3	18	7	D May 31	....	41
5	....	5	16	4	20	10	6	2	63
6	1	....	5	1	3	6	1	....	17
7	....	6	9	7	13	5	6	8	54
8	6	5	11	3	6	3	7	4	45
9	....	....	2	1	10	6	4	D July 6	23
10	....	....	3	....	9	8	7	....	27
Floor	....	13	8	18	7	1	8	10	65
Total	31	63	87	54	119	58	54	31	497

Table 14—Individual Egg and Mortality Record—Concluded.

Lot 5. Limestone

Hen No.	Dec. 1920	Jan. 1921	Feb.	Mar.	Apr.	May	June	July	Total
1	3	7	8	3	13	4	2	....	40
2	....	....	D Jan. 18	....	....	....	....	....	....
3	8	6	5	10	12	....	D May 8	....	41
4	3	7	....	3	12	5	....	D June 6	30
5	6	11	10	4	7	10	13	5	66
6	9	14	9	10	8	9	4	D June 16	63
7	4	5	2	9	8	1	8	3	40
8	....	10	15	13	10	7	D June 25	....	55
9	2	D Dec. 26	....	....	....	....	....	....	2
10	....	3	....	5	9	12	7	1	37
Floor	4	3	6	26	20	6	9	....	74
Total	39	66	55	83	99	54	43	9	448

Lot 6. Rock Phosphate

1	1	2	4	7	6	4	4	1	29
2	2	....	....	D Feb. 16	....	....	....	....	2
3	1	5	....	5	3	....	1	....	15
4	....	2	3	....	....	....	....	D June 24	5
5	....	....	....	....	4	2	5	3	14
6	....	3	4	4	2	1	4	8	26
7	4	5	1	3	3	....	....	2	18
8	....	3	....	D Feb. 15	....	....	....	....	3
9	2	1	D Jan. 21	....	....	....	....	....	3
10	....	1	3	....	D Mar. 10	....	....	....	4
Floor	1	1	....	2	....	1	....	1	6
Total	11	23	15	21	18	8	14	15	125
No. dead	2	3	4	2	6	5	6	4	
Total in 4 months				11				21	

Table 15—Average Egg Production of Hens Laying Over 5 Eggs

Month	Lot 1, No Minerals			Lot 2, Grit			Lot 3, Grit, Shell		
	No. of Hens	No. of Eggs	Eggs Per Hen	No. of Hens	No. of Eggs	Eggs Per Hen	No. of Hens	No. of Eggs	Eggs Per Hen
Dec., 1920	5.0*	29	5.8	9.0	33	3.7	9	33	3.7
Jan., 1921	5.0	28	5.6	9.0	35	3.9	9	36	4.0
Feb., 1921	5.0	21	4.2	9.0	45	5.0	8	53	6.6
Mar., 1921	5.0	23	4.6	9.0	77	8.6	8	71	8.9
Apr., 1921	4.5	16	3.6	8.7	53	6.1	7.5	68	9.1
May, 1921	3.0	3	1.0	7.7	27	3.5	6.7	48	7.3
June, 1921	3.0	5	1.7	6.6	31	4.7	4.1	29	7.1
July, 1921	2.1	17	8.0	6.0	25	4.2	4.0	26	6.5
Total		142	34.5		326	39.7		364	53.2
No. hens at close of expt.	2			6			4		

*Of the ten hens placed in Lot 1, five failed to lay more than 5 eggs.

Month	Lot 4, Grit Limestone			Lot 5, Limestone			Lot 6, Rock Phosphate		
	No. of Hens	No. of Eggs	Eggs Per Hen	No. of Hens	No. of Eggs	Eggs Per Hen	No. of Hens	No. of Eggs	Eggs Per Hen
Dec., 1920	9	31	3.4	8	37	4.6	5	7	1.4
Jan., 1921	9	61	6.8	8	66	8.3	5	16	3.2
Feb., 1921	9	87	9.7	8	55	6.9	5	9	1.8
Mar., 1921	9	54	6.0	8	83	10.4	5	21	4.2
Apr., 1921	9	119	13.2	8	99	12.4	5	18	3.6
May, 1921	9	58	6.4	7	54	7.7	5	8	1.6
June, 1921	8	54	6.8	4.7	43	9.2	5	14	2.8
July, 1921	7.2	31	4.3	4	9	2.3	5	15	3.0
Total		495	56.6		446	61.8		108	21.6
No. hens at close of expt.	7			4			5		

Table 16—Average Weight of the Contents, Expressed as Grams per Egg

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	40.18	39.47	43.54	41.90	38.26	45.03	41.55	43.56
2	42.00	44.07	46.45	43.56	40.49	43.96	42.80	42.79
3	38.99	42.78	46.75	46.90	38.69	41.53	38.97	44.27
4	40.66	45.25	46.45	42.90	46.46	43.66	41.43	40.06
5	39.72	41.76	44.88	44.52	45.69	42.04	42.80	41.47
6	39.83	39.50	42.95	41.71	41.68	37.36	41.30	40.55

Table 17—Average Weight of CaO in the Contents, Expressed as Grams per Egg

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	.030	.025	.028	.028	.025	.035	.031	.028
2	.033	.029	.034	.029	.029	.033	.032	.030
3	.032	.031	.033	.028	.034	.032	.031	.037
4	.037	.035	.035	.034	.036	.032	.031	.032
5	.031	.027	.033	.034	.035	.031	.032	.034
6	.036	.030	.035	.034	.032	.031	.031	.030

Table 18—Average Weight of MgO in the Contents, Expressed as Grams per Egg

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	.010	.009	.009	.009	.008	.008	.009	.009
2	.011	.010	.009	.010	.009	.009	.009	.009
3	.010	.008	.010	.009	.009	.008	.008	.008
4	.011	.009	.010	.008	.010	.011	.009	.008
5	.010	.009	.009	.009	.009	.009	.009	.008
6	.011	.009	.009	.010	.010	.010	.010	.010

Table 19—Average Weight of P_2O_5 in the Contents, Expressed as Grams per Egg

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	.173	.175	.196	.178	.172	.206	.204	.189
2	.203	.173	.219	.208	.194	.209	.208	.216
3	.194	.177	.223	.227	.219	.207	.209	.228
4	.202	.189	.228	.212	.234	.222	.210	.205
5	.200	.195	.215	.219	.225	.211	.226	.227
6	.200	.196	.197	.195	.190	.196	.203	.194

Table 20—Average Percentage of CaO in the Contents

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	.074	.063	.064	.067	.065	.078	.075	.064
2	.078	.066	.073	.066	.072	.075	.075	.070
3	.082	.070	.071	.060	.087	.077	.079	.084
4	.091	.077	.075	.079	.077	.073	.075	.080
5	.078	.064	.073	.076	.076	.074	.073	.082
6	.090	.076	.081	.081	.077	.083	.075	.074

Table 21—Average Percentage of MgO in the Contents

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	.025	.023	.021	.021	.021	.018	.022	.021
2	.026	.023	.020	.023	.023	.021	.021	.021
3	.025	.019	.021	.019	.023	.019	.020	.018
4	.027	.020	.021	.019	.022	.025	.022	.020
5	.025	.021	.020	.020	.020	.021	.022	.019
6	.027	.023	.021	.024	.024	.027	.024	.024

Table 22—Average Percentage of P_2O_5 in the Contents

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	.43	.44	.45	.43	.45	.46	.49	.43
2	.48	.39	.47	.47	.48	.48	.49	.50
3	.50	.42	.48	.48	.57	.49	.53	.52
4	.50	.42	.49	.49	.50	.51	.51	.51
5	.50	.46	.48	.49	.49	.50	.52	.55
6	.50	.49	.46	.47	.45	.52	.49	.48

Table 23—Average Weight of CO_2-free Shell Ash, Expressed as Grams per Egg

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	2.26	1.94	2.21	1.66	1.59	1.69	1.63	1.77
2	2.35	2.17	2.29	1.96	1.75	1.66	1.75	1.93
3	2.43	2.61	2.93	2.51	2.56	2.13	2.17	2.27
4	2.65	2.77	2.76	2.64	2.51	2.15	1.76	2.15
5	2.39	2.60	2.90	2.70	2.70	2.47	2.24	2.33
6	1.79	1.81	1.87	1.93	1.79	1.97	1.76	1.62

Table 24—Average Weight of CaO in Shell, Expressed as Grams per Egg

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	2.183	1.888	2.160	1.613	1.553	1.655	1.594	1.726
2	2.284	2.109	2.235	1.919	1.710	1.610	1.707	1.885
3	2.364	2.540	2.860	2.452	2.509	2.088	2.124	2.216
4	2.572	2.709	2.701	2.584	2.438	2.095	1.715	2.098
5	2.340	2.524	2.833	2,624	2.650	2.394	2.190	2.280
6	1.739	1.769	1.829	1.890	1.748	1.923	1.722	1.584

Table 25—Average Weight of MgO in the Shell, Expressed as Grams per Egg

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	.034	.027	.031	.026	.024	.023	.022	.024
2	.034	.027	.034	.030	.027	.027	.025	.028
3	.030	.031	.037	.032	.033	.029	.027	.033
4	.034	.034	.036	.034	.035	.034	.028	.029
5	.033	.032	.038	.035	.037	.035	.031	.032
6	.027	.027	.026	.029	.029	.036	.030	.026

Table 26—Average Weight of P_2O_5 in the Shell, Expressed as Grams per Egg

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	.016	.014	.014	.011	.012	.012	.011	.015
2	.017	.017	.015	.011	.011	.009	.011	.011
3	.013	.017	.013	.013	.015	.012	.014	.016
4	.015	.017	.016	.014	.016	.014	.011	.012
5	.016	.017	.015	.016	.016	.015	.014	.016
6	.019	.008	.008	.008	.009	.010	.006	.009

Table 27—Average Percentage of CaO in the CO_2-free Ash of the Shell

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	96.59	97.32	97.74	97.17	97.68	97.93	97.80	97.52
2	97.19	97.19	97.60	97.91	97.71	96.99	97.54	97.67
3	97.29	97.32	97.61	97.69	98.01	98.03	97.88	97.63
4	97.06	97.80	97.86	97.88	97.14	97.45	97.44	97.58
5	97.91	97.08	97.69	97.19	98.15	96.93	97.77	97.85
6	97.15	97.74	97.81	97.93	97.66	97.61	97.84	97.78

Table 28—Average Percentage of MgO in the CO_2-free Ash of the Shell

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	1.50	1.39	1.40	1.57	1.51	1.36	1.35	1.36
2	1.45	1.24	1.49	1.53	1.54	1.63	1.43	1.45
3	1.25	1.19	1.26	1.27	1.29	1.36	1.24	1.45
4	1.28	1.23	1.30	1.29	1.39	1.58	1.59	1.35
5	1.38	1.23	1.31	1.30	1.37	1.43	1.38	1.37
6	1.51	1.49	1.39	1.50	1.62	1.83	1.70	1.60

Table 29—Average Percentage of P_2O_5 in the CO_2-free Ash of the Shell

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	.71	.72	.63	.66	.76	.71	.68	.85
2	.72	.73	.66	.56	.63	.54	.63	.57
3	.54	.65	.44	.52	.59	.57	.65	.71
4	.57	.61	.58	.53	.64	.65	.63	.56
5	.67	.65	.52	.59	.59	.61	.63	.72
6	.56	.43	.43	.41	.50	.51	.34	.55

Table 30—Average Weight of one Egg, Grams

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	45.59	44.31	48.68	46.15	42.04	49.23	45.54	47.98
2	47.88	48.85	51.78	48.14	44.66	48.04	46.91	47.32
3	44.67	48.73	53.27	53.16	44.30	46.51	43.88	49.92
4	46.79	51.37	52.60	48.47	51.94	48.49	45.65	44.90
5	45.43	47.55	51.19	50.45	51.60	47.37	47.75	46.47
6	44.56	43.84	47.38	46.11	45.93	41.80	45.60	44.54

Table 31—Average Weight of CaO in the Whole Egg, Grams

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	2.213	1.913	2.188	1.641	1.578	1.690	1.625	1.754
2	2.317	2.138	2.269	1.948	1.739	1.643	1.739	1.915
3	2.396	2.571	2.893	2.480	2.543	2.120	2.155	2.253
4	2.609	2.744	2.736	2.618	2.474	2.127	1.746	2.132
5	2.371	2.551	2.866	2.658	2.685	2.425	2.222	2.314
6	1.775	1.799	1.864	1.924	1.780	1.954	1.753	1.614

Table 32—Average Weight of MgO in the Whole Egg, Grams

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	.044	.036	.040	.035	.032	.031	.031	.033
2	.045	.037	.043	.040	.036	.036	.034	.037
3	.040	.039	.047	.041	.042	.037	.035	.041
4	.045	.043	.046	.042	.045	.045	.037	.037
5	.043	.041	.047	.044	.046	.044	.040	.040
6	.038	.036	.035	.039	.039	.046	.040	.036

Table 33—Average Weight of P_2O_5 in the Whole Egg, Grams

Lot No.	Dec.	Jan.	Feb	Mar.	Apr.	May	June	July
1	.189	.179	.219	.189	.184	.218	.215	.204
2	.220	.190	.234	.219	.205	.218	.219	.227
3	.207	.194	.233	.240	.234	.219	.223	.244
4	.217	.206	.244	.226	.250	.236	.221	.217
5	.216	.212	.230	.235	.241	.226	.240	.243
6	.210	.204	.205	.203	.199	.206	.209	.203

Table 34—Average Percentage of CaO in the Whole Egg.

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	4.86	4.32	4.50	3.56	3.75	3.43	3.57	3.66
2	4.84	4.38	4.38	4.05	3.89	3.42	3.71	4.05
3	5.36	5.26	5.43	4.67	5.74	4.56	4.91	4.51
4	5.58	5.34	5.20	5.40	4.76	4.39	3.83	4.75
5	5.22	5.36	5.60	5.27	5.20	5.12	4.65	4.98
6	4.00	4.10	3.93	4.17	3.88	4.67	3.84	3.62

Table 35—Average Percentage of MgO in the Whole Egg.

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	.096	.081	.082	.076	.076	.063	.068	.069
2	.094	.076	.083	.083	.081	.075	.073	.078
3	.089	.080	.088	.077	.095	.080	.080	.091
4	.095	.085	.087	.087	.086	.093	.081	.082
5	.094	.086	.092	.087	.091	.093	.084	.086
6	.086	.082	.074	.085	.089	.090	.088	.081

Table 36—Average Percentage of P_2O_5 in the Whole Egg.

Lot No.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July
1	.42	.40	.43	.41	.44	.44	.47	.43
2	.46	.39	.45	.46	.46	.45	.47	.48
3	.47	.40	.44	.45	.53	.47	.51	.50
4	.47	.40	.46	.47	.48	.49	.48	.48
5	.47	.44	.45	.47	.47	.48	.50	.52
6	.47	.46	.43	.44	.43	.50	.46	.46

Table 37—Weight of the Four Leg Bones and of the Mineral Content Thereof, expressed in Grams

Lot No.	Hen No.	Four Leg Bones		CO_2-free Ash in 4 Leg Bones	CaO in 4 Leg Bones	MgO in 4 Leg Bones	P_2O_5 in 4 Leg Bones
		Fresh	Dried at 120° C.				
1st control	A	23.20	14.72	5.56	3.088	.073	2.297
	B	21.49	12.98	5.70	3.092	.078	2.385
	Average	22.34	13.85	5.63	3.090	.075	2.341
1	5	27.06	14.62	7.60	4.152	.103	3.123
	6	32.04	18.22	8.46	4.587	.093	3.483
	7	31.98	17.47	7.85	4.258	.096	3.217
	Average	30.36	16.77	7.97	4.332	.098	3.274
2	7	32.67	18.48	9.05	4.924	.104	3.694
	9	27.83	17.18	7.37	3.942	.074	2.996
	2	33.57	21.12	9.78	5.390	.115	3.981
	3	34.01	19.32	8.95	4.898	.104	3.673
	4	33.59	19.86	8.49	4.596	.105	3.470
	5	30.02	18.57	9.16	5.008	.121	3.676
	Average	31.95	19.09	8.80	4.793	.104	3.582
3	9	31.22	21.30	12.32	6.741	.148	5.013
	1	30.24	20.88	8.94	4.908	.108	3.622
	8	32.45	21.04	10.51	5.720	.118	4.229
	Average	31.30	21.07	10.59	5.789	.125	4.288
4	1	27.73	21.12	9.26	5.115	.102	3.802
	6	25.79	20.23	9.86	5.504	.122	4.047
	10	28.37	21.30	8.23	4.595	.093	3.410
	7	38.51	23.69	12.72	7.010	.158	5.178
	8	33.23	19.95	10.80	5.835	.138	4.424
	Average	30.73	21.26	10.18	5.612	.123	4.172
5	1	28.50	18.84	10.01	5.451	.112	4.061
	5	29.85	19.63	11.03	6.049	.150	4.488
	7	36.63	25.40	14.03	7.786	.146	5.730
	10	27.19	15.58	7.69	4.253	.083	3.181
	Average	30.54	19.86	10.69	5.885	.123	4.365
6	3	29.67	18.81	9.96	5.441	.099	4.040
	6	32.76	19.67	10.96	5.944	.124	4.472
	1	37.69	26.24	13.08	7.227	.173	5.300
	5	36.21	24.14	13.44	7.442	.180	5.413
	7	29.25	16.88	8.58	4.773	.109	3.486
	Average	33.12	21.15	11.20	6.165	.137	4.542
2nd control	C	36.98	23.30	11.94	6.557	.143	4.880

Table 38—Average Percentages of CO_2-free Ash in the Four Leg Bones and of Mineral Substances in the Ash

Lot No.	Hen No.	CO_2-free Ash		CaO in the Ash	MgO in the Ash	P_2O_5 in the Ash
		Fresh	Dried at 120° C.			
1st control	A	23.97	37.77	55.53	1.31	41.32
	B	26.52	43.91	54.24	1.37	41.85
	Average	25.24	40.84	54.88	1.34	41.58
1	5	28.09	51.98	54.64	1.36	41.10
	6	26.40	46.43	54.22	1.10	41.17
	7	24.55	44.94	54.24	1.24	40.98
	Average	26.35	47.78	54.33	1.23	41.08
2	7	27.70	48.97	54.41	1.15	40.82
	9	26.48	42.90	53.49	1.00	40.65
	2	29.13	46.31	55.11	1.18	40.71
	3	26.33	46.32	54.73	1.16	41.04
	4	25.28	42.75	54.14	1.24	40.87
	5	30.51	49.33	54.67	1.32	40.13
	Average	27.57	46.10	54.44	1.18	40.70
3	9	39.46	57.84	54.72	1.20	40.71
	1	29.57	42.72	54.90	1.21	40.51
	8	32.39	49.96	54.42	1.12	40.24
	Average	33.81	50.17	54.68	1.18	40.49
4	1	29.79	43.89	55.24	1.10	41.06
	6	38.23	48.74	55.82	1.24	41.04
	10	29.01	38.64	55.83	1.13	41.43
	7	33.03	53.70	55.11	1.24	40.71
	8	32.50	54.14	54.03	1.28	40.96
	Average	32.51	47.82	55.21	1.19	41.04
5	1	35.12	53.14	54.46	1.12	40.57
	5	36.95	56.19	54.84	1.36	40.68
	7	38.30	55.24	55.49	1.04	40.84
	10	28.28	49.35	55.31	1.08	41.37
	Average	34.66	53.48	55.02	1.15	40.87
6	3	33.57	52.95	54.63	1.00	40.56
	6	33.46	55.72	54.24	1.13	40.80
	1	34.70	49.85	55.25	1.32	40.52
	5	37.12	55.68	55.37	1.34	40.30
	7	29.33	50.83	55.63	1.27	40.63
	Average	33.64	53.01	55.02	1.21	40.56
2nd control	C	32.29	51.24	54.92	1.20	40.87

Table 39—Weights of Carcasses and of Mineral Substances Estimated Therein, Grams

Lot No.	Hen No.	Hen as Received	Carcass as Analyzed	CO_2-free Ash in Carcass as Analyzed	CaO in Carcass as Analyzed	MgO in Carcass as Analyzed	P_2O_5 in Carcass as Analyzed
1st control	A	819	480	17.85	7.663	.350	7.793
	B	862	490	15.65	6.423	.318	6.810
	Average	840	485	16.75	7.043	.334	7.301
1	5	1100	689	24.20	10.394	.445	10.657
	6	1262	719	24.05	9.964	.445	10.370
	7	1247	673	22.60	9.734	.434	10.023
	Average	1203	694	23.62	10.031	.441	10.350
2	7	1197	654	21.54	9.103	.362	9.266
	9	1432	894	23.14	9.411	.414	10.138
	2	1295	778	27.04	11.910	.384	11.508
	3	1650	1030	27.60	11.216	.497	11.374
	4	1391	821	27.63	11.298	.542	12.179
	5	1388	884	26.55	11.072	.462	11.386
	Average	1392	844	25.58	10.668	.443	10.975
3	9	1007	629	27.41	13.025	.469	11.484
	1	1287	816	24.78	11.383	.406	10.758
	8	1342	829	30.61	12.136	.432	11.916
	Average	1212	758	27.60	12.185	.436	11.389
4	1	1247	749	24.11	10.519	lost	10.528
	6	1196	735	24.93	10.827	.451	10.636
	10	1194	757	24.23	10.417	.434	10.729
	7	1518	879	31.72	15.162	.463	13.266
	8	1452	900	32.62	15.458	.535	13.521
	Average	1321	804	27.32	12.473	.466	11.736
5	1	910	546	22.73	10.561	.389	9.672
	5	1245	811	28.37	13.069	.431	12.176
	7	1374	872	31.06	14.480	.497	13.203
	10	1022	638	22.49	10.647	.373	9.313
	Average	1138	717	26.16	12.184	.422	11.091
6	3	1409	851	26.91	12.472	.436	11.584
	6	1371	851	25.07	12.256	.406	10.773
	1	1416	827	30.05	13.587	.411	12.729
	5	1564	996	38.69	18.636	.677	16.060
	7	1141	676	23.91	10.379	.435	10.269
	Average	1380	840	28.93	13.466	.473	12.283
2nd control	C	1490	963	28.17	12.246	.507	12.127

Table 40—Percentage of CO_2-free Ash in the Carcass as Analyzed and of Mineral Substances in the CO_2-free Ash

Lot No.	Hen No.	Ash in the Carcass	CaO in the Ash	MgO in the Ash	P_2O_5 in the Ash
1st controls	A	3.72	42.93	1.96	43.66
	B	3.19	41.04	2.03	43.51
	Average	3.45	41.98	1.99	43.58
1	5	3.51	42.95	1.84	44.03
	6	3.35	41.43	1.85	43.13
	7	3.36	43.07	1.92	44.35
	Average	3.41	42.48	1.87	43.84
2	7	3.29	42.26	1.68	43.04
	9	2.59	40.67	1.79	43.81
	2	3.48	44.05	1.42	42.56
	3	2.68	40.64	1.80	41.21
	4	3.37	40.89	1.96	44.07
	5	3.00	41.70	1.74	42.89
	Average	3.07	41.70	1.73	42.93
3	9	4.36	47.52	1.71	41.90
	1	3.04	45.94	1.64	43.43
	8	3.69	39.65	1.41	38.93
	Average	3.69	44.37	1.58	41.42
4	1	3.22	43.63	.....	43.67
	6	3.39	43.43	1.81	42.66
	10	3.20	43.00	1.79	44.28
	7	3.61	47.80	1.46	41.82
	8	3.62	47.39	1.64	41.45
	Average	3.41	45.05	1.62	42.78
5	1	4.16	46.45	1.71	42.55
	5	3.50	46.06	1.52	42.92
	7	3.56	46.62	1.60	42.51
	10	3.54	47.34	1.66	41.41
	Average	3.69	46.62	1.62	42.35
6	3	3.16	46.35	1.62	43.05
	6	2.95	48.89	1.62	42.97
	1	3.63	45.23	1.37	42.36
	5	3.88	48.17	1.75	41.51
	7	3.54	43.41	1.82	42.95
	Average	3.43	46.41	1.64	42.57
2nd control	C	2.93	43.47	1.80	43.05

Table 41—Mineral Supplements Consumed. Pounds per Hen*

Month	Lot 2	Lot 3		Lot 4		Lot 5	Lot 6
	Grit	Grit	Shell	Grit	Lime-stone	Lime-stone	Phos-phate
Dec., 1920	1.0	0.3	0.4	0.4	0.1	0.4	0.5
Jan., 1921	0.8	0.2	0.6	0.1	0.4	0.7	0.5
Feb., 1921	0.6	0.4	0.2	0.5	0.5	0.5	0.4
Mar., 1921	0.6	0.4	0.5	0.4	0.2	0.4	0.6
Apr., 1921	0.3	0.4	0.9	0.6	0.3	0.3	0.4
May, 1921	1.3	0.9	0.8	0.3	0.3	0.3	0.8
June, 1921	2.3	2.6	1.5	0.8	0.8	0.9	0.6
July, 1921	3.3	1.2	1.6	0.2	0.3	1.0	0.2
Total	10.2	6.4	6.5	3.3	2.9	4.5	4.0

*The figures represent the quantities of the different materials taken from the hoppers by the hens; an undetermined part of this was not swallowed, but dropt upon the floor.

Table 42—Weights of the Hens that Lived Thru the Experiment, Grams

Lot No.	Hen No.	Dec. 1	Dec. 31	Jan. 29	Feb. 28	Mar. 30	Apr. 29	May 29	June 29	July 29
1	6	1080	1309	1450	1370	1298	1284	1250	1245	1253
	7	1069	1535	1327	1432	1435	1350	1340	1280	1311
Average		1075	1422	1389	1401	1367	1317	1295	1263	1282
								Increase 207—19 per cent.		
2	2	1157	1350	1742	1678	1330	1152	1350	1330	1275
	3	1497	1780	1751	1846	1350	1587	1560	1620	1590
	4	1225	1640	1504	1623	1641	1453	1365	1336	1452
	5	1199	1250	1350	1493	1495	1351	1250	1251	1381
	7	1027	1165	987	1287	1219	1149	970	1197	1257
	9	1040	1452	1536	1450	1495	1279	1425	1475	1453
Average		1191	1439	1475	1563	1422	1329	1320	1368	1406
								Increase 315—26 per cent		
3	1	1407	1720	1710	1629	1425	1529	1347	1290	1260
	2	1107	1355	1360	1261	1180	1039	980	820	642
	8	980	1435	1488	1265	1390	1290	1450	1362	1292
	9	935	1347	1090	1226	1213	1112	1086	1121	1109
Average		1107	1463	1412	1345	1302	1243	1216	1148	1076
								Loss 31—3 per cent		
4	1	1275	1595	1506	1539	1523	1339	1342	1286	1252
	2	1272	1420	1431	1383	1474	1215	1380	1439	1100
	5	1215	1555	1827	1582	1860	1666	1535	1489	1037
	6	1100	1405	1743	1726	1736	1710	1530	1520	1214
	7	1145	1705	1820	1840	1758	1379	1449	1328	1470
	8	1145	1530	1686	1440	1550	1356	1381	1219	1490
	10	902	985	1236	1385	1513	1329	1202	1091	1210
Average		1151	1457	1607	1557	1631	1428	1403	1339	1253
								Increase 102—9 per cent.		
5	1	1112	1350	1432	1391	1372	1015	950	841	1092
	5	1065	1365	1510	1529	1472	1305	1386	1241	1403
	7	1112	1340	1280	1402	1361	1229	1370	1241	1460
	10	907	1120	1180	1059	1197	1037	1040	1029	1050
Average		1049	1294	1351	1345	1351	1147	1187	1189	1251
								Increase 202—20 per cent.		
6	1	1325	1684	1480	1621	1459	1442	1525	1505	1529
	3	1220	1480	1480	1451	1374	1415	1480	1391	1503
	5	1205	1364	1040	986	1590	1532	1655	1555	1585
	6	1397	1574	1678	1795	1605	1619	1742	1780	1708
	7	1060	1185	1280	1341	1300	1285	1270	1191	1209
Average		1241	1457	1392	1439	1466	1459	1534	1484	1507
								Increase 266—21 per cent.		

Kentucky
Agricultural Experiment Station

University of Kentucky

Analyses of Commercial Fertilizers

BULLETIN NO. 251



LEXINGTON, KENTUCKY

DECEMBER 31, 1923

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BULLETIN NO. 251

ANALYSES OF COMMERCIAL FERTILIZERS

By H. E. Curtis, H. R. Allen and Lelah Gault.

This Bulletin gives the names of all brands of fertilizer registered in this State during the year 1923, the names of the manufacturers, and the official analyses.

Those interested in the use of fertilizers for different crops should apply to the College of Agriculture, the Experiment Station, or to their County Agent, and such literature as bears on the subject in which they are interested will be furnished. Bulletin No. 228 of the Experiment Station, showing the results obtained on the soil experiment fields, is of special interest to all users of fertilizers.

Samples Analyzed

There were registered during the year a total of 803 brands of fertilizer as follows:

Complete fertilizers, containing all three of the essential ingredients—phosphoric acid, nitrogen and potash	423 brands
Nitrogenous superphosphates	105 brands
Acid phosphate and potash mixtures	95 brands
Acid phosphates	115 brands
Bones, tankage, etc.	51 brands
Nitrate of soda	8 brands
Ammonium sulfate	2 brands
Potash salts	4 brands

There were 750 samples of fertilizer collected by our inspectors and sent in by various persons in the State, which have been analyzed, in addition to the official samples. These analyses are to be found in the following pages, and have been divided into two groups—The first group, Table I, contains all analyses that are considered satisfactory, either because the analyses run high in all respects, or the deficiency in one ingredient is fully met by the excess in another. The second group, Table II, contains those analyses that are considered deficient.

As has been our custom in the past, we have shown an index of relative value for the purpose of comparison. The following factors have been used in computing these values:

Available phosphoric acid in mixed fertilizers	1.5
Available phosphoric acid in acid phosphates	1.2
Insoluble phosphoric acid in mixed fertilizers	0.4
Phosphoric acid in bone	0.8
Nitrogen in all fertilizers	6.0
Potash in all fertilizers	3.0

Explanation of the Tables

In the tables of analyses, following the name of each brand, will be found the analysis of such samples as have been collected by our inspectors, sent in by farmers, or furnished by the manufacturers, and the manufacturer's guaranty, printed last in italic figures. In Table II the figures set in bold face type are those results which are considered too low to be acceptable. In a number of cases the same brand of fertilizer will be found in both Tables, I and II—in which case they are marked in each table with a (†) dagger.

In Table I there are a number of analyses that, notwithstanding they are considered good enough to be placed in Table I, have objectionable features to which we desire to call attention: There are quite a number of cases where the potash is guaranteed from sulfate and all the analyses made of some of these brands showed the potash to be from muriate—no sulfate whatever having been used. Four or five companies, one especially, have too many analyses of this class.

It will be noticed in Table II that there are a number of analyses that have been put in this table on account of the deficiency in total phosphoric acid. This comes from attempting to show a large amount of insoluble phosphoric acid in addition to the guaranty of available phosphoric acid, and, on account of this tendency to show a larger percent of insoluble phosphoric acid than the goods contain, it has been deemed advisable to classify them among the deficient brands of fertilizer, hoping in this manner to induce the manufacturers to change these large guarantees of 4% or 5% insoluble phosphoric acid to 1% or 2%.

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	A. D. Adair and McCarty Brothers, Inc., Atlanta, Ga., and Chattanooga, Tenn.	
65362	Adair's Soluble Pacific Guano	Manufacturer
		Guaranteed
66124	Adair's High Grade Acid Phosphate No. 16	J. W. Ramsey, Eubank
		Guaranteed
65364	Old Glory Mixture	Manufacturer
		Guaranteed
65429	Adair's Standard Tobacco Grower	Manufacturer
		Guaranteed
65574	Adair's High Grade Potash Compound	Manufacturer
		Guaranteed
65582	Adair's Formula	Manufacturer
		Guaranteed
66146	Adair's High Grade Blood and Bone Guano	Manufacturer
		Guaranteed
66323	Adair's High Grade Complete Fertilizer No. 765	Manufacturer
		Guaranteed
	The American Agricultural Chemical Co., Inc., Cincinnati, Ohio	
65599	†A. A. C. Special Tobacco Grower	J. R. Davis and Bro., Campbellsville
65891		F. H. Gordon, Richmond
		Guaranteed
65600	†A. A. C. Kentucky Tobacco Grower	John McCarley Hardware Co., Hopkinsville
		Guaranteed
65602	A. A. C. Ground Bone	J. E. and Orval Cooper, Poynter
65893		The Wm. Addams Co., Cynthiana
66149		Skaggs and Nunn, Horse Cave
66150		T. E. Richardson, Campbellsville
66151		Lindsey, Orr and Co., Elkton
66325		J. R. Davis and Bro., Campbellsville
		Guaranteed
64893	A. A. C. High Grade Bone and Potash	Manufacturer
		Guaranteed
64894	A. A. C. Tobacco and Truck Fertilizer	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
11.15	3.55	14.70			1.02	1.82	2.21	2.48		36.5	65362
10.00						*1.65*	*2.00*	*2.00*		*30.9*	
18.60	1.30	19.90								22.3	66124
16.00										*19.2*	
10.00	2.05	12.05			1.77	2.06	2.50	3.38		38.3	65364
9.00						*1.65*	*2.00*	*3.00*		*32.4*	
9.45	1.95	11.40			0.49	1.99	2.42	2.44		34.2	65429
8.00						*1.65*	*2.00*	*2.00*		*27.9*	
11.65	0.60	12.25						4.29		30.6	65574
10.00								*4.00*		*27.0*	
11.05	2.60	13.65						2.43		24.9	65582
10.00								*2.00*		*21.0*	
12.35	0.80	13.15			1.77	2.67	3.24	4.00		46.9	66146
10.00						*2.47*	*3.00*	*3.00*		*38.8*	
7.65	0.90	8.55			4.98	5.40	6.56	6.34		63.3	66323
7.00						*4.94*	*6.00*	*5.00*		*55.1*	
11.10	1.20	12.30			1.35	1.69	2.05			27.3	65599
11.50	1.35	12.85			1.19	1.61	1.95			27.5	65891
10.00	*4.00*	*14.00*				*1.65*	*2.00*			*26.5*	
8.15	2.05	10.20			1.33	1.67	2.03	2.28		29.9	65600
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*2.00*		*29.5*	
		28.80	90	10	0.37	1.70	2.06			33.2	65602
		28.80	100		0.56	1.89	2.29			34.4	65893
		30.10	80	20	0.32	1.72	2.09			34.4	66149
		28.50	85	15	0.38	1.95	2.37			34.5	66150
		28.90	86	14	0.29	1.79	2.17			33.9	66151
		28.10	86	14	0.49	1.92	2.33			34.0	66325
		27.00				*1.65*	*2.00*			*31.5*	
10.60	0.80	11.40						5.07		31.4	64893
10.00	*2.00*	*12.00*						*5.00*		*30.8*	
8.50	1.50	10.00			1.26	1.64	1.99	6.05		41.3	64894
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*5.00*		*38.5*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	The American Agricultural Chemical Co.	
96152	A. A. C. Co., Basic Lime Phosphate (Containing 30% Lime)	E. S. Ferrell and Sons, Buffalo
66326		J. P. Strother, Milton
		Guaranteed
66153	Bowker's Soluble Bone	T. E. Richardson, Campbellsville
		Guaranteed
65605	Bowker's 16% Acid Phosphate	Mayhew and Gilbert, Franklin
65606		L. B. Sievers and Son, Somerset
65895		Estes and Hines, Science Hill
66154		Gooch and Payne, Eubank
66155		Bradshaw and Hagan, Tompkinsville
66156		T. E. Richardson, Campbellsville
		Guaranteed
64897	Bowker's Dissolved Bone with Potash	Manufacturer
		Guaranteed
66157	†Bowker's Harvest Bone Phosphate	Bradshaw and Hagan, Tompkinsville
66158		T. E. Richardson, Campbellsville
		Guaranteed
65607	†Bowker's Fish Guano	Harvey Stout and Sons, Buechel
65897		C. P. Clark, Owensboro
		Guaranteed
65610	†Bowker's Corn and Wheat Phosphate	D. Sanders, McKinney
		Guaranteed
65611	Bowker's Grain and Grass Grower	J. B. Riffe, Hustonville
		Guaranteed
64903	Bowker's Complete Fertilizer	Manufacturer
		Guaranteed
64904	Bowker's Tobacco and Truck Grower	Manufacturer
		Guaranteed
65612	Bowker's High Grade Tobacco Grower	John McCarley Hardware Co., Hopkinsville
		Guaranteed
64906	Bowker's Potash Fertilizer	Manufacturer
		Guaranteed
64908	Bowker's 20% Acid Phosphate	Manufacturer
		Guaranteed
64909	Bradley's Soluble Dissolved Bone	Manufacturer
		Guaranteed
66159	Bradley's 16% Acid Phosphate	Ezekiel Roy, Brady
		Guaranteed
64911	Bradley's Alkaline Bone with Potash	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
13.20	2.70	15.90								15.8	66152
14.20	2.20	16.40								17.0	66326
13.00	*2.00*	*15.00*								*15.6*	
14.80	2.00	16.80								17.8	66153
14.00	*2.00*	*16.00*								*16.8*	
17.00	2.10	19.10								20.4	65605
17.40	2.30	19.70								20.9	65606
16.50	1.90	18.40								19.8	65895
18.20	2.00	20.20								21.8	66154
17.20	2.00	19.20								20.6	66155
18.50	1.00	19.50								21.2	66156
16.00	*2.00*	*18.00*								*19.2*	
10.60	0.80	11.40						2.09		22.5	64897
10.00	*2.00*	*12.00*						*2.00*		*21.8*	
9.00	1.00	10.00			0.57	0.81	0.98	0.99		21.7	66157
8.70	1.30	10.00			0.55	0.79	0.96	1.20		21.9	66158
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*1.00*		*21.5*	
8.60	1.30	9.90			0.62	0.90	1.09	3.28		28.7	65607
8.85	1.00	9.85			0.57	0.85	1.03	3.18		28.3	65897
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*3.00*		*27.5*	
10.80	1.50	12.30			0.68	0.90	1.09	1.13		25.6	65610
10.00	*4.00*	*14.00*				*0.82*	*1.00*	*1.00*		*24.5*	
8.60	1.60	10.20			1.30	1.65	2.00	2.32		30.4	65611
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*2.00*		*29.5*	
12.80	1.20	14.00			1.42	1.66	2.02	3.38		39.8	64903
12.00	*4.00*	*16.00*				*1.65*	*2.00*	*3.00*		*38.5*	
10.70	1.90	12.60			1.95	2.57	3.12	1.11		35.6	64904
10.00	*4.00*	*14.00*				*2.47*	*3.00*	*1.00*		*34.4*	
10.30	1.40	11.70			2.01	2.35	2.85	3.80		41.5	65612
10.00	*4.00*	*14.00*				*2.47*	*3.00*	*3.00*		*40.4*	
10.60	0.80	11.40						5.07		31.4	64906
10.00	*2.00*	*12.00*						*5.00*		*30.8*	
21.00	1.40	22.40								25.2	64908
20.00	*2.00*	*22.00*								*24.0*	
14.80	1.50	16.30								17.8	64909
14.00	*2.00*	*16.00*								*16.8*	
18.50	0.60	19.10								22.2	66159
16.00	*2.00*	*18.00*								*19.2*	
10.60	0.80	11.40						2.09		22.5	64911
10.00	*2.00*	*12.00*						*2.00*		*21.8*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	The American Agricultural Chemical Co.	
66161	Bradley's Corn and Wheat Phosphate	Ezekiel Roy, Brady
		Guaranteed
64916	Bradley's Grain and Grass Grower	Manufacturer
		Guaranteed
64917	Bradley's Complete Fertilizer	Manufacturer
		Guaranteed
64918	Bradley's Tobacco and Truck Grower	Manufacturer
		Guaranteed
66162	Bradley's 20% Acid Phosphate	Ezekiel Roy, Brady
		Guaranteed
64920	Bradley's High Grade Tobacco Grower	Manufacturer
		Guaranteed
65613	Cleveland Dryer Works Horsehead Phosphate	Albert Long, Scottsville
		Guaranteed
64922	Cleveland Dryer Works XXX Superphosphate	Manufacturer
		Guaranteed
66163	Cleveland Dryer Works 16% Acid Phosphate	H. M. Tomes, Big Ready
		Guaranteed
64924	Cleveland Dryer Works Soluble Bone with Potash	Manufacturer
		Guaranteed
64925	Cleveland Dryer Works Faultless Grain Grower	Manufacturer
		Guaranteed
64928	Cleveland Dryer Works Phospho Bone	Manufacturer
		Guaranteed
64929	Cleveland Dryer Works Grain and Grass Grower	Manufacturer
		Guaranteed
64930	Cleveland Dryer Works Complete Fertilizer	Manufacturer
		Guaranteed
64931	Cleveland Dryer Works Tobacco and Truck Grower	Manufacturer
		Guaranteed
64932	Cleveland Dryer Works High Grade Tobacco Grower	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
10.50	2.10	12.60				0.57	0.85	1.03	1.23	25.4	66161
10.00	*4.00*	*14.00*				*0.82*	*1.00*	*1.00*		*24.5*	
9.00	1.40	10.40			1.27	1.75	2.12	2.10		30.9	64916
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*2.00*		*29.5*	
12.80	1.20	14.00			1.42	1.66	2.02	3.38		39.8	64917
12.00	*4.00*	*16.00*				*1.65*	*2.00*	*3.00*		*38.5*	
10.70	1.90	12.60			1.95	2.57	3.12	1.11		35.6	64918
10.00	*4.00*	*14.00*				*2.47*	*3.00*	*1.00*		*34.4*	
21.10	2.70	23.80								25.3	66162
20.00	*2.00*	*22.00*								*24.0*	
10.70	1.60	12.30			2.14	2.52	3.06	3.18		41.4	64920
10.00	*4.00*	*14.00*				*2.47*	*3.00*	*3.00*		*40.4*	
10.30	0.90	11.20								12.4	65613
10.00	*2.00*	*12.00*								*12.0*	
14.80	1.50	16.30								17.8	64922
14.00	*2.00*	*16.00*								*16.8*	
16.60	2.20	18.80								19.9	66163
16.00	*2.00*	*18.00*								*19.2*	
10.60	0.80	11.40						2.09		22.5	64924
10.00	*2.00*	*12.00*						*2.00*		*21.8*	
8.90	0.90	9.80			0.58	0.85	1.03	1.03		21.9	64925
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*1.00*		*21.5*	
11.10	0.90	12.00			0.53	0.82	1.00	1.05		25.1	64928
10.00	*4.00*	*14.00*				*0.82*	*1.00*	*1.00*		*24.5*	
9.00	1.40	10.40			1.27	1.75	2.12	2.10		30.9	64929
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*2.00*		*29.5*	
12.80	1.20	14.00			1.42	1.66	2.02	3.38		39.8	64930
12.00	*4.00*	*16.00*				*1.65*	*2.00*	*3.00*		*38.5*	
10.70	1.90	12.60			1.95	2.57	3.12	1.11		35.6	64931
10.00	*4.00*	*14.00*				*2.47*	*3.00*	*1.00*		*34.4*	
10.70	1.60	12.30			2.14	2.52	3.06	3.18		41.4	64932
10.00	*4.00*	*14.00*				*2.47*	*3.00*	*3.00*		*40.4*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained	
	The American Agricultural Chemical Co.		
64933	Cleveland Dryer Works 20% Acid Phosphate	Manufacturer	21
		Guaranteed	20
65900	Red Line Phosphate	J. E. Bowie, Ghent	14
66327		J. R. Davis and Bro., Campbellsville	15
		Guaranteed	14
65614	Michigan Carbon Works 16% Acid Phosphate	Dickey and Co., Glasgow	16
65615		J. R. Davis and Bro., Campbellsville	17
65901		S. L. Cummins, Crab Orchard	16
66164		S. L. Cummins, Crab Orchard	17
66165		Lebanon Carriage and Implement Co., Lebanon	17
66166		Skaggs and Nunn, Horse Cave	16
		Guaranteed	11
65616	Red Line Phosphate with Potash	Geo. L. Gillum and Son, Russellville	10
		Guaranteed	8
65618	†Red Line Complete Manure	Albert Long, Scottsville	8
66167		Skaggs and Nunn, Horse Cave	8
66168		Lindsey, Orr and Co., Elkton	8
66328		J. F. Collings, Shepherdsville	8
		Guaranteed	9
66329	Homestead A-1 Potash Fertilizer	Woodson Lewis, Greensburg	8
		Guaranteed	
65903	†Michigan Carbon Works Corn and Wheat Phosphate	Mullikin and Craig, Bedford	10
66170		Conner-Hayden Co., Bardstown	10
66171		D. L. D. Sandefur, Beaver Dam	10
66172		Skaggs and Nunn, Horse Cave	10
		Guaranteed	9
65621	†Homestead A. Bone Black Fertilizer	Wodson Lewis and Son, Greensburg	9
65904		L. B. Sievers and Son, Somerset	
66173		Lebanon Carriage and Implement Co., Lebanon	8
		Guaranteed	8
65622	Michigan Carbon Works, Complete Fertilizer	Gross and Wiseman, Cecilia	12
		Guaranteed	12
65625	†Homestead Tobacco Grower	Woodson Lewis and Son, Greensburg	10
66331		Woodson Lewis and Son, Greensburg	10
		Guaranteed	10

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
21.00	1.40	22.40								25.2	64933
20.00	*2.00*	*22.00*								*24.0*	
14.70	1.65	16.35								17.6	65900
15.40	1.70	17.10								18.5	66327
14.00	*2.00*	*16.00*								*16.8*	
16.10	2.50	18.60								19.3	65614
17.61	1.50	19.10								21.1	65615
16.35	1.65	18.00								19.6	65901
17.50	2.10	19.60								21.0	66164
17.40	2.00	19.40								20.9	66165
16.30	2.40	18.70								19.6	66166
16.00	*2.00*	*18.00*								*19.2*	
11.30	0.80	12.10						2.10		23.6	65616
10.00	*2.00*	*12.00*						*2.00*		*21.8*	
8.70	1.30	10.00			0.62	0.86	1.04	1.14		22.2	65618
8.60	1.50	10.10			0.54	0.79	0.96	1.12		21.6	66167
8.50	1.50	10.00			0.60	0.87	1.06	1.08		21.8	66168
8.90	1.40	10.30			0.62	0.90	1.09	1.24		23.0	66328
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*1.00*		*21.5*	
9.00	1.30	10.30			0.59	0.81	0.98	2.83		27.4	66329
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*3.00*		*27.5*	
10.70	1.85	12.55			0.59	0.97	1.18	1.33		26.6	65903
10.10	1.90	12.00			0.61	0.86	1.04	1.17		24.6	66170
10.40	1.70	12.10			0.56	0.83	1.01	1.26		25.0	66171
10.40	1.80	12.20			0.62	0.90	1.09	1.23		25.4	66172
10.00	*4.00*	*14.00*				*0.82*	*1.00*	*1.00*		*24.5*	
9.30	1.50	10.80			1.66	1.98	2.40	1.37		30.5	65621
9.10	0.65	9.75			1.98	2.25	2.73	1.45		31.8	65904
8.40	2.80	11.20			1.54	2.06	2.50	1.45		30.4	66173
8.00	*4.00*	*12.00*				*2.06*	*2.50*	*1.50*		*30.5*	
12.40	1.80	14.20			1.36	1.60	1.94	2.87		37.5	65622
12.00	*4.00*	*16.00*				*1.65*	*2.00*	*3.00*		*38.5*	
10.70	1.30	12.00			2.22	2.64	3.20	3.11		41.7	65625
10.40	1.90	12.30			1.91	2.35	2.85	3.04		39.6	66331
10.00	*4.00*	*14.00*				*2.47*	*3.00*	*3.00*		*40.4*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	The American Agricultural Chemical Co.	
65906	†Michigan Carbon Works High Potash Phosphate	J. E. Bowie, Ghent
66174		Skaggs and Nunn, Horse Cave
		Guaranteed
66332	†Homestead Potato and Tobacco Special	Woodson Lewis and Son, Greensburg
		Guaranteed
64947	Michigan Carbon Works 20% Acid Phosphate	Manufacturer
		Guaranteed
65628	N. W. Horseshoe Brand Square Deal Phosphate	J. W. Morgan, Pine Knot
65629		Woodson Lewis and Son, Greensburg
66333		Woodson Lewis and Son, Greensburg
		Guaranteed
65630	N. W. Horseshoe Br. 16% Acid Phosphate	Dickey and Co., Glasgow
65631		J. W. Morgan, Pine Knot
65908		Woodson Lewis and Son, Gre nsburg
66177		Dickey and Co., Glasgow
66178		E. S. Ferrill and Sons, Buffalo
66334		Woodson Lewis and Son, Greensburg
		Guaranteed
64950	N. W. Horseshoe Br. Bone with Potash	Manufacturer
		Guaranteed
65909	†N. W. Horseshoe Br. Dark Tobacco Grower	L. B. Sievers and Son, Somerset
		Guaranteed
65635	†N. W. Horseshoe Br. Corn and Wheat Phosphate	E. S. Ferrill and Son, Buffalo
65910		L. B. Sievers and Son, Somerset
		Guaranteed
65911	N. W. Horseshoe Br. Challenge Corn Grower	F. H. Gordon, Richmond
		Guaranteed
65637	N. W. Horseshoe Br. Complete Fertilizer	J. R. Nelson, Eubank
		Guaranteed
65912	N. W. Horseshoe Br. H. Gr. Tobacco Grower	J. W. Morgan, Pine Knot
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
10.55	0.75	11.30						4.98		31.1	65906
10.40	1.60	12.00						5.00		31.2	66174
10.00	*2.00*	*12.00*						*5.00*		*30.8*	
8.60	1.20	9.80			1.55	1.79	2.17	5.35		40.2	66332
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*5.00*		*38.5*	
21.00	1.40	22.40								25.2	64947
20.00	*2.00*	*22.00*								*24.0*	
14.80	1.40	16.20								17.8	65628
14.90	1.50	16.40								17.9	65629
15.00	2.10	17.10								18.0	66333
14.00	*2.00*	*16.00*								*16.8*	
17.60	1.40	19.00								21.1	65630
16.80	1.50	18.30								20.2	65631
16.80	1.90	18.70								20.2	65908
17.90	2.40	20.30								21.5	66177
17.10	2.50	19.60								20.5	66178
17.40	2.60	20.00								20.9	66334
16.00	*2.00*	*18.00*								*19.2*	
10.60	0.80	11.40						2.09		22.5	64950
10.00	*2.00*	*12.00*						*2.00*		*21.8*	
8.75	1.40	10.15			0.60	0.85	1.03	0.95		21.6	65909
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*1.00*		*21.5*	
10.50	1.20	11.70			0.61	0.85	1.03	1.28		25.2	65635
11.00	0.90	11.90			0.62	0.93	1.13	1.37		26.6	65910
10.00	*4.00*	*14.00*				*0.82*	*1.00*	*1.00*		*24.5*	
9.30	1.60	10.90			1.18	1.52	1.85	1.96		29.6	65911
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*2.00*		*29.5*	
13.05	1.55	14.60			1.34	1.61	1.95	3.06		39.0	65637
12.00	*4.00*	*16.00*				*1.65*	*2.00*	*3.00*		*38.5*	
10.90	1.10	12.00			1.96	2.42	2.94	2.97		40.2	65912
10.00	*4.00*	*14.00*				*2.47*	*3.00*	*3.00*		*40.4*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained	
	The American Agricultural Chemical Co.		
64959	N. W. Horseshoe Br. 10–5 Potash Manure	Manufacturer	10
		Guaranteed	10
64960	N. W. Horseshoe Br. Tobacco Grower	Manufacturer	8
		Guaranteed	8
64961	N. W. Horseshoe Br. 20% Acid Phosphate	Manufacturer	21
		Guaranteed	20
65639	N. W. Horseshoe Br. Quick Acting Phosphate	J. W. Morgan, Pine Knot	10
66335		Woodson Lewis, Greensburg	11
		Guaranteed	10
64962	Packers Boar's Head Br. Soluble Phosphate	Manufacturer	11
		Guaranteed	10
64963	Packers Boar's Head Br. Gilt Edge Phosphate	Manufacturer	14
		Guaranteed	14
65640	Packers Boar's Head Br. 16% Acid Phosphate	I. E. and Orval Cooper, Poynter	17
65913		P. D. Maddox and Son, Livia	16
		Guaranteed	16
64965	Packers Boar's Head Br. Ky. Potash Mixture	Manufacturer	10
		Guaranteed	10
64966	Packers Boar's Head Br. Faultless Grain Grower	Manufacturer	8
		Guaranteed	8
65642	Packers Boar's Head Br. Sure Growth Potash Manure	I. E. and Orval Cooper, Poynter	9
		Guaranteed	8
64969	Packers Boar's Head Br. Corn and Wheat Phosphate	Manufacturer	11
		Guaranteed	10
64970	Packers Boar's Head Br. Corn and Wheat Grower	Manufacturer	9
		Guaranteed	8
64972	Packers Boar's Head Br. Tobacco and Truck Grower	Manufacturer	10
		Guaranteed	10
64974	Packers Boar's Head Brand Potash Phosphate Fertilizer	Manufacturer	10
		Guaranteed	10

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
10.60	0.80	11.40									
10.00	*2.00*	*12.00*						5.07		31.4	64959
8.50	1.50	10.00						*5.00*		*30.8*	
8.00	*4.00*	*12.00*			1.26	1.64	1.99	6.05		41.3	64960
						1.65	*2.00*	*5.00*		*38.5*	
21.00	1.40	22.40									
20.00	*2.00*	*22.00*								25.2	64961
										24.0	
10.80	1.10	11.90									
11.70	1.30	13.00								13.0	65639
10.00	*2.00*	*12.00*								14.0	66335
										12.0	
11.10	0.90	12.00									
10.00	*2.00*	*12.00*								13.3	64962
										12.0	
14.80	1.50	16.30									
14.00	*2.00*	*16.00*								17.8	64963
										16.8	
17.10	1.50	18.60								20.5	65640
16.90	2.40	19.30								20.3	65913
16.00	*2.00*	*18.00*								*19.2*	
10.60	0.80	11.40									
10.00	*2.00*	*12.00*						2.09		22.5	64965
								2.00		*21.8*	
8.90	0.90	9.80			0.58	0.85	1.03	1.03		21.9	64966
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*1.00*		*21.5*	
9.10	1.30	10.40			0.66	0.98	1.19	2.60		27.9	65642
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*3.00*		*27.5*	
11.10	0.90	12.00			0.53	0.82	1.00	1.05		25.1	64969
10.00	*4.00*	*14.00*				*0.82*	*1.00*	*1.00*		*24.5*	
9.00	1.40	10.40			1.27	1.75	2.12	2.10		30.9	64970
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*2.00*		*29.5*	
10.70	1.90	12.60			1.95	2.57	3.12	1.11		35.6	64972
10.00	*4.00*	*14.00*				*2.47*	*3.00*	*1.00*		*34.4*	
10.60	0.80	11.40						5.07		31.4	64974
10.00	*2.00*	*12.00*						*5.00*		*30.8*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	The American Agricultural Chemical Co.	
64975	Packers Boar's Head Br. H. Gr. Vegetable Fertilizer	Manufacturer Guaranteed
64645	Packers Boar's Head Br. 20% Acid Phosphate	I. E. and Orval Cooper, Poynter Guaranteed
	The Armour Fertilizer Works, Louisville, Cincinnati, Nashville.	
65034	Big Crop 2–14–2 Fertilizer	Manufacturer Guaranteed
65036	Big Crop 4–12–0 Fertilizer	Manufacturer Guaranteed
65037	Big Crop 0–14–4 Fertilizer	Manufacturer Guaranteed
65038	Big Crop 0–10–10 Fertilizer	Manufacturer Guaranteed
65914	Big Crop 1–12–1 Grain Grower	W. H. Brock, Winchester Guaranteed
65040	Armour's 1–8–4 Fertilizer	Manufacturer Guaranteed
66336	Big Crop Bone Meal and Acid Phosphate	Joe Snyder, Vine Grove Guaranteed
65646	Big Crop Burley Tobacco Grower	Brent and Co., Inc., Paris
65647		Smith and Jefferies, Horse Cave
65915		C. S. Brent Seed Co., Lexington
65879		C. S. Brent Seed Co., Lexington Guaranteed
65648	Big Crop Plant Bed Special	Carlisle Coal and Feed Co., Carlisle
65649		Jenkins-Essex Co., Elizabethtown
65916		Anderson and Spillman, Danville Guaranteed
65651	†Big Crop Dark Tobacco Grower	Cantrell and Penick, Greensburg
65917		W. A. Johnson, Brodhead Guaranteed
65045	Big Crop 4–8–3 Fertilizer	Manufacturer Guaranteed
65652	Big Crop 2–12–2 Fertilizer	Sam Hughes, Leitchfield
65653		Taylor County Supply Co., Campbellsville
65918		E. L. and A. T. Byron, Owingsville
65919		Green Clay, Richmond

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
8.50	1.50	10.00			1.26	1.64	1.99	6.05		41.3	64975
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*5.00*		*38.5*	
21.00	1.80	22.80								25.2	64645
20.00	*2.00*	*22.00*								*24.0*	
14.50	1.35	15.85			1.21	1.62	1.97	2.16		38.5	65034
14.00	*1.00*	*15.00*				*1.65*	*2.00*	*2.00*		*37.3*	
12.85	0.70	13.55			2.26	3.30	4.01			39.4	65036
12.00	*1.00*	*13.00*				*3.29*	*4.00*			*38.1*	
15.25	1.40	16.65						5.12		38.7	65037
14.00	*1.00*	*15.00*						*4.00*		*33.4*	
10.80	2.95	13.75						11.57		52.1	65038
10.00	*1.00*	*11.00*						*10.00*		*45.4*	
12.40	1.70	14.10			0.60	1.05	1.27	1.39		29.8	65914
12.00	*1.00*	*13.00*				*0.82*	*1.00*	*1.00*		*26.3*	
8.75	2.55	11.30			0.60	0.91	1.10	4.85		34.2	65040
8.00	*1.00*	*9.00*				*0.82*	*1.00*	*4.00*		*29.3*	
9.90	12.50	22.40			0.23	0.97	1.18			25.7	66336
10.00	*10.00*	*20.00*				*0.82*	*1.00*			*23.9*	
8.50	0.60	9.10			1.25	2.47	3.00	0.72	5.43	46.3	65646
8.00	0.80	8.80			1.30	2.48	3.01		6.15	45.7	65647
8.40	0.60	9.00			1.35	2.52	3.06	0.72	4.94	44.9	65915
8.55	0.75	9.30			1.54	2.59	3.14	0.72	5.35	46.9	65879
8.00	*1.00*	*9.00*				*2.47*	*3.00*		*6.00*	*45.2*	
11.80	1.00	12.80			1.59	2.43	2.95	0.64	1.84	40.1	65648
12.30	0.80	13.10			1.55	2.43	2.95	0.96	1.39	40.4	65649
13.20	0.70	13.90			1.62	2.53	3.07	1.20	0.53	40.5	65916
12.00	*1.00*	*13.00*				*2.47*	*3.00*		*2.00*	*39.2*	
8.35	0.60	8.95			0.83	1.48	1.80		3.96	33.5	65651
8.30	1.00	9.30			0.85	1.78	2.16		3.82	35.0	65917
8.00	*1.00*	*9.00*				*1.65*	*2.00*		*4.00*	*34.3*	
8.30	1.70	10.00			2.52	3.19	3.87	3.12		41.6	65045
8.00	*1.00*	*9.00*				*3.29*	*4.00*	*3.00*		*41.1*	
12.30	1.10	13.40			1.20	1.69	2.05	2.06		35.2	65652
12.10	0.80	12.90			1.07	1.73	2.10	2.07		35.1	65653
12.50	0.80	13.30			0.98	1.68	2.04	2.25		35.9	65918
12.00	0.90	12.90			0.93	1.58	1.92	1.97		33.8	65919

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	The Armour Fertilizer Works.	
66337	Big Crop 2–12–2 Fertilizer	Taylor County Supply Co., Campbellsville
		Guaranteed
65047	Big Crop 2–16–2 Fertilizer	Manufacturer
		Guaranteed
65048	Big Crop 2–10–4 Fertilizer	Manufacturer
		Guaranteed
66338	Big Crop 0–12–4 Fertilizer	Sturgis Grain and Hay Co., Sturgis
		Guaranteed
65654	Big Crop Bone Meal	D. M. Brakefield, Adairville
66179		Cantrell and Penick, Greensburg
66180		W. S. Overstreet, La Grange
66339		Duncan and Sherley, La Grange
		Guaranteed
66181	Big Crop Raw Bone	Moss and Gibson, Crestwood
66340		G. M. Hedrick, Monticello
		Guaranteed
65655	†Big Crop 16% Acid Phosphate	Cadiz Hardware Co., Cadiz
65656		G. M. Hedrick, Monticello
65920		J. B. Payne, Glasgow
66182		Cantrell and Penick, Greensburg
		Guaranteed
65657	Armour's Big Crop 20% Acid Phosphate	B. A. and H. R. Lawless, Sewellton
		Guaranteed
65054	Armour's 2–12–0 Fertilizer	Manufacturer
		Guaranteed
65055	Armour's 1–12–1 Fertilizer	Manufacturer
		Guaranteed
65056	Armour's 1–10–1 Fertilizer	Manufacturer
		Guaranteed
65658	†Armour's 2–8–2 Fertilizer	Cantrell and Penick, Greensburg
65921		W. H. Brock, Mt. Sterling
66186		Sam Terry, Big Clifty
		Guaranteed
65661	Armour's 1–8–1 Fertilizer	K. R. Grider, Liberty
65922		R. L. Jones, Epworth
66187		Sam Terry, Big Clifty
		Guaranteed
65059	Big Crop 2–12–6 Fertilizer	Manufacturer
		Guaranteed
65035	Big Crop 3–12–4 Fertilizer	*
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
12.70	1.30	14.00			1.04	1.41	1.71	2.04		34.2	66337
12.00	*1.00*	*13.00*				*1.65*	*2.00*	*2.00*		*34.3*	
15.65	1.70	17.35			1.53	1.81	2.20	2.23		41.7	65047
16.00	*1.00*	*17.00*				*1.65*	*2.00*	*2.00*		*40.3*	
10.35	1.75	12.10			1.10	1.62	1.97	4.05		38.1	65048
10.00	*1.00*	*11.00*				*1.65*	*2.00*	*4.00*		*37.3*	
11.80	2.10	13.90						4.36		31.6	66338
12.00	*1.00*	*13.00*						*4.00*		*30.4*	
		28.30	76	24	0.51	2.24	2.72			36.1	65654
		27.90	66	34	0.49	2.69	3.27			38.5	66179
		27.70	76	24	0.50	2.79	3.39			38.9	66180
		27.50	80	20	0.32	2.44	2.96			36.6	66339
		27.00				*2.47*	*3.00*			*36.4*	
		23.70	66	34	0.72	3.84	4.66			42.0	66181
		23.90	59	41	0.65	3.64	4.42			41.0	66340
		22.00				*3.71*	*4.50*			*39.9*	
16.80	2.00	18.80								20.2	65655
17.10	1.70	18.80								20.5	65656
17.20	1.30	18.50								20.6	65920
16.20	1.30	17.50								19.4	66182
16.00	*1.00*	*17.00*								*19.2*	
20.70	1.50	22.20								24.8	65657
20.00	*1.00*	*21.00*								*24.0*	
12.15	1.90	14.05			1.19	1.70	2.06			29.2	65054
12.00	*1.00*	*13.00*				*1.65*	*2.00*			*28.3*	
13.00	2.10	15.10			0.63	0.84	1.02	1.33		29.4	65055
12.00	*1.00*	*13.00*				*0.82*	*1.00*	*1.00*		*26.3*	
12.45	1.85	14.30			0.75	1.10	1.34	1.36		30.1	65056
10.00	*1.00*	*11.00*				*0.82*	*1.00*	*1.00*		*23.3*	
8.20	1.00	9.20			1.02	1.64	1.99	2.08		28.8	65658
9.00	0.90	9.90			1.12	1.68	2.04	2.07		30.2	65921
8.50	1.10	9.60			1.05	1.63	1.98	1.88		28.6	66186
8.00	*1.00*	*9.00*				*1.65*	*2.00*	*2.00*		*28.3*	
9.10	1.10	10.20			0.63	1.01	1.23	1.48		24.6	65661
10.00	0.70	10.70			0.54	0.98	1.19	1.01		24.2	65922
8.30	1.20	9.50			0.47	0.81	0.98	1.75		23.0	66187
8.00	*1.00*	*9.00*				*0.82*	*1.00*	*1.00*		*20.3*	
12.35	1.85	14.20			1.12	1.71	2.08	5.99		47.5	65059
12.00	*1.00*	*13.00*				*1.65*	*2.00*	*6.00*		*46.3*	
12.00	*1.00*	*13.00*				*2.47*	*3.00*	*4.00*		*45.2*	65035

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained	
	The Armour Fertilizer Works.		
65119	Big Crop 2–10–2 Fertilizer	Manufacturer	9
		Guaranteed	10
65659	Big Crop Superior Tobacco Grower	Grayson Bros., Dunmor	10
		Guaranteed	9
65121	Tobacco Guano	Manufacturer	8
		Guaranteed	
65923	Nitrate of Soda	Mullikin and Craig, Bedford	
65924		Knox County Supply Co., Barbourville	
		Guaranteed	17
65926	†Ideal Superphosphate	The T. J. Turley Co., Owensboro	16
		Guaranteed	8
65401	Big Crop 4–8–3 Plant Bed Grower	Manufacturer	8
		Guaranteed	8
65526	Big Crop 3–8–6 Fertilizer	Manufacturer	8
		Guaranteed	11
65547	Armour's Bonus "A" Humus	Manufacturer	12
		Guaranteed	8
65548	Armour's Big Crop Burley Special	Manufacturer	8
		Guaranteed	
65660	Armour's Big Crop Dark Tobacco Maker	Lindsey, Orr and Co., Elkton	8
		Guaranteed	8
65550	Armour's Big Crop Tobacco Special	Manufacturer	11
		Guaranteed	10
65551	Armour's Tobacco Grower	Manufacturer	8
		Guaranteed	8
65882	Armour's Special Tobacco Grower	Manufacturer	9
		Guaranteed	8
65883	Armour's Beef, Blood and Bone	Manufacturer	12
		Guaranteed	12
66114	Big Crop 2–14–2 Fertilizer	Manufacturer	14
		Guaranteed	14
66188	Big Crop 2–29 Bone Meal	Green Clay, Richmond	
66189		Moss and Gibson, Crestwood	
		Guaranteed	
	The C. S. Brent Seed Co., Inc., Lexington, Ky.		
65595	Brent's Grain Grower	Manufacturer	8
		Guaranteed	8
65596	Brent's Tobacco Special	Manufacturer	8
		Guaranteed	8

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
9.80	2.35	12.15			1.09	1.62	1.97	2.06		31.5	65119
10.00	*1.00*	*11.00*				*1.65*	*2.00*	*2.00*		*31.3*	
10.60	2.80	13.40							4.42	30.3	65659
10.00	*1.00*	*11.00*							*5.00*	*30.4*	
9.25	2.60	11.85			0.42	1.78	2.16	1.30		29.5	65121
8.00	*1.00*	*9.00*				*1.65*	*2.00*		*1.00*	*25.3*	
						15.70	19.06			94.2	65923
						15.52	18.85			93.1	65924
						14.81	*17.98*			*88.9*	
17.10	1.30	18.40								20.5	65926
16.00	*1.00*	*17.00*								*19.2*	
8.30	2.80	11.10			2.43	3.36	4.08		3.10	43.0	65401
8.00	*1.00*	*9.00*				*3.29*	*4.00*		*3.00*	*41.1*	
8.55	1.70	10.25			2.02	2.60	3.16	6.93		49.9	65526
8.00	*1.00*	*9.00*				*2.47*	*3.00*	*6.00*		*45.2*	
11.80	4.40	16.20			0.64	1.01	1.23			25.5	65547
12.00	*1.00*	*13.00*				*0.82*	*1.00*			*23.3*	
8.55	1.70	10.25			2.02	2.60	3.16	6.93		49.9	65548
8.00	*1.00*	*9.00*				*2.47*	*3.00*	*6.00*		*45.2*	
8.80	2.50	11.30			0.92	1.47	1.78	0.80	3.47	35.8	65660
8.00	*1.00*	*9.00*				*1.65*	*2.00*	*4.00*		*34.3*	
11.15	2.30	13.45						5.41		33.9	65550
10.00	*1.00*	*11.00*						*5.00*		*30.4*	
8.30	2.70	11.10			1.13	1.65	2.00	1.20		27.0	65551
8.00	*1.00*	*9.00*				*1.65*	*2.00*	*1.00*		*25.3*	
9.05	2.85	11.90			0.68	1.03	1.25		1.15	24.4	65882
8.00	*1.00*	*9.00*				*0.82*	*1.00*		*1.00*	*20.3*	
12.40	0.70	13.10				1.64	1.99	2.05		34.9	65883
12.00	*1.00*	*13.00*				*1.65*	*2.00*	*2.00*		*34.3*	
14.50	1.35	15.85			1.21	1.62	1.97	2.16		38.5	66114
14.00	*1.00*	*15.00*				*1.65*	*2.00*	*2.00*		*37.3*	
		31.10	58	42	0.35	1.76	2.14			35.4	66188
		29.40	70	30	0.37	2.00	2.43			35.5	66189
		29.00				*1.65*	*2.00*			*33.1*	
8.65	1.00	9.65			0.68	0.90	1.09	1.06		22.0	65595
8.00						*0.82*	*1.00*		*1.00*	*19.9*	
8.50	0.80	9.30			1.00	1.77	2.15		2.89	32.4	65596
8.00						*1.65*	*2.00*		*3.00*	*30.9*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Buhner Fertilizer Co., Seymour, Ind.	
65663	Buhner's 1½–8–4	Harvey Stout and Sons, Buechel
		Guaranteed
66191	Buhner's Raw Bone	Harvey Stout and Sons, Fern Creek
		Guaranteed
65533	Buhner's 1½–10–3	Manufacturer
		Guaranteed
65585	Buhner's 2–12	Manufacturer
		Guaranteed
	Calumet Fertilizer Co., New Albany, Ind.	
65406	Calumet Brand "Half Thirteen One"	Manufacturer
		Guaranteed
65664	†Calumet Brand "Crop Grower"	J. L. Riney, Rineyville
		Guaranteed
65665	Calumet Brand "Onion and Tobacco Grower"	E. F. Pearson, Franklin
		Guaranteed
65666	Calumet Brand "Potato and Tobacco Special"	E. F. Pearson, Franklin
		Guaranteed
65411	Calumet Brand "Two Twelve Two"	Manufacturer
		Guaranteed
65412	Calumet Brand "Two Twelve Six"	Manufacturer
		Guaranteed
65413	Calumet Brand "Otto Voyles Two in One"	Manufacturer
		Guaranteed
65414	Calumet Brand "High Grade Tobacco and Truck Grower"	Manufacturer
		Guaranteed
65415	Calumet Brand "Extra Ammoniated Bone Phosphate	Manufacturer
		Guaranteed
65416	Calumet Brand "Fourteen Four"	Manufacturer
		Guaranteed
65417	Calumet Brand "Ten Five"	Manufacturer
		Guaranteed
65418	Calumet Brand "Ten Ten Hummer"	Manufacturer
		Guaranteed
65419	Calumet Brand "Twelve Twelve"	Manufacturer
		Guaranteed
65420	Calumet Brand "Eight Twenty-four"	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
8.30	1.00	9.30			0.91	1.18	1.43	4.67		33.9	65663
8.00						*1.23*	*1.50*	*4.00*		*31.4*	
		22.20	60	40	0.66	4.41	5.35			44.2	66191
		20.00				*3.71*	*4.50*			*38.3*	
10.80	1.15	11.95			0.87	1.18	1.43	2.75		32.0	65533
10.00						*1.23*	*1.50*	*3.00*		*31.4*	
11.85	1.50	13.35			1.51	1.93	2.34			30.0	65585
12.00						*1.65*	*2.00*			*27.9*	
14.80	1.20	16.00			0.14	0.46	0.56	1.59		30.2	65406
13.00	*2.50*	*15.50*				*0.41*	*0.50*	*1.00*		*26.0*	
9.20	1.00	10.20				0.35	0.69	0.84	1.23	22.0	65664
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*1.00*		*21.5*	
9.00	1.20	10.20			0.33	0.81	0.98	3.16		28.3	65665
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*3.00*		*27.5*	
9.30	1.10	10.40			0.66	1.66	2.02	5.24		40.1	65666
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*5.00*		*38.5*	
13.15	1.75	14.90			0.74	1.61	1.95	2.07		36.3	65411
12.00	*4.00*	*16.00*				*1.65*	*2.00*	*2.00*		*35.5*	
14.20	1.40	15.60			0.40	1.45	1.76	7.74		53.8	65412
12.00	*4.00*	*16.00*				*1.65*	*2.00*	*6.00*		*47.5*	
17.55	2.35	19.90			0.90	1.83	2.22	2.28		45.1	65413
16.00	*4.00*	*20.00*				*1.65*	*2.00*	*2.00*		*41.5*	
11.40	1.50	12.90			0.64	2.23	2.71	4.83		45.6	65414
10.00	*4.00*	*14.00*				*2.47*	*3.00*	*4.00*		*43.4*	
14.10	1.20	15.30			0.43	1.48	1.80			30.5	65415
12.00	*4.00*	*16.00*				*1.65*	*2.00*			*29.5*	
14.90	1.20	16.10						4.04		35.0	65416
14.00	*4.00*	*18.00*						*4.00*		*34.6*	
10.70	1.00	11.70						5.32		32.4	65417
10.00	*4.00*	*14.00*						*5.00*		*31.6*	
11.00	1.30	12.30						10.44		48.3	65418
10.00	*4.00*	*14.00*						*10.00*		*46.6*	
13.00	1.40	14.40						12.74		58.3	65419
12.00	*4.00*	*16.00*						*12.00*		*55.6*	
8.80	0.90	9.70						26.54		93.2	65420
8.00	*4.00*	*12.00*						*24.00*		*85.6*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained	
	Calumet Fertilizer Co.		
65421	Calumet Brand "Bone and Acid Phosphate"	Manufacturer	16
		Guaranteed	12
66344	Calumet Brand "Special Pure Bone Meal"	Vine Grove Feed Co., Vine Grove	
		Guaranteed	
66345	Calumet Brand "Half and Half"	Vine Grove Feed Co., Vine Grove	8
		Guaranteed	6
65424	Calumet Brand "Raw Bone Meal"	Manufacturer	
		Guaranteed	
65667	Calumet Brand "Acid Phosphate 16%"	Vine Grove Feed Co., Vine Grove	17
65928		Lexington Seed Co., Lexington	16
65929		C. M. Biggs, Sebree	15
66346		Vine Grove Feed Co., Vine Grove	17
66347		Patrick Dillon, Hardinsburg	17
		Guaranteed	16
65426	Calumet Brand "Acid Phosphate 18%"	Manufacturer	20
		Guaranteed	18
65427	Calumet Brand "Kentucky Tobacco Grower"	Manufacturer	10
		Guaranteed	8
65524	Calumet Brand "Nitrate of Soda"	*	
		Guaranteed	
65542	Calumet Brand "Potato and Tobacco Grower"	*	
		Guaranteed	10
65543	Calumet Brand "Northern Special"	*	
		Guaranteed	8
66132	Calumet Brand "Fifteen Seven and One-Half"	Manufacturer	16
		Guaranteed	15
66133	Calumet Brand "20% Acid Phosphate"	Manufacturer	22
		Guaranteed	20
	Consolidated Chemical Co., Louisville, Ky.		
65483	Camel Brand Vegetable, Potato and Tobacco Special	Manufacturer	12
		Guaranteed	11
65488	Camel Brand Extra H. Gr. Tobacco Fertilizer	Manufacturer	10
		Guaranteed	10
65489	Camel Brand High Grade Special	Manufacturer	10
		Guaranteed	10

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
16.80	4.60	21.40				0.72	0.87			31.4	65421
12.00	*8.00*	*20.00*				*0.62*	*0.75*			*24.9*	
		34.30	72	28		0.67	0.81			31.5	66344
		30.00				*0.82*	*1.00*			*28.9*	
8.90	4.50	13.40			0.97	2.09	2.54	1.28		31.5	66345
6.00	*6.00*	*12.00*				*2.06*	*2.50*	*1.00*		*26.8*	
		21.60	77	23	0.43	4.07	4.94			41.7	65424
		20.00				*3.71*	*4.50*			*38.3*	
17.30	1.30	18.60								20.8	65667
16.90	2.00	18.90								20.3	65928
15.80	1.10	16.90								19.0	65929
17.00	1.50	18.50								20.4	66346
17.10	1.40	18.50								20.5	66347
16.00	*2.00*	*18.00*								*19.2*	
20.10	1.60	21.70								24.1	65426
18.00	*2.00*	*20.00*								*21.6*	
10 10	0.90	11.00			0.44	1.39	1.69	8.05		47.9	65427
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*8.00*		*47.5*	
											65524
						15.65	*19.03*			*93.9*	
											65542
10.00	*4.00*	*14.00*				*2.47*	*3.00*			*31.4*	
											65543
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*8.00*		*42.5*	
16.70	1.30	18.00						8.71		51.9	66132
15.00	*4.00*	*19.00*						*7.50*		*46.6*	
22.20	1.60	23.80								26.6	66133
20.00	*2.00*	*22.00*								*24.0*	
12.10	0.80	12.90			0.71	0.93	1.13	3.37		34.2	65483
11.00	*4.00*	*15.00*				*0.82*	*1.00*	*3.00*		*32.0*	
10.70	1.40	12.10			1.40	1.77	2.15	4.52		40.8	65488
10.00	*4.00*	*14.00*				*1.65*	*2.00*	*4.00*		*38.5*	
10.60	1.40	12.00			1.33	1.72	2.09	2.15		33.2	65489
10.00	*4.00*	*14.00*				*1.65*	*2.00*	*2.00*		*32.5*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Consolidated Chemical Co.	
65490	Camel Brand Old Time Grain Fertilizer	Manufacturer Guaranteed
65491	Camel Brand Old Time Tobacco Fertilizer	Manufacturer Guaranteed
65493	Camel Brand Truck and Tobacco Fertilizer	Manufacturer Guaranteed
65494	Camel Brand High Grade Tobacco Bed Special	Manufacturer Guaranteed
65495	Camel Brand Potato and Tobacco Fertilizer	Manufacturer Guaranteed
65497	Camel Brand Corn, Wheat and Oats Grower	Manufacturer Guaranteed
65499	Camel Brand Phosphate and Potash Fertilizer	Manufacturer Guaranteed
65500	Camel Brand Extra High Grade Phosphate	Manufacturer Guaranteed
65669	Camel Brand High Grade Phosphate	Farmers Supply Co., Hodgenville
65934		C. L. Dowdy and Brothers, Mayfield
66196		Farmers Supply Co., Hodgenville Guaranteed
65935	Camel Brand Acid Phosphate	C. L. Dowdy and Bros., Mayfield Guaranteed
	Duncan and Sherley, La Grange, Ky.	
65530	Tiger Brand Special Tobacco Grower	Manufacturer Guaranteed
65939	Tiger Brand A-1 Tobacco Grower	Manufacturer's Warehouse Guaranteed
65940	Tiger Brand Phosphate and Tankage	Manufacturer's Warehouse
66202		Manufacturer's Warehouse Guaranteed
65941	Tiger Brand Corn and Wheat Grower	Manufacturer's Warehouse
66203		Manufacturer's Warehouse Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
8.50	1.40	9.90			1.28	1.65	2.00	2.08		29.5	65490
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*2.00*		*29.5*	
8.50	1.40	9.90			1.28	1.65	2.00	2.08		29.5	65491
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*2.00*		*29.5*	
8.65	1.80	10.45			1.95	2.54	3.08	3.23		38.6	65493
8.00	*4.00*	*12.00*				*2.47*	*3.00*	*3.00*		*37.4*	
10.65	1.90	12.55			2.69	3.28	3.98			36.4	65494
10.00	*4.00*	*14.00*				*3.29*	*4.00*			*36.3*	
10.65	1.90	12.55			2.69	3.28	3.98			36.4	65495
10.00	*4.00*	*14.00*				*3.29*	*4.00*			*36.3*	
15.75	1.30	17.05			0.41	0.65	0.79			28.1	65497
14.00	*4.00*	*18.00*				*0.41*	*0.50*			*25.1*	
11.20	0.55	11.75						2.34		24.0	65499
10.00	*2.00*	*12.00*						*2.00*		*21.8*	
20.95	0.75	21.70								25.1	65500
18.00	*2.00*	*20.00*								*21.6*	
16.25	1.05	17.30								19.5	65669
17.90	1.50	19.40								21.5	65934
17.00	1.20	18.20								20.4	66196
16.00	*2.00*	*18.00*								*19.2*	
14.40	2.70	17.10								17.3	65935
14.00	*2.00*	*16.00*								*16.8*	
9.50	0.80	10.30			2.03	2.03	2.46	6.59		46.5	65530
10.00	*2.00*	*12.00*				*1.65*	*2.00*		*4.00*	*37.7*	
8.40	1.70	10.10			1.64	2.48	3.01	5.18		43.7	65939
8.00	*2.00*	*10.00*				*2.47*	*3.00*		*5.00*	*42.6*	
13.90	1.60	15.50			0.10	0.76	0.92			26.1	65940
12.00	0.60	12.60			0.39	0.85	1.03			23.3	66202
12.00	*2.00*	*14.00*				*0.82*	*1.00*			*23.7*	
12.30	5.00	17.30				0.48	0.58			23.3	65941
11.40	5.00	16.40				0.49	0.59			22.0	66203
10.00	*2.00*	*12.00*				*0.41*	*0.50*			*18.3*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Duncan and Sherley.	
65942	Tiger Brand Phosphate	Manufacturer's Warehouse
66204		Manufacturer's Warehouse
		Guaranteed
66322	Tiger Brand Raw Bone Meal	Manufacturer
		Guaranteed
65938	Tiger Brand Potato and Tobacco Grower	Manufacturer's Warehouse
		Guaranteed
	The Empire Guano Co., Nashville, Tenn.	
65670	Climax Tobacco Grower	L. E. Darnell and Co., Russell Springs
65671		Dulworth and Durham, Greensburg
		Guaranteed
64861	Kentucky Wheat and Corn Grower	Manufacturer
		Guaranteed
65672	Kentucky Premium Guano	L. E. Darnell and Co., Russell Springs
65944		Staggs Bros. Co., Vanceburg
		Guaranteed
65945	High Grade Tobacco Grower	J. H. Wyan, London
		Guaranteed
64865	Red Banner Special	Manufacturer
		Guaranteed
64866	Wheat and Corn Grower	Manufacturer
		Guaranteed
64867	Bone and Potash	Manufacturer
		Guaranteed
64868	High Grade Potash Phosphate	Manufacturer
		Guaranteed
65673	High Grade Acid Phosphate	Dulworth and Durham, Greensburg
66348		Dulworth and Durham, Greensburg
		Guaranteed
65674	Climax Acid Phosphate	L. E. Darnell and Co., Russell Springs
65675		L. A. Pennycuff, Rocky Hill
65946		Dulworth and Durham, Greensburg
66205		J. H. Wyan, London
66349		Dulworth and Durham, Greensburg
		Guaranteed
64871	Raw Bone Mixture	Manufacturer
		Guaranteed
65676	Pure Raw Bone Meal	L. A. Pennycuff, Rocky Hill
		Guaranteed
64873	Burley Tobacco Grower	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
17.50	2.70	20.20								21.0	65942
17.50	3.00	20.50								21.0	66204
16.00	*2.00*	*18.00*								*19.2*	
		22.55	46	54	0.21	4.06	4.93			42.4	66322
		22.00				3.71	4.50			39.9	
10.60	4.90	15.50			1.65	3.05	3.70			36.2	65938
10.00	*2.00*	*12.00*				*3.29*	*4.00*			*35.5*	
8.65	6.10	14.75			0.28	0.91	1.10	0.56	0.75	24.8	65670
8.70	5.10	13.80			0.22	0.92	1.12	1.04	0.80	26.1	65671
8.00	*5.00*	*13.00*				*0.82*	*1.00*		*1.00*	*21.9*	
10.80	5.30	16.10			0.56	1.19	1.44	0.98		28.4	64861
8.00	*5.00*	*13.00*				*0.82*	*1.00*	*1.00*		*21.9*	
8.20	7.50	15.70			0.40	0.48	0.58	2.88	0.73	29.0	65672
8.50	6.80	15.30				0.61	0.74	1.52	2.59	31.5	65944
8.00	*5.00*	*13.00*				*0.41*	*0.50*	*4.00*		*28.5*	
8.40	5.20	13.60			0.66	1.64	1.99	4.65		38.5	65945
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*4.00*	*35.5*	
12.30	2.30	14.60			1.79	2.23	2.71	1.12	1.58	40.9	64865
10.00	*4.00*	*14.00*				*1.65*	*2.00*	*2.00*		*32.5*	
13.40	2.40	15.80			0.45	0.92	1.12	1.38		30.7	64866
11.00	*4.00*	*15.00*				*0.41*	*0.50*	*1.00*		*23.6*	
13.00	10.00	23.00						0.62	1.90	31.1	64867
10.00	*8.00*	*18.00*						*2.00*		*24.2*	
12.40	8.40	20.80						1.90	2.52	35.2	64868
10.00	*8.00*	*18.00*						*4.00*		*30.2*	
17.30	3.05	20.35								20.8	65673
15.60	6.70	22.30								18.7	66348
14.00	*4.00*	*18.00*								*16.8*	
17.50	3.05	20.55								21.0	65674
17.55	3.50	21.05								21.1	65675
16.90	2.80	19.70								20.3	65946
17.20	3.00	20.20								20.6	66205
19.00	3.90	22.90								22.8	66349
16.00	*2.00*	*18 00*								*19.2*	
10.40	10.70	21.10			0.17	2.09	2.54			32.4	64871
10.00	*10.00*	*20.00*				*1.85*	*2.25*			*30.1*	
		21.70	43	57		3.86	4.69			40.5	65676
		20.00				*3.71*	*4.50*			*38.3*	
9.40	1.90	11.30			2.55	2.97	3.61		6.34	51.7	64873
8.00	*3.00*	*11.00*				*2.47*	*3.00*		*5.00*	*43.0*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	The Empire Guano Co.	
64874	Standard Grain Grower	Manufacturer
		Guaranteed
64875	Bright Leaf Tobacco Special	Manufacturer
		Guaranteed
	The Evansville Packing Co., Evansville, Ind.	
65947	High Grade Phosphate	Geo. Higgerson, Morganfield
		Guaranteed
65948	Grain Booster	Atherton-Kidd and Co., Livermore
		Guaranteed
65103	Corn and Wheat Grower	Manufacturer
		Guaranteed
65105	Golden Harvest	Manufacturer
		Guaranteed
65106	Wonder Growth	Manufacturer
		Guaranteed
65677	†Three "B"	R. T. Kirkman, Elkton
		Guaranteed
65950	Half and Half Mixture	Atherton-Kidd and Co., Livermore
		Guaranteed
65678	Potato and Tobacco Grower	Finley Hardware Co., Madisonville
		Guaranteed
65116	Pure Raw Bone Meal	Manufacturer
		Guaranteed
	Federal Chemical Co., Inc., Louisville, Ky.	
65680	Standard Grain Grower	H. C. Damron and Son, Russell Springs
		Guaranteed
65137	Tobacco, Truck and Tomato Fertilizer	Manufacturer
		Guaranteed
65138	Potato Maker and Tobacco Fertilizer	Manufacturer
		Guaranteed
65953	Standard Corn and Wheat Grower	Beck Creek Farmers Club, Parker
65954		Barnett Bros., London
		Guaranteed
65140	Premium High Grade Fertilizer	Manufacturer
		Guaranteed
65143	Loam Land Fertilizer	Manufacturer
		Guaranteed
65144	Mid-West High Grade Mixture	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
14.70	3.30	18.00			0.13	0.67	0.81			27.4	64874
12.00	*5.00*	*17.00*				*0.41*	*0.50*			*22.5*	
12.20	2.10	14.30			1.58	2.13	2.59	0.64	0.93	36.6	64875
9.00	*4.00*	*13.00*				*1.65*	*2.00*		*1.00*	*28.0*	
16.90	1.40	18.30								20.3	65947
16.00										*19.2*	
9.00	0.70	9.70			0.92	1.16	1.41	1.16		24.2	65948
8.00						*0.82*	*1.00*		*1.00*	*19.9*	
10.50	0.70	11.20			0.88	0.91	1.10			21.5	65103
10.00						*0.82*	*1.00*			*19.9*	
7.70	0.50	8.20			0.78	0.79	0.96		3.32	26.5	65105
8.00						*0.82*	*1.00*		*3.00*	*25.9*	
9.95	0.50	10.45			1.61	1.64	1.99			25.0	65106
10.00						*1.65*	*2.00*			*24.9*	
7.40	0.70	8.10			1.69	1.93	2.34	1.80		28.4	65677
8.00						*1.65*	*2.00*		*2.00*	*27.9*	
10.80	0.70	11.50			2.28	2.66	3.23	1.03		35.5	65950
10.00						*2.47*	*3.00*		*1.00*	*32.8*	
10.35	1.05	11.40			1.40	1.40	1.70		4.59	38.1	65678
8.00						*1.65*	*2.00*		*5.00*	*36.9*	
		24.65	45	55	0.14	3.68	4.47			41.8	65116
		23.00				*3.71*	*4.50*			*40.7*	
10.05	2.70	12.75			0.53	0.87	1.06	1.07		24.6	65680
10.00	*4.00*	*14.00*				*0.82*	*1.00*		*1.00*	*24.5*	
11.90	6.10	18.00			2.65	2.80	3.40		1.73	42.3	65137
9.00	*4.00*	*13.00*				*1.65*	*2.00*		*1.00*	*28.0*	
11.90	6.10	18.00			2.80	2.80	3.40		1.73	42.3	65138
9.00	*4.00*	*13.00*				*1.65*	*2.00*		*1.00*	*28.0*	
8.10	3.40	11.50			1.10	1.56	1.89	2.40		30.1	65953
8.00	4.20	12.20			1.25	1.67	2.03	1.90		29.4	65954
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*2.00*	*29.5*	
14.10	5.35	19.45			2.07	2.07	2.51		2.79	44.1	65140
10.00	*4.00*	*14.00*				*1.65*	*2.00*		*2.00*	*32.5*	
14.45	1.80	16.25			2.53	2.53	3.07		2.87	46.2	65143
12.00	*4.00*	*16.00*				*1.65*	*2.00*		*2.00*	*35.5*	
13.15	2.80	16.35			2.43	2.43	2.95		5.25	51.8	65144
10.00	*4.00*	*14.00*				*1.65*	*2.00*		*4.00*	*38.5*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained	
	Federal Chemical Co.		
65148	A-1 Fertilizer	Manufacturer	15
		Guaranteed	*12*
65961	A-1 Corn and Wheat Fertilizer	T. G. Moren, London	14
66208		T. M. Zachery, Liberty	15
		Guaranteed	*14*
65150	A-1 Formula	Manufacturer	13
		Guaranteed	*10*
65152	A-1 Soluble Vegetable Manure	Manufacturer	15
		Guaranteed	*12*
65155	Liberty Grain Grower	Manufacturer	12
		Guaranteed	*10*
65156	Standard Meal Mixture	Manufacturer	13
		Guaranteed	*10*
65157	Liberty Potato Grower	Manufacturer	11
		Guaranteed	*10*
65158	Double Phosphate and Potash Formula	Manufacturer	11
		Guaranteed	*8*
65159	Potash Special	Manufacturer	13
		Guaranteed	*10*
65689	†Potash Mixture	Albert Long, Scottsville	10
65964		Smith and Smith, Shepherdsville	10
		Guaranteed	*10*
65161	Potash Compound	Manufacturer	15
		Guaranteed	*12*
65162	Black Land Special	Manufacturer	15
		Guaranteed	*12*
65965	20% Phosphate	J. B. Polk, Taylorsville	21
66209		L. R. Hart, Big Clifty	21
		Guaranteed	*20*
65164	Extra Grade Phosphate	Manufacturer	18
		Guaranteed	*18*
65166	Daybreak A-1 Champion	Manufacturer	15
		Guaranteed	*11*
65168	Daybreak Cracker-Jack	Manufacturer	15
		Guaranteed	*13*
65169	Daybreak Special	Manufacturer	13
		Guaranteed	*11*
65170	Royal Wheat and Grain Special	Manufacturer	15
		Guaranteed	*12*
65171	Daybreak Special Manure	Manufacturer	13
		Guaranteed	*10*

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
15.20	4.80	20.00			1.47	1.47	1.78			33.5	65148
12.00	*4.00*	*16.00*				*0.82*	*1.00*			*24.5*	
14.60	2.80	17.40			0.44	1.00	1.21			29.0	65961
15.00	1.30	16.30			0.43	0.81	0.98			27.9	66208
14.00	*4.00*	*18.00*				*0.82*	*1.00*			*27.5*	
13.20	6.10	19.30			2.77	2.77	3.36			38.9	65150
10.00	*4.00*	*14.00*				*1.65*	*2.00*			*26.5*	
15.50	3.20	18.70			2.51	2.72	3.30			40.9	65152
12.00	*4.00*	*16.00*				*1.65*	*2.00*			*29.5*	
12.70	8.20	20.90			1.00	1.00	1.21			28.3	65155
10.00	*10.00*	*20.00*				*0.41*	*0.50*			*21.5*	
13.40	8.00	21.40			1.15	1.15	1.40			30.2	65156
10.00	*10.00*	*20.00*				*0.82*	*1.00*			*23.9*	
11.30	9.60	20.90			1.97	1.97	2.39			32.6	65157
10.00	*10.00*	*20.00*				*1.65*	*2.00*			*28.9*	
11.10	9.20	20.30							5.49	36.8	65158
8.00	*8.00*	*16.00*							*4.00*	*27.2*	
13.00	7.40	20.40							2.95	31.3	65159
10.00	*2.00*	*12.00*							*2.00*	*21.8*	
10.20	3.00	13.20						3.82		28.0	65689
10.50	0.80	11.30						4.89		30.7	65964
10.00	*2.00*	*12.00*							*4.00*	*27.8*	
15.40	4.10	19.50						0.56	2.56	34.1	65161
12.00	*2.00*	*14.00*							*2.00*	*24.8*	
15.60	2.70	18.30							5.45	40.8	65162
12.00	*2.00*	*14.00*							*4.00*	*30.8*	
21.40	0.60	22.00								25.7	65965
21.80	1.00	22.80								26.2	66209
20.00	*2.00*	*22.00*								*24.0*	
18.80	0.70	19.50								22.6	65164
18.00	*2.00*	*20.00*								*21.6*	
15.05	5.55	20.60			0.88	0.88	1.07		1.16	33.6	65166
11.50	*4.00*	*15.50*				*0.41*	*0.50*		*0.50*	*22.8*	
15.65	4.65	20.30			0.72	0.72	0.87		1.29	33.5	65168
13.00	*4.00*	*17.00*				*0.41*	*0.50*		*1.00*	*26.6*	
13.95	4.90	18.85			0.74	0.74	0.90		6.03	45.4	65169
11.00	*4.00*	*15.00*				*0.41*	*0.50*		*5.00*	*35.6*	
15.55	4.50	20.05			1.22	1.22	1.48		1.70	37.6	65170
12.00	*4.00*	*16.00*				*0.82*	*1.00*		*1.00*	*27.5*	
13.25	7.40	20.65			1.16	1.16	1.41		2.61	37.6	65171
10.00	*4.00*	*14.00*				*0.82*	*1.00*		*2.00*	*27.5*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Federal Chemical Co.	
65173	Daybreak Favorite	Manufacturer
		Guaranteed
65174	Standard Crop and Tobacco Grower	Manufacturer
		Guaranteed
65176	Daybreak Vegetable Grower	Manufacturer
		Guaranteed
65178	Red Rooster Mixture	Manufacturer
		Guaranteed
65179	Daybreak Nitro-Phosphate	Manufacturer
		Guaranteed
65180	Daybreak Harvest Home	Manufacturer
		Guaranteed
65181	Royal Meal Mixture	Manufacturer
		Guaranteed
65182	Daybreak Double-Duty Corn and Wheat Grower	Manufacturer
		Guaranteed
65183	Daybreak Half and Half Meal Mixture	Manufacturer
		Guaranteed
65184	Daybreak Champion Potash Fertilizer	Manufacturer
		Guaranteed
65185	Daybreak Potash Special	Manufacturer
		Guaranteed
65969	Daybreak Potash Mixture	J. E. Bowie, Ghent
		Guaranteed
65187	Daybreak Phosphate and Potash	Manufacturer
		Guaranteed
65876	Daybreak High Grade Phosphate	W. W. Beeler, Ellisburg
65970		Beck Creek Farmers Club, Parker
65971		Hafendorfer Thornton Co., Owensboro
65972		T. J. Whittinghill, Fordsville
66212		St. Matthews Produce Exchange, St. Matthews
66213		R. A. Dale, Lecta
66214		Grayson County Supply Co., Leitchfield
66352		J. P. Strother, Milton
		Guaranteed
65973	Daybreak Royal Phosphate	J. E. Bowie, Ghent
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
14.55	4.60	19.15			1.23	1.23	1.49		3.70	42.2	65173
11.00	*4.00*	*15.00*				*0.82*	*1.00*		*3.00*	*32.0*	
11.35	8.85	20.20			1.31	1.31	1.59		4.66	42.4	65174
8.00	*4.00*	*12.00*				*0.82*	*1.00*		*4.00*	*30.5*	
11.40	6.75	18.15			2.16	2.16	2.62		5.70	49.9	65176
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*5.00*	*38.5*	
15.90	5.60	21.50			0.82	0.82	1.00			31.0	65178
12.00	*4.00*	*16.00*				*0.41*	*0.50*			*22.1*	
18.20	1.30	19.50			0.74	0.74	0.90			32.3	65179
15.00	*4.00*	*19.00*				*0.41*	*0.50*			*26.6*	
12.75	5.75	18.50			2.53	2.84	3.45			38.5	65180
10.00	*5.00*	*15.00*				*2.47*	*3.00*			*31.8*	
13.40	8.00	21.40			1.15	1.15	1.40			30.2	65181
10.00	*10.00*	*20.00*				*0.82*	*1.00*			*23.9*	
13.40	8.00	21.40			1.15	1.15	1.40			30.2	65182
10.00	*10.00*	*20.00*				*0.82*	*1.00*			*23.9*	
11.30	9.60	20.90			1.97	1.97	2.39			32.6	65183
10.00	*10.00*	*20.00*				*1.65*	*2.00*			*28.9*	
9.50	11.10	20.60							2.63	26.6	65184
8.00	*8.00*	*16.00*							*2.00*	*21.2*	
13.00	7.40	20.40							2.95	31.3	65185
10.00	*2.00*	*12.00*							*2.00*	*21.8*	
11.10	0.80	11.90						4.24		29.7	65969
10.00	*2.00*	*12.00*							*4.00*	*27.8*	
15.41	4.10	19.50						0.56	2.56	34.1	65187
12.00	*2.00*	*14.00*							*2.00*	*24.8*	
17.50	0.55	18.05								21.0	65876
16.60	2.90	19.50								19.9	65970
16.80	2.00	18.80								20.2	65971
18.60	2.50	21.10								22.3	65972
17.50	1.50	19.00								21.0	66212
17.40	1.40	18.80								20.9	66213
16.70	1.70	18.40								20.0	66214
17.60	1.80	19.40								20.1	66352
16.00	*2.00*	*18.00*								*19.2*	
15.10	0.80	15.90								18.1	65973
14.00	*2.00*	*16.00*								*16.8*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained	
	Federal Chemical Co.		
65190	Daybreak Standard Phosphate	Manufacturer	14
		Guaranteed	12
65191	Daybreak Special Phosphate Mixture	Manufacturer	11
		Guaranteed	10
66353	Daybreak Raw Bone	St. Matthews Produce Exchange, St. Matthews	
		Guaranteed	
65546	2-8-3 Formula	Manufacturer	10
		Guaranteed	8
65976	†2-8-5 Tobacco Formula	Hardin Mercantile Co., Hardin	8
		Guaranteed	8
65193	1st Prize Corn and Wheat Champion	Manufacturer	15
		Guaranteed	11
65194	1st Prize Corn, Wheat and Oats Grower	Manufacturer	14
		Guaranteed	11
65195	1st Prize Grain Maker	Manufacturer	15
		Guaranteed	13
65196	1st Prize Special	Manufacturer	13
		Guaranteed	11
65197	1st Prize Wheat and Grain Special	Manufacturer	15
		Guaranteed	12
65198	Blue Ribbon Corn and Wheat Grower	Manufacturer	13
		Guaranteed	10
65199	Blue Ribbon Tobacco Grower	Manufacturer	13
		Guaranteed	10
65200	1st Prize Formula	Manufacturer	14
		Guaranteed	11
65694	1st Prize Crop and Tobacco Grower	Farmers Union Supply Co., Russellville	7
		Guaranteed	8
65202	1st Prize Tobacco and Vegetable Grower	Manufacturer	10
		Guaranteed	8
65203	1st Prize Phosphate Mixture	Manufacturer	15
		Guaranteed	12
65204	1st Prize Ammoniated Bone Phosphate	Manufacturer	18
		Guaranteed	15
65205	Mogul Corn and Wheat Fertilizer	Manufacturer	15
		Guaranteed	12
65206	1st Prize Ammoniated Meal Mixture	Manufacturer	12
		Guaranteed	10

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
14.75	6.15	20.90								17.7	65190
12.00	*2.00*	*14.00*								*14.4*	
11.80	11.20	23.00								14.2	65191
10.00	*10.00*	*20.00*								*12.00*	
		22.00	32	68		4.46	5.41			44.4	66353
		22.00				*3.71*	*4.50*			*39.9*	
10.10	8.80	18.90			2.48	2.48	3.01		3.54	44.2	65546
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*3.00*	*32.5*	
8.20	2.70	10.90			1.02	1.50	1.82	5.10		37.7	65976
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*5.00*	*38.5*	
15.05	5.55	20.60			0.88	0.88	1.07		1.16	33.6	65193
11.50	*4.00*	*15.50*				*0.41*	*0.50*		*0.50*	*22.8*	
14.55	6.45	21.00			0.82	0.82	1.00		1.55	34.0	65194
11.00	*4.00*	*15.00*				*0.41*	*0.50*		*1.00*	*23.6*	
15.65	4.65	20.30			0.72	0.72	0.87		1.29	33.5	65195
13.00	*4.00*	*17.00*				*0.41*	*0.50*		*1.00*	*26.6*	
13.95	4.90	18.85			0.74	0.74	0.90		6.03	45.4	65196
11.00	*4.00*	*15.00*				*0.41*	*0.50*		*5.00*	*35.6*	
15.55	4.50	20.05			1.22	1.22	1.48		1.70	37.6	65197
12.00	*4.00*	*16.00*				*0.82*	*1.00*		*1.00*	*27.5*	
13.25	7.40	20.65			1.16	1.16	1.41		2.61	37.6	65198
10.00	*4.00*	*14.00*				*0.82*	*1.00*		*2.00*	*27.5*	
13.25	7.40	20.65			1.16	1.16	1.41		2.61	37.6	65199
10.00	*4.00*	*14.00*				*0.82*	*1.00*		*2.00*	*27.5*	
14.55	4.60	19.15			1.23	1.23	1.49		3.70	42.2	65200
11.00	*4.00*	*15.00*				*0.82*	*1.00*		*3.00*	*32.0*	
7.25	2.70	9.95			0.43	0.81	0.98	5.60		33.6	65694
8.00	*4.00*	*12.00*				*0.82*	*1.00*		*4.00*	*30.5*	
10.90	5.40	16.30			2.20	2.20	2.67		7.82	55.2	65202
8.00	*4.00*	*12.00*				*1.23*	*1.50*		*6.00*	*39.0*	
15.90	5.60	21.50			0.82	0.82	1.00			31.0	65203
12.00	*4.00*	*16.00*				*0.41*	*0.50*			*22.1*	
18.20	1.30	19.50			0.74	0.74	0.90			32.3	65204
15.00	*4.00*	*19.00*				*0.41*	*0.50*			*26.6*	
15.20	4.80	20.00			1.47	1.47	1.78			33.5	65205
12.00	*4.00*	*16.00*				*0.82*	*1.00*			*24.5*	
12.75	5.75	18.50			2.53	2.84	3.45			38.5	65206
10.00	*5.00*	*15.00*				*2.47*	*3.00*			*31.8*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Federal Chemical Co.	
65207	Sweepstakes Corn and Wheat Grower	Manufacturer Guaranteed
65208	Blue Ribbon Meal Mixture	Manufacturer Guaranteed
65209	Mogul Potash Fertilizer	Manufacturer Guaranteed
65695	1st Prize High Grade Phosphate	Farmers Union Supply Co., Russellville
65979		W. R. Jones, Utica Guaranteed
65211	1st Prize Phosphate	Manufacturer Guaranteed
65212	1st Prize Standard Phosphate	Manufacturer Guaranteed
65213	1st Prize Special Phosphate Mixture	Manufacturer Guaranteed
65214	1st Prize Raw Bone	Manufacturer Guaranteed
	Ford Motor Co., Rouge Plant, Dearborn, Mich.	
66354	Ford Ammonium Sulphate	J. B. Taylor and Sons, Lewisport Guaranteed
	Fox Chem. Co., Br. Federal Chem. Co., Inc., Louisville, Ky.	
65215	Fox Ideal Fertilizer	Manufacturer Guaranteed
66355	†Fox Blood, Bone Phosphate and Potash	T. Z. Leachman, Greensburg Guaranteed
65219	Fox High Grade Special	Manufacturer Guaranteed
65220	Fox Wheat and Grain Special	Manufacturer Guaranteed
65222	Early Harvest Tobacco Grower	Manufacturer Guaranteed
65223	Fox Formula	Manufacturer Guaranteed
65699	Fox Crop and Tobacco Grower	Staggs Bros. Co., Vanceburg Guaranteed
65981	Fox Wheat and Corn Manure	W. A. Sparks, London Guaranteed
65227	Fox Wheat and Corn Grower	Manufacturer Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
13.40	8.00	21.40			1.15	1.15	1.40			30.2	65207
10.00	*10.00*	*20.00*				*0.82*	*1.00*			*23.9*	
11.30	9.60	20.90			1.97	1.97	2.39			32.6	65208
10.00	*10.00*	*20.00*				*1.65*	*2.00*			*28.9*	
9.50	11.10	20.60							2.63	26.6	65209
8.00	*8.00*	*16.00*							*2.00*	*21.2*	
16.95	1.65	18.60								20.3	65695
16.20	2.80	19.00								19.4	65979
16.00	*2.00*	*18.00*								*19.2*	
16.35	4.00	20.35								19.6	65211
14.00	*2.00*	*16.00*								*16.8*	
14.75	6.15	20.90								17.7	65212
12.00	*2.00*	*14.00*								*14.4*	
11.80	11.20	23.00								14.2	65213
10.00	*10.00*	*20.00*								*12.0*	
		22.00	70	30	0.39	4.76	5.78			46.2	65214
		22.00				*3.71*	*4.50*			*39.9*	
						20.86	25.32			125.2	66354
						20.80	*25.26*			*124.8*	
15.05	5.55	20.60			0.88	0.88	1.07		1.16	33.6	65215
11.50	*4.00*	*15.50*				*0.41*	*0.50*		*0.50*	*22.8*	
11.80	4.50	16.30			0.24	0.45	0.55	1.06		25.4	66355
11.00	*4.00*	*15.00*				*0.41*	*0.50*		*1.00*	*23.6*	
13.95	4.90	18.85			0.74	0.74	0.90		6.03	45.4	65219
11.00	*4.00*	*15.00*				*0.41*	*0.50*		*5.00*	*35.6*	
15.55	4.50	20.05			1.22	1.22	1.48		1.70	37.6	65220
12.00	*4.00*	*16.00*				*0.82*	*1.00*		*1.00*	*27.5*	
13.25	7.40	20.65			1.16	1.16	1.41		2.61	37.6	65222
10.00	*4.00*	*14.00*				*0.82*	*1.00*		*2.00*	*27.5*	
14.55	4.60	19.15			1.23	1.23	1.49		3.70	42.2	65223
11.00	*4.00*	*15.00*				*0.82*	*1.00*		*3.00*	*32.0*	
9.00	0.75	9.75				0.60	0.73	4.73		31.6	65699
8.00	*4.00*	*12.00*				*0.82*	*1.00*		*4.00*	*30.5*	
8.50	2.30	10.80			1.24	1.61	1.95	2.06		29.5	65981
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*2.00*	*29.5*	
14.10	5.35	19.45			2.07	2.07	2.51		2.79	44.1	65227
10.00	*4.00*	*14.00*				*1.65*	*2.00*		*2.00*	*32.5*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Fox Chemical Co., Br. Federal Chemical Co., Inc.	
65228	Fox Vegetable Grower	Manufacturer Guaranteed
65230	Red Fox Mixture	Manufacturer Guaranteed
65231	Fox Ammoniated Phosphate	Manufacturer Guaranteed
65232	Fox Ammoniated Fertilizer	Manufacturer Guaranteed
65233	Fox Double Quick Corn and Wheat Grower	Manufacturer Guaranteed
65234	Fox Half and Half Meal Mixture	Manufacturer Guaranteed
65235	Fox Ideal Potash Fertilizer	Manufacturer Guaranteed
65236	Fox Potash Special	Manufacturer Guaranteed
65237	Fox Bone Phosphate and Potash	Manufacturer Guaranteed
65238	Fox Bone Phosphate	Manufacturer Guaranteed
65702 65703 65983 66216 66356 66357	Fox High Grade Phosphate	Staggs Bros. Co., Vanceburg N. B. Triplett, Waynesburg Lancaster-Smith Seed Co., Owensboro Harrison Austin, Beaver Dam T. Z. Leachman, Greensburg Staggs Bros. and Co., Vanceburg Guaranteed
65240	Fox Phosphate	Manufacturer Guaranteed
65241	Fox Standard Phosphate	Manufacturer Guaranteed
65242	Fox Special Phosphate Mixture	Manufacturer Guaranteed
65243	Fox Raw Bone	Manufacturer Guaranteed
	Globe Fert. Co., Br. Federal Chem. Co., Inc., Louisville, Ky.	
65244	Globe Good Grower Fertilizer	Manufacturer Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
11.40	6.75	18.15			2.16	2.16	2.62		5.70	49.9	65228
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*5.00*	*38.5*	
15.90	5.60	21.50			0.82	0.82	1.00			31.0	65230
12.00	*4.00*	*16.00*				*0.41*	*0.50*			*22.1*	
18.20	1.30	19.50			0.74	0.74	0.90			32.3	65231
15.00	*4.00*	*19.00*				*0.41*	*0.50*			*26.6*	
12.75	5.75	18.50			2.53	2.84	3.45			38.5	65232
10.00	*5.00*	*15.00*				*2.47*	*3.00*			*31.8*	
13.40	8.00	21.40			1.15	1.15	1.40			30.2	65233
10.00	*10.00*	*20.00*				*0.82*	*1.00*			*23.9*	
11.30	9.60	20.90			1.97	1.97	2.39			32.6	65234
10.00	*10.00*	*20.00*				*1.65*	*2.00*			*28.9*	
9.50	11.10	20.60							2.63	26.6	65235
8.00	*8.00*	*16.00*							*2.00*	*21.2*	
13.00	7.40	20.40							2.95	31.3	65236
10.00	*2.00*	*12.00*							*2.00*	*21.8*	
11.90	8.00	19.90						0.56	4.06	37.9	65237
10.00	*2.00*	*12.00*							*4.00*	*27.8*	
15.40	4.10	19.50						0.56	2.56	34.1	65238
12.00	*2.00*	*14.00*							*2.00*	*24.8*	
17.30	0.55	17.85								20.8	65702
16.60	0.60	17.20								19.9	65703
18.00	2.70	20.70								21.6	65983
17.30	1.80	19.10								20.8	66216
17.70	2.70	20.40								21.2	66356
17.90	2.30	20.20								21.5	66357
16.00	*2.00*	*18.00*								*19.2*	
16.35	4.00	20.35								19.6	65240
14.00	*2.00*	*16.00*								*16.8*	
14.75	6.15	20.90								17.7	65241
12.00	*2.00*	*14.00*								*14.4*	
11.80	11.20	23.00								14.2	65242
10.00	*10.00*	*20.00*								*12.0*	
		22.00	70	30	0.39	4.78	5.78			46.2	65243
		22.00				*3.71*	*4.50*			*39.9*	
15.05	5.55	20.60			0.88	0.88	1.07		1.16	33.6	65244
11.50	*4.00*	*15.50*				*0.41*	*0.50*		*0.50*	*22.8*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Globe Fert. Co., Br. Federal Chem. Co., Inc.	
65704	Globe Blood, Bone Phosphate and Potash	J. L. Riney, Rineyville
65705		Phelps and Miller, Jamestown
65984		I. K. Miller and Sons, Campbellsville
66217		Farmers Union Supply Co., Bowling Green
		Guaranteed
65246	Globe Grain and Grass Grower	Manufacturer
		Guaranteed
65706	Globe Money Maker	A. E. Sullivan, Russell Springs
		Guaranteed
65248	Globe High Grade Special	Manufacturer
		Guaranteed
65708	†Progress Corn and Wheat Grower	Stapp and Dowell, Esto
66222		Louis Neff and Son, Liberty
66358		R. E. Collis, Bedford
		Guaranteed
65709	Progress Tobacco Grower	A. R. Freeman, Slick Rock
65985		R. E. Collis, Bedford
		Guaranteed
65710	Universal Crop and Tobacco Grower	A. E. Sullivan, Russell Springs
		Guaranteed
65987	Eagle Wheat and Corn Grower	Moss and Gibson, Crestwood
		Guaranteed
65258	Globe Soluble Vegetable Manure	Manufacturer
		Guaranteed
65715	†Ky. Standard Tobacco Grower	E. F. Pearson, Franklin
		Guaranteed
66224	Globe Grain-O-Phosphate	T. M. Zachery, Liberty
		Guaranteed
65263	Globe Golden Harvest	Manufacturer
		Guaranteed
65264	Globe Double Value Corn and Wheat Grower	Manufacturer
		Guaranteed
65266	Globe Tip Top Potash Fertilizer	Manufacturer
		Guaranteed
65267	Globe Potash Special	Manufacturer
		Guaranteed
65992	Globe Bone Phosphate and Potash	Bedford and Tuttle, Winchester
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
11.90	1.70	13.60				0.43	0.52	1.01		24.1	65704
11.15	3.25	14.40			0.24	0.45	0.55	0.96		23.6	65705
11.50	1.20	12.70			0.26	0.50	0.61	1.16		24.2	65984
12.30	3.80	16.10			0.40	0.40	0.49	1.07		25.6	66217
11.00	*4.00*	*15.00*				*0.41*	*0.50*		*1.00*	*23.6*	
14.55	6.45	21.00			0.82	0.82	1.00		1.55	34.0	65246
11.00	*4.00*	*15.00*				*0.41*	*0.50*		*1.00*	*23.6*	
12.90	4.10	17.00				0.53	0.64	0.89		26.8	65706
13.00	*4.00*	*17.00*				*0.41*	*0.50*		*1.00*	*26.6*	
13.95	4.90	18.85			0.74	0.74	0.90		6.03	45.4	65248
11.00	*4.00*	*15.00*				*0.41*	*0.50*		*5.00*	*35.6*	
9.85	2.95	12.80			0.22	0.71	0.86	2.15		26.7	65708
10.20	1.75	11.95			0.36	0.68	0.83	2.48		27.5	66222
11.60	2.00	13.60			0.35	0.77	0.93	1.61		27.7	66358
10.00	*4.00*	*14.00*				*0.82*	*1.00*		*2.00*	*27.5*	
9.65	2.40	12.05			0.68	1.42	1.72	1.88		29.6	65709
11.10	0.90	12.00			0.83	0.83	1.01	2.29		28.9	65985
10.00	*4.00*	*14.00*				*0.82*	*1.00*		*2.00*	*27.5*	
7.90	3.45	11.35			0.45	0.89	1.08	5.12		33.9	65710
8.00	*4.00*	*12.00*				*0.82*	*1.00*		*4.00*	*30.5*	
9.10	0.90	10.00			1.10	1.37	1.66	2.70		30.3	65987
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*2.00*	*29.5*	
10.10	9.30	19.40			2.11	2.11	2.56		5.08	46.8	65258
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*5.00*	*38.5*	
8.45	2.70	11.15			1.09	1.47	1.78	5.30		38.5	65715
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*5.00*	*38.5*	
16.05	0.90	16.95				0.42	0.51			27.0	66224
15.00	*4.00*	*19.00*				*0.41*	*0.50*			*26.6*	
12.75	5.75	18.50			2.53	2.84	3.45			38.5	65263
10.00	*5.00*	*15.00*				*2.47*	*3.00*			*31.8*	
13.40	8.00	21.40			1.15	1.15	1.40			30.2	65264
10.00	*10.00*	*20.00*				*0.82*	*1.00*			*23.9*	
9.50	11.10	20.60							2.63	26.6	65266
8.00	*8.00*	*16.00*							*2.00*	*21.2*	
13.00	7.40	20.40							2.95	31.3	65267
10.00	*2.00*	*12.00*							*2.00*	*21.8*	
10.90	0.80	11.70						3.79		28.0	65992
10.00	*2.00*	*12.00*							*4.00*	*27.8*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Globe Fert. Co., Br. Federal Chem. Co., Inc.	
65269	Globe Potash Compound	Manufacturer
		Guaranteed
65717	Globe High Grade Phosphate	C. M. Gossom, Glasgow
65718		Willie Grider and Son, Russell Springs
65993		S. A. Browning, Vanceburg
66225		T. M. Zachery, Liberty
66226		W. H. Broach, Murray
66227		Farmers Union Supply Co., Bowling Green
		Guaranteed
65719	Globe Phosphate	Vernon Holt, Jamestown
65720		I. K. Miller and Sons, Campbellsville
		Guaranteed
65272	Globe Standard Phosphate	Manufacturer
		Guaranteed
65273	Globe Special Phosphate Mixture	Manufacturer
		Guaranteed
66228	†Globe Raw Bone	I. K. Miller and Sons, Campbellsville
		Guaranteed
	Groves Fertilizer Works, Cincinnati, Ohio.	
65337	Square Brand 2–12–2	Manufacturer
		Guaranteed
65338	Square Brand 2–14–2	Manufacturer
		Guaranteed
65339	Square Brand 2–12–4	Manufacturer
		Guaranteed
65994	Square Brand 3–12–4	Ferrell and Foster, Bagdad
		Guaranteed
65342	Square Brand 2–12–6	Manufacturer
		Guaranteed
65995	Square Brand 2–8–16	Ferrell and Foster, Bagdad
		Guaranteed
65344	Square Brand 0–12–6	Manufacturer
		Guaranteed
65345	Square Brand 0–14–4	Manufacturer
		Guaranteed
65346	Square Brand 0–10–10	Manufacturer
		Guaranteed
65347	Square Brand 0–12–12	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
15.40	4.10	19.50						0.56	2.56	34.1	65269
12.00	*2.00*	*14.00*							*2.00*	*24.8*	
17.00	1.85	18.85								20.4	65717
16.75	2.10	18.85								20.1	65718
17.00	1.60	18.60								20.4	65993
18.05	0.55	18.60								21.7	66225
16.85	2.55	19.40								20.2	66226
16.45	2.10	18.55								19.7	66227
16.00	*2.00*	*18.00*								*19.2*	
15.15	2.50	17.65								18.2	65719
14.75	0.50	15.25								17.7	65720
14.00	*2.00*	*16.00*								*16.8*	
14.75	6.15	20.90								17.7	65272
12.00	*2.00*	*14.00*								*14.4*	
11.80	11.20	23.00								14.2	65273
10.00	*10.00*	*20.00*								*12.0*	
		21.25	86	14	0.21	4.20	5.10			42.2	66228
		22.00				*3.71*	*4.50*			*39.9*	
12.80	2.80	15.60			1.25	1.83	2.22	2.23		38.0	65337
12.00	*1.00*	*13.00*				*1.65*	*2.00*	*2.00*		*34.3*	
14.60	2.90	17.50			1.21	1.80	2.19	2.39		41.0	65338
14.00	*1.00*	*15.00*				*1.65*	*2.00*	*2.00*		*37.3*	
13.30	2.00	15.30			1.27	1.83	2.22	4.62		45.6	65339
12.00	*1.00*	*13.00*				*1.65*	*2.00*	*4.00*		*40.3*	
11.80	2.60	14.40			1.74	2.41	2.93	4.07		45.4	65994
12.00	*1.00*	*13.00*				*2.47*	*3.00*	*4.00*		*45.2*	
13.50	1.60	15.10			1.29	1.75	2.12	6.52		51.0	65342
12.00	*1.00*	*13.00*				*1.65*	*2.00*	*6.00*		*46.3*	
7.90	1.80	9.70			0.76	1.48	1.80	17.67		74.5	65995
8.00	*1.00*	*9.00*				*1.65*	*2.00*	*16.00*		*70.3*	
12.20	2.50	14.70						6.64		39.2	65344
12.00	*1.00*	*13.00*						*6.00*		*36.4*	
13.80	3.60	17.40						4.25		34.9	65345
14.00	*1.00*	*15.00*						*4.00*		*33.4*	
10.60	1.80	12.40						10.67		48.5	65346
10.00	*1.00*	*11.00*						*10.00*		*45.4*	
12.90	1.60	14.50						12.91		58.7	65347
12.00	*1.00*	*13.00*						*12.00*		*54.4*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Groves Fertilizer Works.	
65348	Square Brand 0–8–24	Manufacturer
		Guaranteed
65349	Square Brand 4–12–0	Manufacturer
		Guaranteed
65350	Square Brand 1–8–1	Manufacturer
		Guaranteed
65722	Square Brand 1–8–4	Aaron Moore, Leitchfield
		Guaranteed
65352	Square Brand 0–10–4	Manufacturer
		Guaranteed
65353	Square Brand 1–10–2	Manufacturer
		Guaranteed
65723	16% Acid Phosphate	G. W. Howard, Rineyville
65724		J. A. McAninch, Gilpin
65996		J. C. Everett Co., Maysville
		Guaranteed
65355	20% Acid Phosphate	Manufacturer
		Guaranteed
65356	Half and Half	Manufacturer
		Guaranteed
65357	Bone and Potash Mixture	Manufacturer
		Guaranteed
65725	†Perfect Driller	J. A. McAninch, Gilpin
		Guaranteed
65360	Bone Meal	Manufacturer
		Guaranteed
65361	Raw Bone	Manufacturer
		Guaranteed
	Hall Seed Co., Louisville, Ky.	
65504	Halco High Grade Vegetable Grower	Manufacturer
		Guaranteed
65505	Halco Tobacco Grower	Manufacturer
		Guaranteed
65506	Halco Acid Phosphate	Manufacturer
		Guaranteed
65507	Halco Corn and Wheat Grower	Manufacturer
		Guaranteed
65508	Halco Potato Grower	Manufacturer
		Guaranteed
65509	Halco Vegetable Grower	Manufacturer
		Guaranteed
65511	Halco Potato and Tobacco Grower	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
7.30	2.50	9.80						25.70		89.1	65348
8.00	*1.00*	*9.00*						*24.00*		*84.4*	
12.70	2.60	15.30			2.45	3.55	4.31			41.4	65349
12.00	*1.00*	*13.00*				*3.29*	*4.00*			*38.1*	
8.00	2.40	10.40			0.57	0.96	1.17	1.39		22.9	65350
8.00	*1.00*	*9.00*				*0.82*	*1.00*	*1.00*		*20.3*	
9.25	1.40	10.65			0.64	0.91	1.10	5.41		36.1	65722
8.00	*1.00*	*9.00*				*0.82*	*1.00*	*4.00*		*29.3*	
10.50	2.40	12.90						4.61		30.5	65352
10.00	*1.00*	*11.00*						*4.00*		*27.4*	
9.80	2.50	12.30			0.58	1.04	1.26	2.12		28.3	65353
10.00	*1.00*	*11.00*				*0.82*	*1.00*	*2.00*		*26.3*	
16.45	2.45	18.90								19.7	65723
16.30	3.35	19.65								19.6	65724
16.50	2.70	19.20								19.8	65996
16.00	*1.00*	*17.00*								*19.2*	
19.20	5.00	24.20								23.0	65355
20.00	*1.00*	*21.00*								*24.0*	
8.10	10.40	18.50			1.15	2.05	2.49	2.29		35.5	65356
8.00	*8.00*	*16.00*				*1.65*	*2.00*	*2.00*		*31.1*	
10.20	11.70	21.90			0.50	1.22	1.48	5.65		44.3	65357
10.00	*10.00*	*20.00*				*0.82*	*1.00*	*5.00*		*38.9*	
8.60	14.70	23.30				0.47	0.57			21.6	65725
8.00	*8.00*	*16.00*				*0.41*	*0.50*			*17.7*	
		28.50	79	21	1.16	2.93	3.56			40.4	65360
		27.00				*2.47*	*3.00*			*36.4*	
		24.35	76	24		3.31	4.02			39.3	65361
		22.00				*3.71*	*4.50*			*39.9*	
8.70	1.85	10.55			1.44	2.51	3.05	1.24	5.03	47.7	65504
8.00	*1.00*	*9.00*				*2.47*	*3.00*		*6.00*	*45.2*	
11.20	2.40	13.60			0.49	0.93	1.13		1.74	28.6	65505
10.00	*1.00*	*11.00*				*0.82*	*1.00*	*2.00*		*26.3*	
16.50	1.75	18.25								19.8	65506
16.00	*1.00*	*17.00*								*19.2*	
9.80	3.90	13.70			0.30	0.83	1.01			21.2	65507
10.00	*1.00*	*11.00*				*0.82*	*1.00*			*20.3*	
9.90	2.80	12.70			1.01	1.70	2.06			26.2	65508
10.00	*1.00*	*11.00*				*1.65*	*2.00*			*25.3*	
11.20	1.60	12.80			2.13	3.28	3.98			37.1	65509
10.00	*1.00*	*11.00*				*3.29*	*4.00*			*35.1*	
8.40	2.80	11.20			1.13	1.66	2.02	2.81		32.1	65511
8.00	*1.00*	*9.00*				*1.65*	*2.00*	*3.00*		*31.3*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Hall Seed Co.	
65512	Halco Half Bone and Phosphate	Manufacturer
		Guaranteed
65513	Halco Bone Meal	Manufacturer
		Guaranteed
65514	Halco Raw Bone	Manufacturer
		Guaranteed
65515	Halco 14% Phosphate	Manufacturer
		Guaranteed
	Herbert Stone and Fertilizer Co., Nashville, Tenn.	
65594	16% Acid Phosphate	Manufacturer
		Guaranteed
	Hopkins Fertilizer Co., New Albany, Ind.	
65998	Nitrate of Soda	Duncan and Sherley, La Grange
		Guaranteed
66229	†Ammoniated Special	Duncan and Sherley, La Grange
66230		Johnson Lumber and Supply Co., Buechel
		Guaranteed
66000	†Wheat and Corn Grower No. 1	Crawford and Snyder, Milton
66001		W. F. McClure, Bedford
66002		L. C. Goering, Hawesville
66231		Hutcheson Bros., Auburn
66364		Crawford and Snyder, Milton
		Guaranteed
65726	Superior	Johnson Lumber and Supply Co., Buechel
65727		Lindsey, Orr and Co., Elkton
66003		W. T. Crum, Smithfield
66233		Hutcheson Bros., Auburn
		Guaranteed
64981	Red Banner Special	Manufacturer
		Guaranteed
66234	General Crop Grower	Chas. Stone, Leitchfield
		Guaranteed
65728	Truck, Potato and Tobacco Grower	Trigg County Feed and Produce Co., Cadiz
66004		Bohannon and Stedman, Versailles
66005		R. A. Newton and Co., Shelbyville
		Guaranteed
65729	†Blackland Special	W. F. Neeley, Glasgow
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
15.10	7.30	22.40				0.90	1.09			31.0	65512
10.00	*10.00*	*20.00*				*0.82*	*1.00*			*23.9*	
		26.30	77	23	0.32	2.59	3.14			36.6	65513
		27.00				*2.47*	*3.00*			*36.4*	
		22.25	82	18	0.32	4.14	5.03			42.6	65514
		22.00				*3.71*	*4.50*			*39.9*	
14.40	2.60	17.00								17.3	65515
14.00	*1.00*	*15.00*								*16.8*	
20.10	1.30	21.40								24.1	65794
16.00										*19.2*	
						15.84	19.23			95.0	65998
						15.00	*18.21*			*90.0*	
10.40	2.55	12.95			0.84	3.24	3.93			36.1	66229
10.05	6.20	16.25			1.98	3.31	4.02			37.4	66230
10.00	*2.00*	*12.00*				*3.29*	*4.00*			*35.5*	
11.00	1.70	12.70			0.30	0.54	0.66	0.80	1.62	27.7	66000
11.10	0.80	11.90			0.29	0.53	0.64	2.19		26.7	66001
11.00	1.30	12.30			0.46	0.46	0.56	0.60	1.21	25.2	66002
10.30	0.70	11.00			0.20	0.40	0.49	1.60	0.49	24.4	66231
10.20	1.40	11.60			0.24	0.61	0.74	2.43		26.8	66364
10.00	*2.00*	*12.00*				*0.41*	*0.50*	*2.00*		*24.3*	
10.55	1.40	11.95			1.24	1.84	2.23	5.06		42.6	65726
11.15	1.25	12.40			0.98	1.58	1.92	5.02		41.8	65727
9.90	1.90	11.80			1.21	1.88	2.28	4.09		39.2	66003
10.10	2.40	12.50			0.54	1.49	1.81	3.40	0.82	37.7	66233
10.00	*2.00*	*12.00*				*1.65*	*2.00*	*4.00*		*37.7*	
8.30	1.00	9.30			1.12	2.06	2.50	0.32	4.68	40.2	64981
8.00	*2.00*	*10.00*				*0.82*	*1.00*	*3.00*		*26.7*	
12.20	2.00	14.20			0.72	1.66	2.02	2.44		36.4	66234
12.00	*2.00*	*14.00*				*1.65*	*2.00*	*2.00*		*34.7*	
10.50	3.80	14.30			1.27	2.46	2.99	3.34		42.1	65728
10.40	3.30	13.70			0.58	2.64	3.20	3.49		43.2	66004
10.40	3.10	13.50			0.42	2.39	2.90	2.28	1.60	42.8	66005
10.00	*2.00*	*12.00*				*2.47*	*3.00*	*3.00*		*39.6*	
11.20	1.20	12.40						5.99		35.3	65729
10.00	*2.00*	*12.00*						*6.00*		*33.8*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Hopkins Fertilizer Co.	
66235	Two-In-One	S. E. Walker, Limp
		Guaranteed
65730	Half and Half No. 1	W. L. Kimbrough and Son, Guthrie
66007		W. T. Crum, Smithfield
66236		S. E. Walker, Limp
		Guaranteed
66008	Pure Raw Bone	Duncan and Sherley, La Grange
66237		Johnson Lumber and Supply Co., Buechel
66238		Duncan and Sherley, La Grange
		Guaranteed
64988	Pig Knuckle Bone Meal	Manufacturer
		Guaranteed
65731	Climax Acid Phosphate	Conner-Hayden and Co., Bardstown
66009		Crawford and Snyder, Milton
66239		Thomas-Hinton Co., Bowling Green
66240		S. E. Redford, Glasgow
66241		Conner-Hayden and Co., Bardstown
66365		Crawford and Snyder, Milton
		Guaranteed
64990	Muriate of Potash	Manufacturer
		Guaranteed
65732	†Burley Grower	Johnson Lumber and Supply Co., Buechel
66010		Haggard and Paynter, Winchester
66011		C. M. Embry, Richmond
		Guaranteed
65733	Potato Grower	Johnson Lumber and Supply Co., Buechel
66243		Johnson Lumber and Supply Co., Buechel
		Guaranteed
	International Agricultural Corp., Inc., Cincinnati, Ohio.	
65365	I. A. C. Tobacco and Truck Grower	Manufacturer
		Guaranteed
65366	I. A. C. Potato and Tobacco Grower	Manufacturer
		Guaranteed
65734	I. A. C. A-1 Tobacco Fertilizer	C. A. Ray, Rocky Hill
66012		J. W. Bratcher, Berea
		Guaranteed
65368	I. A. C. 2–16–2 Special	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
8.50	10.60	19.10				0.84	1.65	2.00	2.19	33.5	66235
8.00	*8.00*	*16.00*				*1.65*	*2.00*	*2.00*		*31.1*	
10.00	3.05	13.05			0.87	1.78	2.16	1.73		32.1	65730
6.10	8.00	14.10			0.96	1.69	2.05	1.34		26.5	66007
7.25	5.35	12.60			0.85	1.55	1.88	1.20		25.9	66236
6.00	*7.00*	*13.00*				*1.65*	*2.00*	*1.00*		*24.7*	
		21.10	61	39	0.49	4.10	4.98			41.5	66008
		21.05	50	50		3.54	4.30			38.1	66237
		22.55	48	52		3.77	4.58			40.7	66238
		21.50				*3.50*	*4.25*			*38.2*	
		25.00	69	31	0.42	2.22	2.70			33.3	64988
		22.00				*2.00*	*2.43*			*29.6*	
17.00	3.75	20.75								20.4	65731
17.60	1.50	19.10								21.1	66009
16.40	3.50	19.90								19.7	66239
16.65	0.70	17.35								20.0	66240
16.05	3.50	19.55								19.3	66241
16.00	5.20	21.20								19.2	66365
16.00	*2.00*	*18.00*								*19.2*	
								50.56		151.7	64990
								50.00		*150.0*	
8.90	2.35	11.25			0.42	2.47	3.00	6.44		48.4	65732
10.00	1.20	11.20			1.85	2.29	2.78	6.30		48.1	66010
8.10	5.20	13.30			1.28	2.45	2.97	5.99		46.9	66011
8.00	*2.00*	*10.00*				*2.47*	*3.00*	*6.00*		*45.6*	
9.10	1.10	10.20			0.69	1.66	2.02	3.57		34.8	65733
8.45	2.80	11.25			0.47	1.55	1.88	2.20	0.79	32.1	66243
8.00	*2.00*	*10.00*				*1.65*	*2.00*	*3.00*		*31.7*	
8.50	4.30	12.80			0.92	1.83	2.22	0.92	9.51	56.7	65365
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*10.00*	*53.5*	
8.10	4.90	13.00			1.42	2.47	3.00	0.64	5.90	48.6	65366
8.00	*4.00*	*12.00*				*2.47*	*3.00*		*6.00*	*46.4*	
10.45	1.30	11.75			1.13	1.72	2.09	4.92		41.3	65734
11.10	5.80	16.90			0.92	1.71	2.08	4.36		42.3	66012
10.00	*4.00*	*14.00*				*1.65*	*2.00*		*4.00*	*38.5*	
16.50	0.90	17.40			1.32	1.63	1.98	2.25		41.6	65368
16.00	*1.00*	*17.00*				*1.65*	*2.00*	*2.00*		*40.3*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	International Agricultural Corp., Inc.	
65735	I. A. C. High Grade Fertilizer	Geo. W. Richardson, Somerset
		Guaranteed
65737	†I. A. C. Farmers Favorite Manure	Q. F. Combs, Pembroke
		Guaranteed
66247	I. A. C. Wheat and Corn Grower	R. H. Lile, Clarkson
		Guaranteed
65374	I. A. C. Potato and Truck Grower	Manufacturer
		Guaranteed
65375	I. A. C. High Grade Special	Manufacturer
		Guaranteed
65376	I. A. C. Corn and Grain Grower	Manufacturer
		Guaranteed
65378	I. A. C. Potash Fertilizer	Manufacturer
		Guaranteed
65739	I. A. C. 20% Acid Phosphate	Geo. W. Richardson, Somerset
		Guaranteed
65740	I. A. C. Standard Acid Phosphate	C. M. Langdon, Science Hill
65741		W. E. Ellis and Bro., Hartford
66013		J. W. Bratcher, Berea
66249		C. M. Langdon, Science Hill
66250		W. E. Ellis and Bro., Hartford
66251		R. H. Lile, Clarkson
66366		McKenzie and Herrin, Eubank
		Guaranteed
66252	I. A. C. Bone Mixture	R. H. Lile, Clarkson
		Guaranteed
65382	I. A. C. Nitrate of Soda	Manufacturer
		Guaranteed
65383	I. A. C. Muriate of Potash	Manufacturer
		Guaranteed
65384	Buffalo Tobacco Special	Manufacturer
		Guaranteed
66015	†Buffalo Tobacco and Potato Grower	H. L. Sparks and Co., N. Pleasureville
		Guaranteed
65742	†Buffalo High Grade Tobacco Special	W. E. Ellis and Bro., Hartford
66016		J. F. Collier and Co., Paris
		Guaranteed
65387	Buffalo Special Two Sixteen Two	Manufacturer
		Guaranteed
66019	†Buffalo Tobacco and Corn Grower	J. W. Hardyman, Flemingsburg
		Guaranteed
66020	Buffalo Kentucky Standard	J. W. Hardyman, Flemingsburg
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
12.50	1.20	13.70			1.25	1.74	2.11	2.89		38.3	65735
12.00	*4.00*	*16.00*				*1.65*	*2.00*	*2.00*		*35.5*	
10.90	4.10	15.00			0.58	0.90	1.09	3.08		32.6	65737
10.00	*5.00*	*15.00*				*0.82*	*1.00*	*3.00*		*30.9*	
10.75	3.15	13.90			0.31	0.55	0.67	1.12		24.1	66247
11.00	*5.00*	*16.00*				*0.41*	*0.50*	*1.00*		*24.0*	
9.90	4.80	14.70			1.92	3.25	3.95			36.3	65374
10.00	*5.00*	*15.00*				*3.29*	*4.00*			*36.7*	
9.90	5.60	15.50			1.35	2.39	2.90			31.4	65375
10.00	*5.00*	*15.00*				*2.47*	*3.00*			*31.8*	
12.50	4.60	17.10			1.09	1.93	2.34			32.2	65376
12.00	*5.00*	*17.00*				*1.65*	*2.00*			*29.9*	
12.90	2.00	14.90						2.20		26.8	65378
12.00	*5.00*	*17.00*						*2.00*		*26.0*	
20.70	0.40	21.10								24.8	65739
20.00	*1.00*	*21.00*								*24.0*	
16.45	2.40	18.85								19.7	65740
18.70	1.10	19.80								22.4	65741
17.70	1.30	19.00								21.2	66013
16.95	1.95	18.90								20.3	66249
18.35	1.35	19.70								22.0	66250
16.70	1.85	18.55								20.0	66251
17.90	1.40	19.30								21.5	66366
16.00	*2.00*	*18.00*								*19.2*	
		23.50	83	17	0.52	0.91	1.10			24.3	66252
		22.00				*0.82*	*1.00*			*22.5*	
						15.72	19.08			94.3	65382
						14.83	*18.00*			*89.0*	
								49.80		149.4	65383
								50.00		*150.0*	
8.50	4.30	12.80			0.92	1.83	2.22	0.92	9.51	56.7	65384
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*10.00*	*53.5*	
8.40	5.30	13.70			1.15	2.53	3.07	6.54		49.5	66015
8.00	*4.00*	*12.00*				*2.47*	*3.00*		*6.00*	*46.4*	
10.80	3.50	14.30			1.09	1.83	2.22	0.88	3.62	42.1	65742
10.60	2.80	13.40			1.12	1.61	1.95	3.84		38.2	66016
10.00	*4.00*	*14.00*				*1.65*	*2.00*		*4.00*	*38.5*	
16.50	0.90	17.40			1.32	1.63	1.98	2.25		41.6	65387
16.00	*1.00*	*17.00*				*1.65*	*2.00*	*2.00*		*40.3*	
8.10	6.70	14.80			0.93	1.87	2.27	2.70		34.2	66019
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*2.00*	*29.5*	
9.90	7.00	16.90			0.41	1.03	1.25	3.90		35.5	66020
10.00	*5.00*	*15.00*				*0.82*	*1.00*	*3.00*		*30.9*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	International Agricultural Corp., Inc.	
66021	Buffalo Corn and Grain Grower	J. W. Hardyman, Flemingsburg
		Guaranteed
65393	Buffalo Ammoniated Phosphate	Manufacturer
		Guaranteed
65394	Buffalo Grain Grower	Manufacturer
		Guaranteed
65395	Buffalo Potash Mixture	Manufacturer
		Guaranteed
65396	Buffalo Phosphate and Potash	Manufacturer
		Guaranteed
65397	Buffalo 18% Acid Phosphate	Manufacturer
		Guaranteed
65745	Buffalo 16% Acid Phosphate	Geo. W. Richardson, Somerset
65746		J. G. Warner, Waynesburg
66367		Geo. W. Richardson, Somerset
		Guaranteed
65399	Buffalo Special Bone and Phosphate	Manufacturer
		Guaranteed
65400	Buffalo Bone Meal	Manufacturer
		Guaranteed
	The Jarecki Chemical Co., Armour Owned, Louisville, Cincinnati, Nashville.	
65747	Jarecki's 1–12–1 Lake Erie Fertilizer	Ryley Correll, Correll
65748		Stapp and Dowell, Esto
		Guaranteed
65010	Jarecki's 1–8–4 Fertilizer	Manufacturer
		Guaranteed
66024	†Jarecki's Burley Tobacco Grower	Ramsey and Mason, Mt. Sterling
		Guaranteed
66025	Jarecki's 2–12–2 Fertilizer	Ramsey and Mason, Mt. Sterling
		Guaranteed
65013	Jarecki's 2–14–2 Fertilizer	Manufacturer
		Guaranteed
65014	Jarecki's 2–16–2 Fertilizer	Manufacturer
		Guaranteed
65015	Jarecki's 2–12–6 Fertilizer	Manufacturer
		Guaranteed
65016	Jarecki's 3–12–4 Fertilizer	*
		Guaranteed
65017	Jarecki's 4–12–0 Fertilizer	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
8.20	7.00	15.20			0.38	0.91	1.10	2.09		26.8	66021
8.00	*5.00*	*13.00*				*0.82*	*1.00*	*2.00*		*24.9*	
12.50	4.60	17.10			1.09	1.93	2.34			32.2	65393
12.00	*5.00*	*17.00*				*1.65*	*2.00*			*29.9*	
13.20	4.80	18.00			0.55	0.90	1.09			27.1	65394
13.00	*5.00*	*18.00*				*0.82*	*1.00*			*26.4*	
11.10	1.60	12.70						5.27		33.1	65395
10.00	*5.00*	*15.00*						*5.00*		*32.0*	
12.90	2.00	14.90						2.20		26.8	65396
12.00	*5.00*	*17.00*						*2.00*		*26.0*	
19.70	1.30	21.00								23.6	65397
18.00	*1.00*	*19.00*								*21.6*	
18.40	1.10	19.50								22.1	65745
16.40	1.40	17.80								19.7	65746
18.10	1.55	19.65								21.7	66367
16.00	*2.00*	*18.00*								*19.2*	
		24.50	78	22	0.52	0.93	1.13			25.2	65399
		22.00				*0.82*	*1.00*			*22.5*	
		26.10	60	40		1.90	2.31			32.3	65400
		27.00				*1.65*	*2.00*			*31.5*	
12.60	1.30	13.90			0.71	1.03	1.25	1.30		29.5	65747
12.40	0.60	13.00			0.41	0.73	0.89	0.91		26.0	65748
12.00	*1.00*	*13.00*				*0.82*	*1.00*	*1.00*		*26.3*	
8.75	2.55	11.30			0.60	0.91	1.10	4.85		34.2	65010
8.00	*1.00*	*9.00*				*0.82*	*1.00*	*4.00*		*29.3*	
8.60	0.50	9.10			1.55	2.63	3.19	0.72	5.21	46.7	66024
8.00	*1.00*	*9.00*				*2.47*	*3.00*		*6.00*	*45.2*	
11.50	1.20	12.70			1.02	1.62	1.97	2.14		33.9	66025
12.00	*1.00*	*13.00*				*1.65*	*2.00*	*2.00*		*34.3*	
14.50	1.35	15.85			1.21	1.62	1.97	2.16		38.5	65013
14.00	*1.00*	*15.00*				*1.65*	*2.00*	*2.00*		*37.3*	
15.65	1.70	17.35			1.53	1.81	2.20	2.23		41.7	65014
16.00	*1.00*	*17.00*				*1.65*	*2.00*	*2.00*		*40.3*	
12.35	1.85	14.20			1.12	1.71	2.08	5.99		47.5	65015
12.00	*1.00*	*13.00*				*1.65*	*2.00*	*6.00*		*46.3*	
											65016
12.00	*1.00*	*13.00*				*2.47*	*3.00*	*4.00*		*45.2*	
12.85	0.70	13.55			2.26	3.30	4.01			39.4	65017
12.00	*1.00*	*13.00*				*3.29*	*4.00*			*38.1*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	The Jarecki Chemical Co., Armour Owned.	
65018	Jarecki's 0–12–4 Fertilizer	Manufacturer
		Guaranteed
65019	Jarecki's 0–14–4 Fertilizer	Manufacturer
		Guaranteed
65749	Jarecki's 16% Acid Phosphate	C. L. and F. F. Dudley, Flemingsburg
65750		J. B. Laskey, Somerset
		Guaranteed
65022	Jarecki's 20% Acid Phosphate	Manufacturer
		Guaranteed
65023	Jarecki's Bone Meal and Acid Phosphate	Manufacturer
		Guaranteed
65024	Jarecki's Bone Meal	Manufacturer
		Guaranteed
65025	Jarecki's Raw Bone	Manufacturer
		Guaranteed
65026	Plant Bed Special	Manufacturer
		Guaranteed
65027	Jarecki's Dark Tobacco Grower	Manufacturer
		Guaranteed
65028	Jarecki's 4–8–3 Fertilizer	Manufacturer
		Guaranteed
65029	Jarecki's 2–12–0 Fertilizer	Manufacturer
		Guaranteed
65030	Jarecki's 1–12–1 Fertilizer	Manufacturer
		Guaranteed
66027	Jarecki's 1–10–1 Fertilizer	Mullikin and Craig, Bedford
65751		C. L. and F. F. Dudley, Flemingsburg
		Guaranteed
65032	Jarecki's 2–8–2 Fertilizer	Manufacturer
		Guaranteed
66028	Jarecki's 1–8–1 Fertilizer	Mullikin and Craig, Bedford
		Guaranteed
66029	Indian Brand Tobacco and Potato Fertilizer	Eminence Milling Co., Eminence
		Guaranteed
65134	Jarecki's 2–10–4 Fertilizer	Manufacturer
		Guaranteed
65525	Jarecki's 3–8–6 Fertilizer	Manufacturer
		Guaranteed
65576	Jarecki's Burley Tobacco Grower	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
12.45	1.95	14.40						3.95		31.3	65018
12.00	*1.00*	*13.00*						*4.00*		*30.4*	
15.25	1.40	16.65						5.12		38.7	65019
14.00	*1.00*	*15.00*						*4.00*		*33.4*	
16.90	1.50	18.40								20.3	65749
16.00	0.90	16.90								19.2	65750
16.00	*1.00*	*17.00*								*19.2*	
20.80	0.45	21.25								25.0	65022
20.00	*1.00*	*21.00*								*24.0*	
13.20	9.50	22.70				1.02	1.24			29.7	65023
10.00	*10.00*	*20.00*				*0.82*	*1.00*			*23.9*	
		26.90	85	15	0.38	2.47	3.00			36.3	65024
		27.00				*2.47*	*3.00*			*36.4*	
		24.35	63	37		3.95	4.80			43.2	65025
		22.00				*3.71*	*4.50*			*39.9*	
12.30	1.20	13.50			1.49	2.51	3.05	1.00	0.94	39.8	65026
12.00	*1.00*	*13.00*				*2.47*	*3.00*		*2.00*	*39.2*	
8.15	2.50	10.65			1.04	1.67	2.03		3.57	34.0	65027
8.00	*1.00*	*9.00*				*1.65*	*2.00*		*4.00*	*34.3*	
8.30	1.70	10.00			2.52	3.19	3.87	3.12		41.6	65028
8.00	*1.00*	*9.00*				*3.29*	*4.00*	*3.00*		*41.1*	
12.15	1.90	14.05			1.19	1.70	2.06			29.2	65029
12.00	*1.00*	*13.00*				*1.65*	*2.00*			*28.3*	
12.10	2.40	14.50			0.66	0.97	1.18	1.11		28.3	65030
12.00	*1.00*	*13.00*				*0.82*	*1.00*	*1.00*		*26.3*	
10.70	0.60	11.30			0.45	0.80	0.97	1.08		24.3	66027
10.25	0.85	11.10			0.42	0.80	0.97	1.03		23.6	65751
10.00	*1.00*	*11.00*				*0.82*	*1.00*	*1.00*		*23.3*	
8.65	3.05	11.70			1.17	1.66	2.02	2.21		30.8	65032
8.00	*1.00*	*9.00*				*1.65*	*2.00*	*2.00*		*28.3*	
8.20	1.10	9.30			0.54	0.89	1.08	1.12	0.68	23.5	66028
8.00	*1.00*	*9.00*				*0.82*	*1.00*	*1.00*		*20.3*	
8.50	1.70	10.20			2.16	2.44	2.96		5.70	45.2	66029
8.00	*1.00*	*9.00*				*2.47*	*3.00*		*6.00*	*45.2*	
10.35	1.75	12.10			1.10	1.62	1.97	4.05		38.1	65134
10.00	*1.00*	*11.00*				*1.65*	*2.00*	*4.00*		*37.3*	
8.55	1.70	10.25			2.02	2.60	3.16	6.93		49.9	65525
8.00	*1.00*	*9.00*				*2.47*	*3.00*	*6.00*		*45.2*	
8.15	0.70	8.85			1.68	2.69	3.27	1.40	4.60	47.7	65576
8.00	*1.00*	*9.00*				*2.47*	*3.00*		*6.00*	*45.2*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	The Jarecki Chemical Co., Armour Owned.	
66120	Jarecki's 2–14–2 Fertilizer	Manufacturer
		Guaranteed
66121	Jarecki's 2–29 Bone Meal	Manufacturer
		Guaranteed
	Ky. Fertilizer Co., Br. Federal Chem. Co., Inc., Louisville, Ky.	
65275	O. K. Special Mixture	Manufacturer
		Guaranteed
65752	†O. K. Grain Grower	C. M. Hill, Cecilia
66254		Smith and Smith, Shepherdsville
		Guaranteed
65753	O. K. Corn, Wheat and Oats Grower	Grover Lay, Russell Springs
65754		J. W. Burton, Columbia
		Guaranteed
65278	O. K. Old Reliable	Manufacturer
		Guaranteed
66368	†O. K. Special	J. L. Rogers, Milton
		Guaranteed
65281	O. K. Corn and Wheat Grower	Manufacturer
		Guaranteed
65284	O. K. Crop and Tobacco Grower	Manufacturer
		Guaranteed
66255	†Golden Leaf Tobacco Grower	L. R. Hart, Big Clifty
		Guaranteed
65286	O. K. Tobacco and Vegetable Grower	Manufacturer
		Guaranteed
65287	O. K. Mixture	Manufacturer
		Guaranteed
65288	O. K. Ammoniated Phosphate	Manufacturer
		Guaranteed
65289	O. K. Special Meal Mixture	Manufacturer
		Guaranteed
65290	O. K. Double-Header Corn and Wheat Grower	Manufacturer
		Guaranteed
65291	O. K. Half and Half Meal Mixture	Manufacturer
		Guaranteed
65292	Gold Medal Potash Fertilizer	Manufacturer
		Guaranteed
65757	O. K. Potash Special	E. C. Lawless, Jamestown
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
14.50	1.35	15.85			1.21	1.62	1.97	2.16		38.5	66120
14.00	*1.00*	*15.00*				*1.65*	*2.00*	*2.00*		*37.3*	
		28.90	81	19	0.99	1.96	2.38			34.9	66121
		29.00				*1.65*	*2.00*			*33.1*	
15.05	5.55	20.60			0.88	0.88	1.07		1.16	33.6	65275
11.50	*4.00*	*15.50*				*0.41*	*0.50*		*0.50*	*22.8*	
12.10	2.20	14.30			0.14	0.35	0.42	1.16		24.6	65752
12.30	1.20	13.50				0.31	0.38	0.75		23.0	66254
11.00	*4.00*	*15.00*				*0.41*	*0.50*		*1.00*	*23.6*	
10.90	3.10	14.00			0.20	0.35	0.42		1.05	22.8	65753
11.00	3.00	14.00			0.28	0.43	0.52	1.05		23.4	65754
11.00	*4.00*	*15.00*				*0.41*	*0.50*		*1.00*	*23.6*	
15.65	4.65	20.30			0.72	0.72	0.87		1.29	33.5	65278
13.00	*4.00*	*17.00*				*0.41*	*0.50*		*1.00*	*26.6*	
11.25	2.00	13.25			0.39	0.39	0.47		5.44	36.3	66368
11.00	*4.00*	*15.00*				*0.41*	*0.50*		*5.00*	*35.6*	
13.25	7.40	20.65			1.16	1.16	1.41		2.61	37.6	65281
10.00	*4.00*	*14.00*				*0.82*	*1.00*		*2.00*	*27.5*	
11.35	8.85	20.20			1.31	1.31	1.59		4.66	42.4	65284
8.00	*4.00*	*12.00*				*0.82*	*1.00*		*4.00*	*30.5*	
8.20	1.90	10.10			1.26	1.65	2.00	2.38		30.1	66255
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*2.00*	*29.5*	
10.90	5.40	16.30			2.20	2.20	2.67		7.82	55.2	65286
8.00	*4.00*	*12.00*				*1.23*	*1.50*		*6.00*	*39.0*	
15.90	5.60	21.50			0.82	0.82	1.00			31.0	65287
12.00	*4.00*	*16.00*				*0.41*	*0.50*			*22.1*	
18.20	1.30	19.50			0.74	0.74	0.90			32.3	65288
15.00	*4.00*	*19.00*				*0.41*	*0.50*			*26.6*	
12.75	5.75	18.50			2.53	2.84	3.45			38.5	65289
10.00	*5.00*	*15.00*				*2.47*	*3.00*			*31.8*	
13.40	8.00	21.40			1.15	1.15	1.40			30.2	65290
10.00	*10.00*	*20.00*				*0.82*	*1.00*			*23.9*	
11.30	9.60	20.90			1.97	1.97	2.39			32.6	65291
10.00	*10.00*	*20.00*				*1.65*	*2.00*			*28.9*	
9.50	11.10	20.60							2.63	26.6	65292
8.00	*8.00*	*16.00*							*2.00*	*21.2*	
11.90	2.40	14.30						2.19		25.4	65757
10.00	*2.00*	*12.00*							*2.00*	*21.8*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Ky. Fertilizer Co., Br. Federal Chem. Co.	
65758	O. K. High Grade Phosphate	J. W. Pardue, Smith Grove
65759		Grover Lay, Russell Springs
66036		T. G. Moren, London
66256		Smith and Smith, Shepherdsville
66257		L. Jackson, Caneyville
66369		S. Y. Cutshaw, Bedford
		Guaranteed
65295	O. K. Phosphate	Manufacturer
		Guaranteed
66037	O. K. Standard Phosphate	Smith and Smith, Shepherdsville
66258		Smith and Smith, Shepherdsville
		Guaranteed
65297	O. K. Special Phosphate Mixture	Manufacturer
		Guaranteed
65298	O. K. Raw Bone	Manufacturer
		Guaranteed
	Louisville Fertilizer Co. (Armour Owned), Louisville, Cincinnati, Nashville.	
65060	Louisville 2–14–2 Fertilizer	Manufacturer
		Guaranteed
65061	Louisville 3–12–4 Fertilizer	
		Guaranteed
65062	Louisville 4–12–0 Fertilizer	Manufacturer
		Guaranteed
65063	Louisville 0–14–4 Fertilizer	Manufacturer
		Guaranteed
65064	Louisville 0–10–10 Fertilizer	Manufacturer
		Guaranteed
65760	Louisville 1–12–1 Fertilizer	Jarrett Johnson, Waynesburg
		Guaranteed
65066	Louisville 1–8–4 Fertilizer	Manufacturer
		Guaranteed
65067	Louisville Bone Meal and Acid Phosphate	Manufacturer
65068	Plant Bed Special	Manufacturer
		Guaranteed
66038	Louisville Dark Tobacco Grower	Irvington Hardware Co., Irvington
		Guaranteed
65070	Louisville 4–8–3 Fertilizer	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
18.70	0.50	19.20								22.4	65758
16.70	1.70	18.40								20.0	65759
18.00	1.40	19.40								21.6	66036
16.25	0.95	17.20								19.5	66256
17.20	2.05	19.25								20.6	66257
17.35	1.35	18.70								20.8	66369
16.00	*2.00*	*18.00*								*19.2*	
16.35	4.00	20.35								19.6	65295
14.00	*2.00*	*16.00*								*16.8*	
13.00	1.00	14.00								15.6	66037
13.85	0.60	14.45								16.6	66258
12.00	*2.00*	*14.00*								*14.4*	
11.80	11.20	23.00								14.2	65297
10.00	*10.00*	*20.00*								*12.0*	
		22.00	70	30	0.39	4.76	5.78			46.2	65298
		22.00				*3.71*	*4.50*			*39.9*	
14.50	1.35	15.85			1.21	1.62	1.97	2.16		38.5	65060
14.00	*1.00*	*15.00*				*1.65*	*2.00*	*2.00*		*37.3*	
											65061
12.00	*1.00*	*13.00*				*2.47*	*3.00*	*4.00*		*45.2*	
12.85	0.70	13.55			2.26	3.30	4.01			39.4	65062
12.00	*1.00*	*13.00*				*3.29*	*4.00*			*38.1*	
15.25	1.40	16.65						5.12		38.7	65063
14.00	*1.00*	*15.00*						*4.00*		*33.4*	
10.80	2.95	13.75						11.57		52.1	65064
10.00	*1.00*	*11.00*						*10.00*		*45.4*	
12.70	0.40	13.10			0.51	0.88	1.07	0.90		27.2	65760
12.00	*1.00*	*13.00*				*0.82*	*1.00*	*1.00*		*26.3*	
8.75	2.55	11.30			0.60	0.91	1.10	4.85		34.2	65066
8.00	*1.00*	*9.00*				*0.82*	*1.00*	*1.00*		*29.3*	
13.20	9.50	22.70				1.02	1.24			29.7	65067
10.00	*10.00*	*20.00*				*0.82*	*1.00*			*23.9*	
12.30	1.20	13.50			1.49	2.51	3.05	1.00	0.94	39.8	65068
12.00	*1.00*	*13.00*				*2.47*	*3.00*		*2.00*	*39.2*	
8.40	0.60	9.00			1.12	1.92	2.33	0.56	3.86	37.6	66038
8.00	*1.00*	*9.00*				*1.65*	*2.00*		*4.00*	*34.3*	
8.30	1.70	10.00			2.52	3.19	3.87	3.12		41.6	65070
8.00	*1.00*	*9.00*				*3.29*	*4.00*	*3.00*		*41.1*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Louisville Fertilizer Co. (Armour Owned.)	
65071	Louisville 2–12–6 Fertilizer	Manufacturer
		Guaranteed
65073	Louisville 2–16–2 Fertilizer	Manufacturer
		Guaranteed
66040	Louisville 2–10–4 Fertilizer	Walter Young Coal Co., Owingsville
66041		L. D. Gividen, Sulphur
		Guaranteed
66370	Louisville 0–12–4 Fertilizer	Basket Grain Co., Henderson
		Guaranteed
65076	Louisville Bone Meal	Manufacturer
		Guaranteed
65077	Louisville Raw Bone	Manufacturer
		Guaranteed
65761	†Louisville 16% Acid Phosphate	S. E. Bedford, Glasgow
65762		Liberty Hardware Co., Liberty
66042		Jarrett Johnson, Waynesburg
66259		South Somerset Mills, Somerset
66371		Irvington Hardware and Impl. Co., Irvington
		Guaranteed
65763	Louisville 20% Acid Phosphate	T. E. Richardson, Campbellsville
66043		S. A. Browning, Vanceburg
		Guaranteed
65080	Louisville 2–12–0 Fertilizer	Manufacturer
		Guaranteed
65764	Louisville 1–10–1 Fertilizer	B. B. Sims, Jamestown
66262		Hurst, Brown Hardware Co., Bardstown
		Guaranteed
66044	Louisville 2–8–2 Fertilizer	Walter Young Coal Co., Owingsville
66263		N. T. Paul, Hudson
66372		Irvington Hardware and Impl. Co., Irvington
		Guaranteed
65765	Louisville 1–8–1 Fertilizer	Jarrett Johnson, Waynesburg
65766		B. B. Sims, Jamestown
66045		Walter Young Coal Co., Owingsville
		Guaranteed
65125	Louisville Superior Tobacco Grower	Manufacturer
		Guaranteed
65126	Louisville 2–8–1 Fertilizer	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
12.80	0.90	13.70			1.21	1.76	2.14	6.60		49.9	65071
12.00	*1.00*	*13.00*				*1.65*	*2.00*	*6.00*		*46.3*	
15.65	1.70	17.35			1.53	1.81	2.20	2.23		41.7	65073
16.00	*1.00*	*17.00*				*1.65*	*2.00*	*2.00*		*40.3*	
10.50	1.00	11.50			1.13	1.66	2.02	3.95		38.0	66040
10.80	1.30	12.10			0.72	1.44	1.75	4.40		38.6	66041
10.00	*1.00*	*11.00*				*1.65*	*2.00*	*4.00*		*37.3*	
11.45	2.50	13.95						4.19		30.8	66370
12.00	*1.00*	*13.00*						*4.00*		*30.4*	
		26.90	85	15	0.38	2.47	3.00			36.3	65076
		27.00				*2.47*	*3.00*			*36.4*	
		24.35	63	37	0.16	3.95	4.80			43.2	65077
		22.00				*3.71*	*4.50*			*39.9*	
17.00	1.30	18.30								20.4	65761
17.70	1.30	19.00								21.2	65762
17.10	1.30	18.40								20.5	66042
17.40	2.15	19.55								20.9	66259
16.50	1.20	17.70								19.8	66371
16.00	*1.00*	*17.00*								*19.2*	
20.80	1.00	21.80								25.0	65763
20.90	2.10	23.00								25.1	66043
20.00	*1.00*	*21.00*								*24.0*	
12.15	1.90	14.05			1.19	1.70	2.06			29.2	65080
12.00	*1.00*	*13.00*				*1.65*	*2.00*			*28.3*	
10.40	1.90	12.30			0.39	0.80	0.97	1.69		26.2	65764
10.75	0.85	11.60			0.52	0.86	1.04	1.30		25.5	66262
10.00	*1.00*	*11.00*				*0.82*	*1.00*	*1.00*		*23.3*	
10.20	0.80	11.00			1.05	1.89	2.29	2.07		33.2	66044
8.60	0.90	9.50			1.03	1.45	1.76	2.04		28.1	66263
9.05	0.95	10.10			1.15	1.67	2.03	2.22		32.1	66372
8.00	*1.00*	*9.00*				*1.65*	*2.00*	*2.00*		*28.3*	
8.30	0.70	9.00			0.54	0.95	1.15	1.11		21.8	65765
8.00	3.30	11.30			0.48	0.86	1.04	1.72		23.6	65766
8.90	1.00	9.90			0.61	0.96	1.17	1.09		22.8	66045
8.00	*1.00*	*9.00*				*0.82*	*1.00*	*1.00*		*20.3*	
9.65	2.60	12.25							4.64	29.4	65125
10.00	*1.00*	*11.00*							*5.00*	*30.4*	
8.30	2.70	11.10			1.13	1.65	2.00	1.20		27.0	65126
8.00	*1.00*	*9.00*				*1.65*	*2.00*	*1.00*		*25.3*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained	
	Louisville Fertilizer Co. (Armour Owned.)		
66046	Louisville Potash Mixture	Ratliff Hardware Co., Princeton	10
		Guaranteed	*10*
65128	Nitrate of Soda	Manufacturer	
		Guaranteed	
65527	Louisville 3–8–6 Fertilizer	Manufacturer	8
		Guaranteed	8
66048	†Louisville Burley Tobacco Grower	S. Caudill, Morehead	8
		Guaranteed	8
65552	Louisville Burley Special	Manufacturer	8
		Guaranteed	8
65553	Louisville Dark Tobacco Maker	Manufacturer	8
		Guaranteed	8
65554	Louisville Tobacco Special	Manufacturer	11
		Guaranteed	*10*
65768	Louisville 14% Acid Phosphate	Louis Cohen, Central City	16
		Guaranteed	*14*
65575	Louisville Burley Tobacco Grower	Manufacturer	8
		Guaranteed	*8*
66116	Louisville 2–14–2 Fertilizer	Manufacturer	14
		Guaranteed	*14*
66117	Louisville 2–29 Bone Meal	Manufacturer	
		Guaranteeed	
	Mt. Pleasant Fertilizer Co., Inc. (Sub. of Va-Car Chem. Co.), Nashville, Tenn.		
65769	Mt. Pleasant Big Winner Acid Phosphate	Grigsby and Co., Bardstown	19
65770		Farmers Union Supply Co., Franklin	18
66049		Ryan-Miller Co., Harden	18
66265		E. S. Diuguid and Son, Murray	17
66266		Farmers Union Supply Co., Franklin	15
66373		Geo. J. Lucas, Nebo	18
		Guaranteed	*16*
64992	Mt. Pleasant High Grade Acid Phosphate	Manufacturer	21
		Guaranteed	*20*
64993	Mt. Pleasant 24% Acid Phosphate	Manufacturer	25
		Guaranteed	*24*
65771	Mt. Pleasant Spl. Tobacco Grower	E. M. Garrett, Scottsville	8
		Guaranteed	*8*
64995	Mt. Pleasant Black Patch Tobacco Grower	Manufacturer	13
		Guaranteed	*7*

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
10.50	2.20	12.70						1.61		21.5	66046
10.00	*1.00*	*11.00*						*2.00*		*21.4*	
						15.62	18.96			93.7	65128
						14.81	*17.98*			*88.9*	
8.55	1.70	10.25			2.02	2.60	3.16	6.93		49.9	65527
8.00	*1.00*	*9.00*				*2.47*	*3.00*	*6.00*		*45.2*	
8.30	0.70	9.00			1.55	2.59	3.14	0.68	5.44	46.6	66048
8.00	*1.00*	*9.00*				*2.47*	*3.00*		*6.00*	*45.2*	
8.55	1.70	10.25			2.02	2.60	3.16	6.93		49.9	65552
8.00	*1.00*	*9.00*				*2.47*	*3.00*	*6.00*		*45.2*	
8.75	2.45	11.20			1.11	1.92	2.33	4.30		38.5	65553
8.00	*1.00*	*9.00*				*1.65*	*2.00*	*4.00*		*34.3*	
11.15	2.30	13.45						5.41		33.9	65554
10.00	*1.00*	*11.00*						*5.00*		*30.4*	
16.30	1.20	17.50								19.6	65768
14.00	*1.00*	*15.00*								*16.8*	
8.15	0.70	8.85			1.68	2.69	3.27	1.40	4.60	47.7	65575
8.00	*1.00*	*9.00*				*2.47*	*3.00*		*6.00*	*45.2*	
14.50	1.35	15.85			1.21	1.62	1.97	2.16		38.5	66116
14.00	*1.00*	*15.00*				*1.65*	*2.00*	*2.00*		*37.3*	
		28.90	81	19	0.99	1.96	2.38			34.9	66117
		29.00				*1.65*	*2.00*			*33.1*	
19.50	1.30	20.80								23.4	65769
18.90	3.20	22.10								22.7	65770
18.10	1.50	19.60								21.7	66049
17.55	2.00	19.55								21.1	66265
15.90	1.90	17.80								19.1	66266
18.50	2.10	20.60								22.2	66373
16.00	*2.00*	*18.00*								*19.2*	
21.90	0.70	22.60								27.3	64992
20.00	*2.00*	*22.00*								*24.0*	
25.10	0.70	25.80								30.1	64993
24.00	*2.00*	*26.00*								*28.8*	
8.00	8.20	16.20			0.75	1.13	1.37	1.86		27.6	65771
8.00	*4.00*	*12.00*				*1.23*	*1.50*		*1.50*	*25.5*	
13.20	3.90	17.10			0.37	0.51	0.62	1.93		30.2	64995
7.00	*9.00*	*16.00*				*0.41*	*0.50*		*1.00*	*19.6*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Mt. Pleasant Fertilizer Co., Inc. (Sub. of Va-Car Chem. Co.)	
65772	Mt. Pleasant H. Gr. Tobacco Grower	E. M. Garrett, Scottsville
		Guaranteed
64997	Mt. Pleasant Grain Grower	Manufacturer
		Guaranteed
65773	Mt. Pleasant Corn Special	E. G. Scruggs, Adairville
		Guaranteed
64999	Black Patch Universal	Manufacturer
		Guaranteed
66050	Mt. Pleasant Superior Tobacco Grower	E. S. Diuguid and Son, Murray
		Guaranteed
65002	Mt. Pleasant Burley Special	Manufacturer
		Guaranteed
65003	Mt. Pleasant Burley Tobacco Grower	Manufacturer
		Guaranteed
65004	Mt. Pleasant 10–4–0	Manufacturer
		Guaranteed
65774	Grigsby Special	Grigsby and Co., Bardstown
		Guaranteed
65007	Mt. Pleasant Half and Half	Manufacturer
		Guaranteed
65561	Black Patch Mt. Pleasant Special Acid Phos.	Manufacturer
		Guaranteed
65562	Black Patch Mt. Pleasant Soluble Bone	Manufacturer
		Guaranteed
65563	Mt. Pleasant Acid Phosphate	Manufacturer
		Guaranteed
66135	Mt. Pleasant Wheat Grower	Manufacturer
		Guaranteed
66137	Black Patch Grain Grower	Manufacturer
		Guaranteed
66138	Black Patch Wheat and Clover	Manufacturer
		Guaranteed
	New Louisville Rendering Co., Inc., Louisville, Ky.	
65590	Pure Animal Matter, Meat, Bones and Blood	Manufacturer
		Guaranteed
65591	Pure Bone Meal	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
9.20	6.20	15.40			1.08	1.70	2.06	2.97		35.4	65772
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*3.00*	*32.5*	
9.10	9.90	19.00			1.56	1.77	2.15			28.2	64997
8.00	*10.00*	*18.00*				*1.23*	*1.50*			*23.4*	
13.20	4.70	17.90			0.87	1.08	1.31			28.2	65773
12.00	*4.00*	*16.00*				*0.82*	*1.00*			*24.5*	
11.90	13.10	25.00			0.31	1.53	1.86			32.3	64999
10.00	*6.00*	*16.00*				*1.65*	*2.00*			*27.3*	
10.00	4.40	14.40						3.98		28.7	66050
8.00	*4.00*	*12.00*							*4.00*	*25.6*	
9.60	9.10	18.70			0.93	1.06	1.29	3.70		35.5	65002
8.00	*3.00*	*11.00*				*0.82*	*1.00*		*4.00*	*30.1*	
12.80	3.90	16.70			1.86	2.08	2.53			33.2	65003
12.00	*3.00*	*15.00*				*1.65*	*2.00*			*29.1*	
10.20	7.90	18.10			2.92	3.14	3.81			37.3	65004
10.00	*4.00*	*14.00*				*3.29*	*4.00*			*36.3*	
11.20	6.80	18.00			0.48	0.77	0.93	0.48	0.97	28.6	65774
10.00	*2.00*	*12.00*				*0.82*	*1.00*		*1.00*	*23.7*	
11.50	13.40	24.90			0.29	1.54	1.87			31.9	65007
10.00	*10.00*	*20.00*				*1.65*	*2.00*			*28.9*	
15.45	4.40	19.85								18.5	65561
14.00	*4.00*	*18.00*								*16.8*	
13.90	7.20	21.10								16.7	65562
12.00	*8.00*	*20.00*								*14.0*	
11.15	11.10	22.25								13.4	65563
10.00	*12.00*	*22.00*								*12.0*	
8.20	8.45	16.65			0.80	1.35	1.64	1.81		29.2	66135
8.00	*4.00*	*12.00*				*1.23*	*1.50*	*1.50*		*25.5*	
7.25	14.20	21.45			0.22	0.42	0.51	1.12		22.4	66137
7.00	*9.00*	*16.00*				*0.41*	*0.50*	*1.00*		*19.6*	
10.80	9.40	20.20						2.07		26.2	66138
10.00	*5.00*	*15.00*						*2.00*		*23.0*	
		17.10	76	24	1.49	6.14	7.45			50.5	65590
		10.00				*4.00*	*4.86*			*32.0*	
		23.60	47	53	0.40	4.05	4.92			43.2	65591
		22.00				*3.50*	*4.25*			*38.6*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	The Nitrate Agencies Co., New Orleans, La.	
66053	Nitrate of Soda	Yopp Seed Co., Paducah
		Guaranteed
	Price Chemical Co., Inc., Louisville, Ky.	
66267	†Special Corn and Wheat Fertilizer	Peoples Store, Loretto
		Guaranteed
65458	Universal Crop Fertilizer	Manufacturer
		Guaranteed
65459	Walter Crady's Vegetable, Potato and Tobacco Spl.	Manufacturer
		Guaranteed
66054	One-Ten-One Fertilizer	J. C. Starns, Williamstown
		Guaranteed
65465	High Grade Special	Manufacturer
		Guaranteed
65466	Old Time Grain Fertilizer	Manufacturer
		Guaranteed
65470	H. Gr. Tobacco Bed Special	Manufacturer
		Guaranteed
65471	Potato and Tobacco Fertilizer	Manufacturer
		Guaranteed
65473	Victory Grain Special	Manufacturer
		Guaranteed
66270	Potash Tobacco Fertilizer	Flaherty Hdw. Co., Vine Grove
		Guaranteed
65781	Phosphate and Potash	H. F. Upchurch, Susie
		Guaranteed
65476	Extra High Grade Phosphate	Manufacturer
		Guaranteed
65782	High Grade Phosphate	Peoples Store, Loretto
66059		A. D. Roberts, Hawesville
66106		D. M. Hocker, Corbin
66271		Peoples Store, Loretto
66272		Farmers Union Supply Co., Glasgow
66273		Aaron Moore, Leitchfield
		Guaranteed
65478	Steamed Bone	Manufacturer
		Guaranteed
65784	Acid Phosphate	I. K. Miller and Sons, Campbellsville
		Guaranteed
65885	Grain and Grass Grower	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
						15.68	19.04			94.1	66053
						15.00	*18.23*			90.0	
12.00	1.15	13.15				0.48	0.58	0.97		24.3	66267
11.00	*4.00*	*15.00*				*0.41*	*0.50*	*1.00*		*23.6*	
13.60	0.50	14.10			0.71	0.92	1.12	1.15		29.6	65458
12.00	*4.00*	*16.00*				*0.82*	*1.00*	*1.00*		*27.5*	
12.20	0.80	13.00			0.65	0.94	1.14	3.12		33.6	65459
11.00	*4.00*	*15.00*				*0.82*	*1.00*	*3.00*		*32.0*	
11.05	1.90	12.95			0.75	1.28	1.55	1.42		29.3	66054
10.00	*4.00*	*14.00*				*0.82*	*1.00*	*1.00*		*24.5*	
10.90	1.50	12.40			1.32	1.74	2.11	2.13		33.8	65465
10.00	*4.00*	*14.00*				*1.65*	*2.00*	*2.00*		*32.5*	
8.70	1.60	10.30			1.37	1.76	2.14	2.40		31.5	65466
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*2.00*		*29.5*	
10.60	1.70	12.30			2.71	3.33	4.04			36.6	65470
10.00	*4.00*	*14.00*				*3.29*	*4.00*			*36.3*	
11.00	2.70	13.70			2.83	3.41	4.14			38.0	65471
10.00	*4.00*	*14.00*				*3.29*	*4.00*			*36.3*	
16.40	1.30	17.70			0.24	0.48	0.58			28.0	65473
14.00	*4.00*	*18.00*				*0.41*	*0.50*			*25.1*	
10.60	0.30	10.90						5.02		31.1	66270
10.00	*2.00*	*12.00*						*5.00*		*30.8*	
11.70	0.70	12.40						1.86		23.4	65781
10.00	*2.00*	*12.00*						*2.00*		*21.8*	
21.40	0.60	22.00								25.7	65476
18.00	*2.00*	*20.00*								*21.6*	
17.40	0.60	18.00								20.9	65782
16.75	0.85	17.60								20.1	66059
16.35	0.85	17.20								19.6	66106
16.75	0.45	17.20								20.1	66271
16.80	0.50	17.30								20.2	66272
17.15	0.50	17.65								20.6	66273
16.00	*2.00*	*18.00*								*19.2*	
		32.20	80	20		1.04	1.26			32.0	65478
		30.00				*1.03*	*1.25*			*30.2*	
12.00	1.50	13.50								14.4	65784
12.00	*2.00*	*14.00*								*14.4*	
8.40	1.40	9.80			0.46	0.80	0.97		1.09	21.2	65885
8.00	*4.00*	*12.00*				*0.41*	*0.50*	*1.00*		*19.1*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Price Chemical Co., Inc.	
65886	Acid Phosphate	Manufacturer
		Guaranteed
66374	Miller's Special Wheat Grower	I. K. Miller and Sons, Campbellsville
		Guaranteed
	Rasin-Monumental Co., Sub. of Va-Car Chem. Co., Cincinnati, Nashville, Memphis,	
65786	Rasin's 16% Acid Phosphate	Lessenberry and Jones, Glasgow
65787		J. H. Wyan, London
		Guaranteed
65788	Rasin's 20% Acid Phosphate	J. H. Wyan, London
		Guaranteed
65324	Rasin's 24% Acid Phosphate	Manufacturer
		Guaranteed
65325	Rasin's 10–5 Acid and Potash	Manufacturer
		Guaranteed
65326	Rasin's Royal Grain Grower	Manufacturer
		Guaranteed
65789	Raisin's Special Plant Food	J. H. Wyan, London
		Guaranteed
65328	Rasin's Reliable Wheat and Corn Fertilizer	Manufacturer
		Guaranteed
65329	Rasin's Big Giant Phosphate	Manufacturer
		Guaranteed
65330	Rasin's General Favorite	Manufacturer
		Guaranteed
65332	Rasin's Truck and Tobacco Fertilizer	Manufacturer
		Guaranteed
65790	Rasin's 2–8–4 Tobacco Grower	J. H. Wyan, London
		Guaranteed
65334	Rasin's Phosphate and Bone Meal	Manufacturer
		Guaranteed
65791	Rasin's Raw Bone Meal	Lessenberry and Jones, Glasgow
		Guaranteed
	Read Phosphate Co., Nashville, Tenn.	
65792	Read's Blood and Bone No. 1	I. K. Miller and Sons, Campbellsville
		Guaranteed
65793	Read's High Grade Tobacco Grower	Clint Smith, Franklin
65794		Wooldridge and Williams, Sewellton
66061		M. D. Royse, Winchester
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
16.10	0.70	16.80								19.3	65886
14.00	*2.00*	*16.00*								*16.8*	
12.05	0.75	12.80			0.40	0.60	0.73			21.8	66374
12.00	*2.00*	*14.00*				*0.41*	*0.50*			*21.3*	
18.50	3.50	22.00								22.2	65786
18.30	1.30	19.60								22.0	65787
16.00	*1.50*	*17.50*								*19.2*	
23.30	1.20	24.50								28.0	65788
20.00	*1.50*	*21.50*								*24.0*	
28.40	0.70	29.10								34.1	65324
24.00	*1.50*	*25.50*								*28.8*	
10.90	1.40	12.30						6.12	2.55	42.9	65325
10.00	*1.50*	*11.50*						*5.00*		*30.6*	
13.55	1.70	15.25						0.60	2.33	29.8	65326
12.00	*1.50*	*13.50*						*2.00*		*24.6*	
14.00	1.30	15.30			0.53	1.67	2.03			31.5	65789
12.00	*1.50*	*13.50*				*1.65*	*2.00*			*28.5*	
8.90	2.30	11.20			0.26	1.05	1.27	0.68	1.98	28.6	65328
8.00	*1.50*	*9.50*				*0.82*	*1.00*	*2.00*		*23.5*	
9.20	1.00	10.20			0.67	1.01	1.23		3.16	29.7	65329
8.00	*1.50*	*9.50*				*0.82*	*1.00*	*3.00*		*26.5*	
11.40	1.40	12.80			1.60	1.89	2.29	1.80	1.00	37.4	65330
8.00	*1.50*	*9.50*				*1.65*	*2.00*	*2.00*		*28.5*	
10.40	1.80	12.20			1.79	2.94	3.57			34.3	65332
9.00	*1.50*	*10.50*				*2.47*	*3.00*			*28.9*	
8.80	1.90	10.70			1.33	1.55	1.88	1.68	2.52	35.9	65790
8.00	*1.50*	*9.50*				*1.65*	*2.00*		*4.00*	*34.5*	
9.75	13.85	23.60				1.01	1.23			26.2	65334
10.00	*12.00*	*22.00*				*0.82*	*1.00*			*24.7*	
		25.20	100			3.38	4.10			40.4	65791
		20.00				*3.71*	*4.50*			*38.3*	
7.80	6.10	13.90			0.63	1.61	1.95	2.54		31.4	65792
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*2.00*	*29.5*	
7.90	5.80	13.70			1.11	1.78	2.16	3.28	0.55	36.3	65793
8.80	4.90	13.70			0.88	1.68	2.04	4.00	0.42	38.5	65794
7.70	5.10	12.80			0.71	1.55	1.88	4.01		34.9	66061
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*4.00*	*35.5*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Read Phosphate Co.	
66062	Read's Special Burley Tobacco Grower	Boone County Farm Bureau, Florence
		Guaranteed
65795	Read's Kentucky Tobacco Grower	Young Hardware Co., Hopkinsville
65796		S. A. Browning, Vanceburg
66063		F. L. Selby, Esto
		Guaranteed
65797	Read's Kentucky Blood and Bone	Leslie Meece, Font Hill
65798		Hollingsworth and Young, Bowling Green
66064		J. A. Ramsey and Co., Murl
66275		J. H. Jasper, Somerset
		Guaranteed
65799	†Read's Kentucky Special	Leslie Meece, Font Hill
		Guaranteed
65801	Read's High Grade Tobacco and Truck Grower	I. K. Miller and Sons, Campbellsville
65802		U. L. Antle, Columbia
66276		Hollingsworth-Young Hardware Co., Bowling Green
		Guaranteed
64847	Read's Premium Grain Grower	Manufacturer
		Guaranteed
65803	Read's Farmers Special Manure	Wooldridge and Williams, Sewellton
66277		Hollingsworth-Young Hardware Co., Bowling Green
		Guaranteed
64849	Read's High Grade Ammoniated Dissolved Bone	Manufacturer
		Guaranteed
65804	Read's Corn and Wheat Grower	Leslie Meece, Font Hill
66278		J. H. Jasper, Somerset
66279		W. S. Overstreet, La Grange
		Guaranteed
65805	Read's Alkaline Bone	U. L. Antle, Columbia
65806		J. A. Chisholm, Fountain Run
66281		J. H. Jasper, Somerset
		Guaranteed
65807	Read's Standard Grain Grower	I. K. Miller and Sons, Campbellsville
65808		F. L. Selby, Esto
66282		J. H. Jasper, Somerset
66283		W. S. Overstreet, La Grange
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
10.70	0.70	11.40			1.20	2.52	3.06	5.60		48.3	66062
8.00	*3.00*	*11.00*				*2.47*	*3.00*		*5.00*	*43.0*	
8.10	5.10	13.20			0.70	1.33	1.61	2.16		28.7	65795
8.60	6.00	14.60			0.28	1.02	1.24	0.88	0.62	25.9	65796
7.95	7.40	15.35			0.24	0.93	1.13	0.92	0.57	24.9	66063
8.00	*5.00*	*13.00*				*0.82*	*1.00*		*1.00*	*21.9*	
7.90	6.40	14.30				0.78	0.95	0.52	0.71	22.8	65797
8.50	6.90	15.40			0.24	1.01	1.23	0.76	0.84	26.4	65798
8.95	8.20	17.15			0.26	0.82	1.00		1.00	24.6	66064
9.80	6.20	16.00				0.65	0.79	1.67		26.1	66275
8.00	*5.00*	*13.00*				*0.82*	*1.00*	*1.00*		*21.9*	
8.40	7.50	15.90			0.34	0.75	0.91	1.40	2.54	31.9	65799
8.00	*5.00*	*13.00*				*0.41*	*0.50*	*4.00*		*28.5*	
8.20	3.80	12.00			1.41	2.10	2.55	8.40		51.6	65801
8.60	5.20	13.80			1.13	1.86	2.26	1.56	7.88	54.5	65802
9.15	3.50	12.65			0.71	1.37	1.66	1.84	6.15	47.6	66276
8.00	*3.00*	*11.00*				*1.65*	*2.00*		*8.00*	*47.1*	
13.60	2.90	16.50			1.80	2.06	2.50	0.62	1.47	40.2	64847
12.00	*4.00*	*16.00*				*1.65*	*2.00*	*2.00*		*35.5*	
10.10	3.10	13.20			0.32	1.12	1.36	3.57		33.8	65803
10.15	6.55	16.70			0.29	0.99	1.20	2.70		31.9	66277
10.00	*4.00*	*14.00*				*0.82*	*1.00*	*3.00*		*30.5*	
12.30	2.30	14.60			1.79	2.23	2.71	1.12	1.58	40.9	64849
10.00	*4.00*	*14.00*				*1.65*	*2.00*	*2.00*		*32.5*	
10.80	5.20	16.00			0.21	0.70	0.85	0.76	1.61	29.6	65804
11.25	5.15	16.40				0.54	0.66	1.05		25.3	66278
11.75	5.95	17.70				0.33	0.40	1.34		26.0	66279
11.00	*4.00*	*15.00*				*0.41*	*0.50*	*1.00*		*23.6*	
10.00	7.80	17.80						2.71		26.3	65805
9.90	8.30	18.20						2.71		26.3	65806
10.45	8.30	18.75						2.95		27.9	66281
10.00	*8.00*	*18.00*						*2.00*		*24.2*	
13.20	4.40	17.60				0.45	0.55			24.3	65807
12.10	4.50	16.60				0.57	0.69			23.4	65808
12.25	4.55	16.80				0.52	0.63			23.3	66282
11.45	5.80	17.25				0.53	0.64			22.7	66283
12.00	*5.00*	*17.00*				*0.41*	*0.50*			*22.5*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Read Phosphate Co.	
65809	Read's High Grade Acid Phosphate	U. L. Antle, Columbia
		Guaranteed
65810	Read's Special High Grade Acid Phosphate	Leslie Meece, Font Hill
65811		S. A. Browning, Vanceburg
66065		Marion Milling Co., Marion
66284		W. S. Overstreet, La Grange
66285		J. H. Jasper, Somerset
66375		Burk and Price Co., Owensboro
66376		B. F. Beard and Co., Hardinsburg
		Guaranteed
64856	Read's Premium Acid Phosphate	Manufacturer
		Guaranteed
66377	Read's Half and Half	Beard Bros., Hardinsburg
		Guaranteed
65812	†Read's Pure Raw Bone Meal	Clint Smith, Franklin
66286		W. S. Overstreet, La Grange
		Guaranteed
66067	Bright Leaf Tobacco Grower	M. D. Royse, Winchester
		Guaranteed
65586	Read's Prize Tobacco Grower	Manufacturer
		Guaranteed
65587	Read's Red Diamond Tobacco Grower	Manufacturer
		Guaranteed
66068	Standard Tobacco Grower	W. P. Poyner, Mayfield
66069		Ballard County Farm Bureau, Barlow
		Guaranteed
65813	XXX Dissolved Bone	W. L. Calhoun, Montpelier
		Guaranteed
	Smith Agricultural Chemical Co., Columbus, Ohio.	
65814	Smith's Potato and Tobacco Special	J. C. Everett and Co., Maysville
		Guaranteed
65517	Smith's Tobacco Grower	Manufacturer
		Guaranteed
65518	Smith's Standard 2–12–6	Manufacturer
		Guaranteed
65519	Smith's Standard 10–10	Manufacturer
		Guaranteed
65815	Smith's Standard 16% Acid Phosphate	J. C. Everett and Co., Maysville
		Guaranteed
65521	Smith's 10–2	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
17.20	3.40	20.60								20.6	65809
14.00	*4.00*	*18.00*								*16.8*	
17.00	3.10	20.10								20.4	65810
17.40	3.35	20.75								20.9	65811
15.95	2.80	18.75								19.1	66065
16.20	4.00	20.20								19.4	66284
17.05	3.25	20.30								20.5	66285
17.30	4.30	21.60								20.8	66375
15.65	5.20	20.85								18.8	66376
16.00	*2.00*	*18.00*								*19.2*	
19.10	0.70	19.80								22.9	64856
18.00	*1.00*	*19.00*								*21.6*	
10.65	13.00	23.65				1.94	2.36			32.8	66377
10.00	*10.00*	*20.00*				*1.85*	*2.25*			*30.1*	
		21.35	55	45	0.29	3.70	4.49			39.3	65812
		22.00	40	60		3.75	4.55			40.1	66286
		20.00				*3.71*	*4.50*			*38.3*	
9.90	3.75	13.65			0.91	1.67	2.03		0.98	29.3	66067
9.00	*4.00*	*13.00*				*1.65*	*2.00*		*1.00*	*28.0*	
11.60	2.30	13.90			1.55	2.56	3.11	3.14		43.1	65586
10.00	*4.00*	*14.00*				*2.47*	*3.00*		*3.00*	*40.4*	
11.80	4.00	15.80			1.81	4.03	4.89			43.5	65587
10.00	*4.00*	*14.00*				*3.29*	*4.00*			*36.3*	
8.15	5.40	13.55			0.77	1.54	1.87	2.21		30.3	66068
7.45	4.00	11.45			0.64	1.71	2.08	2.08		29.3	66069
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*2.00*	*29.5*	
14.75	4.90	19.65								17.7	65813
12.00	*6.00*	*18.00*								*14.4*	
8.10	1.35	9.45			0.31	0.80	0.97	7.19		39.1	65814
8.00						*0.82*	*1.00*	*7.00*		*37.9*	
7.70	1.20	8.90			0.45	0.80	0.97	4.02		28.9	65517
8.00						*0.82*	*1.00*	*4.00*		*28.9*	
11.80	1.50	13.30			1.08	1.50	1.82	6.34		46.3	65518
12.00						*1.65*	*2.00*	*6.00*		*45.9*	
10.20	0.80	11.00						10.46		47.0	65519
10.00								*10.00*		*45.0*	
16.60	1.60	18.20								19.9	65815
16.00										*19.2*	
10.20	1.00	11.20						1.92		21.5	65521
10.00								*2.00*		*21.0*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained	
	Smith Agricultural Chemical Co.		
65522	Smith's 1–8–2	Manufacturer	
		Guaranteed	
65583	Smith's Standard 20% Acid Phosphate	Manufacturer	
		Guaranteed	
65865	Smith's Standard 2–12–2	Manufacturer	
		Guaranteed	
	Smith Bros., New Albany, Ind.		
66071	Corn and Wheat Grower	W. S. Overstreet, La Grange	
		Guaranteed	
66070	Champion Potato and Tobacco Grower	W. S. Overstreet, La Grange	
		Guaranteed	
66127	Acid Phosphate	Manufacturer	
		Guaranteed	
66378	Half and Half	W. T. Crum, Smithfield	
		Guaranteed	
66129	Kentucky Tobacco Grower	Manufacturer	
		Guaranteed	
66130	Champion Crop Grower	Manufacturer	
		Guaranteed	
	Southern Fertilizer Co., Inc., Louisville, Ky.		
65403	Elk Special Grain Grower	Manufacturer	
		Guaranteed	
66072	Elk Special Tobacco Grower	Ratliff Hardware Co., Princeton	
		Guaranteed	
66073	Atlas Phosphate	Conrad, Payne and Co., Cloverport	
66288		Ratliff Hardware Co., Princeton	
		Guaranteed	
66075	Elk Tobacco Grower	Bush Coal Co., Winchester	
		Guaranteed	
66074	Elk Corn and Wheat Grower	Bush Coal Co., Winchester	
		Guaranteed	
	Swift and Co., Inc., National Stock Yards, Ill.		
65430	Swift's Red Steer 3–12–4 Fertilizer	Manufacturer	
		Guaranteed	
65816	†Swift's Red Steer 3–8–6 Fertilizer	D. E. Patterson, Hodgenville	
		Guaranteed	
65817	†Swift's Diamond "B" Fertilizer	V. R. Sanders, Rocky Hill	
		Guaranteed	
65433	Swift's Diamond "A" Fertilizer	Manufacturer	
		Guaranteed	

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
8.70	1.30	10.00			0.46	0.74	0.90	2.12		24.4	65522
8.00						*0.82*	*1.00*	*2.00*		*22.9*	
20.90	0.85	21.75								25.1	65583
20.00										*24.0*	
11.90	1.60	13.50			1.11	1.49	1.81	1.90		33.1	65865
12.00						*1.65*	*2.00*	*2.00*		*33.9*	
13.15	2.10	15.25				0.77	0.93			25.2	66071
12.00	*2.00*	*14.00*				*0.82*	*1.00*			*23.7*	
9.60	3.00	12.60			0.77	1.63	1.98	1.94		31.2	66070
10.00	*2.00*	*12.00*				*1.65*	*2.00*	*2.00*		*31.7*	
17.70	1.20	18.90								21.2	66127
16.00	*2.00*	*18.00*								*19.2*	
6.10	6.70	12.80			0.51	1.76	2.14	1.38		26.5	66378
6.00	*6.00*	*12.00*				*1.65*	*2.00*	*1.00*		*24.3*	
8.60	0.70	9.30			1.69	1.69	2.05	3.16	0.93	35.6	66129
8.00	*2.00*	*10.00*				*1.65*	*2.00*	*4.00*		*34.7*	
12.20	0.90	13.10			2.13	2.13	2.59	1.88	0.72	39.2	66130
12.00	*2.00*	*14.00*				*1.65*	*2.00*	*2.00*		*34.7*	
11.80	2.35	14.15			0.29	0.47	0.57	2.49		28.9	65403
11.00	*1.00*	*12.00*				*0.41*	*0.50*	*2.00*		*25.4*	
11.05	0.65	11.70			0.25	0.49	0.59	1.12		23.1	66072
10.00	*1.00*	*11.00*				*0.41*	*0.50*		*1.00*	*20.9*	
16.40	1.10	17.50								19.7	66073
16.75	1.10	17.85								20.1	66288
16.00										*19.2*	
8.85	0.65	9.55			0.88	1.44	1.75	1.01		25.2	66075
8.00	*1.00*	*9.00*				*1.65*	*2.00*		*1.00*	*25.3*	
7.70	0.55	8.25			0.64	0.99	1.20	0.97		20.6	66074
7.00	*1.00*	*8.00*				*0.82*	*1.00*		*1.00*	*18.8*	
12.90	4.00	16.90			0.36	2.41	2.93	4.17		47.9	65430
12.00	*1.00*	*13.00*				*2.47*	*3.00*	*4.00*		*45.2*	
7.75	2.95	10.70			2.39	2.60	3.16	6.34		47.4	65816
8.00	*3.00*	*11.00*				*2.47*	*3.00*	*6.00*		*46.0*	
8.75	3.35	12.00			2.27	2.27	2.76	4.98		43.0	65817
8.00	*3.00*	*11.00*				*2.47*	*3.00*	*5.00*		*43.0*	
8.50	3.80	12.30			1.31	2.66	3.23	3.09		39.5	65433
8.00	*3.00*	*11.00*				*2.47*	*3.00*	*3.00*		*37.0*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Swift and Co., Inc.	
65820	†Swift's Red Steer 2–16–2 Fertilizer	South Somerset Mills, Somerset
		Guaranteed
65822	†Swift's Champion Wheat and Corn Grower	J. W. Collier, Crab Orchard
66108		Bryley Supply Co., Pineville
		Guaranteed
65438	Swift's Special Grain Grower	Manufacturer
		Guaranteed
65824	†Swift's Diamond "W" Vegetable and Tobacco Grower	W. E. Burress, Greensburg
66379		Young and Bishop, Providence
66380		G. H. Harris, Cloverport
		Guaranteed
65825	Swift's Diamond "K" Grain Grower	I. K. Miller and Sons, Campbellsville
65826		South Somerset Mills, Inc., Somerset
66293		South Somerset Mills, Inc., Somerset
66291		J. B. Marriott, Cecilia
66292		I. K. Miller and Sons, Campbellsville
		Guaranteed
65442	Swift's Diamond "W" Tobacco Grower	Manufacturer
		Guaranteed
65827	Swift's Complete Fertilizer	Jno. B. Marriott, Cecilia
66079		J. W. Rider, Mt. Vernon
66080		Bryley Supply Co., Pineville
66294		J. B. Marriott, Cecilia
		Guaranteed
65444	Swift's Red Steer 4–12–0 Fertilizer	Manufacturer
		Guaranteed
65445	Swift's Blood and Phosphate	Manufacturer
		Guaranteed
65446	Swift's Corn and Oats Special	Manufacturer
		Guaranteed
66109	Swift's Tankage and Bone Phosphate	W. S. Overstreet, La Grange
		Guaranteed
66295	Swift's Red Steer 0–14–4 Fertilizer	Mayhew and Gilbert, Franklin
		Guaranteed
65449	Swift's 12–4 Phosphate and Potash	Manufacturer
		Guaranteed
65450	Swift's 14–2 Phosphate and Potash	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
17.40	0.75	18.15			1.67	1.67	2.03	2.00		42.4	65820
16.00	*1.00*	*17.00*				*1.65*	*2.00*	*2.00*		*40.3*	
12.30	3.10	15.40			1.48	1.48	1.80	2.06		34.8	65822
12.80	2.20	15.00			1.31	1.53	1.86	2.33		36.3	66108
12.00	*3.00*	*15.00*				*1.65*	*2.00*	*2.00*		*35.1*	
10.75	3.20	13.95			1.30	1.72	2.09	2.05		33.9	65438
10.00	*3.00*	*13.00*				*1.65*	*2.00*	*2.00*		*32.1*	
8.90	2.80	11.70			1.62	1.62	1.97	2.97		33.1	65824
8.65	2.85	11.50			1.62	1.62	1.97	3.11		33.2	66379
8.95	2.65	11.60			1.61	1.61	1.95	2.95		33.0	66380
8.00	*3.00*	*11.00*				*1.65*	*2.00*	*3.00*		*32.1*	
13.35	2.55	15.90			0.86	0.86	1.04	0.85		28.8	65825
13.15	0.85	14.00			1.18	1.38	1.68	0.97		31.3	65826
11.90	2.10	14.00			0.90	0.90	1.09	1.03		27.2	66293
12.30	1.10	13.40			0.84	0.84	1.02	0.91		26.7	66291
12.20	1.10	13.30			0.81	0.81	0.98	0.93		26.4	66292
12.00	*3.00*	*15.00*				*0.82*	*1.00*	*1.00*		*27.1*	
8.90	3.30	12.20			1.19	1.75	2.12	1.09		28.4	65442
8.00	*3.00*	*11.00*				*1.65*	*2.00*	*1.00*		*26.1*	
9.80	2.20	12.00			1.09	1.09	1.32	1.00		25.1	65827
8.10	2.20	10.30			0.60	0.91	1.10	1.38		22.6	66079
9.35	2.35	11.70			0.96	0.96	1.17	1.24		24.5	66080
7.90	1.70	9.60			0.86	0.86	1.04	1.05		20.8	66294
8.00	*3.00*	*11.00*				*0.82*	*1.00*	*1.00*		*21.1*	
12.95	3.25	16.20			1.77	3.38	4.10			41.0	65444
12.00	*3.00*	*15.00*				*3.29*	*4.00*			*38.9*	
13.00	2.15	15.15			1.24	1.62	1.97			30.1	65445
12.00	*3.00*	*15.00*				*1.65*	*2.00*			*29.1*	
10.80	3.20	14.00			1.41	1.80	2.19			28.3	65446
10.00	*3.00*	*13.00*				*1.65*	*2.00*			*26.1*	
12.05	3.90	15.95			0.87	0.87	1.06			24.9	66109
12.00	*3.00*	*15.00*				*0.82*	*1.00*			*24.1*	
14.50	1.50	16.00						3.76		33.6	66295
14.00								*4.00*		*33.0*	
13.00	3.35	16.35						3.96		32.7	65449
12.00								*4.00*		*30.0*	
15.30	2.45	17.75						1.93		29.7	65450
14.00								*2.00*		*27.0*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Swift and Co., Inc.	
65828	Swift's Red Steer 20% Acid Phosphate	South Somerset Mills, Inc., Somerset
66081		Yopp Seed Co., Paducah
66381		J. L. Townsend Co., Clay
		Guaranteed
65829	Swift's High Grade Acid Phosphate Fertilizer	Hoy McClure, Somerset
66296		South Somerset Mills, Inc., Somerset
66297		J. B. Marriott, Cecilia
66298		Grigsby and Co., Bardstown
		Guaranteed
65830	Swift's Bone Meal and Phosphate	J. W. Collier, Crab Orchard
66299		I. K. Miller and Sons, Campbellsville
		Guaranteed
66300	Swift's Raw Bone Meal Fertilizer	J. B. Marriott, Cecilia
66301		Mayhew and Gilbert, Franklin
		Guaranteed
65455	Swift's 2¼–29 Bone Meal Fertilizer	Manufacturer
		Guaranteed
65831	Swift's 1¼–29 Bone Meal Fertilizer	R. T. Kirkman, Elkton
66302		I. K. Miller and Sons, Campbellsville
66303		Mayhew and Gilbert, Franklin
66304		South Somerset Mills, Inc., Somerset
66382		Young and Bishop, Providence
		Guaranteed
65832	Swift's Bone Meal Fertilizer	South Somerset Mills, Inc., Somerset
		Guaranteed
	Taylor and Powell Fertilizer Co., Springfield, Tenn.	
65571	No. 4 Tobacco Grower	Manufacturer
		Guaranteed
	Tennessee Chemical Co. (Armour owned), Louisville, Cincinnati, Nashville.	
65084	Plant Bed Special	Manufacturer
		Guaranteed
65086	Ox 4–8–3 Fertilizer	Manufacturer
		Guaranteed
65835	†Ox 2–12–6 Fertilizer	W. F. Grainger, Franklin
		Guaranteed
65088	Ox 2–12–2 Fertilizer	Manufacturer
		Guaranteed
66083	Ox 2–16–2 Fertilizer	J. J. Shaver, Mayfield
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
21.00	0.75	21.75								25.2	65828
22.50	0.50	23.00								27.0	66081
21.85	1.10	22.95								26.2	66381
20.00										*24.0*	
17.50	0.45	17.95								21.0	65829
18.00	1.30	19.30								21.6	66296
17.20	1.60	18.80								20.6	66297
17.60	1.30	18.90								21.1	66298
16.00										*19.2*	
12.70	6.80	19.50			0.38	0.82	1.00			26.7	65830
16.30	5.50	21.80			0.23	0.90	1.09			32.1	66299
13.00	*7.00*	*20.00*				*0.82*	*1.00*			*27.2*	
		22.90	100		0.30	4.69	5.69			46.5	66300
		23.20	100			4.49	5.45			45.5	66301
		23.00				*3.71*	*4.50*			*40.7*	
		30.15	83	17	0.32	2.05	2.49			36.4	65455
		29.00				*1.85*	*2.25*			*34.3*	
		33.15	80	20	0.30	1.13	1.37			33.3	65831
		31.90	78	22	0.31	1.21	1.47			32.8	66302
		30.00	73	27	0.29	1.22	1.48			31.3	66303
		29.60	80	20	0.42	1.11	1.35			30.3	66304
		31.55	75	25	0.40	1.24	1.51			32.7	66382
		29.00				*1.03*	*1.25*			*29.4*	
		28.15	77	23	0.43	2.49	3.02			37.5	65832
		24.00				*2.47*	*3.00*			*34.0*	
10.20	4.80	15.00			4.02	4.02	4.88			41.3	65571
10.00						*2.47*	*3.00*			*29.8*	
12.90	0.85	13.75			1.35	2.61	3.17	1.20	1.35	43.0	65084
12.00	*1.00*	*13.00*				*2.47*	*3.00*		*2.00*	*39.2*	
8.30	1.70	10.00			2.52	3.19	3.87	3.12		41.6	65086
8.00	*1.00*	*9.00*				*3.29*	*4.00*	*3.00*		*41.1*	
12.15	1.80	13.95			1.01	1.47	1.78	6.15		46.2	65835
12.00	*1.00*	*13.00*				*1.65*	*2.00*	*6.00*		*46.3*	
11.55	1.70	13.25			1.23	1.69	2.05	1.99		34.1	65088
12.00	*1.00*	*13.00*				*1.65*	*2.00*	*2.00*		*34.3*	
15.70	1.90	17.60			1.35	1.67	2.03	2.03		40.4	66083
16.00	*1.00*	*17.00*				*1.65*	*2.00*	*2.00*		*40.3*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Tennessee Chemical Co. (Armour Owned.)	
66084	†Ox 2–10–4 Fertilizer	Pineville Produce Co., Pineville
		Guaranteed
66085	Ox 0–12–4 Fertilizer	N. D. Tabor, Olive Hill
		Guaranteed
66305	†Ox Bone Meal	W. F. Grainger, Franklin
		Guaranteed
66306	Ox Raw Bone	W. F. Grainger, Franklin
		Guaranteed
65837	†Ox 16% Acid Phosphate	J. S. Duke, Crab Orchard
66086		N. D. Tabor, Olive Hill
66087		J. M. Johnson, Benton
66307		Auburn Mills, Auburn
66308		J. M. Johnson, Benton
66384		C. F. Roberts and Co., Olive Hill
		Guaranteed
65095	Ox 20% Acid Phosphate	Manufacturer
		Guaranteed
65096	Ox 2–12–0 Fertilizer	Manufacturer
		Guaranteed
66385	Ox 1–12–1 Fertilizer	C. F. Roberts and Co., Olive Hill
		Guaranteed
65098	Ox 1–10–1 Fertilizer	Manufacturer
		Guaranteed
66088	Ox 2–8–2 Fertilizer	Mullikin and Craig, Bedford
		Guaranteed
66089	Ox 1–8–1 Fertilizer	N. D. Tabor, Olive Hill
		Guaranteed
65129	Ox Superior Tobacco Grower	Manufacturer
		Guaranteed
65131	Ox 2–8–1 Fertilizer	Manufacturer
		Guaranteed
65132	Ox Potash Mixture	Manufacturer
		Guaranteed
65133	Ox Nitrate of Soda	Manufacturer
		Guaranteed
65555	Ox Burley Special	Manufacturer
		Guaranteed
66091	Ox Dark Tobacco Maker	P. A. Blackwell and Co., Henderson
		Guaranteed
66092	Ox Tobacco Special	Sexton Bros., Murray
		Guaranteed
65558	Ox Tobacco Grower	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
10.45	0.85	11.30			1.17	1.73	2.10	3.53		37.0	66084
10.00	*1.00*	*11.00*				*1.65*	*2.00*	*4.00*		*37.3*	
12.35	0.75	13.10						4.13		31.2	66085
12.00	*1.00*	*13.00*						*4.00*		*30.4*	
		27.40	74	26	0.46	2.37	2.88			36.2	66305
		27.00				*2.47*	*3.00*			*36.4*	
		25.70	59	41		3.99	4.84			44.5	66306
		22.00				*3.71*	*4.50*			*39.9*	
16.60	0.85	17.45								19.9	65837
16.45	1.35	17.80								19.7	66086
16.60	1.45	18.05								19.9	66087
16.00	3.00	19.00								19.2	66307
15.60	3.20	18.80								18.7	66308
17.10	1.30	18.40								20.5	66384
16.00	*1.00*	*17.00*								*19.2*	
20.80	0.45	21.25								25.0	65095
20.00	*1.00*	*21.00*								*24.0*	
12.15	1.90	14.05			1.19	1.70	2.06			29.2	65096
12.00	*1.00*	*13.00*				*1.65*	*2.00*			*28.3*	
12.00	1.25	13.25			0.56	0.80	0.97	0.98		26.2	66385
12.00	*1.00*	*13.00*				*0.82*	*1.00*	*1.00*		*26.3*	
12.45	1.85	14.30			0.75	1.10	1.34	1.36		30.1	65098
10.00	*1.00*	*11.00*				*0.82*	*1.00*	*1.00*		*23.3*	
9.00	0.75	9.75			0.88	1.74	2.11	2.13		30.6	66088
8.00	*1.00*	*9.00*				*1.65*	*2.00*	*2.00*		*28.3*	
8.60	1.20	9.80			0.56	1.00	1.21	1.34		23.4	66089
8.00	*1.00*	*9.00*				*0.82*	*1.00*	*1.00*		*20.3*	
9.65	2.60	12.25							4.64	29.4	65129
10.00	*1.00*	*11.00*							*5.00*	*30.4*	
8.30	2.80	11.10			1.13	1.65	2.00	1.20		27.0	65131
8.00	*1.00*	*9.00*				*1.65*	*2.00*	*1.00*		*25.3*	
10.20	2.20	12.40						2.04		22.3	65132
10.00	*1.00*	*11.00*						*2.00*		*21.4*	
						15.62	18.96			93.7	65133
						14.81	*17.98*			*88.9*	
8.55	1.70	10.25			2.02	2.60	3.16	6.93		49.9	65555
8.00	*1.00*	*9.00*				*2.47*	*3.00*	*6.00*		*45.2*	
7.80	3.30	11.10			1.05	1.72	2.09	0.52	3.51	35.4	66091
8.00	*1.00*	*9.00*				*1.65*	*2.00*	*4.00*		*34.3*	
9.30	2.45	11.75						6.08		33.2	66092
10.00	*1.00*	*11.00*						*5.00*		*30.4*	
9.80	2.35	12.15			1.09	1.62	1.97	2.06		31.5	65558
10.00	*1.00*	*11.00*				*1.65*	*2.00*	*2.00*		*31.3*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Tennessee Chemical Co. (Armour Owned.)	
65838	Ox Louisville Standard	J. S. Duke, Crab Orchard
		Guaranteed
66118	Ox 2–14–2 Fertilizer	Manufacturer
		Guaranteed
66119	Ox 2–29 Bone Meal	Manufacturer
		Guaranteed
66140	Ox Bone Meal and Acid Phosphate	Manufacturer
		Guaranteed
66145	Ox 14% Acid Phosphate	Manufacturer
		Guaranteed
	Tennessee Coal, Iron and Railroad Co., Birmingham, Ala.	
65839	Duplex Basic Phosphate	Farmers Union Supply Co., Glasgow
65840		Farmers Union Supply Co., Somerset
66094		Taylor Co. Supply Co., Campbellsville
66310		Farmers Union Supply Co., Franklin
66311		Taylor Co. Supply Co., Campbellsville
66312		Hardin County Farm Bureau, Elizabethtown
66386		Farmers Union Supply Co., Somerset
		Guaranteed
	Victor Guano Co., Nashville, Tenn.	
64876	Kentucky Home Guano	Manufacturer
		Guaranteed
64877	Complete Guano	Manufacturer
		Guaranteed
65841	Kentucky Soil Food	E. C. Humble, Russell Springs
		Guaranteed
64879	Burley Tobacco Grower	Manufacturer
		Guaranteed
64880	High Grade Guano	Manufacturer
		Guaranteed
65842	Wheat, Oat and Corn Grower	E. C. Humble, Russell Springs
		Guaranteed
64882	High Grade Tobacco and Truck Grower	Manufacturer
		Guaranteed
64883	Bone and Potash	Manufacturer
		Guaranteed
64884	High Grade Bone and Potash	Manufacturer
		Guaranteed
64885	High Grade Acid Phosphate	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERGENTACE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
8.40	0.60	9.00			0.38	0.73	0.89	1.12		20.6	65838
8.00	*1.00*	*9.00*				*0.82*	*1.00*	*1.00*		*20.3*	
14.50	1.35	15.85			1.21	1.62	1.97	2.16		38.5	66118
14.00	*1.00*	*15.00*				*1.65*	*2.00*	*2.00*		*37.3*	
		28.90	81	19	0.99	1.96	2.38			34.9	66119
		29.00				*1.65*	*2.00*			*33.1*	
13.20	9.50	22.70				1.02	1.24			29.7	66140
11.00	*9.00*	*20.00*				*0.82*	*1.00*			*25.0*	
15.25	2.80	18.05								18.3	66145
14.00	*1.00*	*15.00*								*16.8*	
		19.10								22.9	65839
		18.75								22.5	65840
		18.25								22.0	66094
		19.40								23.3	66310
		18.90								22.7	66311
		19.40								23.3	66312
		19.30								23.2	66386
		18.00								*21.6*	
10.80	5.30	16.10			0.56	1.19	1.44	0.98		28.4	64876
8.00	*5.00*	*13.00*				*0.82*	*1.00*	*1.00*		*21.9*	
10.60	2.20	12.80			1.75	2.38	2.89		2.73	39.3	64877
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*2.00*		*29.5*	
8.05	6.55	14.60				0.54	0.66	4.12	1.89	36.0	65841
8.00	*5.00*	*13.00*				*0.41*	*0.50*	*4.00*		*28.5*	
9.40	1.90	11.30			2.55	2.97	3.61		6.34	51.7	64879
8.00	*3.00*	*11.00*				*2.47*	*3.00*		*5.00*	*43.0*	
12.30	2.30	14.60			1.79	2.23	2.71	1.12	1.58	40.9	64880
10.00	*4.00*	*14.00*				*1.65*	*2.00*	*2.00*		*32.5*	
11.65	5.50	17.15			0.21	0.60	0.73	1.02		26.3	65842
11.00	*4.00*	*15.00*				*0.41*	*0.50*	*1.00*		*23.6*	
10.60	2.50	13.10			2.12	2.60	3.16	1.02	3.81	47.0	64882
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*4.00*	*35.5*	
13.00	10.00	23.00						0.62	1.90	31.1	64883
10.00	*8.00*	*18.00*						*2.00*		*24.2*	
12.40	8.40	20.80						1.90	2.52	35.2	64884
10.00	*8.00*	*18.00*						*4.00*		*30.2*	
16.10	6.50	22.60								19.3	64885
14.00	*4.00*	*18.00*								*16.8*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Victor Guano Co.	
65843	Special High Grade Acid Phosphate	J. B. Laskey, Somerset
65844		Lewis Co., Farm Bureau, Vanceburg
66387		Lambert-Gresham Hardware Co., Henderson
65598		I. Garnett Million, Richmond
		Guaranteed
64887	Bright Leaf Tobacco Guano	Manufacturer
		Guaranteed
65578	Kentucky High Grade Tobacco Grower	Manufacturer
		Guaranteed
65845	Premium Acid Phosphate	Lewis County Farm Bureau, Vanceburg
		Guaranteed
	Virginia-Carolina Chemical Co., Inc., Cincinnati, Nashville, Memphis.	
65846	V. C. 14% Acid Phosphate	C. B. Carden and Co., Hartford
		Guaranteed
65847	V. C. 16% Acid Phosphate	Estes and Hines, Science Hill
65848		Farmers Union Supply Co., Glasgow
66095		Farmers Union Supply Co., Falmouth
66096		G. M. Hedrick, Monticello
66313		Taylor County Supply Co., Campbellsville
66314		A. W. Tarter, Columbia
66315		Farmers Union Supply Co., Glasgow
		Guaranteed
65849	V. C. 20% Acid Phosphate	Wayne County Farm Bureau, Monticello
66097		Jones Hardware Co., Kuttawa
		Guaranteed
65850	V. C. 24% Acid Phosphate	L. Corder, Monticello
65851		J. H. Spradlin, Whitley City
66098		L. Corder, Monticello
		Guaranteed
65852	V. C. Capitol Phosphate and Potash	Grigsby and Co., Bardstown
		Guaranteed
65304	V. C. Prolific Grain Grower	Manufacturer
		Guaranteed
65305	V. C. Sure Grain Producer	Manufacturer
		Guaranteed
66316	V. C. Champion Corn and Wheat Grower	Wm. Garner, Stop
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
16.90	3.10	20.00								20.3	65843
17.25	3.35	20.60								20.7	65844
17.75	3.10	20.85								21.3	66387
16.55	3.60	20.15								19.9	65598
16.00	*2.00*	*18.00*								*19.2*	
12.20	2.10	14.30			1.58	2.13	2.59	0.64	0.93	36.6	64887
9.00	*4.00*	*13.00*				*1.65*	*2.00*		*1.00*	*28.0*	
12.80	3.40	16.20			0.94	1.88	2.28	2.00	0.55	39.5	65578
12.00	*2.00*	*14.00*				*1.65*	*2.00*		*2.00*	*34.7*	
19.40	3.50	22.90								23.3	65845
18.00	*2.00*	*20.00*								*21.6*	
16.15	5.80	21.95								19.4	65846
14.00	*1.50*	*15.50*								*16.8*	
17.60	1.20	18.80								21.1	65847
18.25	1.85	20.10								21.9	65848
18.35	1.25	19.60								22.0	66095
17.50	1.25	18.75								21.0	66096
18.60	2.30	20.90								22.3	66313
17.30	2.70	20.00								20.8	66314
18.50	2.70	21.20								22.2	66315
16.00	*1.50*	*17.50*								*19.2*	
23.10	0.85	23.95								27.7	65849
21.55	0.65	22.20								25.9	66097
20.00	*1.50*	*21.50*								*24.0*	
25.30	1.55	26.85								30.4	65850
26.40	1.65	28.05								31.7	65851
26.90	2.05	28.95								32.3	66098
24.00	*1.50*	*25.50*								*28.8*	
10.95	2.20	13.15						6.28		36.2	65852
10.00	*1.50*	*11.50*						*5.00*		*30.6*	
13.55	1.70	15.25						0.60	2.33	29.8	65304
12.00	*1.50*	*13.50*						*2.00*		*24.6*	
15.95	1.50	17.45			1.76	2.50	3.04			39.5	65305
12.00	*1.50*	*13.50*				*1.65*	*2.00*			*28.5*	
7.70	3.10	10.80			0.60	0.92	1.12	2.02		24.4	66316
8.00	*1.50*	*9.50*				*0.82*	*1.00*	*2.00*		*23.5*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained	
	Virginia-Carolina Chemical Co., Inc.		
65307	V. C. Farmers Friend	Manufacturer	9.
		Guaranteed	8.
65853	V. C. Beef, Blood and Bone BBB	Jas. Rice, Adairville	8.
65854		Otter Creek Milling Co., Zula	9.
		Guaranteed	8.
66099	V. C. Springfall Fertilizer	J. S. Bell, Monticello	11.
66317		Wm. Garner, Stop	11.
		Guaranteed	12.
66100	V. C. Tobacco Plant Food	Thompson and Henry, Lexington	10.
		Guaranteed	9.
65311	V. C. Gem Fertilizer for Tobacco	Manufacturer	12.
		Guaranteed	9.
65856	†V. C. 2–8–4 Tobacco Special (Potash from Sulphate)	Taylor County Supply Co., Campbellsville	9.
		J. R. Shuffett and Son, Greensburg	8.
66101		Wm. Garner, Stop	8.
66318		Guaranteed	8.
65313	V. C. Bone Meal and Phosphate	Manufacturer	9.
		Guaranteed	10.
66319	V. C. Pure Bone Meal	G. M. Hedrick, Monticello	
		Guaranteed	
66320	†V. C. Raw Bone Meal	Vm. Garner, Stop	
		Guaranteed	
65316	V. C. Plant Food for Vegetables, Lawns and Flowers	Manufacturer	9.
		Guaranteed	8.
65317	V. C. Nitrate of Soda	Manufacturer	
		Guaranteed	
65318	V. C. Muriate of Potash	Manufacturer	
		Guaranteed	
65319	V. C. Sulphate of Potash	Manufacturer	
		Guaranteed	
65320	V. C. Sulphate of Ammonia	Manufacturer	
		Guaranteed	
65321	V. C. Bright Tobacco Fertilizer (Potash from Sulphate)	Manufacturer	10.
		Guaranteed	8.
65858	V. C. 10% Acid Phosphate	E. M. Garrett, Scottsville	10.
		Guaranteed	10.
65859	V. C. Tobacco and Truck Special (Potash from Sulphate)	A. W. Tarter, Columbia	7.
		Guaranteed	8.

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
9.20	1.00	10.20			0.67	1.01	1.23		3.16	29.7	65307
8.00	*1.50*	*9.50*				*0.82*	*1.00*	*3.00*		*26.5*	
8.05	6.85	14.90			1.03	1.58	1.92	2.16		30.8	65853
9.00	0.85	9.85			1.70	1.98	2.40	2.56		33.40	65854
8.00	*1.50*	*9.50*				*1.65*	*2.00*	*2.00*		*28.5*	
11.40	3.30	14.70			1.28	1.59	1.93	2.23		34.7	66099
11.80	3.10	14.90			0.33	1.71	2.08	2.09		35.5	66317
12.00	*1.50*	*13.50*				*1.65*	*2.00*	*2.00*		*34.5*	
10.60	1.50	12.10			1.26	2.38	2.89			30.8	66100
9.00	*1.50*	*10.50*				*2.47*	*3.00*			*28.9*	
12.00	3.25	15.25			0.54	1.97	2.39	0.76	1.06	36.6	65311
9.00	*1.50*	*10.50*				*1.65*	*2.00*		*1.00*	*27.0*	
9.05	7.20	16.25			1.72	1.96	2.38		3.95	40.1	65856
8.85	8.00	16.85			1.91	1.91	2.32		4.07	40.2	66101
8.40	1.90	10.30			1.21	1.46	1.77	1.12	2.84	34.0	66318
8.00	*1.50*	*9.50*				*1.65*	*2.00*		*4.00*	*34.5*	
9.75	13.85	23.60				1.01	1.23			26.2	65313
10.00	*12.00*	*22.00*				*0.82*	*1.00*			*24.7*	
		28.70	85	15	0.72	2.22	2.70			36.3	66319
		22.00				*2.47*	*3.00*			*32.4*	
		22.20	85	15	0.39	4.32	5.24			45.5	66320
		20.00				*3.71*	*4.50*			*38.3*	
9.55	2.75	12.30			3.96	5.21	6.32	0.72	2.69	56.9	65316
8.00	*1.50*	*9.50*				*4.94*	*6.00*	*3.00*		*51.2*	
						15.68	19.04			94.7	65317
						14.82	*18.00*			*88.9*	
								52.24		156.7	65318
								50.00		*150.0*	
									49.0	147.0	65319
									48.0	*144.0*	
						20.74	25.18			124.4	65320
						20.56	*25.00*			*123.4*	
10.90	0.90	11.80			0.27	1.04	1.26		2.70	31.1	65321
8.00	*1.50*	*9.50*				*0.82*	*1.00*		*2.00*	*23.5*	
10.10	13.10	23.20								12.1	65858
10.00	*1.50*	*11.50*								*12.0*	
7.80	2.00	9.80			2.16	2.41	2.93	1.60	4.78	46.1	65859
8.00	*1.50*	*9.50*				*2.47*	*3.00*		*6.00*	*45.4*	

TABLE I.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Virginia-Carolina Chemical Co., Inc.	
65860	V. C. Big Giant Crop Grower	B. R. Twyford, Monticello
		Guaranteed
65861	V. C. Progressive Farmer	G. M. Hedrick, Monticello
66388		G. M. Hedrick, Monticello
		Guaranteed
	Winona Oil and Mfg. Co., Columbia, Tenn.	
65597	Winona 16% Acid Phosphate	I. Garnett Million, Richmond
65775		Denton Hardware Co., Madisonville
65862		I. H. Hummer and Co., Scottsville
65863		Hardin County Farm Bureau, Elizabethtown
66102		Lambert-Gresham Hdw. Co., Henderson
66321		Auburn Mills, Auburn
		Guaranteed
	Wood, Stubbs and Co., Store, Louisville, Ky.	
65535	Acme Potato and Tobacco Grower	Manufacturer
		Guaranteed
65536	Acme Special Potato Grower	Manufacturer
		Guaranteed
65537	Acme Wheat and Corn Grower	Manufacturer
		Guaranteed
65538	Acme High Grade Vegetable Grower	Manufacturer
		Guaranteed
65540	Acme Three-Eight-Five	Manufacturer
		Guaranteed
65541	Acme Tobacco Booster	Manufacturer
		Guaranteed
66113	Acme High Grade Phosphate 16%	Manufacturer
		Guaranteed

TABLE I.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
9.65	2.60	12.25			0.56	0.93	1.13	0.98		24.0	65860
10.00	*1.50*	*11.50*				*0.82*	*1.00*	*1.00*		*23.5*	
16.35	2.90	19.25			1.27	1.47	1.78	2.32		41.5	65861
15.30	3.90	19.20			1.20	1.68	2.04	2.10		40.9	66388
16.00	*1.50*	*17.50*				*1.65*	*2.00*	*2.00*		*40.5*	
16.95	2.85	19.80								20.3	65597
18.90	1.80	20.70								22.7	65775
17.65	2.05	19.70								21.2	65862
17.30	3.30	20.60								20.8	65863
17.10	3.50	20.60								20.5	66102
17.30	1.30	18.60								20.8	66321
16.00	*2.00*	*18.00*								*19.2*	
8.70	1.15	9.85			0.75	1.09	1.32		2.38	27.2	65535
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*2.00*		*24.5*	
8.90	1.45	10.35			1.36	1.98	2.40		3.09	35.1	65536
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*3.00*		*32.5*	
10.85	1.05	11.90			0.46	0.81	0.98		1.18	25.1	65537
10.00	*4.00*	*14.00*				*0.41*	*0.50*	*1.00*		*22.1*	
9.75	3.05	12.80			2.86	3.63	4.41			37.6	65538
10.00	*4.00*	*14.00*				*3.29*	*4.00*			*36.3*	
9.00	1.50	10.50			1.89	2.70	3.28		5.45	46.7	65540
8.00	*4.00*	*12.00*				*2.47*	*3.00*	*5.00*		*43.4*	
10.95	1.35	12.30			1.30	1.93	2.34		4.08	40.8	65541
10.00	*4.00*	*14.00*				*1.65*	*2.00*	*4.00*		*38.5*	
18.25	0.10	18.35								21.9	66113
16.00	*2.00*	*18.00*								*19.2*	

TABLE II.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	The American Agricultural Chem. Co., Inc., Cincinnati, Ohio.	
65890	†A. A. C. Special Tobacco Grower	Bokhara Seed Co., Falmouth
		Guaranteed
65601	†A. A. C. Kentucky Tobacco Grower	J. C. Everett and Co., Maysville
65892		J. R. Nelson, Eubank
66324		J. P. Strother, Milton
		Guaranteed
64892	A. A. C. Little Wonder Fertilizer	Manufacturer
		Guaranteed
65603	A. A. C. High Grade Fertilizer	Gross and Wiseman, Cecilia
65604		T. J. Bell, Moreland
65894		Mullikin and Craig, Bedford
		Guaranteed
65896	†Bowker's Harvest Bone Phosphate	T. E. Richardson, Campbellsville
		Guaranteed
64899	Bowker's Harvest Queen	Manufacturer
		Guaranteed
65608	†Bowker's Fish Guano	J. L. Richards and Sons, Jamestown
		Guaranteed
65609	†Bowker's Corn and Wheat Phosphate	Gooch and Payne, Eubank
		Guaranteed
65898	Bowker's Tobacco Grower	T. E. Richardson, Campbellsville
65899		R. L. McFerron, Mt. Vernon
		Guaranteed
66160	Bradley's Faultless Grain Grower	Ezekiel Roy, Brady
		Guaranteed
64913	Bradley's Sure Crop	Manufacturer
		Guaranteed
64914	Bradley's Potato and Root Fertilizer	Manufacturer
		Guaranteed
64926	Cleveland Dryer Works Sure Crop	Manufacturer
		Guaranteed
64927	Cleveland Dryer Works Potato and Tobacco Fertilizer	Manufacturer
		Guaranteed
65617	†Red Line Complete Manure	L. B. Sievers and Son, Somerset
65902		Mullikin and Craig, Bedford
		Guaranteed
66169	Michigan Carbon Works Sure Crop	S. L. Cummins, Crab Orchard
		Guaranteed
65619	†Michigan Carbon Works Corn and Wheat Phosphate	T. J. Bell, Moreland
		Guaranteed

TABLE II.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
10.65	2.35	13.00			0.40	**1.24**	1.51			**24.4**	65890
10.00	*4.00*	*14.00*				*1.65*	*2.00*			*26.5*	
7.90	1.90	**9.80**			1.27	1.65	2.00	2.19		29.1	65601
8.80	1.00	**9.80**			1.35	1.60	1.94	2.11		29.5	65892
8.20	1.90	**10.10**			1.25	1.56	1.89	1.94		**28.2**	66324
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*2.00*		*29.5*	
10.50	1.40	**11.90**			0.51	0.83	1.01			21.3	64892
10.00	*4.00*	*14.00*				*0.82*	*1.00*			*21.5*	
8.10	1.80	**9.90**			1.93	2.40	2.91	5.86		**44.9**	65603
8.20	1.70	**9.90**			1.98	2.39	2.90	6.03		45.4	65604
8.55	1.15	**9.70**			2.01	2.46	2.99	5.74		**45.3**	65894
8.00	*4.00*	*12.00*				*2.47*	*3.00*	*6.00*		*46.4*	
8.65	0.90	**9.55**			0.66	0.95	1.15	1.12		22.4	65896
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*1.00*		*21.5*	
8.60	1.00	**9.60**			0.56	0.81	0.98	2.11		24.5	64899
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*2.00*		*24.5*	
8.30	1.10	**9.40**			0.56	0.83	1.01	3.34		27.9	65608
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*3.00*		*27.5*	
10.30	1.00	**11.30**			0.73	0.93	1.13	1.24		25.2	65609
10.00	*4.00*	*14.00*				*0.82*	*1.00*	*1.00*		*24.5*	
8.30	1.00	**9.30**			1.34	1.68	2.04	5.18		38.5	65898
8.15	0.90	**9.05**			1.06	1.85	2.25	5.78		41.0	65899
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*5.00*		*38.5*	
8.30	1.60	**9.90**			0.61	0.88	1.07	0.91		21.1	66160
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*1.00*		*21.5*	
8.60	1.00	**9.60**			0.56	0.81	0.98	2.11		24.5	64913
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*2.00*		*24.5*	
8.60	0.90	**9.50**			0.57	0.82	1.00	3.31		28.1	64913
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*3.00*		*27.5*	
8.60	1.00	**9.60**			0.56	0.81	0.98	2.11		24.5	64926
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*2.00*		*24.5*	
8.60	0.90	**9.50**			0.57	0.82	1.00	3.31		28.1	64927
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*3.00*		*27.5*	
8.30	1.30	**9.60**			0.63	0.87	1.06	0.97		21.1	65617
8.85	0.70	**9.55**			0.53	0.82	1.00	1.34		22.5	65902
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*1.00*		*21.5*	
8.20	1.40	**9.60**			0.57	0.81	0.98	2.18		24.3	66169
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*2.00*		*24.5*	
10.40	1.10	**11.50**			0.75	0.96	1.17	1.70		26.9	65619
10.00	*4.00*	*14.00*				*0.82*	*1.00*	*1.00*		*24.5*	

TABLE II.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	The American Agricultural Chem. Co., Inc.	
65620	†Homestead A Bone Black Fertilizer	Hill Hardware Co., Bowling Green
66330		J. F. Collings, Shepherdsville
		Guaranteed
65623	†Homestead Tobacco Grower	Lebanon Carriage and Impl. Co., Lebanon
65624		Hill Hardware Co., Bowling Green
65905		J. P. Page, Barlow
		Guaranteed
66175	†Michigan Carbon Works High Potash Phosphate	D. L. D. Sandefur, Beaver Dam
		Guaranteed
65626	†Homestead Potato and Tobacco Special	Woodson Lewis and Son, Greensburg
65627		Mayhew and Gilbert, Franklin
65907		J. P. Strother, Milton
66176		S. L. Cummins, Crab Orchard
		Guaranteed
65632	†N. W. Horseshoe Br. Dark Tobacco Grower	E. S. Ferrill and Son, Buffalo
65633		Woodson Lewis and Son, Greensburg
		Guaranteed
65634	N. W. Horseshoe Br. Sure Crop	L. B. Sievers and Son, Somerset
		Guaranteed
64953	N. W. Horseshoe Br. Potash Manure	Manufacturer
		Guaranteed
65636	†N. W. Horseshoe Br. Corn and Wheat Phosphate	J. R. Nelson, Eubank
		Guaranteed
65638	N. W. Horseshoe Br. Tobacco and Truck Grower	J. W. Morgan, Pine Knot
		Guaranteed
65641	Packer's Boar's Head Br. Sure Crop	I. E. and Orval Cooper, Poynter
		Guaranteed
65643	Packer's Boar's Head Br. Complete Fertilizer	I. E. and Orval Cooper, Poynter
		Guaranteed
65644	Packer's Boar's Head Br. H. Gr. Tobacco Grower	I. E. and Orval Cooper, Poynter
		Guaranteed

TABLE II.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
8.35	1.50	**9.85**			1.63	1.95	2.37	1.59		29.6	65620
8.50	1.40	**9.90**			1.59	1.97	2.39	1.58		29.9	66330
8.00	*4.00*	*12.00*				*2.06*	*2.50*	*1.50*		*30.5*	
10.10	1.10	**11.20**			2.16	2.43	2.95	1.17		33.7	65623
10.80	1.20	12.00			1.92	2.29	2.78	2.94		**39.2**	65624
10.65	1.30	**11.95**			1.97	2.42	2.94	2.99		40.0	65905
10.00	*4.00*	*14.00*				*2.47*	*3.00*	*3.00*		*40.4*	
10.40	1.40	11.80						**4.54**		29.8	66175
10.00	*2.00*	*12.00*						*5.00*		*30.8*	
8.90	0.80	**9.70**			1.26	1.47	1.78	5.06		37.7	65626
8.80	0.90	**9.70**			1.25	1.53	1.86	5.62		39.6	65627
7.80	2.10	9.90			0.84	2.29	2.78	**4.19**		38.9	65907
7.50	2.00	**9.50**			1.33	1.61	1.95	4.94		**36.5**	66176
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*5.00*		*38.5*	
8.50	0.60	**9.10**			0.62	0.84	1.02	1.32		22.0	65632
8.70	0.80	**9.50**			0.52	0.80	0.97	1.07		21.4	65633
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*1.00*		*21.5*	
8.80	0.80	**9.60**			0.55	0.83	1.01	2.09		24.8	65634
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*2.00*		*24.5*	
8.60	0.90	**9.50**			0.57	0.82	1.00	3.31		28.1	64953
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*3.00*		*27.5*	
10.10	1.60	**11.60**			0.61	0.90	1.09	1.28		24.9	65636
10.00	*4.00*	*14.00*				*0.82*	*1.00*	*1.00*		*24.5*	
10.10	1.50	**11.60**			2.09	2.50	3.04	1.19		34.3	65638
10.00	*4.00*	*14.00*				*2.47*	*3.00*	*1.00*		*34.4*	
8.20	1.10	**9.30**			0.53	0.80	0.97	1.90		**23.2**	65641
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*2.00*		*24.5*	
12.20	1.70	**13.90**			1.29	1.54	1.87	2.87		**36.8**	65643
12.00	*4.00*	*16.00*				*1.65*	*2.00*	*3.00*		*38.5*	
9.90	1.40	**11.30**			1.93	2.38	2.89	2.87		**38.2**	65644
10.00	*4.00*	*14.00*				*2.47*	*3.00*	*3.00*		*40.4*	

TABLE II.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Armour Fertilizer Works, Louisville, Cincinnati, Nashville.	
65650	†Big Crop Dark Tobacco Grower	D. M. Brakefield, Adairville
		Guaranteed
66183	†Big Crop 16% Acid Phosphate	Wilson-Winn and Co., Russellville
66184		R. T. Kirkman, Elkton
		Guaranteed
66185	†Armour's 2-8-2 Fertilizer	Cantrell and Penick, Greensburg
		Guaranteed
65925	Ideal H. Gr. Tobacco Grower	The T. J. Turley Co., Owensboro
		Guaranteed
66341	†Ideal Superphosphate	The T. J. Turley Co., Owensboro
		Guaranteed
	Buhner's Fertilizer Co., Seymour, Ind.	
65534	Buhner's 3-8-5	Manufacturer
		Guaranteed
66192	Buhner's Crop Grower	Harvey Stout and Sons, Fern Creek
		Guaranteed
	Calumet Fertilizer Co., New Albany, Ind.	
65927	†Calumet Br. "Crop Grower"	Lexington Seed Co., Lexington
66342		Vine Grove Feed Co., Vine Grove
		Guaranteed
66343	Calumet Br. 2-8-2	Patrick Dillon, Hardinsburg
		Guaranteed
	Consolidated Chemical Co., Louisville, Ky.	
65931	Camel Br. Corn and Wheat Special	J. M. Skillman, Hardinsburg
66193		Farmers Supply Co., Hodgenville
		Guaranteed
65668	Camel Br. Universal Crop Fertilizer	Geo. W. Richardson, Somerset
		Guaranteed
66194	Camel Br. General Crop Fertilizer	Farmers Supply Co., Hodgenville
		Guaranteed
65485	Camel Br. One-Ten-One Fertilizer	Manufacturer
		Guaranteed
65486	Camel Br. One-Eight-Three Fertilizer	Manufacturer
		Guaranteed
65932	Camel Br. Blue Grass Tobacco Grower	J. M. Skillman, Hardinsburg
		Guaranteed
65933	Camel Br. Three-Eight-Six Tobacco Grower	J. F. Collings, Shepherdsville
		Guaranteed

TABLE II.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
8.70	2.70	11.40			1.15	1.84	2.23	**0.52**	**2.64**	34.7	65650
8.00	*1.00*	*9.00*				*1.65*	*2.00*		*4.00*	*34.3*	
14.90	3.10	18.00								**17.9**	66183
14.70	3.00	17.70								**17.6**	66184
16.00	*1.00*	*17.00*								*19.2*	
7.90	1.10	9.00			0.97	1.81	1.95	**1.32**		**25.9**	66185
8.00	*1.00*	*9.00*				*1.65*	*2.00*	*2.00*		*28.3*	
11.00	1.40	12.40			0.91	1.71	2.08	**0.96**	**6.95**	**51.1**	65925
10.00	*1.00*	*11.00*				*1.65*	*2.00*		*10.00*	*55.3*	
14.90	2.90	17.80								**17.9**	66341
16.00	*1.00*	*17.00*								*19.2*	
8.70	2.55	11.25			1.30	**2.06**	2.50	4.59		**40.2**	65534
8.00						*2.47*	*3.00*	*5.00*		*41.8*	
8.00	3.20	11.20			0.71	**1.38**	1.68	2.15		**28.0**	66192
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*2.00*		*29.5*	
8.40	1.10	**9.50**			0.34	0.75	0.91	0.97		20.5	65927
7.50	1.20	**8.70**			0.27	0.71	0.86	1.14		**19.4**	66342
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*1.00*		*21.5*	
8.30	1.40	**9.70**			0.74	1.46	1.77	2.06		**28.0**	66343
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*2.00*		*29.5*	
11.60	0.90	**12.50**			0.33	0.57	0.69	1.05		24.3	65931
11.60	0.50	**12.10**			0.36	0.68	0.83	1.44		26.0	66193
11.00	*4.00*	*15.00*				*0.41*	*0.50*	*1.00*		*23.6*	
12.35	1.35	**13.70**			0.46	0.80	0.97	0.95		26.7	65668
12.00	*4.00*	*16.00*				*0.82*	*1.00*	*1.00*		*27.5*	
10.40	0.90	**11.30**			0.50	0.88	1.07	2.21		27.9	66194
10.00	*4.00*	*14.00*				*0.82*	*1.00*	*2.00*		*27.5*	
10.25	0.85	**11.10**			0.68	0.93	1.13	1.49		25.8	65485
10.00	*4.00*	*14.00*				*0.82*	*1.00*	*1.00*		*24.5*	
8.65	0.90	**9.55**			0.94	0.94	1.14	3.56		29.7	65486
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*3.00*		*27.5*	
8.40	0.80	**9.20**			0.89	1.21	1.47	4.07		32.4	65932
8.00	*4.00*	*12.00*				*1.23*	*1.50*	*4.00*		*33.0*	
8.10	0.90	**9.00**			1.42	2.43	2.95	5.63		**44.0**	65933
8.00	*4.00*	*12.00*				*2.47*	*3.00*	*6.00*		*46.4*	

TABLE II.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Consolidated Chemical Co.	
65496	Camel Br. High Grade Fertilizer	Manufacturer Guaranteed
66195	Camel Br. Potash Tobacco Fertilizer	Otter Creek Milling Co., Zula Guaranteed
66197	Camel Br. Steamed Bone	Farmers Supply Co., Hodgenville Guaranteed
66198	Camel Br. Raw Bone	Otter Creek Milling Co., Zula
66199		Farmers Supply Co., Hodgenville Guaranteed
65589	Camel Br. Three-Eight-Six Tobacco Fertilizer	Manufacturer Guaranteed
66200	Camel Br. Beef, Blood and Bone	Farmers Supply Co., Hodgenville Guaranteed
66201	Camel Br. Standard Grain Fertilizer	Otter Creek Milling Co., Zula Guaranteed
	The Empire Guano Co., Nashville, Tenn.	
65943	Blood, Bone and Potash	The Denton Mercantile Co., Hillsboro Guaranteed
	The Evansville Packing Co., Evansville, Ind.	
65104	Phosphate and Potash	Manufacturer Guaranteed
65107	Farmers Pride	Manufacturer Guaranteed
65949	†Three "B"	McLean Hardware Co., Calhoun Guaranteed
65110	Corn and Wheat Special	Manufacturer Guaranteed
65112	Special Ten Ten	Manufacturer Guaranteed
65113	Farmers Special	Manufacturer Guaranteed
65114	Vegetable Special	Manufacturer Guaranteed
65951	Tobacco Special	McLean Hardware Co., Calhoun Guaranteed
65679	Dark Patch Special	Young Hardware Co., Hopkinsville Guaranteed
65566	Phosphate and Potash Special	Manufacturer Guaranteed

TABLE II.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
10.40	1.30	**11.70**			1.29	1.73	2.10			26.5	65496
10.00	*4.00*	*14.00*				*1.65*	*2.00*			*26.5*	
9.30	2.30	11.60						3.64	1.10	**29.1**	66195
10.00	*2.00*	*12.00*						*5.00*		*30.8*	
		29.10	70	30	0.21	0.80	0.97			**28.1**	66197
		30.00				1.03	1.25			30.2	
		20.10	75	25	0.36	4.18	5.07			41.2	66198
		16.90	79	21	0.28	3.73	4.53			**35.9**	66199
		22.00				*3.71*	*4.50*			*39.9*	
8.70	1.90	10.60			1.21	**2.00**	2.43		6.11	**44.1**	65589
8.00	*4.00*	*12.00*				*2.47*	*3.00*		*6.00*	*46.4*	
8.10	0.80	**8.90**			0.96	1.37	1.66	2.25		**27.4**	66200
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*2.00*		*29.5*	
8.40	1.00	**9.40**			1.29	1.70	2.06	2.16		29.7	66201
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*2.00*		*29.5*	
8.70	4.80	13.50			0.40	**1.23**	1.49	1.87		**28.0**	65943
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*2.00*		*29.5*	
7.70	0.50	8.20							2.52	**19.3**	65104
10.00									*2.00*	*21.0*	
10.50	0.60	11.10			0.67	0.70	0.85		1.11	**23.5**	65107
12.00						*0.82*	*1.00*		*1.00*	*25.9*	
8.20	1.40	9.60			1.37	1.61	1.95	**1.05**		**25.7**	65949
8.00						*1.65*	*2.00*		*2.00*	*27.9*	
8.85	0.45	9.30			0.65	0.66	0.80		2.50	**24.9**	65110
12.00						*0.82*	*1.00*		*3.00*	*31.9*	
6.05	0.35	6.40							**6.05**	**27.4**	65112
10.00									*10.00*	*45.0*	
9.10	0.40	9.50			1.05	**1.05**	1.27		1.84	**25.6**	65113
12.00						*1.65*	*2.00*		*2.00*	*33.9*	
5.45	0.35	5.80			0.90	**0.90**	1.09		**4.75**	**28.0**	65114
12.00						*1.65*	*2.00*		*6.00*	*45.9*	
10.30	1.10	11.40			2.41	**2.70**	3.28	3.50		**42.6**	65951
10.00						*3.29*	*4.00*		*4.00*	*46.7*	
10.05	0.70	10.75			1.66	**1.90**	2.31	3.78		**38.1**	65679
10.00						*2.47*	*3.00*		*3.00*	*38.8*	
7.35	0.75	8.10							**2.63**	19.2	65566
10.00									*4.00*	*27.0*	

TABLE II.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained	
	Federal Chemical Co., Inc., Louisville, Ky.		
65952	Ammoniated Potash Ten	Lancaster-Smith Seed Co., Owensboro	8
		Guaranteed	8
65955	Special Tobacco Maker	Lake Bros., Springfield	10
65956		Fordsville Planing Mill Co., Fordsville	9
65957		Geo. Wetherill and Son, Prestonville	9
		Guaranteed	10
65681	Beef, Blood and Bone	Grayson County Supply Co., Leitchfield	10
66206		Grayson County Supply Co., Leitchfield	8
		Guaranteed	10
65682	Level Best Tobacco Grower	S. A. Browning, Vanceburg	9
65958		Thompson Fertilizer Co., Mt. Sterling	10
		Guaranteed	10
65683	Special Tobacco and Potato Grower	N. B. Triplett, Waynesburg	7
65684		Buechel Produce Exchange, Buechel	7
65959		St. Matthews Produce Exchange, St. Matthews	7
66207		St. Matthews Produce Exchange, St. Matthews	8
		Guaranteed	8
65685	High Grade Tobacco Grower	Sam Carpenter and Co., Maysville	7
65960		R. T. Foree Co., New Castle	7
		Guaranteed	8
65962	High Grade Fertilizer	Perry Feed and Commission Co., Hazard	11
65963		Gentry and McCauley, Versailles	11
		Guaranteed	12
65686	A-1 Potato Grower	Buechel Produce Exchange, Buechel	10
		Guaranteed	10
65687	A-1 Extra Tobacco Special	Alva West and Co., Maysville	9
65688		Blue Grass Commission Co., Lexington	9
		Guaranteed	10
66350	†Potash Mixture	Plain Hardware Co., Madisonville	11
		Guaranteed	10
65690	Pure Bone	Planters Hardware Co., Hopkinsville	
66210		E. F. Pearson, Franklin	
66351		T. Z. Leachman, Greensburg	
		Guaranteed	

TABLE II.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
8.00	2.80	10.80			0.50	0.91	1.10	9.46		**47.0**	65952
8.00	*4.00*	*12.00*				*0.82*	*1.00*		*10.00*	*48.5*	
10.00	0.80	**10.80**			0.90	1.46	1.77	2.32		**31.0**	65955
9.70	0.70	**10.40**			1.31	1.72	2.09	2.63		33.0	65956
9.40	1.10	**10.50**			1.30	1.64	1.99	3.73		35.6	65957
10.00	*4.00*	*14.00*				*1.65*	*2.00*		*2.00*	*32.5*	
10.00	0.70	**10.70**			0.92	1.48	1.80	2.11		**30.5**	65681
8.40	2.30	**10.70**			1.18	1.62	1.97	2.21		**30.0**	66206
10.00	*4.00*	*14.00*				*1.65*	*2.00*		*2.00*	*32.5*	
9.55	0.75	**10.30**			2.50	2.50	3.04	3.62		40.5	65682
10.00	0.80	**10.80**			1.74	2.33	2.83	1.48	1.70	**38.8**	65958
10.00	*4.00*	*14.00*				*2.47*	*3.00*		*3.00*	*40.4*	
7.80	0.80	**8.60**			2.18	2.47	3.00	5.91		**44.6**	65683
7.60	0.45	**8.05**			2.42	2.69	3.27	3.36	3.83	49.3	65684
7.60	0.60	**8.20**			2.44	2.71	3.29	3.08	3.67	48.2	65959
8.40	3.00	11.40			1.70	2.30	2.79		**5.33**	**43.6**	66207
8.00	*4.00*	*12.00*				*2.47*	*3.00*		*6.00*	*46.4*	
7.45	0.45	**7.90**			2.76	3.07	3.73	5.47		46.2	65685
7.70	0.90	**8.60**			2.31	2.96	3.59	3.12	0.93	**41.7**	65960
8.00	*4.00*	*12.00*				*3.29*	*4.00*		*4.00*	*45.3*	
11.60	1.00	**12.60**			1.58	2.03	2.46			30.0	65962
11.90	0.90	**12.80**			1.24	1.72	2.09			28.5	65963
12.00	*4.00*	*16.00*				*1.65*	*2.00*			*29.5*	
10.30	0.60	**10.90**			2.90	3.31	4.02			35.6	65686
10 00	*4.00*	*14.00*				*3.29*	*4.00*			*36.3*	
9.60	0.70	**10.30**			2.43	**2.88**	3.50			**32.0**	65687
9.95	0.55	**10.50**			2.43	3.06	3.71			**33.5**	65688
10.00	*4.00*	*14.00*				*3.29*	*4.00*			*36.3*	
11.10	3.40	14.50						**2.86**		**26.6**	66350
10.00	*2.00*	*12.00*							*4.00*	*27.8*	
		24.60	83	17	0.79	3.82	4.64			42.6	65690
		24.50	79	21	0.91	3.84	4.66			42.6	66210
		26.40	84	26	0.54	3.31	4.02			41.0	66351
		30.00				*1.03*	*1.25*			*30.2*	

TABLE II.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Federal Chemical Co., Inc.	
65691	Daybreak Wheat and Corn Special	Alva West and Co., Maysville
66211		Grayson County Supply Co., Leitchfield
		Guaranteed
65692	Daybreak Tobacco Manure	J. A. Shaver, Greenville
		Guaranteed
65966	Daybreak Tobacco Grower	Owenton Grocery Co., Owenton
		Guaranteed
65693	Daybreak Special Tobacco Grower	Alva West and Co., Maysville
65967		G. G. Wood and Co., Carrollton
65968		Birk and Price Co., Owensboro
		Guaranteed
65974	Plant Bed Special	R. A. Dodd, Nicholasville
65975		McClure and Simms, Springfield
		Guaranteed
65977	†2-8-5 Tobacco Formula	Jones and Co., La Center
		Guaranteed
	Fox Chemical Co., Branch Federal Chemical Co., Inc., Louisville, Ky.	
65696	†Fox Blood, Bone Phosphate and Potash	Mart. Hamlin, Pine Knot
		Guaranteed
65980	Red Fox Grain and Grass Grower	Sweeney Bros., Lawrenceburg
		Guaranteed
65697	Fox Soil Builder	S. W. Stanton, Eller
		Guaranteed
65698	Fox Early Harvest	A. R. Blakey, Esto
		Guaranteed
65700	Fox Tobacco Grower	N. B. Triplett, Waynesburg
		Guaranteed
65701	Fox Special Tobacco Grower	Blue Grass Commission Co., Lexington
65982		Sweeney Bros., Lawrenceburg
		Guaranteed
	Globe Fertilizer Co. Br. Federal Chem. Co., Inc., Louisville, Ky.	
66218	Globe Blood, Bone Phosphate and Potash	T. M. Zachery, Liberty
66219		I. K. Miller and Sons, Campbellsville
		Guaranteed
66220	Globe Wheat and Grain Special	T. M. Zachery, Liberty
66221		W. H. Broach, Murray
		Guaranteed

TABLE II.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
10.95	0.60	**11.55**			0.48	0.48	0.58	1.18		25.3	65691
10.60	1.80	**12.40**			0.16	0.40	0.49	1.28		22.9	66211
11.00	*4.00*	*15.00*				*0.41*	*0.50*		*1.00*	*23.6*	
9.50	0.85	**10.35**			0.67	0.94	1.14	2.29		27.1	65692
10.00	*4.00*	*14.00*				*0.82*	*1.00*		*2.00*	*27.5*	
7.80	1.20	**9.00**			1.05	1.56	1.89	2.19		**27.8**	65966
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*2.00*	*29.5*	
6.80	0.95	**7.75**			1.06	1.35	1.64	6.34		**37.7**	65693
6.90	1.00	**7.90**			0.98	1.29	1.57	6.34		**37.4**	65967
7.80	2.50	10.30			0.74	1.25	1.52	5.62		**37.1**	65968
8.00	*4.00*	*12.00*				1.23	1.50		6.00	39.0	
9.60	1.00	**10.60**			2.49	2.83	3.44	3.99		43.8	65974
10.80	1.00	**11.80**			2.09	2.43	2.95	2.98		40.1	65975
10.00	*4.00*	*14.00*				*2.47*	*3.00*		*3.00*	*40.4*	
8.20	2.20	10.40			0.85	1.52	1.85	5.00		**37.3**	65977
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*5.00*	*38.5*	
11.60	0.50	**12.10**			0.66	0.66	0.80	0.93		24.4	65696
11.00	*4.00*	*15.00*				*0.41*	*0.50*		*1.00*	*23.6*	
10.10	0.40	**10.50**			0.28	0.50	0.61	1.26		**22.1**	65980
11.00	*4.00*	*15.00*				*0.41*	*0.50*		*1.00*	*23.6*	
11.75	2.65	**14.40**			0.22	0.50	0.61	0.99		**24.7**	65697
13.00	*4.00*	*17.00*				*0.41*	*0.50*		*1.00*	*26.6*	
9.75	2.55	12.30			0.21	0.73	0.89	2.00		**26.0**	65698
10.00	*4.00*	*14.00*				*0.82*	*1.00*		*2.00*	*27.5*	
8.00	0.90	**8.90**			1.51	1.83	2.22	2.31		30.3	65700
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*2.00*	*29.5*	
7.30	0.70	**8.00**			1.56	1.90	2.31	6.34		41.7	65701
7.70	1.30	**9.00**			1.10	1.52	1.85	4.08	0.94	**36.3**	65982
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*5.00*	*38.5*	
11.10	1.40	**12.50**				0.43	0.52	1.67		24.8	66218
11.30	1.40	**12.70**				0.35	0.42	1.31		23.5	66219
11.00	*4.00*	*15.00*				*41*	*0.50*		*1.00*	*23.6*	
11.20	2.30	**13.50**			0.33	0.78	0.95	1.58		27.1	66220
12.60	2.90	15.50			0.26	0.55	0.67	0.79		**25.7**	66221
12.00	*4.00*	*16.00*				*0.82*	*1.00*		*1.00*	*27.5*	

TABLE II.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained	
	Globe Fertilizer Co., Br. Federal Chem. Co., Inc.		
65707	†Progress Corn and Wheat Grower	Harmon and McAnly, Junction City	10
		Guaranteed	*10*
65986	Braden Formula	A. T. Warder, Epworth	10
66223		W. A. Williams, Bengal	10
66359		Vine Grove Feed Co., Vine Grove	10
		Guaranteed	*11*
65711	Big Four Tobacco Grower	C. L. and F. F. Dudley, Flemingsburg	7
65712		Farmers Union Supply Co., Bowling Green	8
65988		I. K. Miller and Sons, Campbellsville	7
		Guaranteed	*8*
66360	Globe Wheat Grower	Moss and Gibson, Crestwood	**8**
		Guaranteed	*10*
65713	Kentucky Tobacco Maker	I. K. Miller and Sons, Campbellsville	9
		Guaranteed	*10*
65714	†Kentucky Standard Tobacco Grower	S. A. Browning, Vanceburg	7
65989		Fred H. Vogel, Henderson	8
		Guaranteed	*8*
65716	Globe Special Tobacco Grower	Stuart's Cash Grocery, Horse Cave	7
65990		R. A. Dodd, Nicholasville	7
65991		W. H. Broach, Murray	8
		Guaranteed	*8*
66361	Globe Gold Medal Mixture	I. K. Miller and Sons, Campbellsville	**11**
		Guaranteed	*12*
66362	Globe Half and Half Meal Mixture	Pete Sheehan, Rock Haven	**8**
		Guaranteed	*10*
66363	†Globe Raw Bone	Moss and Gibson, Crestwood	
		Guaranteed	
	Groves Fertilizer Works, Cincinnati, Ohio.		
65721	Square Br. 3–8–6	J. A. McAninch, Gilpin	8
		Guaranteed	*8*
65997	†Perfect Driller	J. F. Collings, Shepherdsville	**6**
		Guaranteed	*8*
65359	Bone and Phosphate	Manufacturer	**8**
		Guaranteed	*10*
	Hall Seed Co., Louisville, Ky.		
65510	Halco Special Tobacco Grower	Manufacturer	9
		Guaranteed	*8*

TABLE II.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
10.50	0.55	**11.05**				**0.51**	0.62	1.98		**25.0**	65707
10.00	*4.00*	*14.00*				*0.82*	*1.00*		*2.00*	*27.5*	
10.90	1.00	**11.90**			0.74	0.98	1.19	3.91		34.4	65986
10.55	2.50	13.05			0.31	0.76	0.92	3.16		**30.9**	66223
10.60	2.50	13.10			0.33	0.79	0.96	3.01		**30.7**	66359
11.00	*4.00*	*15.00*				*0.82*	*1.00*		*3.00*	*32.0*	
7.35	0.70	**8.05**			1.39	1.70	2.06	2.18		**28.1**	65711
8.60	2.90	11.50			0.74	**1.11**	1.35	1.76		**26.0**	65712
7.80	1.00	**8.80**			1.38	1.76	2.14	2.49		30.1	65988
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*2.00*	*29.5*	
8.10	3.10	**11.20**			1.24	1.68	2.04	2.53		32.1	66360
10.00	*4.00*	*14.00*				*1.65*	*2.00*		*2.00*	*32.5*	
9.65	0.65	**10.30**			1.46	1.83	2.22	2.08		32.0	65713
10.00	*4.00*	*14.00*				*1.65*	*2.00*		*2.00*	*32.5*	
7.55	0.50	**8.05**			1.52	1.79	2.17	5.66		39.3	65714
8.80	1.10	9.90			0.34	**1.27**	1.54	2.36	3.22	37.9	65989
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*5.00*	*38.5*	
7.55	1.85	**9.40**			1.69	2.52	3.06	**8.88**		**53.8**	65716
7.30	1.20	**8.50**			2.39	2.70	3.28	10.82		60.1	65990
8.00	2.10	10.10			1.30	**2.06**	2.48	10.34		**56.2**	65991
8.00	*4.00*	*12.00*				*2.47*	*3.00*		*10.00*	*58.4*	
11.10	1.40	**12.50**				0.43	0.52			**19.8**	66361
12.00	*4.00*	*16.00*				*0.41*	*0.50*			*22.1*	
8.80	13.10	21.90			0.28	1.49	1.81			**27.4**	66362
10.00	*10.00*	*20.00*				*1.65*	*2.00*			*28.9*	
		20.40	85	15	0.37	3.82	4.64			39.2	66363
		22.00				*3.71*	*4.50*			*40.0*	
8.30	1.60	9.90			1.76	2.60	3.16	**5.14**		**44.1**	65721
8.00	*1.00*	*9.00*				*2.47*	*3.00*	*6.00*		*45.2*	
6.50	9.30	15.80				0.54	0.66			16.7	65997
8.00	*8.00*	*16.00*				*0.41*	*0.50*			*17.7*	
8.80	13.80	22.60			0.37	1.20	1.46			25.9	65359
10.00	*10.00*	*20.00*				*0.82*	*1.00*			*23.9*	
9.10	4.50	13.60				0.41	0.50	**0.54**		19.0	65510
8.00	*1.00*	*9.00*				*0.41*	*0.50*	*1.00*		*17.9*	

TABLE II.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Hopkins Fertilizer Co., New Albany, Ind.	
65999	†Ammoniated Special	W. T. Crum, Smithfield
		Guaranteed
66232	†Wheat and Corn Grower No. 1	Conner-Hayden Co., Bardstown
		Guaranteed
66006	†Blackland Special	W. F. McClure, Bedford
		Guaranteed
66242	†Burley Grower	Johnson Lumber and Supply Co., Buechel
		Guaranteed
66244	Coarse Ground Steamed Bone Meal	S. E. Redford, Glasgow
		Guaranteed
	International Agricultural Corp., Inc., Cincinnati, Ohio.	
65736	I. A. C. Standard Fertilizer	C. A. Ray, Rocky Hill
		Guaranteed
66245	†I. A. C. Farmers Favorite Manure	R. H. Lile, Clarkson
		Guaranteed
66246	I. A. C. Old Kentucky Special	C. M. Langdon, Science Hill
		Guaranteed
65738	I. A. C. Standard Potash Mixture	Q. F. Combs, Pembroke
66248		C. M. Langdon, Science Hill
		Guaranteed
66014	†Buffalo Tobacco and Potato Grower	Harrodsburg Impl. Co., Harrodsburg
		Guaranteed
66017	†Buffalo High Grade Tobacco Special	Harrodsburg Impl. Co., Harrodsburg
		Guaranteed
65743	†Buffalo Tobacco and Corn Grower	Coffey and Vanhook, Moreland
66018		Valley Grocery Co., Fredonia
		Guaranteed
65744	Buffalo Corn and Oats Special	Geo. W. Richardson, Somerset
		Guaranteed
66022	Buffalo High Grade Plant Food	S. C. Gray, Eminence
		Guaranteed
	The Jarecki Chemical Co., Armour Owned, Louisville, Cincinnati, Nashville.	
66023	†Jarecki's Burley Tobacco Grower	J. C. Everett and Co., Maysville
		Guaranteed
66026	Jarecki's 0–10–10 Fertilizer	Mullikin and Craig, Bedford
		Guaranteed

TABLE II.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
10.10	3.30	13.40			1.08	**2.79**	3.39			**33.2**	65999
10.00	*2.00*	*12.00*				*3.29*	*4.00*			*35.5*	
9.05	6.55	15.60				0.48	0.58	2.08	0.60	27.1	66232
10.00	*2.00*	*12.00*				*0.41*	*0.50*	*2.00*		*24.3*	
11.70	0.90	12.60						**5.33**		33.9	66006
10.00	*2.00*	*12.00*						*6.00*		*33.8*	
7.60	2.85	10.45			1.07	2.28	2.77	4.60	1.37	**44.1**	66242
8.00	*2.00*	*10.00*				*2.47*	*3.00*	*6.00*		*45.6*	
		26.20	76	24	0.74	2.61	3.17			36.6	66244
		30.00				*1.23*	*1.50*			*31.4*	
8.50	0.90	**9.40**			1.20	1.65	2.00	2.60		30.8	65736
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*2.00*		*29.5*	
9.80	1.55	**11.35**			0.60	0.88	1.07	3.03		**29.7**	66245
10.00	*5.00*	*15.00*				*0.82*	*1.00*	*3.00*		*30.9*	
8.95	1.25	**10.20**			0.55	0.83	1.01	1.90		24.6	66246
8.00	*5.00*	*13.00*				*0.82*	*1.00*	*2.00*		*24.9*	
10.40	1.25	**11.65**						5.72		33.3	65738
10.40	1.00	**11.40**						1.80	3.14	**30.8**	66248
10.00	*5.00*	*15.00*						*5.00*		*32.0*	
8.50	1.40	**9.90**			1.45	2.36	2.87	5.55		**44.1**	66014
8.00	*4.00*	*12.00*				*2.47*	*3.00*		*6.00*	*46.4*	
10.30	1.10	**11.40**			0.98	1.60	1.94	4.41		38.7	66017
10.00	*4.00*	*14.00*				*1.65*	*2.00*		*4.00*	*38.5*	
8.10	1.00	**9.10**			0.94	1.57	1.91	2.88	0.58	32.4	65743
8.10	0.90	**9.00**			1.09	1.72	2.09		2.07	29.0	66018
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*2.00*	*29.5*	
11.60	1.10	**12.70**			0.24	0.51	0.62	1.25		24.7	65744
11.00	*5.00*	*16.00*				*0.41*	*0.50*	*1.00*		*24.0*	
10.40	1.30	**11.70**			1.57	2.41	2.93			**30.6**	66022
10.00	*5.00*	*15.00*				*2.47*	*3.00*			*31.8*	
9.30	1.80	11.10			1.70	**2.01**	2.44	**1.36**	**3.90**	**42.5**	66023
8.00	*1.00*	*9.00*				*2.47*	*3.00*		*6.00*	*45.2*	
10.20	0.60	10.80						**9.07**		**42.8**	66026
10.00	*1.00*	*11.00*						*10.00*		*45.4*	

TABLE II.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Ky. Fertilizer Co., Br. Federal Chemical Co., Inc., Louisville, Ky.	
66031	†O. K. Grain Grower	Smith and Smith, Shepherdsville
66253		L. R. Hart, Big Clifty
		Guaranteed
66032	†O. K. Special	J. L. Siler, Corbin
		Guaranteed
66033	O. K. Wheat and Grain Special	Thompson Fertilizer Co., Mt. Sterling
		Guaranteed
66034	O. K. Tobacco Fertilizer	Smith and Smith, Shepherdsville
		Guaranteed
65755	O. K. High Grade Mixture	J. F. Bertram, Vanceburg
65756		Sam Carpenter and Co., Maysville
		Guaranteed
66035	†Golden Leaf Tobacco Grower	S. Y. Cutshaw, Bedford
		Guaranteed
	Louisville Fertilizer Co. (Armour Owned), Louisville, Cincinnati, Nashville.	
66039	Louisville 2–12–2 Fertilizer	Sweeney Bros., Lawrenceburg
		Guaranteed
66260	†Louisville 16% Acid Phosphate	Elkin and Kimmel, Greenville
66261		Yopp Seed Co., Paducah
		Guaranteed
65767	†Louisville Burley Tobacco Grower	S. E. Bedford, Glasgow
66047		Hess and Racke, Alexandria
		Guaranteed
	Mt. Pleasant Fertilizer Co., Inc. (Sub. of Va. Car. Chem. Co.), Nashville, Tenn.	
66051	Mt. Pleasant Superior Burley Grower	Nagle Packing Co., Paducah
		Guaranteed
65005	Mt. Pleasant 10–4–4	Manufacturer
		Guaranteed
65008	Mt. Pleasant Raw Bone Meal	Manufacturer
		Guaranteed
66052	Mt. Pleasant 10–4–3 Fertilizer	Nagle Packing Co., Paducah
		Guaranteed
66136	Mt. Pleasant Bone and Potash	Manufacturer
		Guaranteed
	Price Chemical Co., Inc., Louisville, Ky.	
65777	†Special Corn and Wheat Fertilizer	W. A. Johnson, Brodhead
65778		H. F. Upchurch, Susie
66268		Aaron Moore, Leitchfield
66269		Johnson and Viers Co., Elizabethtown
		Guaranteed

TABLE II.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
10.50	0.80	**11.30**			0.54	0.76	0.92	1.68		25.7	66031
9.30	2.00	**11.30**			0.69	1.04	1.26	1.92		26.8	66253
11.00	*4.00*	*15.00*				*0.41*	*0.50*		*1.00*	*23.6*	
11.20	2.50	13.70			0.34	0.72	0.87	**3.97**		**34.0**	66032
11.00	*4.00*	*15.00*				*0.41*	*0.50*		*5.00*	*35.6*	
12.00	1.20	**13.20**			0.61	0.92	1.12	1.49		28.5	66033
12.00	*4.00*	*16.00*				*0.82*	*1.00*		*1.00*	*27.5*	
9.70	1.10	**10.80**			0.55	0.86	1.04	3.10		29.5	66034
10.00	*4.00*	*14.00*				*0.82*	*1.00*		*2.00*	*27.5*	
10.40	0.60	**11.00**			0.64	0.89	1.08	3.22		30.8	65755
10.70	0.70	**11.40**			0.73	1.02	1.24	3.24		32.2	65756
11.00	*4.00*	*15.00*				*0.82*	*1.00*		*3.00*	*32.0*	
7.20	1.00	**8.20**			1.37	1.68	2.04	2.21		**27.9**	66035
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*2.00*	*29.5*	
10.90	1.10	12.00			1.13	2.03	2.46	0.56	2.12	37.0	66039
12.00	*1.00*	*13.00*				*1.65*	*2.00*	*2.00*		*34.3*	
14.50	3.10	17.60								**17.4**	66260
14.65	2.45	17.10								**17.6**	66261
16.00	*1.00*	*17.00*								*19.2*	
8.70	1.70	10.40			1.22	**2.09**	2.54	**0.72**	**4.66**	**42.4**	65767
9.90	1.80	11.70			1.82	**2.07**	2.51	**0.68**	**4.63**	**43.9**	66047
8.00	*1.00*	*9.00*				*2.47*	*3.00*		*6.00*	*45.2*	
9.90	1.50	11.40			1.02	**1.02**	1.24	2.79		29.9	66051
8.00	*4.00*	*12.00*				*1.65*	*2.00*		*2.00*	*29.5*	
6.40	14.40	20.80			3.34	3.49	4.24	**3.45**		46.7	65005
10.00	*2.00*	*12.00*				*3.29*	*4.00*		*4.00*	*47.5*	
		24.90	100		0.52	**3.01**	3.65			**38.0**	65008
		22.00				*3.71*	*4.50*			*39.9*	
9.90	2.30	12.20			1.11	**1.38**	1.68	3.91		**35.8**	66052
10.00	*2.00*	*12.00*				*3.29*	*4.00*	*3.00*		*44.5*	
11.45	7.40	18.85						**2.43**		27.4	66136
10.00	*4.00*	*14.00*						*3.00*		*25.6*	
11.00	1.10	**12.10**			0.29	0.47	0.57	0.87		**22.4**	65777
11.60	1.00	**12.60**			0.36	0.60	0.73	1.51		25.9	65778
11.10	0.80	**11.90**			0.52	0.73	0.89	1.24		25.1	66268
11.30	1.10	**12.40**			0.31	0.56	0.68	1.12		24.1	66269
11.00	*4.00*	*15.00*				*0.41*	*0.50*	*1.00*		*23.6*	

TABLE II.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Price Chemical Co., Inc.	
65460	General Crop Fertilizer	Manufacturer
		Guaranteed
65462	One-Eight-Three Fertilizer	Manufacturer
		Guaranteed
65779	Ky. Blue Grass Tobacco Special	I. K. Miller and Sons, Campbellsville
66055		J. C. Starns, Williamstown
66103		A. D. Roberts, Hawesville
		Guaranteed
66104	Extra H. Gr. Tobacco Fertilizer	F. W. Hudson, Bedford
		Guaranteed
66056	Old Time Tobacco Fertilizer	P. S. Howard, Wyett
66105		W. S. Overstreet, La Grange
		Guaranteed
66057	3-8-6 Tobacco Grower	M. B. Walling ford, Flemingsburg
		Guaranteed
66058	Truck and Tobacco Fertilizer	D. M. Hocker, Corbin
		Guaranteed
65780	H. Gr. Fertilizer	Peoples Store, Loretto
		Guaranteed
66274	Raw Bone	Peoples Store, Loretto
		Guaranteed
65783	No. 1 Fertilizer	I. K. Miller and Sons, Campbellsville
		Guaranteed
65588	Three-Eight-Six Tobacco Fertilizer	Manufacturer
		Guaranteed
	Rasin-Monumental Co. (Sub. Va. Car. Chemical Co.), Cincinnati, Nashville, Memphis.	
66060	Rasin's Sweepstakes Fertilizer	J. H. Wyan, London
		Guaranteed
65335	Rasin's Pure Bone Meal	Manufacturer
		Guaranteed
	Read Phosphate Co., Nashville, Tenn.	
65800	†Read's Kentucky Special	J. A. Ramsey and Co., Murl
		Guaranteed
66280	Read's High Grade Potash Mixture	J. H. Jasper, Somerset
		Guaranteed
66066	†Read's Pure Raw Bone Meal	M. D. Royse, Winchester
		Guaranteed
66391	Read's Wheat and Tobacco Special	*
		Guaranteed

TABLE II.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
10.80	0.80	**11.60**			0.75	0.95	1.15	2.17		28.7	65460
10.00	*4.00*	*14.00*				*0.82*	*1.00*	*2.00*		*27.5*	
8.60	1.00	**9.60**			0.64	0.86	1.04	3.33		28.5	65462
8.00	*4.00*	*12.00*				*0.82*	*1.00*	*3.00*		*27.5*	
7.60	1.20	**8.80**			0.87	1.18	1.43	3.76		**30.2**	65779
8.35	0.65	**9.00**			0.90	1.25	1.52	3.96		32.2	66055
7.85	0.80	**8.65**			0.86	1.17	1.42	4.25		**31.9**	66103
8.00	*4.00*	*12.00*				*1.23*	*1.50*	*4.00*		*33.0*	
9.85	1.15	**11.00**			1.23	1.55	1.88	4.07		**36.8**	66104
10.00	*4.00*	*14.00*				*1.65*	*2.00*	*4.00*		*38.5*	
8.75	1.00	**9.75**			1.18	1.49	1.81	0.48	1.38	**28.1**	66056
7.80	0.85	**8.65**			1.21	1.65	2.00	1.98		**28.0**	66105
8.00	*4.00*	*12.00*				*1.65*	*2.00*	*2.00*		*29.5*	
8.15	0.60	**8.75**			1.92	2.23	2.71	6.13		**44.2**	66057
8.00	*4.00*	*12.00*				*2.47*	*3.00*	*6.00*		*46.4*	
9.00	0.85	9.85			1.81	**2.16**	2.62	2.66		**34.8**	66058
8.00	*4.00*	*12.00*				*2.47*	*3.00*	*3.00*		*37.4*	
9.80	2.20	12.00			0.71	**1.36**	1.65			**23.7**	65780
10.00	*4.00*	*14.00*				*1.65*	*2.00*			*26.5*	
		17.25	86	14		4.31	5.23			39.7	66274
		22.00				*3.71*	*4.50*			*39.9*	
11.60	1.00	**12.60**			0.19	0.43	0.52			**20.4**	65783
12.00	*4.00*	*16.00*				*0.41*	*0.50*			*22.1*	
8.90	2.00	10.90			1.22	**2.01**	2.44		5.92	**44.0**	65588
8.00	*4.00*	*12.00*				*2.47*	*3.00*		*6.00*	*46.4*	
10.60	4.40	15.00			1.20	1.65	2.00	2.00		33.6	66060
12.00	*1.50*	*13.50*				*1.65*	*2.00*	*2.00*		*34.5*	
		31.50	81	19	0.23	**1.24**	1.63			33.2	65335
		22.00				*2.47*	*3.00*			*32.4*	
10.40	6.30	16.70			0.20	0.68	0.83	**1.76**	**0.97**	30.4	65800
8.00	*5.00*	*13.00*				*0.41*	*0.50*	*4.00*		*28.5*	
11.25	7.65	18.90						**2.52**		**27.5**	66280
10.00	*8.00*	*18.00*						*4.00*		*30.2*	
		23.15	22	78		**3.04**	3.69			**36.8**	66066
		20.00				*3.71*	*4.50*			*38.3*	
											66391
8.00	*3.00*	*11.00*				*1.65*	*2.00*	*5.00*		*38.1*	

TABLE II.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Smith Brothers, New Albany, Ind.	
66131	Bone and Potash	Manufacturer Guaranteed
	Swift and Co., Inc., National Stock Yards, Ill.	
66076	†Swift's Red Steer 3–8–6 Fertilizer	Green and Duff, Mt. Sterling
66107		W. C. Bonta, Pleasureville Guaranteed
65818	†Swift's Diamond "B" Fertilizer	W. E. Burress, Greensburg Guaranteed
65819	Swift's Red Steer 2–12–6 Fertilizer	South Somerset Mills, Somerset Guaranteed
66077	†Swift's Red Steer 2–16–2 Fertilizer	D. I. and S. F. Klapp, Clinton Guaranteed
65821	Swift's Grain and Tobacco Grower	Hoy McClure, Somerset Guaranteed
66289	†Swift's Champion Wheat and Corn Grower	J. B. Marriott, Cecilia Guaranteed
65823	†Swift's Diamond "W" Vegetable and Tobacco Grower	Jno. P. Marriott, Cecilia
66078		I. K. Miller and Sons, Campbellsville Guaranteed
66290	Swift's Superphosphate	W. L. Anderson and Sons, Caneyville Guaranteed
	Tennessee Chemical Co. (Armour Owned), Louisville, Cincinnati, Nashville.	
65833	Ox Dark Tobacco Grower	R. E. Moore, Madisonville
65834		J. S. Duke, Crab Orchard Guaranteed
66082	†Ox 2–12–6 Fertilizer	J. M. Johnson, Benton Guaranteed
66383	†Ox 2–10–4 Fertilizer	C. F. Roberts and Co., Olive Hill Guaranteed
65836	†Ox Bone Meal	W. F. Grainger, Franklin Guaranteed
66309	†Ox 16% Acid Phosphate	Sexton Bros., Murray Guaranteed
66090	Ox Special Tobacco Guano	The T. J. Turley Co., Owensboro Guaranteed

TABLE II.

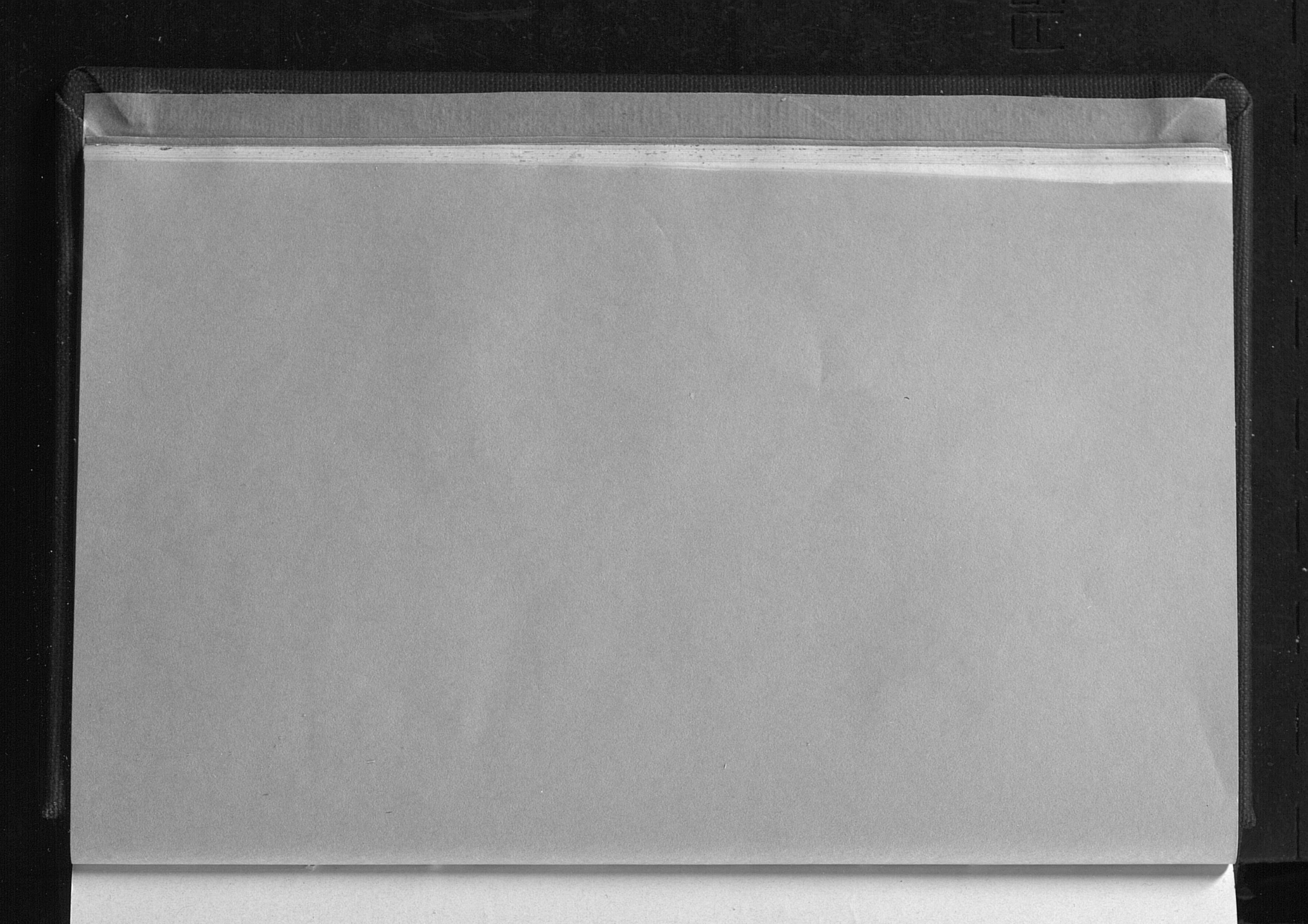
PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN		Equivalent to Ammonia	POTASH		Index of Relative Value	Station Number
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total		Muriate	Sulfate		
10.20	1.10	11.30						**1.68**		20.8	66131
10.00	*2.00*	*12.00*						*2.00*		*21.8*	
8.05	4.10	12.15			2.12	**2.12**	2.57	**5.24**		**42.2**	66076
9.80	3.80	13.60			1.85	**2.06**	2.50	**5.29**		**44.5**	66107
8.00	*3.00*	*11.00*				*2.47*	*3.00*	*6.00*		*46.0*	
8.55	3.70	12.25			1.96	**1.96**	2.38	4.99		**41.0**	65818
8.00	*3.00*	*11.00*				*2.47*	*3.00*	*5.00*		*43.0*	
13.05	0.95	14.00			1.77	1.77	2.15	**4.92**		45.3	65819
12.00	*1.00*	*13.00*				*1.65*	*2.00*	*6.00*		*46.3*	
15.70	1.10	16.80			1.42	1.42	1.72	2.20		**39.1**	66077
16.00	*1.00*	*17.00*				*1.65*	*2.00*	*2.00*		*40.3*	
12.80	0.80	13.60			1.15	**1.15**	1.40	**2.87**		**35.0**	65821
10.00	*3.00*	*13.00*				*1.65*	*2.00*	*4.00*		*38.1*	
11.90	1.45	13.35			1.62	1.62	1.97	1.96		**34.0**	66289
12.00	*3.00*	*15.00*				*1.65*	*2.00*	*2.00*		*35.1*	
9.25	2.75	12.00			1.52	1.52	1.85	**2.00**		**30.1**	65823
7.30	3.00	10.30			1.57	1.57	1.91	3.38		31.7	66078
8.00	*3.00*	*11.00*				*1.65*	*2.00*	*3.00*		*32.1*	
8.00	1.00	9.00			1.51	1.51	1.83	1.87		**27.1**	66290
8.00	*3.00*	*11.00*				*1.65*	*2.00*	*2.00*		*29.1*	
8.95	1.80	10.75			1.92	2.72	3.30		**0.54**	**32.1**	65833
8.45	0.45	8.90			0.80	1.45	1.76		**3.53**	**32.2**	65834
8.00	*1.00*	*9.00*				*1.65*	*2.00*		*4.00*	*34.3*	
11.35	1.15	12.50			0.88	1.61	1.95	1.80	4.00	**44.6**	66082
12.00	*1.00*	*13.00*				*1.65*	*2.00*	*6.00*		*46.3*	
10.25	1.50	11.75			1.03	1.63	1.98	**3.39**		**35.9**	66383
10.00	*1.00*	*11.00*				*1.65*	*2.00*	*4.00*		*37.3*	
		24.00	77	23	0.47	3.90	4.73			42.6	65836
		27.00				*2.47*	*3.00*			*36.4*	
15.20	3.30	18.50								18.2	66309
16.00	*1.00*	*17.00*								*19.2*	
9.60	1.90	11.50			1.37	2.21	2.68	**0 40**		**29.6**	66090
10.00	*1.00*	*11.00*				*1.65*	*2.00*		*2.00*	*31.3*	

TABLE II.

Station Number	Name and Address of Manufacturer and Name of Brand	From Whom Obtained
	Virginia-Carolina Chemical Co., Inc., Cincinnati, Nashville, Memphis.	
65855	†V. C. 2-8-4 Tobacco Special (Potash from Sulphate)	C. B. Carden and Co., Hartford Guaranteed
65857	†V. C. Raw Bone Meal	Jas. Rice, Adairville Guaranteed
	Wood, Stubbs and Co., Store, Louisville, Ky.	
65539	Acme Crop Booster	Manufacturer Guaranteed
65889	Acme Br. Blue Ribbon Potato Grower	Manufacturer Guaranteed

TABLE II.

PHOSPHORIC ACID			PERCENTAGE OF FINENESS		NITROGEN			POTASH			
Available	Insoluble	Total	Fine Bone	Medium Bone	Water Soluble	Total	Equivalent to Ammonia	Muriate	Sulfate	Index of Relative Value	Station Number
10.35	6.30	16.65			1.77	1.97	2.39	**3.49**		40.3	65855
8.00	*1.50*	*9.50*				*1.65*	*2.00*		*4.00*	*34.5*	
		23.50	100		0.55	**2.82**	3.42			**35.7**	65857
		20.00				*3.71*	*4.50*			*38.3*	
11.60	0.65	12.25							**3.95**	**29.5**	65539
10.00	*2.00*	*12.00*						*5.00*		*30.8*	
8.95	1.60	10.55			1.19	**1.99**	2.42	0.68	6.07	46.3	65889
8.00	*4.00*	*12.00*				*2.47*	*3.00*		*6.00*	*46.4*	



Kentucky
Agricultural Experiment Station
University of Kentucky

THE MEXICAN BEAN BEETLE IN KENTUCKY

CIRCULAR NO. 31

Lexington, Ky.
December, 1923

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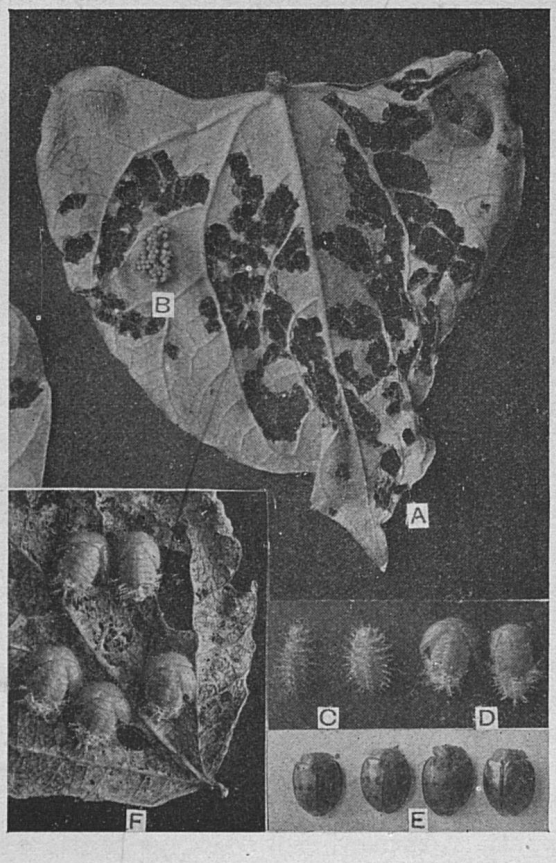
The Mexican Bean Beetle in Kentucky

By H. GARMAN

The severe injuries of the Mexican bean beetle (*Epilachna corrupta*) in Kentucky during 1922 and 1923 make desirable an account of the pest as a means of warning our gardeners and truck growers as to this new danger to beans of all sorts grown in the state, and as a vehicle for putting into their possession such information as can be obtained with regard to means of controlling the pest. Its spread during the summer of 1923 was remarkably rapid in the eastern part of the state, the thinly settled mountain counties, contrary to what one would expect, showing a more rapid dispersal than the more thickly settled and closely tilled central counties. It is now scattered over two-thirds of eastern Kentucky, but in isolated spots in the more northern parts of the state. In the southern counties of this end of the state it has become common and generally distributed in some localities. No complaints have thus far reached us from the northern tier of counties, but the recent discovery of the insect in southeastern Ohio, at Gallipolis, in Gallia county, opposite Mason county, Kentucky; at Coalton, Jackson county; at Chillicothe, in Ross county; at Portsmouth, Scioto county, opposite Greenup county, Kentucky, shows that its presence may now be expected anywhere in eastern Kentucky on our side of the Ohio river.

While inspecting the nurseries of western Kentucky during July and August of last summer the insect was kept constantly in mind and inquiries were made everywhere in that region as to the presence of the Mexican bean beetle. It was not observed and was not known to gardeners of whom inquiries were made, and we learned of no case of injury from it in the region west of

Louisville. It is not unlikely, however, that the pest occurs there in isolated spots and that its injuries will be noted in 1924. Mr. R. A. Stevenson, of the Department, visited the region about Bowling Green late in the season but found no evidence of its presence there at that time.



F'g. 1.—A, leaf injured by the Mexican bean beetle; B, a cluster of eggs; C, two larvae; D, two pupae; E, four adults; F, five pupae attached to a bit of leaf. Natural size.

As its name implies, the insect invaded this country from Mexico, appearing first in the southwestern states of Texas, New Mexico, Arizona and southern Utah, and continuing northward into Colorado, where it is now present thruout most of the state. It was observed in the latter state by C. V. Riley in the year

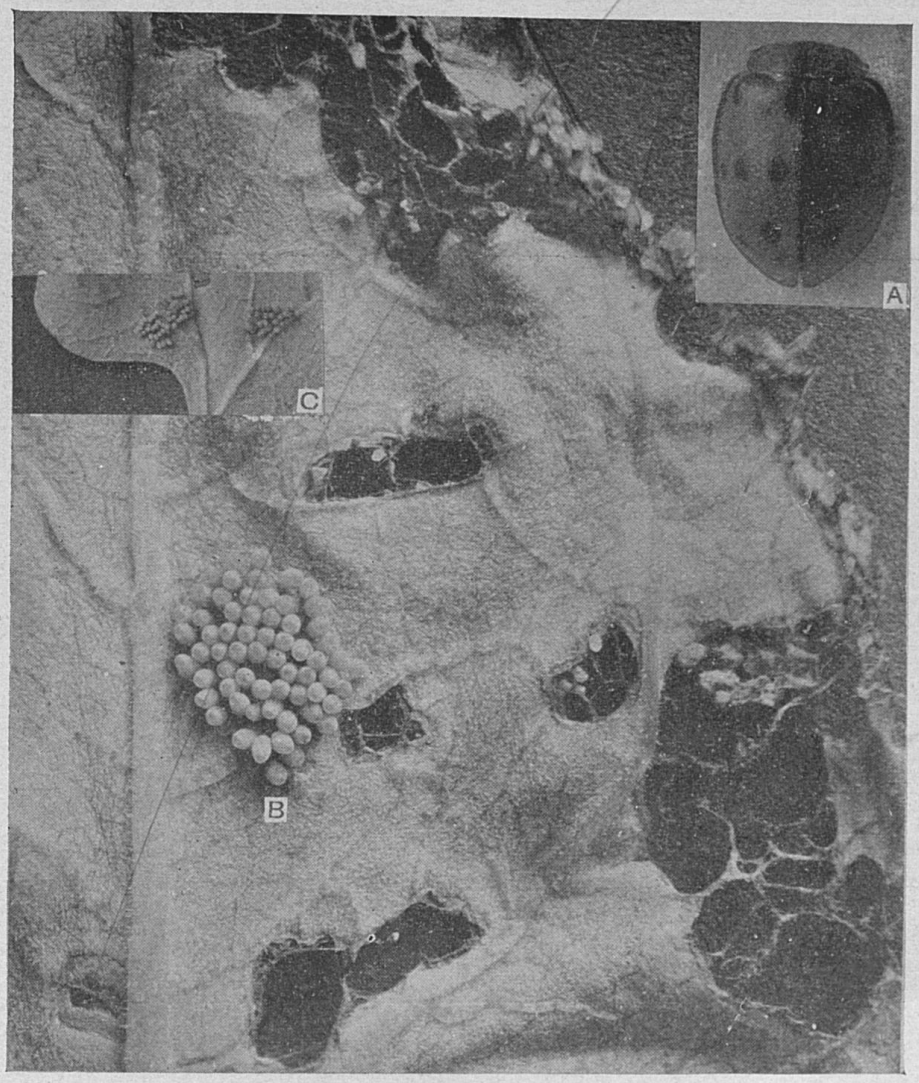


Fig. 2.—A, adult magnified 4 times; B, cluster of eggs magnified 4 times; C, two clusters of eggs, natural size.

1882, and thus appears to be permanently established there. This fact that it has continued its northward spread in the mountains of the west and becomes resident leaves us little hope that it will be suppressed by our cold winters and implies that we must be prepared to deal with the newcomer thruout Kentucky. Our own brief experience with the pest confirms this impression,

tho we have not had a very trying winter since the beetle appeared within our boundary.

In the east the beetle has been present since 1920, when it appeared in a small area of northern Alabama. In 1921 it had appeared in two southern counties (McCreary and Whitley) of Kentucky, after having spread thru most of the eastern third of

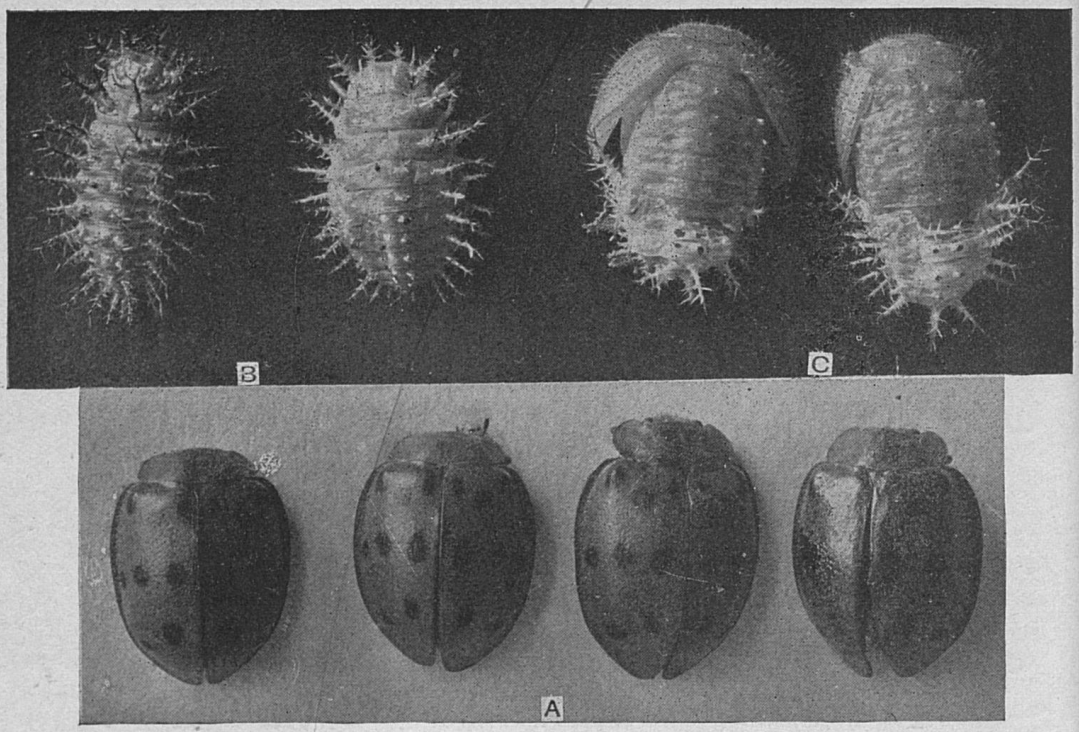


Fig. 3.—A, four beetles; B, 2 larvae; C, 2 pupae. Magnified 4 times.

Tennessee. It is now known to the writer to have appeared during 1923 in the following Kentucky counties:

Adair	Estill	Lee	Perry
Bell	Fayette	Leslie	Powell
Boyle	Harlan	Letcher	Pulaski
Breathitt	Hart	Lincoln	Rockcastle
Casey	Jackson	Madison	Rowan
Clay	Knox	Marshall	Russell
Cumberland	Laurel	Monroe	Taylor
Elliott	Lawrence	Owsley	Whitley

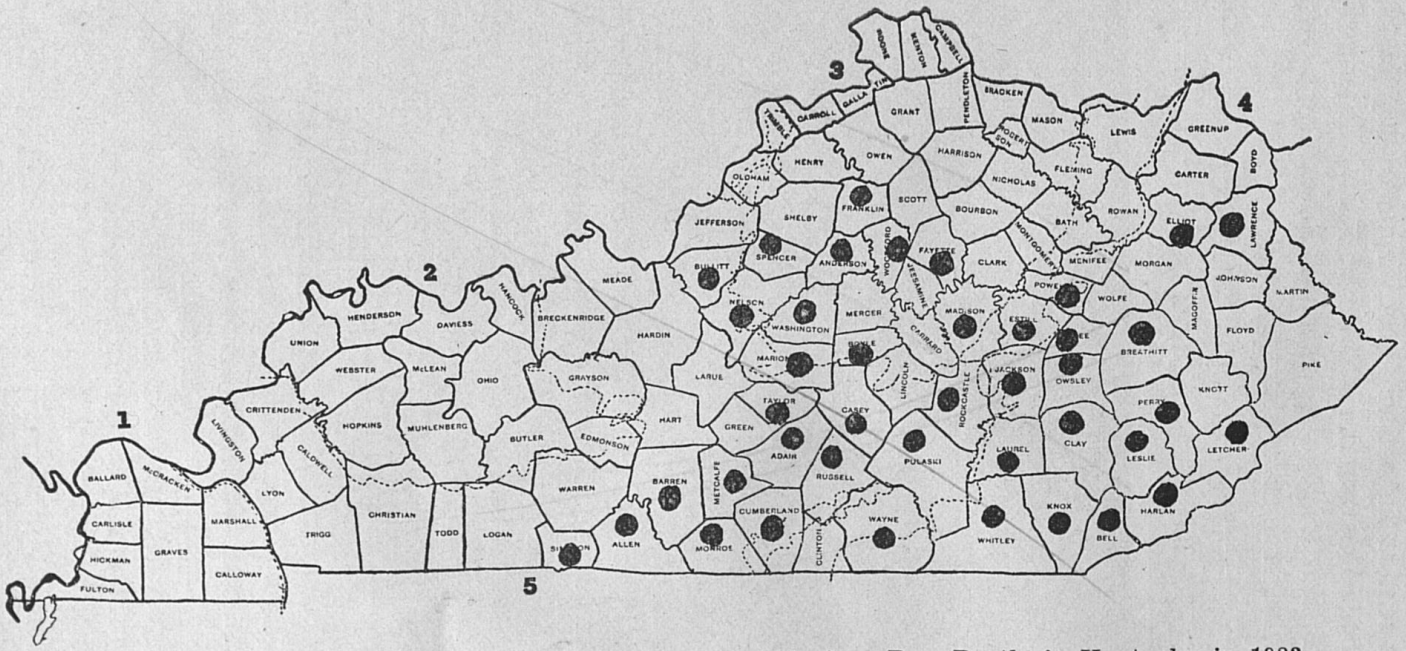


Fig. 4.—The black dots show the distribution of the Mexican Bean Beetle in Kentucky in 1923.

It was sent to the writer from Wayne county in 1922, but was not reported during the summer of 1923. In August, 1923, Mr. Neale F. Howard, of the Bureau of Entomology, observed it at Taylorsville, in Spencer county.

To these localities must be added the following counties in which the insect was observed in 1922 by men scouting for the Bureau of Entomology of the United States Department of Ag-

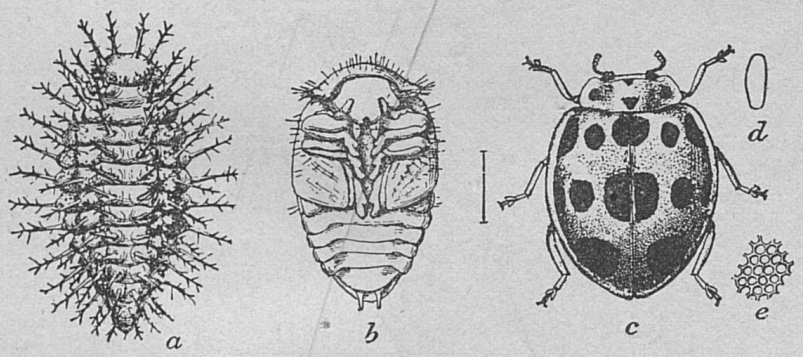


Fig. 5.—The squash lady beetle (**Epilachna borealis**). A, larva; B, pupa; C, adult; D, egg.

riculture, giving a total of 44 Kentucky counties in which the Mexican bean beetle has now appeared.

Allen	Metcalfe
Anderson	Nelson
Barren	Simpson
Bullitt	Washington
Franklin	Woodford

THE ADULT BEETLE

The adult insect is a lady beetle about a quarter of an inch (0.25 to 0.28 inch) long, a trifle less in breadth, the back arched, the head small and withdrawn between two forward-directed extensions of the thorax. Its legs are rather short and, while it runs about quickly, it depends for more extended traveling upon two long, membranous underwings kept concealed most of the time under the thick wing covers.

The general color above is pale brown, whitish when immature, in some individuals with a coppery reflection, the head

and thorax unmarked, the wing covers, with sixteen small, round black dots, arranged six in a zig-zag cross row in front, six in a rather straight series across the middle of the back, and a third series of four about midway between the median row and the hind margins. The wings are yellow, marked with black. The under parts of the body are brown, slightly darker centrally.

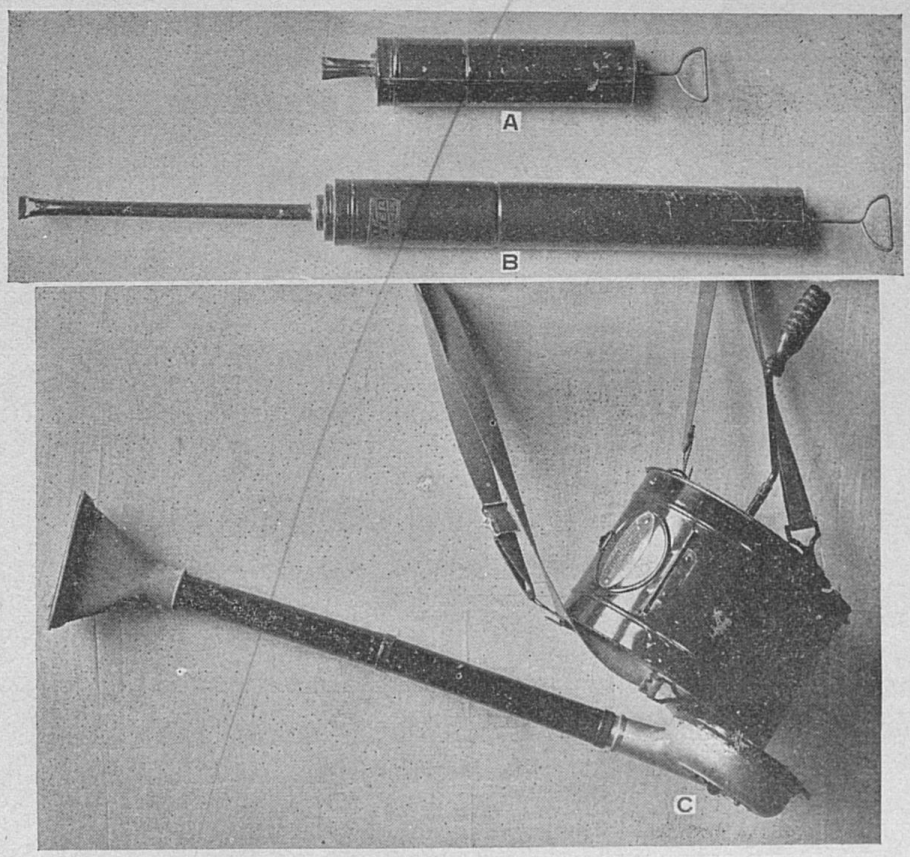


Fig. 6.—Showing different types of hand dusters. A, small duster suitable for city gardens; B, a duster of the same construction but of greater capacity; C, a duster suitable for field work.

There are a number of other spotted lady beetles resembling the Mexican insect in a general way, but none has the spots of this number and arranged exactly the same. Most of the others are beneficial from their habit of devouring plant lice and bark lice. We have one other plant-eating species, however, the native

squash lady beettle (*Epilachna borealis*). It was found in 1922 by Mr. Max Braithwaite, then connected with the Department of Entomology and Botany, doing a good deal of mischief to squashes in the Big Sandy Valley, and has at times been sent to the Station by correspondents with lots of the Mexican bean beetle, a fact implying that it may sometimes be found on beans, tho not known as an enemy of these plants. While some specimens of this squash-infesting insect are no larger than its Mexican relative, larger ones are often considerably more than a quarter of an inch (.33 inch) long, and there are fourteen *spots* on the back,

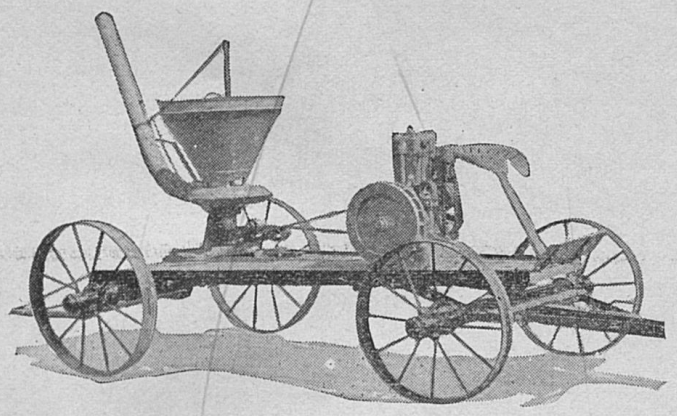


Fig. 7.—A self-mixing machine suitable for dusting beans and other low-growing crops. (By courtesy of the Bean Sprayer Company, Lansing, Michigan.)

those of the hindmost of the three cross rows being larger and only two in number. The thorax, also, is marked with black, with three dots and a large triangular spot, the latter on the hind margin.

A second beetle likely to be mistaken for the Mexican species, more because it injures beans than for any close resemblance, however, is a native species known to entomologists under the scientific name, *Cerotoma trifurcata.* It is not a lady beetle, but belongs to the same family as our common Colorado potato beetle, tho it is much smaller, being only about one-fifth inch long and slender bodied. It is marked on the back with six black spots, the four on the middle of the wing covers, squarish, and an irregular black longitudinal stripe on each wing cover

just within the outer margin. The head is black and the body beneath largely black, the antennae and legs marked with black. This little beetle gnaws holes in the leaves like those made by the adult bean beetle, but it has never proved common enough to cause great loss to gardeners.

LIFE-HISTORY AND EARLY STAGES

The adult beetles of the latest brood conceal themselves like other lady beetles among rubbish for the winter and come out of their hiding places only when spring is well advanced and

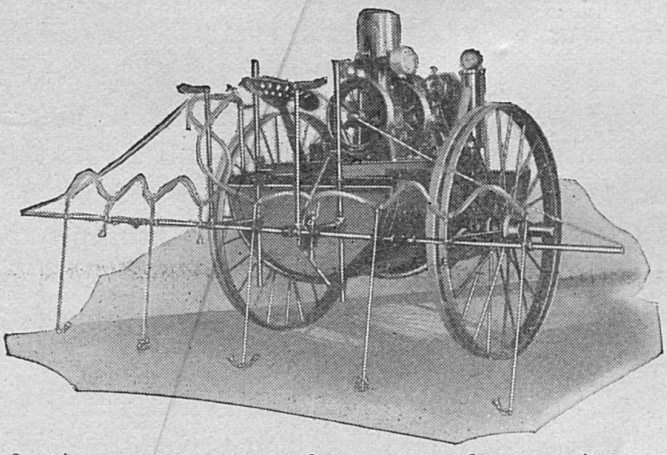


Fig. 8.—A power sprayer for use on low-growing crops. (By courtesy of the Bean Sprayer Company.)

food is to be had. Their time of resuming activity thus ranges with the forwardness of the season, but at this latitude they may be observed at work in gardens in early June, the injury increasing in seriousness toward the latter part of the month and continuing in early July. Later in the season it is not so often reported, but the insects continue active thru the summer and have been sent to the station by correspondents as late as October 3.

The Egg

The eggs are placed in clumps, consisting of a few or as many as fifty, are pale yellow, long-oval, smooth to the eye, and are attached by one end to the under sides of the leaves. The greatest diameter is near the middle, the ends appearing as if

cut off. Examples measure 0.057 inch in length and 0.025 inch in greatest diameter.

The Grub or Larva

A very characteristic little grub hatches from the egg in about six days. It is whitish or yellowish, with a well developed head and biting mouthparts and three pairs of jointed legs attached to the first three body segments, the whole body above bearing brown, branched spines. The color becomes a clear sulfur yellow as the insect grows, and the spines become yellow like the body except at the tips, where they are black. With their branches, the spines give the insect some resemblance to a small cocklebur. They are arranged in both cross and longitudinal rows, the first body segment bearing four and a curved row of minute erect spinules; the following nine segments bear six spines each; the eleventh bears but four spines and a lateral tubercle on each side, while the remaining two divisions bear none of the large spines. Beneath, the abdomen bears small groups of spinules but no spines.

When the grub gets its growth and is ready for the quiescent pupa stage it is about 0.40 inch long, and about 0.12 inch in width at the middle. By this time, if at all numerous on the leaves, it has skeletonized them pretty completely by eating away all of the green substance and leaving only the brown framework. Generally the grubs do not eat entirely thru the leaf, while the adult is more disposed to gnaw right thru, making holes not very different in character from those eaten out by the native beetle, *Cerotoma trifurcata*, already mentioned.

The Pupae

The change to pupae takes place on the leaves, and numerous pupae are often found secured to the under surfaces, each partly enclosed with the spiny skin of the larva, which has been shuffled off toward the rear end until only the hind third of the body is enclosed by it. The skin adheres to the leaf by some

means, probably a gluey substance produced from the region just behind the mouth.

The pupae measures about 0.30 in. in length and 0.22 inch in width across the bases of the wing cases, this being the widest part of the body. The color is yellow, the surface apparently smooth, but under a magnifier is seen to be clothed with minute erect setae, some brown, others brown-tipped. A noticeable series of these little spines follows the margin of the prothorax.

The pupae may be observed, a dozen or more attached to a leaf, about the first of July. Some have been secured June 25. Adult beetles come from them during the early part of July and continue to come forth for a couple of weeks. When fully mature the adults may place eggs for a second generation which becomes adult in late August and in September. Beetles of the second, and some of the first brood, find hiding places in October and November among rubbish and grasses, where they remain over winter. In the spring there are thus beetles of various ages that lay eggs and start the first brood of the season.

The egg stage lasts about a week. The larva or grub stage, during which most of the injury is done, may last about 15 days. The pupae stage lasts about a week. The whole life period from egg to adult thus covers about one month. Adults may live for eight months or more if they hibernate, but those maturing early in the season probably soon die after they have completed the placing of their eggs on the plants.

FOOD PLANTS OF THE MEXICAN BEAN BEETLE

While the insect is partial to garden beans, such as snap beans and pole beans, it will attack other members of the bean family, such as lima beans, and at times cowpeas and even soybeans, tho the writer has not observed any very serious harm done to the two latter. Some other leguminous plants, such as Florida beggar weed, alfalfa and even sweet clover, have been said to suffer injury on some occasions. A few non-leguminous plants have been observed to furnish the beetles a little food at times, but probably will never be in any serious danger from the insect, for it is known that many injurious species gnaw plants

other than those upon which they chiefly subsist without at any time endangering crops.

TREATMENT

The insect has proved a difficult one to combat because its larva feeds on the under sides of the leaves where insecticides cannot readily be applied, and partly because the beans are rather tender plants and very strong solutions and mixtures of poisons are likely to burn the foliage. At one time in the states south of Kentucky, where the beetle was first established, dusting the plants with a mixture consisting of one part by weight of arsenate of lime to eight parts of ordinary builders' hydrated lime was recommended. The mixture was not entirely satisfactory, and of late we have been suggesting a mixture consisting of 1 part of arsenate of lime, 1 part finely ground dusting sulfur and 4 parts of hydrated lime, first suggested by Dr. W. E. Hinds, Entomologist of the Alabama Station. The ingredients should be thoroly mixed, and the applications ought, for best results, to be made with a good duster. For small garden plantings about cities, a piston duster costing about $1.50 may be used. The large plantings of truck growers and farmers require one of the dusters slung by straps to the shoulders of the operator. Several different types of these latter dusters have been produced, mainly to meet the demand of cotton growers in the south. The cost of those the writer has seen ranged from $5.00 to $20.00, the latter price being higher than most bean growers in Kentucky are willing to pay. The dusters serve, however, for the treatment of other crops, such as tobacco.

Applications ought to begin as soon as the insects are observed at work on the beans and should be made weekly in order to get the new growth.

Spraying with arsenate of lead (1½ pounds in 50 gallons of water) can be practist as it is for the tobacco worm. Carefully done, this treatment seems to the writer a better one than dusting. With suitable nozzles and by throwing the spray with some force the under sides of the leaves may be completely covered

with a mixture that when dry will stick longer than a dust and retain its effectiveness as long as it remains on the leaves. The arsenate of lead to be used with sprays is slower in killing than Paris green and arsenate of lime, but if applied early, when the young are recently hatched, will do the work as completely as a stronger preparation, and should do no harm to the plants. One application of this sort will on some kinds of plants remain, largely, thruout a summer season.

Whenever a crop has been rendered worthless by an attack it should not be allowed to stand, but ought to be disposed of, either by burning or by plowing under deep enough to kill the plants and thus deprive the insects of further forage.

In the fall, lurking places for the beetles should be removed. Loose rubbish on land or at the edges may be raked up and burned. Leaves and weeds about a field are safe wintering places for the insects and should be cleared away in the fall so that they will afford the beetles no shelter.

Rotation will help some, as it does for other insect pests, but the beetles are provided with large membranous wings, and probably fly long distances during mild fall weather.

The beetles have other means of dispersal, also. They may be carried about by freight or passenger cars and in automobiles or other vehicles.

THE POSSIBILITY OF QUARANTINE

With these different ways of becoming scattered there does not at present seem to be any possibility of controlling its spread by legislation. Insects that do not fly or do not fly readily, may be retarded in their dissemination by means of this sort, but in the present case there does not seem to be any reasonable expectation of getting help from this source.

SUMMARY

The Mexican bean beetle is a small, brown lady beetle when adult, with sixteen black dots in three rows across its back.

It hibernates among rubbish as an adult.

Its preference is for garden beans, but it will do some mis-

chief to other members of the family, and especially when it is exceptionally common and its preferred food plants have been destroyed.

Beans of all sorts should be watched closely in the early part of the season and sprays or dusts be applied when the first clusters of eggs are being placed on the leaves.

Refuse of infested crops should be destroyed when the eggs, larvae or pupae are still present on the leaves. All lurking places should be removed in the fall to keep the beetles from hibernating about premises.

Dusting with arsenate of lime, 1 lb., sulfur, 1 lb., and hydrated lime 4 lbs., is recommended as a means of checking the injuries.

During the season of 1924 the pest is likely to appear in many new localities in Kentucky. Correspondents observing it will confer a favor by reporting its presence in any locality not already noted by us as invaded in 1922 and 1923.

Figures 1, 2, 3 and 6 are from photographs made by Miss Carrie Lee Hathaway, of the Department.

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