



Class.....639.73.....

Number.....N53.....

Volume.....3 cop 2.....

Source.....Binding.....

Received.....July 1909.....

Cost.....

Accession No.15435.....

Bulletin 124

March, 1906

NEW HAMPSHIRE COLLEGE

AGRICULTURAL EXPERIMENT STATION

THE

Inspection of Feeding-Stuffs

IN 1905

IN COÖPERATION WITH THE
STATE BOARD OF AGRICULTURE

NEW HAMPSHIRE COLLEGE
OF
AGRICULTURE AND THE MECHANIC ARTS
DURHAM

AVERAGE COMPOSITION OF COMMON CATTLE FOODS.

| | Water. | Ash. | Protein. | Soluble Carbohy- drates. | Fibre. | Fat. |
|-----------------------------|--------|------|----------|--------------------------------|--------|------|
| * Hay, red top..... | 8.9 | 5.2 | 7.9 | 47.4 | 28.6 | 1.9 |
| † Hay, Timothy..... | 13.2 | 4.4 | 5.9 | 45.0 | 29.0 | 2.5 |
| * Hay, clover..... | 15.3 | 6.2 | 12.3 | 38.1 | 24.8 | 3.3 |
| * Hay, Hungarian..... | 7.7 | 6.0 | 7.5 | 49.0 | 27.7 | 2.1 |
| * Oat fodder..... | 8.9 | 6.2 | 7.6 | 45.1 | 29.3 | 2.8 |
| * Rye fodder, in bloom..... | 8.5 | 5.9 | 9.7 | 43.4 | 30.2 | 2.3 |
| * Corn stover..... | 40.1 | 3.4 | 3.8 | 31.9 | 19.7 | 1.1 |
| † Corn silage..... | 80.5 | 1.5 | 1.6 | 10.0 | 5.8 | 0.6 |
| * Corn, N. H. Flint..... | 10.1 | 1.5 | 11.6 | 70.2 | 1.1 | 5.5 |
| * Corn, Western Dent..... | 10.6 | 1.5 | 10.3 | 70.4 | 2.2 | 5.0 |
| * Corn meal..... | 15.0 | 1.4 | 9.2 | 68.7 | 1.9 | 3.8 |
| † Hominy feed..... | 9.0 | 2.8 | 11.0 | 65.0 | 3.6 | 8.6 |
| * Oats, whole..... | 11.0 | 3.0 | 11.8 | 59.7 | 9.5 | 5.0 |
| † Corn and oats, pure..... | 12.0 | 2.2 | 9.8 | 68.5 | 3.3 | 4.2 |
| § Wheat bran, spring..... | 10.6 | 6.0 | 16.3 | 53.0 | 9.4 | 4.7 |
| § Wheat bran, winter..... | 11.7 | 5.9 | 15.2 | 51.8 | 8.5 | 3.9 |
| † Wheat middlings, white... | 11.3 | 2.7 | 15.8 | 62.5 | 3.5 | 4.2 |
| † Wheat middlings, brown.. | 10.6 | 3.8 | 17.8 | 57.0 | 5.5 | 5.3 |
| † Wheat feed..... | 10.8 | 4.3 | 17.6 | 58.1 | 5.1 | 4.7 |
| † Gluten feed..... | 8.6 | 1.2 | 26.3 | 53.4 | 6.9 | 3.6 |
| † Gluten meal..... | 8.8 | 0.7 | 35.5 | 50.3 | 1.6 | 3.1 |
| ‡ Distillers' Grains..... | 8.8 | 1.8 | 32.1 | 34.9 | 11.0 | 11.4 |
| ‡ Brewers' Grains..... | 8.0 | 3.8 | 23.1 | 49.4 | 10.8 | 4.9 |
| ‡ Malt sprouts..... | 11.0 | 5.8 | 27.1 | 42.6 | 11.9 | 1.6 |
| * Linseed meal, old process | 9.8 | 5.5 | 33.9 | 35.7 | 7.3 | 7.8 |
| * Linseed meal, new process | 9.1 | 5.8 | 35.2 | 38.4 | 8.5 | 3.0 |
| † Cottonseed meal..... | 6.9 | 7.2 | 44.6 | 25.1 | 5.6 | 10.6 |

* Composition of American Feeding Stuffs. Jenkins and Winton.

† Analyses made at the N. H. Expt. Sta., 1895-1899.

§ Penn. Expt. Sta. Bull. 48.

†† Compiled from Feed Inspection Reports of various states.

‡ Hatch Expt. Sta. Bull., No. 94.

THE INSPECTION OF FEEDING-STUFFS IN 1905.

BY FRED W. MORSE.

The customary collection of commercial feeding-stuffs under the state law was made by the State Board of Agriculture and 106 different samples were drawn during the year in the spring and fall. These samples were delivered to the chemist of the Agricultural Experiment Station for analysis.

There are published in this bulletin the results obtained on 84 different lots of commercial feeding-stuffs, after excluding a number of duplicate samples, the composition of which was found to be correct.

There were found to be three distinct classes of cottonseed meal, according to the percentage of protein, being guaranteed respectively to contain 38.5 per cent., 41 per cent., and 43 per cent. Analysis showed further that two brands, viz., Green Diamond and Phoenix, guaranteed to contain 43 per cent. protein, contained less than 41 per cent. The remaining seven samples were found to be equal to their guarantee.

The prices were practically alike for all three grades. This is an injustice to the consumer because the lowest grade contains more lint and hulls than the highest grade. The consumer, however, can protect himself by reading the tags on the sacks.

The different linseed meals were fully equivalent to the statements on their tags. The marked difference in composition between the flax meal or new process and the old process meal in percentages of protein and fat should be kept in mind when buying them. If the meal is desired

for calves, the old process is by all means the better, because of its higher oil content.

Gluten meal and gluten feed are both residues of corn left in the manufacture of corn starch and glucose. The important difference between them is the amount of hulls or bran. In gluten meal, the hulls are absent, while in gluten feed they are present, either in a coarse or fine ground condition. This material causes a marked difference in the bulk of the two feeding-stuffs and in the percentage of protein. The manufacturers of these products have persistently overrated them in their statements of protein. The meals will average about 33 per cent. and the feeds about 25 per cent., respectively, instead of 38 and 27, as often claimed in the past. Warner's Gluten Feed has persistently fallen below 25 per cent. since our inspection began.

Distillers' grains are a waste product in the manufacture of whisky and alcohol and are usually from corn. As much of the starch as possible has been converted into alcohol, leaving the hulls, germs and gluten of the kernels, together with more or less starch. Their composition is very similar to the gluten products in protein; but is much higher in fat, and varies with the thoroughness with which the alcoholic fermentation has been carried out. About 33 per cent. of protein and 11 per cent. of fat should be guaranteed for these materials. One brand has guaranteed 36 per cent., but has never equalled it in our experience.

Hominy feeds are from corn and differ from corn meal in having more protein, fat and fiber than the latter. They are uniformly good. The corn and oat feeds are evidently made up from inferior oats and by-products of the cereal mills, since they practically always contain more fiber than the whole grains ever show. Oat feeds are in most cases nothing but oat hulls, more or less finely ground, as is shown by their percentages of fiber. The samples collected were equal to the guarantees; but fine-ground oat fodder would be equally valuable.

There are now on the market many mixtures of the various waste products of different grains, and they must necessarily be bought on the basis of their guaranteed composition. Such feeding-stuffs include Union Grains, Suerene Feed, H-O Dairy Feed, Quaker Dairy Feed and a number of others. It will be noted that most of these compounded feeds are fully equal to the claims made for them, while a few are positively low in both protein and fat. The percentages of fiber in a few instances are high enough to indicate the presence of oat hulls, corncobs or similar material, as they are above those for wheat bran.

Two brands of so-called mixed feed were collected, which were not pure wheat products. One contained corneob and gave an exceptionally high fiber, while the other was made up largely of screenings, finely ground. They complied with the law in bearing proper labels, but one was inferior to its stated composition.

COMPOSITION OF LICENSED CATTLE FOODS.

INSPECTED IN 1905.—STANDARD BY-PRODUCTS.

| Brand. | Manufactured by | Protein. | | Fat. | |
|----------------------|------------------------------|----------|-------|--------|-------|
| | | Found. | Quar. | Found. | Quar. |
| COTTONSEED MEAL. | | | | | |
| Cottonseed Meal..... | J. G. Falls & Co..... | 41.6 | 41. | 9.41 | 9. |
| Cottonseed Meal..... | J. E. Soper & Co..... | 38.5 | 38.5 | 9.92 | ..... |
| Dixie Brand..... | Humphreys, Godwin & Co..... | 43.7 | 41. | 9.22 | 9. |
| Green Diamond..... | Chapin & Co..... | 40.5 | 43. | 9.03 | 9. |
| Magnolia..... | Chas. M. Cox Co..... | 42.6 | 43. | 11.15 | 9. |
| Old Gold..... | T. H. Bunch..... | 43.2 | 43. | 8.30 | 9. |
| Owl Brand..... | F. W. Brodie & Co..... | 44.1 | 43. | 11.82 | 9. |
| Phoenix..... | D. L. Marshall Co..... | 40.6 | 43. | 7.91 | 9. |
| Prime..... | American Cotton Oil Co..... | 39.38 | 41. | 10.83 | 9. |
| Prime..... | Hunter Bros. Milling Co..... | 45.45 | 43. | 9.10 | 9. |
| Prime..... | N. Car. Cotton Oil Co..... | 38.5 | 38.6 | 7.30 | 8. |
| LINSEED MEAL. | | | | | |
| Cleveland..... | ..... | 37.7 | 38. | 1.92 | 1. |
| Old Process..... | American Linseed Co..... | 35.7 | 32. | 7.84 | 5. |
| Old Process..... | Metzger Seed & Oil Co..... | 30.2 | 30. | 7.43 | 5. |
| GLUTEN MEAL. | | | | | |
| Chicago..... | ..... | 33.54 | 38. | 2.89 | 3. |
| Cream..... | ..... | 31.77 | 35.5 | 3.55 | 3. |
| Cream..... | ..... | 35.36 | 35.5 | 4.70 | 3. |

LICENSED CATTLE FOODS.—*Concluded.*

| Brand. | Manufactured by | Protein. | | Fat. | |
|---------------------------------|----------------------------------|----------|-------|--------|-------|
| | | Found. | Guar. | Found. | Guar. |
| GLUTEN FEED. | | | | | |
| Buffalo..... | Glucose Sugar Refining Co..... | 24.92 | 25. | 1.05 | 3. |
| Globe..... | New York Glucose Co..... | 25.12 | 27. | 2.81 | 3. |
| Jenks..... | Huron Milling Co..... | 31.47 | 27. | 8.21 | 7.5 |
| Queen..... | | 20.98 | 27. | 2.45 | 3. |
| Tiger Brand..... | St. Louis Syrup & Preserving Co. | 26.45 | 25. | 4.02 | 3.75 |
| Warner's..... | Warner Sugar Refining Co..... | 22.40 | 25. | 2.69 | 3. |
| DISTILLERS' GRAINS. | | | | | |
| Ajax Flakes..... | Chapin & Co..... | 32.89 | 33. | 12.81 | 12 |
| Biles' Four Ex Grains | J. W. Biles Co..... | 34.83 | ..... | 10.26 | ..... |
| Empire State Dairy Feed..... | | 26.97 | 36.2 | 11.23 | 11.7 |
| HOMINY FEED. | | | | | |
| Hominy Feed..... | Hunter Bros. Milling Co..... | 11.09 | 11. | 8.99 | 7.7 |
| Hominy Feed..... | Miner & Hillard Milling Co..... | 10.43 | 10. | 8.99 | 7.5 |
| Blue Ribbon..... | J. E. Soper & Co..... | 10.36 | 11. | 8.03 | 8. |
| Green Diamond..... | Chapin & Co..... | 10.04 | 10. | 8.34 | 7. |
| Niagara White Meal. | Chapin & Co..... | 11.04 | 10. | 8.70 | 7. |
| Paragon..... | Chas. M. Cox Co..... | 10.69 | 10.5 | 8.56 | 7.5 |
| Regular..... | Toledo Elevator Co..... | 9.17 | 10.60 | 6.77 | 8.27 |
| Wirthmore..... | Chas. M. Cox Co..... | 10.70 | 10.5 | 9.39 | 7.5 |

COMPOUNDED CATTLE FOODS.

| Brand. | Manufactured by | Protein. | | Fat. | | Crude fiber. |
|-----------------------------|-----------------------------|----------|-------|--------|-------|--------------|
| | | Found. | Guar. | Found. | Guar. | |
| Blatchford's Calf Meal..... | | 25.12 | 25. | 5.30 | 5. | ..... |
| Biles' Ready Ration..... | Biles & Co..... | 24.10 | 24. | 7.51 | 7. | ..... |
| Union Grains..... | J. W. Biles Co..... | 22.60 | 24. | 8.63 | 7. | 9.08 |
| Protana..... | Purina Mills Co..... | 21.53 | 20. | 3.87 | 3.05 | 16.77 |
| Sucrene Dairy Feed..... | Am. Milling Co..... | 18.03 | 16.5 | 5.65 | 3.5 | 10.50 |
| Jersey Mixed Feed..... | Indiana Milling Co..... | 11.74 | 12. | 3.48 | 3.2 | 15.92 |
| Peerless Mixed Feed..... | Jennings & Fulton..... | 13.81 | 15.22 | 3.90 | 5.47 | 11.59 |
| Farmers' Fav. Cow Feed. | Valley City Milling Co..... | 15.20 | ..... | 4.96 | ..... | 7.66 |
| Badger's Stock Feed..... | J. H. Cressy & Co..... | 8.19 | 12. | 3.13 | 4.2 | ..... |
| Badger's Stock Feed..... | J. H. Cressy & Co..... | 8.34 | 12. | 2.42 | 4.2 | 7.68 |
| Empire Feed..... | Empire Mills..... | 8.60 | 7.63 | 1.12 | 2.97 | ..... |
| Haskell's Stock Feed..... | W. S. Haskell & Co..... | 9.31 | 10. | 6.28 | 6.28 | 8.38 |
| Quaker Dairy Feed..... | American Cereal Co..... | 13.02 | 14. | 4.06 | 3.5 | 17.81 |
| Quaker Dairy Feed..... | | 11.73 | 14. | 3.71 | 3.5 | ..... |
| Queen Stock Feed..... | Brown Milling Co..... | 8.23 | 9.2 | 4.31 | 4.7 | 8.84 |
| Schumacher's Stock Food | American Cereal Co..... | 10.23 | 13. | 3.48 | 5. | 11.86 |
| Schumacher Stock Feed.. | American Cereal Co..... | 9.89 | 12. | 3.25 | 5. | ..... |
| Victor Corn and Oat Feed | American Cereal Co..... | 8.25 | 9. | 3.25 | 4. | 12.35 |
| Victor Corn and Oat Feed | American Cereal Co..... | 9.18 | 9. | 3.52 | 4.9 | ..... |
| Wirthmore Stock Feed... | Chas. M. Cox Co..... | 10.00 | 10. | 6.42 | 4. | 8.83 |
| H-O Horse Feed..... | H-O Company..... | 11.48 | 12. | 5.53 | 4.5 | 11.64 |
| H-O Horse Feed..... | H-O Company..... | 12.83 | 12. | 4.01 | 4.5 | ..... |
| Hygrade Horse Feed..... | St. Albans Grain Co..... | 12.11 | 9. | 2.58 | 4. | 11.39 |
| OAT FEEDS. | | | | | | |
| Royal Oat Feed..... | Great Western Cereal Co.... | 7.73 | 7.5 | 2.84 | 2. | 26.28 |
| Vim Oat Feed..... | American Cereal Co..... | 6.89 | 7.5 | 2.82 | 2.75 | 26.32 |

The writer considers it impracticable to apply a scale of valuations to feeding-stuffs: but there is nothing unfair in a table showing the actual amounts of each nutrient which can be purchased for a given sum. The following table gives the retail prices for the more common feeding-stuffs during October, 1905.

AMOUNT OF NUTRIENTS WHICH \$1.00 WILL BUY.

| Brand. | Price per 100 lbs. | Pounds of Protein. | Pounds of Fat. | Pounds of Carbo- hydrates. |
|----------------------------------------|-----------------------|--------------------------|----------------------|-------------------------------------|
| Cotton-seed Meal, 43% Protein, 9% Fat. | \$1.55 | 27.7 | 5.8 | ..... |
| Cotton-seed Meal, 39% Protein, 8% Fat. | 1.55 | 25.1 | 5.1 | ..... |
| Linseed Meal, Old process..... | 1.70 | 19.9 | 4.5 | ..... |
| Linseed Meal, New process..... | 1.70 | 20.7 | 1.7 | ..... |
| Distillers' Grains, dry..... | 1.45 | 22.1 | 7.8 | 24.0 |
| Gluten Meal..... | 1.60 | 22.1 | 1.9 | 31.4 |
| Gluten Feed..... | 1.40 | 18.7 | 2.5 | 38.1 |
| Wheat Middlings, White..... | 1.30 | 12.1 | 3.2 | 48.0 |
| Wheat Middlings, Brown..... | 1.20 | 14.8 | 4.4 | 47.5 |
| Wheat Feed..... | 1.25 | 13.6 | 3.7 | 46.4 |
| Wheat Bran..... | 1.15 | 14.1 | 4.0 | 46.0 |
| Corn Meal..... | 1.30 | 7.0 | 2.9 | 52.8 |
| Hominy Feed..... | 1.25 | 8.8 | 6.9 | 52.0 |
| Corn and Oat Feed, "Victor"..... | 1.10 | 8.2 | 4.0 | 56.6 |

It will be at once seen that cottonseed meal is the lowest-priced protein food, with distillers' grains next. Of the wheat products, white or flour middlings are somewhat more expensive than the other coarser forms, and need not be selected for a cattle food, since cattle are quite able to digest the coarser materials.

Hominy feed is shown to be more economical than corn-meal. The various compound feeds can be worked out in the same way; and, as a rule, they will be found a little more expensive than unmixed equivalents of bran, hominy feed, distillers' grains and similar feeds.

There are no failures on the part of any of the poultry foods to reach the percentage guaranteed, while some of the animal meats and seraps overrun heavily, especially in fat. Excessive amounts of fat would not seem advantageous for laying hens, however.

The prices of several of the brands seem unduly high. The cereal foods cannot be any better than the grains from

which they are made; but are rated much higher than cattle foods of an equivalent composition. The animal meals and bone meals are considerably higher than standard fertilizer bone and tankage of equal composition, although it is doubtful if they are any more select in quality.

Whether the prices are fixed by the jobbers or retailers has not been ascertained; but in several instances they are unreasonable.

COMPOSITION OF LICENSED POULTRY FOODS.

INSPECTION OF 1905.

| Brand. | Manufactured by. | Price per 100 lbs. | Protein. | | Fat. | |
|-----------------------------------------------|----------------------------------------|-----------------------|----------|-------|--------|-------|
| | | | Found. | Guar. | Found. | Guar. |
| VEGETABLE FOODS. | | | | | | |
| Purina Alfalfa Meal..... | | \$2.00 | 15.60 | .... | 2.09 | ... |
| American Cereal..... | | 1.70 | 13.51 | 14. | 6.41 | 4.5 |
| Greene's Perfect..... | Greene's Chicken Feed Co. | 1.80 | 13.25 | 12. | 4.75 | 2. |
| H-O..... | H-O Company..... | 1.85 | 17.64 | 17. | 5.94 | 5.5 |
| H-O..... | H-O Company..... | 2.00 | 17.72 | 17. | 6.13 | 5.5 |
| *Page's Perfected..... | Carroll S. Page..... | 3.50 | 27.11 | 24. | 8.73 | 8. |
| ANIMAL MEAL. | | | | | | |
| Armour's Meat Meal.... | Armour & Co..... | 2.75 | 54.15 | .... | 12.61 | ... |
| Beach's Star Brand Meat and Bone Meal..... | Beach Soap Co..... | 2.00 | 30.23 | 26. | 10.64 | 10. |
| Bowker's..... | Bowker Fertilizer Co..... | 2.00 | 37.46 | 30. | 12.37 | 5. |
| Marsh's..... | Geo. E. Marsh & Co..... | 1.75 | 37.54 | 36. | 9.94 | 8. |
| Romaine's Boiled Beef and Bone..... | D. W. Romaine..... | 2.25 | 34.52 | .... | 20.63 | ... |
| Swift's Bone and Meat Meal | Lowell Fertilizer Co..... | 2.50 | 44.49 | 40. | 13.04 | 8. |
| Whitman & Pratt's..... | Whitman & Pratt Render- ing Co..... | 2.00 | 39.30 | 35. | 16.62 | 15. |
| BEEF SCRAPS. | | | | | | |
| Beach's..... | Beach's Soap Co..... | 2.50 | 44.58 | 40. | 14.43 | 20. |
| Bowker's..... | Bowker Fertilizer Co..... | 2.50 | 50.02 | 30. | 16.43 | 20. |
| Bradley's..... | American Agr'l Chem. Co. | 2.40 | 47.25 | 40. | 16.29 | 15. |
| Beef Scraps..... | Carroll S. Page..... | 3.00 | 49.78 | .... | 30.15 | ... |
| Swift's..... | Lowell Fertilizer Co..... | 2.50 | 44.90 | 40. | 15.78 | 15. |
| Pure Beef Scraps..... | H. K. Webster Co..... | 2.75 | 54.98 | 55. | 17.46 | 12. |
| BONE MEAL. | | | | | | |
| Beach's Star Brand Cracked Bone..... | Beach Soap Co..... | 2.75 | 24.27 | 25. | 4.56 | 5. |
| Beach's Star Brand Granu- lated Bone..... | Beach Soap Co..... | 2.75 | 22.25 | 25. | 13.04 | 5. |
| Beach's Star Brand Bone Meal..... | Beach Soap Co..... | 2.75 | 10.71 | 10. | 9.28 | 8. |
| Swift's..... | Lowell Fertilizer Co..... | 2.00 | 25.22 | 10. | 3.83 | 5. |
| Warren's..... | A. L. Warren..... | 1.90 | 26.39 | 26. | 15.29 | 6. |
| Warren's Chicken Feed..... | | 1.90 | 26.85 | 27. | 8.06 | 1. |

*A mixture of sunflower seed and coarse raw bone.

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