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U. S. DEPARTMENT OF AGRICULTURE,
OFFICE OF EXPERIMENT STATIONS,
A. C. TRUE, Director.

THE DIGESTIBILITY
OF
AMERICAN FEEDING STUFFS.

BY

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WASHINGTON:
GOVERNMENT PRINTING OFFICE.
1900.



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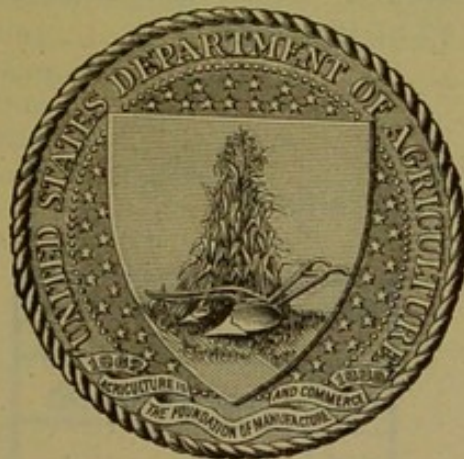
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LETTER OF TRANSMITTAL.

U. S. DEPARTMENT OF AGRICULTURE,
OFFICE OF EXPERIMENT STATIONS,
Washington, D. C., February 1, 1900.

SIR: I have the honor to transmit herewith a compilation by W. H. Jordan, director, and F. H. Hall, librarian, of the New York Agricultural Experiment Station, at Geneva, summarizing the results of experiments made at the experiment stations in the United States on the digestibility of feeding stuffs by farm animals. The authors have endeavored to make a complete résumé of the data on this subject up to the close of 1898.

A previous summary, by W. H. Jordan, of coefficients of digestibility of American feeding stuffs, including the results of 154 experiments, was published in the Experiment Station Record in 1894. Since that time a large number of additional digestion experiments have been made, as is shown by the fact that the present compilation contains the results of 378 experiments. Coefficients of digestibility have now been determined for nearly all of the more important American feeding stuffs, many of them the averages of a number of experiments. It is now possible to use reliable American coefficients quite generally in the calculation of feeding rations for farm animals. In addition to its value for this purpose the compilation will prove useful in showing in what respect our data are insufficient and need to be supplemented by additional digestion experiments. I therefore recommend that it be published as Bulletin No. 77 of this Office.

Respectfully,

A. C. TRUE,
Director.

Hon. JAMES WILSON,
Secretary of Agriculture.

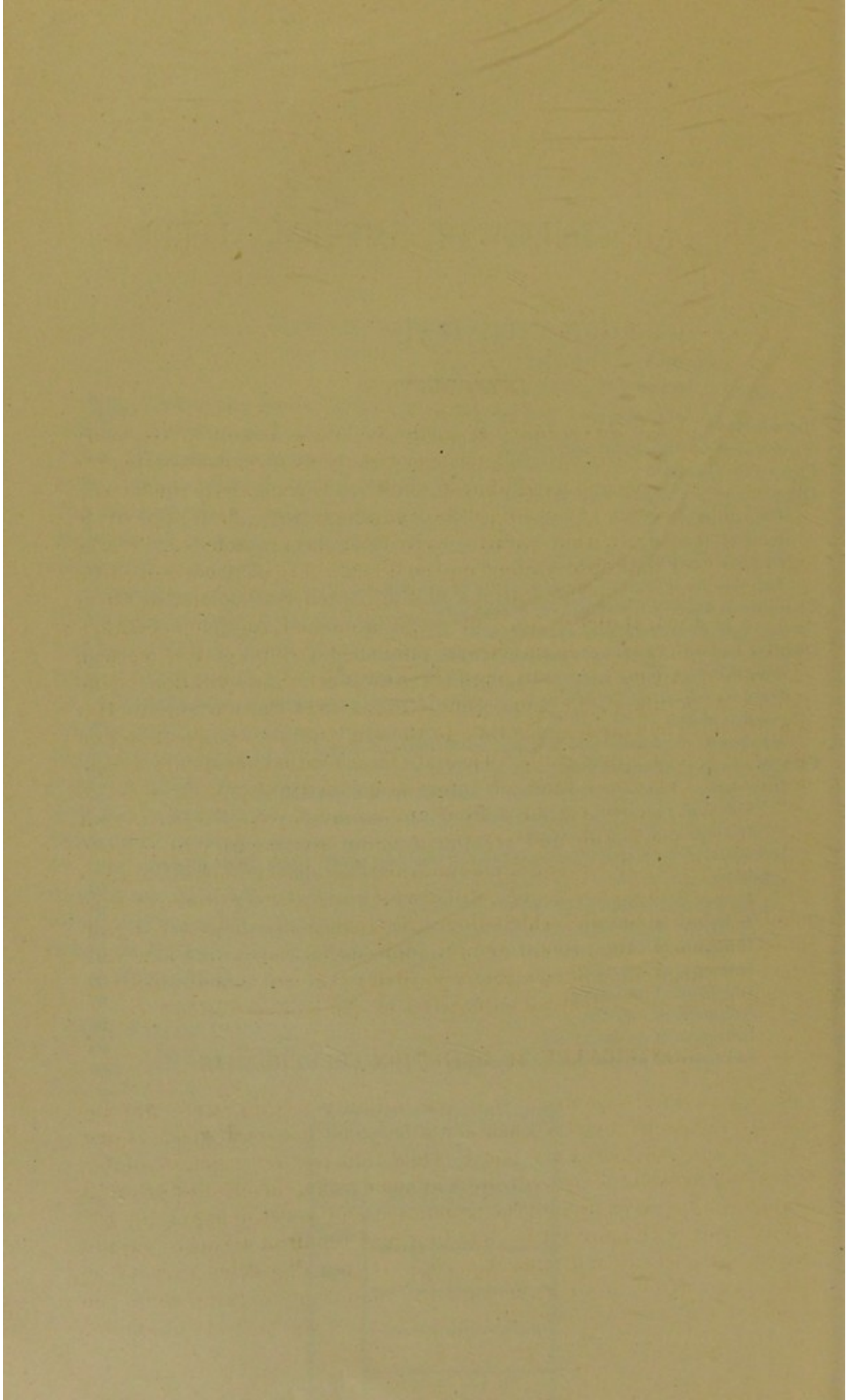
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THE DIGESTIBILITY OF AMERICAN FEEDING STUFFS.

INTRODUCTION.

A study of the digestibility of cattle foods was begun in Germany more than forty years ago and for over twenty-five years experiments of this class were conducted almost wholly in German experiment stations. The coefficients of digestibility, which were first applied to practical feeding in this country, were from foreign sources. It was not until 1884 that observations on the digestibility of American cattle foods were begun by the stations in the United States and, so far as can be learned, Bulletin No. 3 of the Wisconsin Experiment Station, issued in that year, contains the first published account of an American experiment of this kind, although the New York State Station began similar work about the same time. Since 1884 the stations in this country have devoted much time to the study of the composition and digestibility of feeding stuffs. The data thus secured constitute a most useful and important fund of information on this subject, some of which is not readily available from any other source. The facts that methods of harvesting and treatment materially modify the digestibility of coarse fodders and that the American markets afford a great variety of commercial feeding stuffs which are the by-products from numerous industries and which differ greatly in composition and digestibility emphasize the need of definite information concerning materials which are the product of conditions peculiar to the soil, climate, methods of treatment, and industrial enterprises of the United States.

SIGNIFICANCE OF DIGESTION COEFFICIENTS.

It is generally recognized that the ordinary feeding stuffs are not entirely digested; that is, each contains some material which is not retained and utilized by the body. Only that portion which is soluble or is rendered soluble by hydrolysis or some other chemical or physical change can be taken up into the circulation and assist in supplying the animal body with material for building and repair of tissue or supply the energy for heat and muscular work. Often digestible material is not absorbed owing to its mechanical condition which prevents the proper action of the digestive juices. Of two cattle foods of similar

composition, the one most digestible has the higher nutritive value, assuming that both require the same expenditure of internal muscular work for chewing, digesting, etc. A ration of given composition is useful in direct proportion to the solubility of its constituents in the several digestive fluids and the readiness with which they are rendered available for the body, although bulk, mechanical condition, etc., are factors which may modify the extent, rapidity, and normal procedure of the digestive process.

The conclusion is obvious that the comparison of different rations with one another or with accepted feeding standards can only be made with approximate accuracy when the amounts and kinds of available material which the rations contain are known. The percentage of protein, fat, and other constituents of any feeding stuff or ration which is retained in the body is generally assumed to represent its digestibility. These percentages are called coefficients of digestibility or digestion coefficients. It is not enough to ascertain the dry matter in two rations and then measure their relative efficiency by this factor. The digestibility must also be known. While in some cases a standard based on the dry matter content would be sufficiently accurate for all practical purposes, in others it would be very misleading; as, for instance, in comparing a ration made up of straw, timothy hay, bran, and brewer's grains, with one composed of silage, clover hay, corn meal, pea meal, and linseed meal. The availability of the dry matter in the two cases is very unlike. These are among the practical considerations which have led to a widespread use of coefficients of digestibility in the compounding of rations.

PROCESS OF DIGESTION.

When food is taken into an animal's mouth and begins its passage through the digestive tract it undergoes the first of a series of complex changes which do not cease until a portion of it is expelled from the body as the solid excrement or feces. Under normal conditions the dry matter of the feces is always greatly less than the dry matter of the food. Somewhere between the mouth and the termination of the intestinal passage a large portion of the food has been diverted to channels other than the alimentary canal. As a matter of fact it has been taken through the walls of the intestinal tract and has passed into the blood and tissues, there to perform its functions in sustaining and constructing the animal body. The sole object of digestion, therefore, is to fit the food compounds to make this passage through the membranes that are interposed between the space along which the food is passing and the cavities of the lacteals and blood capillaries. These compounds must be rendered soluble or diffusible if they are not so in the food. For instance, most albuminoids are neither soluble nor diffusible, which is also true of starch, and these compounds as they

enter the body must either be modified or broken up into other compounds before they can be absorbed into the circulation.

The immediate causes of the most important changes, other than mechanical, which the foods undergo during digestion are the ferments, bodies which by their growth or presence produce profound changes in the albumen, starch, sugar, and other constituents of foods. These ferments belong to two classes—organized and unorganized. The characteristics, properties, and functions of the two classes of ferments are treated of in special works on the physiology of digestion.

Two general methods have been used in studying the digestibility of foods: (1) By experiments with animals, and (2) by experiments with artificially prepared digestive fluids. The digestion-coefficients which are now most generally in use were obtained by experiments of the first class.

DIGESTION EXPERIMENTS WITH ANIMALS.

GENERAL METHOD.

In general, a digestion experiment with an animal consists in feeding a known quantity of food of known composition, and the collection, weighing, and analysis of the resulting feces. If it is desired to study the metabolism of the protein the urine is also collected. It is essential that several precautions shall be observed in conducting a digestion experiment:

(1) The food must be thoroughly mixed and fed in uniform quantities at regular intervals. It must not vary during the experiment either in composition or in daily quantity actually consumed. The feeding of green food, freshly cut each day, which is suffering a progressive change due to growth, is an example of unreliable work.

(2) Before the feces are collected, the experimental food should be fed a sufficient length of time for the residue of any previous food to be completely removed from the alimentary canal. This preliminary feeding period should not be less than seven days, and it is in the direction of safety with ruminants to make it eight or ten.

(3) The feces should be collected for a sufficient number of days to overcome the error caused by an irregularity of excretion. The collection period should not be less than five days, and probably need not be over a week.

(4) It is important that the animal shall eat with relish throughout the experiment and shall be fairly contented.

(5) It is better that the quantity of food fed should be as nearly as possible the normal quantity that would be eaten by the animal under usual conditions.

(6) Very often only two animals are used in a single test, but four or more give more reliable results, since the influence of individual peculiarities is less when an average is taken.

SOURCES OF ERROR.

Notwithstanding all the precautions that may be taken in conducting digestion experiments, there are sources of error which must be considered as to some extent unavoidable. The more important are the following:

(1) *Errors of weighing and analysis.*—With correct weighing apparatus and by the use of the best-known analytical methods the necessary errors of this class should not be sufficiently large to minimize greatly the practical value of digestion coefficients.

This statement recognizes the distinction which exists between errors of analysis as commonly understood and limitations of analysis due to lack of knowledge.

(2) *Mechanical losses.*—As with weighings and analytical work, these are preventable to the point of unimportant errors. Proper precautions and oversight may surely detect losses of this kind. The digestion pens must be so arranged and be kept so clean that any scattering of food or feces to a serious extent will easily be discovered.

(3) *Irregular eating.*—It is fatal to the accuracy and reliability of a digestion experiment if the food is not eaten regularly and in uniform quantities. When uneaten residues are left in irregular quantities or at irregular intervals suspicion is justly cast upon the accuracy of the results.

(4) *Individuality of animals—Variations in proportions digested by same animal at different times—Irregular excretion of undigested residue.*—It is probably true that each of these factors exerts more or less influence upon the results of a digestion experiment. The effect of all of them tends in one direction, viz, to cause variations in the coefficients of digestibility obtained for the same food with different animals. It is not easy to determine either the relative or the absolute influence of these sources of error. The American work on this subject is summarized and discussed in another section of this bulletin (pp. 87–89). In general, it may be said that the use of more than two animals is to be recommended, since it apparently diminishes the error due to individual peculiarities.

PRESENT LIMITATIONS OF METHODS.

It is generally confessed that digestion coefficients for protein and ether extract as usually obtained are faulty.

Conversion factor for protein.—In the first place, protein is ordinarily assumed to be represented by $N \times 6.25$, which, as Osborne, Ritthausen, and others have shown, is far from correct with many feeding stuffs, if not with all. A factor between 5.7 and 6 would probably be more nearly correct for most grains and grain products, and perhaps even for hay and straw. This would not affect the accuracy of the coefficient of digesti-

bility for protein, provided the nitrogen compounds of the undigested residues have the same nitrogen factor as those digested. Of this we have no assurance. As a matter of fact, the protein of feeding stuffs is in all cases a mixture of several nitrogen compounds. It seems quite probable that these compounds vary in digestibility and that those digested differ from those not digested. The use of the same factor for both food and feces is a probable source of error.

Metabolic nitrogen in feces.—The proportion of digested nitrogen is really more accurately known than that of protein, but even here an apparently unavoidable error confronts the experimenter. The solid excrement includes more than the undigested portion of the food. It contains, besides this material, nitrogenous bile compounds, mucus, epithelial cells, and nitrogen compounds which are the products of fermentations, such as skatol, indol, phenol, etc., the latter occurring especially where the food is rich in proteids. The presence of these metabolic products would not be the occasion of error if we were in possession of some reliable method for accurately separating the real undigested protein from all the incidental nitrogen compounds found in the feces. Several methods have been tried for this purpose, but so far it has not seemed possible to demonstrate their accuracy. By their use it has been shown beyond reasonable doubt, however, that, in some cases at least, a considerable proportion of the nitrogen in the feces of ruminants and swine is due to metabolic products and not to undigested protein.

Experiments by Jordan, Bartlett and Merrill¹ in which the feces from sheep, obtained in testing the digestibility of fifteen different materials, were extracted with ether, hot alcohol, hot water, and cold limewater, showed that from 14.5 to 32.8 per cent of the fecal nitrogen was dissolved. The coefficients for protein calculated on the basis of the nitrogen undissolved were from 6.2 to 30.2 higher than those secured by the usual method of calculation, the average being between 10 and 11 per cent. Later results by Bartlett² when timothy hay, corn meal, and skimmed milk were fed to sheep and the feces were treated by the same solvents, showed that from 30 to 45.5 per cent of the total nitrogen present was extracted. When Patterson³ extracted the fecal metabolic nitrogen in the manner indicated, he obtained coefficients of digestibility for protein averaging 9 per cent higher for rations of silage, corn stover, and grain fed to steers than when this nitrogen was included.

These figures coincide in a general way with the outcome of European investigations and show that coefficients of digestibility as usually determined for feeding stuffs containing a small percentage of protein are much too low.

¹ Maine Sta. Rpts. 1888, pp. 195-203; 1889, pp. 282-285.

² Maine Sta. Rpt. 1897, p. 155.

³ Maryland Sta. Rpt. 1891, p. 309.

It has been proposed to digest the feces with pepsin in order to learn the amount of metabolic nitrogen. In many cases this method gives results comparing fairly well with those secured by successive extraction with the several liquids named. Jordan, Bartlett, and Merrill¹ found, however, that the proportion of nitrogen rendered soluble by the pepsin method increased with the length of treatment, the insoluble nitrogen in feces from timothy hay diminishing from 1.19 after six hours' digestion to 0.99 after twenty-four hours, an increased solution of 13 per cent of the total nitrogen present before treatment. Unless it should be learned that feeding stuffs have a fixed solubility in the digestive fluids which is independent of length of time, it is reasonable to expect that the treatment of the feces with pepsin would continue to some extent the proteolytic changes of the alimentary canal.

The quantity of metabolic nitrogen in the feces appears to be independent of the proportion of nitrogen in the food, but apparently is influenced by the amount of dry matter digested. In experiments conducted by Jordan and Merrill² in fifteen cases the fecal metabolic nitrogen as determined varied from 0.20 to 0.50 gram (averaging 0.30 gram) for each 100 grams digested dry matter and from 0.96 to 4.80 grams nitrogen for each 100 grams protein digested.

European investigators (Pfeiffer, Kellner, Stutzer, and others) have also studied one of these relations and obtained results, using a pepsin solution for extracting the metabolic nitrogen, that gave on the average about 0.4 of a gram of extracted nitrogen for each 100 grams dry substance digested. The variations were considerable, however, and the facts hardly seem to justify the adoption of this factor for general application to digestion trials, although by its use a much closer approximation to accuracy would be reached than by making no correction whatever. The most suggestive fact about the European investigations is the general approximation of digestion coefficients obtained for protein by artificial pepsin pancreas digestion with those obtained by extracting the feces with a pepsin solution. This fact indicates, though it does not prove, the greater accuracy of the larger percentages.

The probable reason why some correction is not now generally applied to the coefficient for protein is that no method has been proposed for extracting the metabolic nitrogen the accuracy of which is demonstrated. There is no question, however, but that brief successive treatment (ten minutes) with alcohol, hot water, and limewater, as proposed by Jordan,³ after extraction with ether, removes very little protein that has withstood the prolonged action of the digestive juices, and that the nitrogen left after such treatment is a much more accurate measure of the undigested protein than is the total fecal nitrogen.

Fat determination unsatisfactory.—The determination of the digesti-

¹ Agl. Sci., 2 (1888), p. 299.

² Maine Sta. Rpt. 1888, p. 201.

³ Ibid., p. 195.

bility of the fats or ether extract of feeding stuffs is as unsatisfactory as that for protein. In the first place, the ether extract, which is taken as the measure of the fat in a cattle food, is, in the case of the fodders, far from being all fat or oil. The prolonged treatment of vegetable tissue with ether removes not only the glycerids and fatty acids, but also chlorophyl, waxes, organic acids, and other compounds. This means that the experimenter is really ignorant of the amount of fats or oils fed to the animal experimented upon. The fat extraction from the fecal residue is even less accurate, for here certain of the bile compounds are soluble in ether and the extract sometimes appears to consist largely of other materials than fat. Under these circumstances food-ether-extract minus fecal-ether-extract as a measure of the digestibility of the real fats of the ration is very unsatisfactory. The minus quantity which is occasionally obtained for the digestibility of the fat in a particular feeding stuff shows clearly the utter unreliability of the method. This is another problem that for years has attracted the attention of agricultural chemists, and is still unsolved.

Error in dry matter not large.—The presence in the feces of bile residues, mucus, etc., also has more or less influence upon the coefficients of digestibility of the dry matter. The dry matter of the food minus the dry matter of the feces is taken as the measure of dry matter digested, and any condition which increases the latter factor diminishes the apparent digestibility. According to Wolff, the fecal dry matter, as ordinarily estimated, in the case of steers is not more than 2 or 3 per cent too large. Such being the case, the error for dry matter in the food would generally be not over 1 per cent, which is not sufficiently large to seriously impair the value of digestion experiments.

The usual method of determining the digestibility by ruminants and horses of roots, grains, and grain products is not wholly satisfactory. The necessary procedure is first to determine the digestibility of some coarse food, to which is added in a subsequent period the roots or grain which is the subject of the experiment. Any increase of undigested material above that secured when the coarse food was fed alone is assumed to come from the roots or grain.

This method is faulty, because it is not certain that the coarse food is digested to the same extent when fed alone as when mixed with other feeding stuffs. It is possible that the presence of more easily digestible materials modifies the digestibility of the coarse part of the ration; in fact it is claimed that this is the case, and it is also entirely probable that the hay or other fodder used is not digested in exactly the same proportions in both periods, even if the grain has no influence. Any variation in the digestibility of the coarse food causes an error in the coefficients for the grain somewhat in proportion to the relative amounts in the fodder and grain of the several classes of nutrients. The same general results often pertain to the ether extract when the roots or grain contain but little. It should be said, however, that the coefficients

of digestibility of the cereal grains as determined by several experimenters show a fairly consistent agreement, indicating that the averages of several animals closely approximate the actual digestibility.

APPLICATION OF DIGESTION COEFFICIENTS TO PRACTICE.

The usual method of applying digestion coefficients to the calculation of the digestible nutrients in the feeding stuffs making up a ration is to use the average both of composition and digestibility of each component as found in published tables in order to ascertain the amount of digestible material of each class. Owing to the fact that a variety of conditions affect the composition and digestibility of feeding stuffs, especially fodders, it is entirely possible by the use of average coefficients to obtain figures that are wide of the actual facts. A proper recognition of some of these conditions in the classification of feeding stuffs, according to composition and digestibility, would greatly increase the practical value of the various data which science offers to the feeder.

The following are among the more important considerations relative to variations of digestibility which should be kept in mind in selecting coefficients as a basis of calculation.

(1) *The influence of drying a fodder plant upon its digestibility.*—The practical question here is whether the coefficients obtained for a particular fodder in a green state are applicable to the same feeding stuff in a dry state or vice versa. The great preponderance of evidence certainly supports the usual statement that the drying of a fodder does not diminish its digestibility. It should be remembered, however, that the evidence in support of this conclusion has been secured largely from experiments in which the dried material was cured under the most favorable conditions. It seldom happens that in actual practice the dried fodders of even a single year are harvested without rain, loss of leaves, or some other deleterious influence or change. Only those who have tested the matter realize how perfect the conditions of drying must be to insure no loss of dry matter in the process of curing, especially with those fodder plants whose tissues are somewhat coarse.

For these reasons the application of the coefficients of digestibility resulting from digestion trials with green fodders to the ordinary dried products is likely to cause an overestimate of the nutritive value of the latter. (See also p. 94.)

(2) *The influence of the stage of growth upon digestibility.*—The evidence is apparently conclusive that the dry matter of early cut timothy, for instance, is more digestible than that of late cut. On the other hand, experiments with corn grown in the same field in the same year indicate with a fair degree of certainty that the mature corn is more digestible than the immature. Both facts are explainable on entirely rational grounds. The important point in this connection is that average coefficients for timothy hay and corn fodder or corn silage may be

highly inapplicable to the fodders harvested in certain conditions of growth. A recognition of this fact in classifying coefficients of digestibility seems to be essential to reasonable accuracy. (See also p. 91.)

(3) *The influence of conditions and of methods of preservation and preparation of fodders.*—When any fodder ferments in the process of curing, a destruction of the most soluble and digestible parts of the plant occurs, and unless there is some compensating effect produced, which is not likely, the proportion of digestible dry matter is diminished. Hay that is wet or which ferments in the mow, or any other material, like corn fodder or stover, that because of its coarse condition cures slowly, with attendant fermentation, or which when piled in heaps heats, must be regarded as inferior in digestibility to the original material. The grinding of grain appears to have a marked effect upon digestibility, at least, with horses and swine. Digestion trials touching this point have given practically unanimous results in favor of grinding, making it doubtful if coefficients obtained from feeding ground corn or oats are applicable to the whole grains. (See p. 97.)

(4) *Influence of breed upon digestibility.*—We have been taught, on the basis of early German experiments, that the several kinds of ruminants digest their food with practically the same efficiency. This means, for instance, that digestion coefficients obtained with sheep are applicable to the calculations of rations for cows. The testimony on this point, however, is not all that could be desired. Out of nine comparisons by American experimenters, only one showed a practical agreement between the results with large and small ruminants. Out of four comparisons of steers and sheep, three showed that a notably larger proportion was digested by the steers. On the other hand, five comparisons of cows and goats showed that a much higher proportion was digested by the goats in three cases; in one the cow digested the food more thoroughly; and in one there was practically no difference. Considerable more work along this line seems desirable.

It is generally conceded, and apparently with good reason, that all feeding stuffs containing considerable proportions of crude fiber are less satisfactorily digested by horses than by ruminants, the difference being due mainly to a less efficient action of ferments on the cellulose in the digestive apparatus of the former. It is plain, then, that the coefficients of digestibility secured by digestion experiments with ruminants are inapplicable to horses. The same is true for swine. The digestibility of roots and grains does not vary markedly with all these classes of animals.

The previously named factors are the main ones which it is possible to recognize in a practical way in the selection of coefficients of digestibility.

Breed, individuality, age, extent of activity, quantity of ration, cooking, or other methods of preparation, length of time of storage, and manner of feeding have been investigated as to their effect upon diges-

tion, and it is found that digestibility is modified by cooking and by long continued storage, and perhaps by the quantity of the ration, and is apparently uninfluenced by the other factors named; but these influences can scarcely be considered in choosing coefficients. The factors noted in the preceding paragraphs are discussed in detail in another section of this bulletin, pp. 91-100.

It is very evident that the experimenter who is conducting business-feeding experiments, and even the farmer, can do much better than to select general average coefficients without reference to conditions.

EXPERIMENT STATION LITERATURE ON DIGESTIBILITY.

A number of the American experiment stations have issued publications in which the digestibility of different feeding stuffs is discussed in more or less detail, and in a number of cases brief summaries of the results of such experiments have been included. With very few exceptions the results of the digestion experiments conducted at the stations have been published in station bulletins or reports. The majority of figures included in the tables in this summary were taken from these publications. Some of the earlier work of the New York State Station was published in the journal of the American Chemical Society.¹ In a few instances the data recorded in the tables of the present compilation were obtained by correspondence. A list of the station reports and bulletins consulted follows:

- Colorado Station—Bulletin No. 8.
- Connecticut Storrs Station—Reports 1894, 1895, 1896.
- Illinois Station—Bulletin No. 43.
- Maine Station—Reports 1886, 1887, 1888, 1889, 1890, 1891, 1893, 1894, 1897.
- Maryland Station—Report 1891; Bulletins Nos. 20, 41, 43, 51.
- Massachusetts State Station—Reports 1893, 1894.
- Massachusetts Hatch Station—Reports 1895, 1896, 1897; Bulletin No. 50.
- Minnesota Station—Bulletin No. 26; Reports 1894, 1895, 1896.
- Mississippi Station—Report 1895.
- New York State Station—Reports 1884, 1888, 1889; Bulletins Nos. 132, 141.
- North Carolina Station—Bulletins Nos. 80c, 87d, 97, 118, 148.
- Oregon Station—Bulletins Nos. 6, 47.
- Pennsylvania Station—Reports 1886, 1887, 1888, 1889, 1890, 1891, 1892, 1894.
- Texas Station—Bulletins Nos. 13, 15.
- Utah Station—Bulletins Nos. 16, 54.
- Wisconsin Station—Reports 1884, 1889.

NUMBER AND DISTRIBUTION OF EXPERIMENTS.

The digestion experiments made at the experiment stations have covered a wide range of feeding stuffs and have been made with a considerable number of farm animals. The following table gives statistics

¹Jour. Amer. Chem. Soc., 12 (1889).

of the number of experiments made with the different kinds of animals at all the stations which have engaged in this line of work:

TABLE 1.—*Number and distribution of experiments.*

Experiment station.	With sheep.	With steers.	With cows.	With goats.	With horses.	With swine.	Total.
Colorado		1					1
Connecticut (Storrs)	47						47
Illinois		4					4
Maine	68					3	71
Maryland <i>a</i>		22			7		29
Massachusetts State	25						25
Massachusetts Hatch	35						35
Minnesota			1			12	13
Mississippi	10	1					11
New York (Geneva)	6	2	17				25
North Carolina <i>b</i>	15	8	5	11			39
Oregon	2	2					4
Pennsylvania <i>c</i>	26	20	2				48
Texas		2	1				3
Utah		6					6
Wisconsin	3		2				5
	237	68	28	11	7	15	366

a Two experiments printed twice.

b Sheep and goat, 3; cow and goat, 5; steer and heifer, 1.

c Steer and sheep, 1.

The total number of digestion experiments, made by the stations up to the end of 1898, of which record has been found, is 378. Of these 59 have been made with green fodder, 34 with silage, 143 with dried fodder, 24 with grains and seeds, 62 with by-products, 8 with roots and tubers, 1 with milk, and 47 with rations.

In addition to experiments with farm animals some of the stations have conducted digestion experiments with man. Some work of a similar nature, and many digestion experiments with dogs, have been made by American investigators who were not connected with the experiment stations. None of this is included in the present compilation.

Most of the digestion experiments with man conducted at the experiment stations have been made in connection with studies of food and nutrition undertaken in cooperation with the Office of Experiment Stations, and the results published in bulletins reporting this work.¹

DETAILED DATA OF DIGESTION EXPERIMENTS WITH ANIMALS.

DATA FOR DIGESTION EXPERIMENTS, CLASSIFIED BY STATIONS.

The following table gives the details of all the digestion experiments made by the stations up to the close of 1898. The experiments have been alphabetically arranged by stations, the experiments of each station being given chronologically. In experiments in which the coefficient of digestibility of the dry matter, or of the total organic matter, were not given by the investigator, these values have been computed by the compilers when sufficient data for the purpose were recorded.

¹ See Office of Experiment Stations Circ. 238 (revised) for a list of publications of the Office on food and nutrition.

TABLE 2.—Data for digestion experiments

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
	-COLORADO STATION.						
1	Alfalfa hay (second crop, overripe, dry), 24 lbs.	<i>Per ct.</i> 9.75	<i>Per ct.</i> 7.87	<i>Per ct.</i> 11.64	<i>Per ct.</i> 19.92	<i>Per ct.</i> 48.47	<i>Per ct.</i> 2.35
	CONNECTICUT (STORRS) STATION.						
2	Wheat bran, 4 oz.	9.2	5.4	17.1	10.2	52.7	5.4
	Corn meal, 12 oz.	12.4	1.2	10.2	1.3	70.6	4.3
	Hay, 16 oz.	8.8	5.2	10.9	31.1	40.3	3.7
3	Wheat bran, 4 oz.	8.8	5.8	18.1	10.2	52.0	5.1
	Corn meal and linseed meal (1:3), 4 oz.	10.5	4.3	30.1	6.0	43.6	5.5
	Oat and pea meal, 8 oz.	11.5	3.4	23.9	6.6	52.1	2.5
	Hay, 16 oz.	8.2	5.0	11.4	30.1	41.7	3.6
4	Wheat bran, 4 oz.	8.7	6.1	16.6	10.3	53.2	5.1
	Corn meal and linseed meal (1:3), 4 oz.	11.1	4.2	29.4	6.1	43.7	5.5
	Oat and pea meal, 8 oz.	11.4	3.3	22.2	7.7	52.9	2.5
	Hay, 16 oz.	8.5	5.3	11.1	32.3	39.2	3.6
5	Wheat bran, 4 oz.	8.7	5.8	16.8	9.4	54.1	5.2
	Corn meal, 12 oz.	12.4	1.2	10.0	1.3	70.3	4.8
	Hay, 16 oz.	7.8	5.4	11.2	30.7	41.4	3.5
6	Uncured crimson-clover fodder (from just before to just after bloom). Sheep A and B, 10 lbs.; sheep D, 8 lbs.	84.2	1.5	2.8	4.3	6.6	0.7
7	Uncured barley fodder (full bloom and week following), 6 lbs.	76.7	2.2	3.6	7.0	9.7	0.9
8	Uncured barley and pea fodder (barley in full bloom and week following; peas in early bloom), 6 lbs.	80.1	1.7	4.0	5.0	8.3	0.9
9	Rowen hay of mixed grasses (blue grass, orchard grass, meadow fescue), 2 lbs.	14.8	6.4	14.6	24.1	35.6	4.5
10	Timothy rowen hay, including some barnyard grass, 2 lbs.	18.6	6.6	13.2	24.8	32.5	4.3
11	Crimson clover hay (past full bloom, dried in bunches), 1½ lbs.	13.9	7.3	14.1	31.3	31.6	1.8
12	Crimson clover hay (in full bloom, dried and cured in barn), 1½ lbs.	19.6	7.3	15.5	25.9	29.7	1.9
13	Soy-bean meal, ½ lb.	10.7	5.1	35.6	2.6	27.4	18.6
	Timothy rowen hay, 1 lb.	13.5	7.1	15.2	23.5	36.0	4.7

No. 1: O'Brine, Colorado Sta. Bul. 8, p. 22.

Nos. 2-10: Phelps and Woods, Connecticut (Storrs) Sta. Rpt. 1894, pp. 110-120.

Nos. 11-13: Phelps and Bryant, Connecticut (Storrs) Sta. Rpt. 1895, pp. 197-200.

with animals (arranged by States).

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
		<i>Per ct.</i> [57]	<i>Per ct.</i> [59]	<i>Per ct.</i> [38]	<i>Per ct.</i> 77	<i>Per ct.</i> 49	<i>Per ct.</i> 64	<i>Per ct.</i> 54	
1	Average for two steers.								Experiment covered 15 days.
2	Sheep B		62.7	5.9	48.0	45.6	71.5	60.6	Ration fed 12 days, feces collected 5 days. Sheep D, slight diarrhea toward close.
	Sheep D		70.8	26.6	62.1	59.6	76.1	72.9	
	Average		66.8	16.3	55.1	52.6	73.8	66.8	
3	Sheep B		70.1	26.8	73.5	59.0	73.8	64.7	Ration fed 12 days, feces collected 5 days.
	Sheep D		70.9	28.2	71.2	60.8	74.9	71.2	
	Average		70.5	27.5	72.3	59.9	74.3	67.9	
4	Sheep B		75.0	40.9	77.1	69.2	77.0	72.8	Ration fed 12 days, feces collected 5 days. Sheep D, slight diarrhea.
	Sheep D		70.3	20.9	71.6	61.1	73.6	73.4	
	Average		72.7	30.9	74.4	65.1	75.3	73.1	
5	Sheep B		72.8	32.0	57.6	60.7	80.1	69.1	Ration fed 12 days, feces collected 5 days.
	Sheep D		69.6	27.4	52.2	55.2	77.7	71.2	
	Average		71.2	29.7	54.9	58.0	78.9	70.2	
6	Sheep A	67.2	65.5	55.0	76.7	54.1	74.5	67.3	Do.
	Sheep B	69.4	69.8	55.9	77.5	57.9	74.9	62.9	
	Sheep D	69.0	69.1	56.1	77.2	56.2	74.1	69.3	
	Average	67.9	69.1	57.4	77.1	56.1	74.5	66.5	
7	Sheep A	59.3	62.2	49.7	69.3	49.0	69.3	61.2	Do.
	Sheep B	69.9	70.7	62.2	71.4	63.6	76.3	63.1	
	Average	64.6	66.5	55.9	70.4	56.3	72.8	62.2	
8	Sheep C	64.6	65.1	58.4	81.1	49.3	67.0	64.8	Do.
	Sheep D	42.1	55.2	33.9	73.2	37.6	55.8	54.5	
	Average	53.4	60.2	46.2	77.2	43.5	61.4	59.7	
9	Sheep A	65.8	66.7	54.8	70.1	66.2	67.7	50.5	Ration fed 12 days. With sheep A and B feces collected 4½ days; with C and D feces collected 5 days.
	Sheep B	62.4	63.5	49.4	67.6	65.4	62.9	44.0	
	Sheep C	63.5	61.1	55.5	70.2	66.1	62.6	45.6	
	Sheep D	65.3	66.3	52.4	68.4	68.2	67.0	44.6	
	Average	64.3	65.2	53.0	69.1	66.5	65.1	46.2	
10	Sheep A	62.3	64.4	50.8	66.1	65.2	64.8	50.8	Ration fed 12 days; feces collected 5 days.
	Sheep B	62.0	62.0	74.6	69.4	62.0	60.9	48.2	
	Sheep C	62.2	64.1	53.2	68.2	65.2	63.5	48.7	
	Sheep D	62.3	67.2	46.9	68.3	73.4	64.3	50.3	
	Average	62.2	64.4	56.4	68.0	66.5	63.4	49.5	
11	Sheep A	52.5	52.9	48.4	67.8	39.8	59.4	49.2	Do.
	Sheep B	53.7	54.9	41.5	67.8	41.4	62.7	49.2	
	Sheep C	54.1	54.8	46.8	68.9	46.4	57.3	45.9	
	Sheep D	56.1	56.6	51.2	68.5	47.3	60.7	52.4	
	Average	54.1	54.8	47.0	68.3	43.7	60.0	49.2	
12	Sheep A	55.2	56.2	45.6	67.2	47.0	59.8	32.8	Do.
	Sheep B	56.6	57.6	47.2	67.6	48.9	61.6	29.5	
	Sheep C	57.1	57.8	49.7	73.2	42.8	63.9	42.3	
	Average	56.3	57.2	47.5	69.3	46.2	61.8	34.9	
13	Sheep A		68.5	42.0	75.8	61.2	66.7	71.1		Ration fed 12 days; feces collected 5 days. Sheep A ate some wool; this accounts for the low coefficient for ash.
	Sheep B		70.5	51.6	77.0	61.2	69.0	76.7	
	Sheep C		71.5	48.9	80.0	63.1	68.4	77.4	
	Sheep E		65.4	51.1	76.0	56.7	60.9	71.4	
	Average		69.0	48.4	77.2	60.6	66.3	74.2	

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
CONNECTICUT (STORRS) STATION—continued.							
14	Soy-bean meal, $\frac{3}{4}$ lb	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
	Timothy rowen hay, $1\frac{1}{2}$ lbs	10.1	5.2	36.4	2.6	26.6	19.1
		13.2	7.1	14.9	24.6	36.1	4.1
15	Uncured oat and pea fodder (oats just in bloom to full bloom, peas in bloom), 6 lbs.	83.9	1.6	3.3	3.9	6.3	1.0
16	Uncured oat fodder (beginning to bloom, many heads not full grown), 6 lbs.	80.3	1.9	2.7	5.4	8.7	1.0
17	Uncured Hungarian grass (nearly full grown and beginning to bloom), 6 lbs.	78.6	2.1	2.6	5.9	9.3	1.5
18	Uncured soy-bean fodder (heavy growth, plants in bloom), 6 lbs.	78.9	2.5	3.8	5.5	8.4	.9
19	Uncured clover rowen ($\frac{1}{10}$ grass, mainly timothy, past full bloom to early seed), $6\frac{3}{8}$ lbs.	74.4	2.2	4.3	6.7	11.1	1.3
20	Uncured Hungarian grass (more advanced than in No. 17, quite woody), $6\frac{3}{8}$ lbs.	73.8	2.3	2.4	8.1	12.6	.8
21	Uncured soy-bean fodder (seeds formed to half grown, stems quite hard), $6\frac{3}{8}$ lbs.	74.8	2.2	3.3	6.9	11.8	1.0
22	Uncured sweet-corn fodder (early roasting stage; many small ears), $6\frac{3}{8}$ lbs.	79.4	1.3	1.7	4.5	12.5	.6
23	Uncured sweet-corn fodder (2 weeks later than in No. 22, stalks and leaves yellow, ears past roasting stage), $6\frac{3}{8}$ lbs.	78.3	1.1	2.0	4.0	13.8	.8
24	Uncured cowpea fodder (medium heavy, not fully grown, no runners), $6\frac{3}{8}$ lbs.	80.0	2.2	3.3	3.5	10.2	.8
25	Uncured sweet-corn fodder (early roasting stage, stalks green), $6\frac{3}{8}$ lbs.	81.1	1.1	1.8	3.7	11.7	.6
26	Uncured rowen grass (timothy two-thirds grown, with clover and fine grasses; not very succulent), $5\frac{1}{2}$ lbs.	67.2	2.6	5.3	8.1	14.9	1.9
27	Uncured barley fodder (heads three-fourths grown to full grown), $6\frac{3}{8}$ lbs.	79.6	2.0	3.5	5.0	9.1	.8

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
14	Sheep A	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	Ration fed 12 days; feces collected 5 days.
	Sheep B	67.0	69.5	36.8	77.0	63.1	66.5	74.1	
	Sheep C	69.5	66.9	45.3	77.4	55.8	63.5	72.0	
	Sheep E	36.8	73.7	48.6	80.0	69.5	71.5	73.1	
	Average	69.3	45.7	78.2	62.0	66.0	73.1		
15	Sheep A	65.7	68.7	38.5	81.7	61.2	65.7	74.3	Do.
	Sheep B	62.8	67.1	23.9	81.3	53.7	67.1	72.8	
	Average	64.4	67.9	31.2	81.5	57.5	66.4	73.6	
16	Sheep C	63.3	65.4	43.8	75.7	62.6	63.5	68.4	Do.
	Sheep E	61.8	63.5	45.7	74.9	57.8	62.7	71.3	
	Average	62.6	64.5	44.8	75.3	60.2	63.1	69.8	
17	Sheep A	69.1	70.6	53.6	66.7	72.7	68.4	85.1	Do.
	Sheep B	72.8	73.8	62.9	71.8	76.1	71.7	81.9	
	Average	70.9	72.2	58.3	69.3	74.4	70.0	83.5	
18	Sheep C	57.1	64.5	1.8	80.5	44.7	70.9	58.2	Do.
	Sheep E	61.2	67.5	13.8	77.0	55.5	73.0	50.0	
	Average	59.2	66.0	7.8	78.8	50.1	72.0	54.1	
19	Sheep B	58.2	59.7	42.7	61.4	51.5	63.9	60.0	Do.
	Sheep F	60.4	61.8	44.1	62.3	53.6	66.7	61.5	
	Average	59.3	60.8	43.4	61.9	52.5	65.3	60.8	
20	Sheep C	67.7	68.5	59.6	61.0	70.3	69.2	62.5	Duplicate of No. 17 with different animals. The grass was more advanced.
	Sheep D	66.7	67.6	57.8	61.6	72.2	66.3	59.8	
	Average	67.2	68.0	58.7	61.3	71.3	67.8	61.2	
21	Sheep B	58.1	61.0	27.6	70.8	38.5	71.7	59.3	Similar to No. 18; different animals used; fodder more advanced.
	Sheep F	59.1	63.5	13.0	67.7	43.3	75.3	49.3	
	Average	58.6	62.3	20.3	69.3	40.9	73.5	54.3	
22	Sheep C	66.1	67.5	46.4	58.6	53.6	73.3	79.2	Ration fed 12 days; feces collected 5 days.
	Sheep D	67.5	68.4	54.9	52.5	54.9	74.9	77.3	
	Average	66.8	68.0	50.7	55.5	54.3	74.1	78.3	
23	Sheep B	72.2	73.2	53.2	66.8	59.8	77.4	82.1	Do.
	Sheep F	73.1	74.5	47.4	66.1	61.6	79.1	81.3	
	Average	72.7	73.9	50.3	66.5	60.7	78.3	81.7	
24	Sheep C	70.7	75.9	28.2	72.7	57.8	84.2	62.5	Ration fed 12 days; feces collected 5 days. Feces of sheep C, soft for 4 days.
	Sheep D	69.8	76.0	19.5	75.3	57.1	84.2	56.3	
	Average	70.3	76.0	23.9	74.0	57.5	84.2	59.4	
25	Sheep C	77.2	78.8	51.3	68.7	72.2	82.4	79.8	Ration fed 12 days; feces collected 5 days.
	Sheep D	69.2	70.4	49.4	57.9	57.9	75.9	76.2	
	Average	73.2	74.6	50.4	63.3	65.0	79.2	78.0	
26	Sheep B	63.6	65.3	43.9	71.9	60.0	67.3	54.8	Do.
	Sheep F	65.9	67.5	46.5	71.5	67.6	68.2	50.9	
	Average	64.8	66.4	45.2	71.7	63.8	67.8	52.9	
27	Sheep B	67.2	68.7	53.2	73.1	66.4	69.3	56.3	Do.
	Sheep F	66.9	68.4	52.5	73.1	64.0	69.9	58.9	
	Average	67.1	68.5	52.8	73.1	65.2	69.6	57.6	

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
	CONNECTICUT (STORRS) STATION—continued.	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
28	Uncured Canada pea fodder (vines large and succulent, three-fourths grown, no blossoms), 6 $\frac{3}{16}$ lbs.	86.5	1.4	3.7	3.0	4.8	0.6
29	Clover rowen, field cured (little past full bloom), 800 gm.	15.1	7.2	15.7	21.0	37.4	3.6
30	Clover rowen, barn cured (little past full bloom, same as in No. 29), 800 gm.	14.6	7.3	17.4	19.7	37.2	3.8
31	Rowen hay (from mixed grasses), 800 gm.....	10.5	6.7	14.4	21.1	42.9	4.4
32	Oat hay (fair grade, seeds two-thirds grown), 800 gm.	12.3	5.5	9.8	25.8	42.5	4.1
33	Rowen hay (from mixed grasses), 400 gm.....	13.2	7.5	13.5	20.7	40.2	4.9
	Coarse bran, 400 gm	7.0	6.1	15.3	11.1	55.1	5.4
34	Coarse bran, 400 gm. (fed with 400 gm. rowen hay from mixed grasses).	7.0	6.1	15.3	11.1	55.1	5.4
35	Rowen hay (from mixed grasses), 400 gm	8.8	7.0	13.1	22.0	44.3	4.8
	No. 2 wheat middlings, 400 gm	8.4	5.0	18.7	9.6	52.5	5.8
36	No. 2 wheat middlings, 400 gm. (fed with 400 gm. rowen hay from mixed grasses).	8.4	5.0	18.7	9.6	52.5	5.8
37	Uncured oat fodder (seeds half to full grown, stems quite woody), 2,740 gm.	67.0	2.4	3.3	9.8	16.0	1.5
38	Uncured oat and pea fodder (oats turning yellow, stems woody, seeds half grown. Peas lodged, some blackened, some seeds full grown), 2,740 gm.	68.8	2.2	4.0	8.3	15.1	1.6
39	Oat and pea fodder, green (oats early milk, peas fairly succulent, lodged, brown, pods and seeds developed), 2,340 gm.	71.4	2.0	4.7	10.0	10.6	1.3

No. 28: Phelps and Bryant, Connecticut (Storrs) Sta. Rpt. 1895, p. 214.

Nos. 29-39: Phelps and Bryant, Connecticut (Storrs) Sta. Rpt. 1895, pp. 256-264.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
28	Sheep C	<i>Per ct.</i> 67.6	<i>Per ct.</i> 71.0	<i>Per ct.</i> 37.8	<i>Per ct.</i> 81.1	<i>Per ct.</i> 62.4	<i>Per ct.</i> 71.3	<i>Per ct.</i> 50.0	Ration fed 12 days, feces collected 5 days.
	Sheep D	69.1	71.7	46.9	83.0	62.4	70.8	54.8	
	Average ..	68.4	71.3	42.3	82.0	62.4	71.0	52.4	
29	Sheep A	56.7	58.1	42.4	60.3	47.6	63.1	58.3	Do.
	Sheep B	59.3	60.5	45.8	65.1	50.7	64.1	60.4	
	Average ..	58.0	59.3	44.1	62.7	49.1	63.6	59.4	
30	Sheep C	58.9	59.7	50.3	69.1	46.4	62.2	60.5	Do.
	Sheep D	56.8	58.0	44.5	64.7	44.7	61.7	59.9	
	Average ..	57.9	58.9	47.4	66.9	45.6	61.9	60.2	
31	Sheep A	63.9	65.6	42.5	67.7	65.9	66.6	47.2	Do.
	Sheep B	64.0	66.2	37.3	68.2	66.7	66.9	49.4	
	Sheep C	66.2	68.1	41.8	70.8	69.2	68.5	50.6	
	Sheep D	63.6	65.6	38.8	69.1	64.6	66.8	47.2	
	Average ..	64.4	66.4	40.1	69.0	66.6	67.2	48.6	
32	Sheep A	49.2	50.7	19.6	52.3	45.6	52.3	60.5	Do.
	Sheep B	48.8	49.2	42.1	53.9	42.0	51.3	62.1	
	Sheep C	52.0	52.6	41.7	57.7	46.8	53.9	63.0	
	Sheep D	47.1	47.9	34.8	52.7	39.4	50.5	62.0	
	Average ..	49.3	50.1	34.6	54.2	43.5	52.0	61.9	
33	Sheep A	59.7	62.0	31.6	70.3	44.7	65.2	62.1	Do.
	Sheep B	60.3	62.7	30.2	68.9	47.8	66.7	54.9	
	Sheep C	64.5	67.1	33.5	71.5	56.4	69.4	66.0	
	Sheep D	60.2	63.1	24.3	67.5	47.0	67.4	60.7	
	Average ..	61.2	63.7	29.9	69.6	49.0	67.2	60.9	
34	Sheep A	56.2	58.8	18.2	72.6	5.0	64.2	75.7	Calculated by compilers from No. 31 and No. 33.
	Sheep B	57.7	60.2	21.4	69.6	12.6	66.6	59.8	
	Sheep C	63.4	66.2	23.2	72.2	32.7	70.0	80.0	
	Sheep D	57.4	61.0	6.4	66.2	14.2	67.8	72.9	
	Average ..	58.7	61.6	17.3	70.2	16.1	67.2	72.1	
35	Sheep A	66.8	68.5	41.7	73.9	54.4	71.0	71.7	Ration fed 12 days, feces collected 5 days.
	Sheep B	66.9	69.2	32.5	76.1	54.6	71.9	68.9	
	Sheep C	66.1	69.1	24.6	70.9	54.3	73.0	71.7	
	Sheep D	66.3	68.7	32.5	70.6	58.6	71.1	70.3	
	Average ..	66.5	68.9	32.8	72.9	55.5	71.7	70.7	
36	Sheep A	69.8	71.5	40.5	78.2	28.1	74.8	92.0	Calculated by compilers from No. 31 and No. 35.
	Sheep B	69.8	72.4	25.8	81.6	26.8	76.0	85.0	
	Sheep C	66.3	70.1	0.5	71.0	20.1	76.8	89.1	
	Sheep D	64.3	66.7	23.7	71.6	44.7	66.4	89.4	
	Average ..	67.6	70.2	22.6	75.6	29.9	73.5	88.9	
37	Sheep A	53.8	56.5	49.1	67.8	43.5	61.1	67.5	Ration fed 12 days, feces collected 5 days.
38	Sheep D	61.4	62.9	41.9	73.2	49.1	66.9	70.3	Do.
39	Sheep A	69.7	70.2	63.3	82.7	67.4	66.8	74.3	Do.
	Sheep B	61.2	61.7	54.4	76.5	60.2	56.2	65.1	
	Average ..	65.5	66.0	58.9	79.6	63.8	61.5	69.7	

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
CONNECTICUT (STORRS) STATION—continued.							
40	Oat fodder, green (early seed to early milk), 2,340 gm.	<i>Per ct.</i> 73.5	<i>Per ct.</i> 2.1	<i>Per ct.</i> 2.7	<i>Per ct.</i> 8.3	<i>Per ct.</i> 12.2	<i>Per ct.</i> 1.2
41	Millet fodder, green (from bloom to early seed, succulent to slightly woody), 2,340 gm.	75.6	2.1	1.8	7.6	12.2	.7
42	Soy-bean fodder, green (early to full bloom, succulent), 2,340 gm.	78.3	2.3	3.2	7.0	8.4	.8
43	Soy-bean fodder, green (from bloom to early seed), 2,340 gm.	76.4	2.3	3.4	6.6	10.3	1.0
44	Barnyard millet (bloom to early seed), 2,340 gm....	68.8	2.1	1.7	9.6	16.8	1.0
45	Sweet-corn fodder, green (ears in roasting stage, many ears succulent), 2,740 gm.	81.1	1.1	1.8	4.2	11.3	.5
46	Cowpea fodder, green (vines three-fourths grown, medium heavy), 2,340 gm.	84.4	1.8	2.9	3.7	6.6	.6
47	Rowen, green (mixed grasses and clover), 2,340 gm.	72.9	2.2	3.8	7.1	12.5	1.5
48	Sweet-corn fodder, green (ears in roasting stage), 2,740 gm.	81.8	1.3	1.8	4.3	10.4	.5
ILLINOIS EXPERIMENT STATION.							
49	Corn silage (fair sample; several varieties of corn), 62½ to 80 lbs.	72.91	1.97	2.70	6.07	15.67	0.76
50	Cowpea silage, 84 to 98 lbs	78.62	2.38	3.22	5.92	9.24	0.62
51	Soy-bean silage, 50 to 69 lbs	75.68	3.47	3.14	7.55	9.40	0.76

Nos. 40-47: Phelps and Bryant, Connecticut (Storrs) Sta. Rpt. 1896, pp. 265-272.
 No. 48: Phelps and Bryant. Details obtained by correspondence.
 Nos. 49-51: Hopkins, Illinois Sta. Bul. 43 (1896), pp. 188-194.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
40	Sheep C	60.6	60.2	65.0	71.8	55.6	60.0	68.1	Ration fed 12 days, feces collected 5 days.
	Sheep D	63.6	63.3	67.9	72.8	53.6	66.9	72.3	
	Average ..	62.1	61.8	66.4	72.3	54.6	63.5	70.2	
41	Sheep F	61.5	61.8	58.1	57.3	58.8	64.4	59.8	Do.
42	Sheep C	59.4	63.2	27.9	77.8	45.5	73.0	54.3	Do.
	Sheep D	57.7	61.9	21.6	76.5	49.1	68.7	45.8	
	Average ..	58.6	62.6	24.8	77.2	47.3	70.9	50.1	
43	Sheep B	63.7	67.5	29.0	74.4	49.2	77.4	61.5	Ration fed 14 days, feces collected 7 days. Result calculated for 5 days.
	Sheep F	61.8	66.7	16.4	75.9	50.4	75.4	53.8	
	Average ..	62.8	67.1	22.7	75.2	49.8	76.4	57.7	
44	Sheep C	63.5	65.2	51.7	45.0	62.5	68.4	71.6	Ration fed 12 days, feces collected 5 days.
	Sheep D	64.8	65.6	53.7	49.3	63.2	68.3	71.8	
	Average ..	64.2	65.4	52.7	47.2	62.8	68.4	71.7	
45	Sheep B	67.6	68.6	51.7	60.3	58.3	73.6	70.6	Do.
	Sheep F	68.2	69.1	54.3	61.1	60.5	73.4	72.1	
	Average ..	67.9	68.9	53.0	60.7	59.4	73.5	71.4	
46	Sheep C	66.1	72.1	19.9	77.3	62.4	76.4	60.0	Do.
	Sheep D	66.5	72.1	23.2	77.0	61.0	77.5	58.6	
	Average ..	66.3	72.1	21.6	77.2	61.7	77.0	59.3	
47	Sheep B	65.2	67.0	44.2	64.9	61.8	71.9	56.3	Do.
	Sheep F	66.2	67.8	48.1	69.9	63.3	71.3	54.0	
	Average ..	65.6	67.4	46.2	67.4	62.6	71.6	55.2	
48	Sheep No. 1 <i>a</i> ..	69.6	70.6	55.5	63.2	67.1	73.5	69.6	
	Sheep No. 2 <i>a</i> ..	67.3	68.2	61.0	57.9	58.6	73.8	71.0	
	Average ..	68.5	69.4	58.3	60.3	62.9	73.7	70.3	
49	Steer No. 53...	61.7	64.3	29.0	51.3	55.6	69.4	81.0	Feces collected 6 days.
	Steer No. 54...	61.9	64.1	35.0	51.7	58.0	67.6	78.9	
	Steer Roan ...	59.8	62.0	31.9	52.6	53.2	66.1	80.2	
	Steer No. 57...	63.5	65.9	32.0	54.2	60.1	69.4	80.2	
	Average ..	61.7	64.1	32.0	52.4	56.7	68.1	80.1	
50	Steer No. 53...	59.9	63.5	32.0	57.5	51.0	73.1	63.6	Do.
	Steer No. 54...	59.5	63.2	30.4	56.7	52.7	72.1	62.2	
	Steer Roan ...	59.0	62.9	29.1	57.5	50.2	72.6	62.2	
	Steer No. 57...	60.1	64.0	29.7	58.2	53.8	72.3	62.2	
	Average ..	59.6	63.4	30.3	57.5	52.0	72.5	62.6	
51	Steer No. 53...	49.8	53.9	27.2	55.2	44.1	60.9	46.9	Do.
	Steer No. 54...	49.8	53.6	29.4	55.2	42.2	61.4	48.5	
	Steer Roan ...	49.4	53.4	27.5	54.8	42.1	61.4	47.7	
	Steer No. 57...	50.1	54.1	27.7	56.2	43.2	61.3	52.5	
	Average ..	49.8	53.8	28.0	55.3	42.9	61.2	48.9	

a Details obtained by correspondence.

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen free extract.	Fat.
ILLINOIS EXPERIMENT STATION—continued.							
52	Cured corn fodder (entire plant cut short, not shredded), 6 to 24 lbs.	<i>Per ct.</i> 15.58	<i>Per ct.</i> 3.84	<i>Per ct.</i> 5.92	<i>Per ct.</i> 19.22	<i>Per ct.</i> 53.55	<i>Per ct.</i> 1.72
MAINE EXPERIMENT STATION.							
53	Timothy hay (in bloom or very near it, with 200 gm. corn meal in periods 1 and 3, with 200 gm. cotton-seed meal in period 2), 600 gm.	10.95	4.00	7.00	30.6	45.1	2.35
54	Flint corn, unground, 787 gm	19.60	1.40	7.91	1.78	65.1	4.25
55	Corn meal, same corn as in No. 54 (finely ground), 787 gm.	18.25	1.45	8.25	1.86	66.0	4.16
56	Corn and cob meal (from same corn as in No. 54), 969 gm.	12.60	1.90	7.81	9.35	64.55	3.79
57	Timothy hay (2 weeks past bloom), 700 gm.....	11.34	3.75	5.94	28.89	47.41	2.67
58	Clover hay (partly out of bloom), 700 gm	11.10	6.27	10.66	30.36	39.24	2.97
59	Oat straw, 350 gm	10.00	3.67	3.56	37.8	42.0	3.0
60	Potatoes (fed raw to sheep Nos. 1 and 2 in period No. 1, with 350 gm. same oat straw as in No. 59; fed cooked to sheep No. 1 in period No. 2, with 500 gm. same timothy hay as in No. 57), 1,000 gm.	75.90	0.82	2.62	.55	19.98	.13
61	Alsike-clover hay (in full bloom), 700 gm	12.55	7.86	12.69	27.86	35.63	3.41
62	White-clover hay (in bloom for some time), 700 gm.	12.39	7.42	15.12	24.91	36.49	3.67
63	Blue-joint hay (cut late in July), 700 gm.....	8.62	5.46	9.19	33.10	40.81	2.82
64	Orchard-grass hay (1 to 10 days past bloom), 700 gm	10.95	6.25	7.50	33.02	39.25	3.03
65	Redtop hay (in full bloom), 700 gm	11.60	4.47	8.56	27.38	44.78	3.21
66	Timothy hay (in full bloom), 700 gm.....	8.32	4.20	7.50	29.94	46.74	3.30
67	Timothy hay (past bloom), 600 gm.....	12.60	4.52	6.85	28.05	44.84	3.14
68	Wild-oat-grass hay (in bloom), 700 gm.....	8.33	3.49	6.87	31.26	47.38	2.67
69	Witch-grass hay (in bloom), 700 gm.....	10.85	4.83	8.50	33.94	38.52	3.36
70	Buttercup hay (in full bloom), 700 gm.....	10.43	6.01	9.06	30.44	40.71	3.35
71	Whiteweed hay (in full bloom, cut July 9), 700 gm .	9.63	6.85	8.44	29.00	41.72	4.56

No. 52: Hopkins, Illinois Sta. Bul. 43 (1896), p. 197.
 Nos. 53-56: Jordan, Maine Sta. Rpt. 1886, pp. 55-62.
 Nos. 57-60: Jordan, Maine Sta. Rpt. 1887, pp. 73-78.
 Nos. 61-71: Jordan, Maine Sta. Rpt. 1888, pp. 94, 95.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen free extract.	Fat.	
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	
52	Steer No. 53...	66.1	68.0	24.0	41.5	67.7	70.9	77.4	Feces collected 6 days.
	Steer No. 54...	57.2	60.9	21.4	30.5	67.0	61.2	64.7	
	Steer Roan...	58.0	59.1	14.1	35.1	61.4	60.7	72.9	
	Steer No. 57...	64.8	67.1	18.3	41.9	68.0	69.7	74.6	
	Average.	61.5	63.8	19.4	37.2	66.0	65.6	72.4	
53	Sheep No. 1, period No. 1.	.....	57.5	.....	43.0	50.5	65.6	42.8	Digestibility of hay alone computed by assuming the digestibility of corn meal from German averages; cotton-seed meal from the average results of Armsby and Wolff. First and second periods covered 12 days, third period covered 11 days.
	Sheep No. 2, period No. 2.	.....	61.2	.....	41.1	.....	65.5	54.6	
	Sheep No. 1, period No. 3.	.....	59.1	.....	42.1	53.6	66.1	45.5	
	Average.	.....	59.3	.....	42.1	52.0	65.7	47.6	
54	Pig No. 1.....	82.5	83.4	.....	68.7	38.3	88.8	45.6	3½ per cent of kernels found unbroken in dung; others were partially broken. Feces collected 12 days.
55	Pig No. 1.....	89.5	91.2	.....	86.1	29.4	94.2	81.7	Feces collected 12 days.
56	Pig No. 1.....	75.6	76.7	.....	75.7	28.5	83.6	82.0	Only 11 per cent of material in cob digested. Feces collected 12 days.
57	Sheep No. 1...	53.5	54.4	.....	45.6	46.4	60.2	55.6	Feces collected 12 days.
	Sheep No. 2...	49.7	50.4	.....	44.9	39.2	57.7	54.5	
	Average.	51.6	52.4	.....	45.2	42.8	58.9	55.0	
58	Sheep No. 1, period No. 1.	55.5	56.4	.....	59.1	45.7	64.2	51.8	Feces collected 12 days. Test repeated for 6 days with sheep No. 2.
	Sheep No. 2, period No. 1.	54.9	55.9	.....	58.1	43.8	64.8	52.9	
	Sheep No. 2, period No. 2.	54.4	56.2	.....	49.3	49.0	63.3	54.8	
	Average.	54.9	56.2	.....	55.5	46.2	64.1	53.2	
59	Sheep No. 1...	49.0	50.8	.....	.....	57.2	51.8	35.5	Ration small and protein so low that results with latter not reliable. Feces collected 12 days.
	Sheep No. 2...	51.7	53.2	.....	.....	58.0	54.6	41.1	
	Average.	50.3	52.0	.....	.....	57.6	53.2	38.3	
60	Sheep No. 1...	78.0	79.3	.....	45.4	.....	93.4	13.0	
	Sheep No. 2...	73.3	74.6	.....	43.9	.....	87.3	13.0	
	Sheep No. 1...	80.1	81.2	.....	43.4	.....	92.1	.....
	Average.	77.1	78.4	.....	44.2	.....	90.9	13.0	
61	Sheep.....	61.9	62.7	53.0	64.0	51.0	74.1	35.1	Rations fed 12 days, feces collected 5 days.
62	Sheep.....	66.0	66.6	58.5	73.2	60.6	69.5	50.6	Do.
63	Sheep.....	39.9	41.8	10.0	56.5	36.5	43.2	37.0	Do.
64	Sheep.....	54.4	55.8	35.0	58.5	57.5	54.4	51.2	Do.
65	Sheep.....	57.6	59.3	24.3	60.4	61.2	59.1	44.2	Do.
66	Sheep.....	65.7	66.8	41.8	60.4	62.1	71.8	51.5	Do.
67	Sheep.....	54.1	55.5	28.0	44.5	51.7	61.0	34.6	Do.
68	Sheep.....	59.6	61.2	17.1	48.6	65.1	62.1	38.2	Rations fed 12 days, feces collected 4 days.
69	Sheep.....	59.9	61.0	40.3	64.2	67.6	62.1	60.0	Rations fed 12 days, feces collected 5 days.
70	Sheep.....	56.1	56.6	48.1	56.3	41.1	66.9	69.7	Do.
71	Sheep.....	57.8	58.3	52.0	58.4	45.5	66.7	62.0	Do.

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
	MAINE EXPERIMENT STATION—continued.						
72	Timothy hay (in early bloom, cut July 24), 700 gm.	<i>Per ct.</i> 8.29	<i>Per ct.</i> 4.77	<i>Per ct.</i> 8.75	<i>Per ct.</i> 26.77	<i>Per ct.</i> 47.64	<i>Per ct.</i> 3.78
73	Timothy hay (10 days past bloom), 700 gm.....	7.97	3.67	7.00	26.82	51.08	3.46
74	Wild-oat-grass hay (in full bloom), 700 gm.....	8.29	4.23	8.75	27.8	47.7	3.3
75	Redtop hay (in full bloom), 700 gm	8.11	4.10	8.50	26.6	49.1	3.6
76	Blue-joint hay (in bloom), 700 gm	6.80	5.32	9.50	33.8	42.16	2.37
77	Witch-grass hay (in full bloom), 700 gm.....	6.45	5.25	7.31	28.73	49.52	2.74
78	Alsike-clover hay (in full bloom), 700 gm	8.45	6.54	12.50	28.00	40.63	3.88
79	Partially cured southern corn fodder (whole plant, no ears formed), 800 gm.	41.5	4.16	7.10	18.77	26.97	1.50
80	Partly dry field-corn fodder (many ears fully developed), 800 gm.	46.0	4.20	7.14	15.63	25.82	1.21
81	Partly dry sweet-corn fodder (some ears fully formed), 800 gm.	50.9	2.67	6.25	14.90	23.93	1.34
82	Southern corn silage (fresh from silo, from same corn as in No. 79), 2,500 gm.	82.22	1.05	1.82	5.70	8.70	.51
83	Field-corn silage (fresh from silo, from same corn as in No. 80), 2,500 gm.	83.08	.86	2.00	4.34	8.75	.99
84	Sweet-corn silage (fresh from silo, from same corn as in No. 81), 2,500 gm.	83.49	.87	1.97	4.07	8.60	1.00
85	Wheat middlings (very fine, fancy, fed with 400 gm. same redtop hay as in No. 65), 400 gm.	11.13	3.04	20.06	5.73	57.03	4.01
86	Coarse, roller-process wheat bran (fed with 400 gm. same redtop hay as in No. 65), 400 gm.	11.55	6.08	16.56	8.06	53.31	4.41

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
72	Sheep No. 1...	59.83	60.4	49.6	59.3	56.1	63.2	57.4	Feces collected 5 days.
	Sheep No. 2...	61.00	61.8	46.8	58.4	59.3	64.2	56.4	
	Average.	60.4	61.1	48.2	58.9	57.7	63.7	56.9	
73	Sheep No. 1...	61.1	62.3	30.7	50.4	56.8	66.9	61.1	Do.
	Sheep No. 2...	55.6	56.4	35.7	49.6	49.8	60.9	55.6	
	Average.	58.3	59.4	33.2	50.0	53.3	63.9	58.3	
74	Sheep No. 3...	68.3	69.1	52.2	68.0	70.6	68.8	62.8	Do.
75	Sheep No. 1...	61.3	62.3	34.1	62.4	60.8	64.1	54.8	Do.
	Sheep No. 2...	62.3	63.6	33.2	61.9	61.8	65.2	58.8	
	Average.	61.8	63.0	33.7	62.2	61.3	64.6	56.8	
76	Sheep No. 3...	70.5	71.5	54.3	72.3	73.4	70.9	53.3	Feces collected 3 days.
	Sheep No. 4...	66.7	68.1	43.0	68.2	71.5	66.4	51.4	
	Average.	68.6	69.8	48.7	70.2	72.4	68.6	52.3	
77	Sheep No. 1...	62.7	64.3	36.5	49.5	59.5	69.9	53.6	Do.
	Sheep No. 2...	62.1	63.0	46.5	56.3	56.4	68.2	55.3	
	Average.	62.4	63.6	41.5	52.9	57.9	69.0	54.4	
78	Sheep No. 3...	61.1	62.0	49.9	67.3	53.2	66.5	61.0	Feces collected 5 days.
	Sheep No. 4...	64.3	65.2	52.9	69.2	58.7	68.1	69.3	
	Average.	62.7	63.6	51.4	68.2	55.9	67.3	65.2	
79	Sheep No. 1...	66.0	69.0	32.1	57.2	77.5	66.3	68.1	Do.
	Sheep No. 2...	63.6	65.3	37.8	59.1	71.7	62.8	69.5	
	Average.	64.8	67.1	34.9	58.1	74.6	64.5	68.8	
80	Sheep No. 3...	69.1	71.4	41.0	62.6	79.6	69.0	68.2	Do.
	Sheep No. 4...	71.3	73.3	46.5	64.6	80.1	71.6	74.9	
	Average.	70.2	72.3	44.2	63.6	79.8	70.3	71.6	
81	Sheep No. 3...	61.7	63.7	26.3	54.6	70.9	61.5	66.9	Do.
	Sheep No. 4...	60.1	62.4	20.5	63.3	69.5	57.4	68.0	
	Average.	60.9	63.1	23.4	59.0	70.2	59.4	67.4	
82	Sheep No. 3...	65.87	68.7	19.0	51.3	76.2	67.9	64.3	Do.
	Sheep No. 4...	60.6	63.8	10.9	42.0	71.4	63.3	66.2	
	Average.	63.2	66.3	14.9	46.6	73.8	65.6	65.3	
83	Sheep No. 3...	69.9	72.8	14.3	48.1	75.6	75.6	82.8	Do.
	Sheep No. 4...	68.3	71.3	10.2	57.6	74.7	71.1	82.4	
	Average.	69.1	72.1	12.2	52.8	75.2	73.3	82.6	
84	Sheep No. 1...	66.6	68.5	31.0	52.7	68.4	70.7	82.3	Do.
	Sheep No. 2...	69.6	71.7	32.9	55.2	73.8	73.0	84.6	
	Average.	68.1	70.1	31.9	54.0	71.1	71.8	83.5	
85	Sheep No. 1...	72.6	75.1	78.4	80.7	84.1	Do.
	Sheep No. 2...	77.2	79.3	.....	79.4	.....	84.5	86.1
	Average.	74.9	77.2	.....	78.9	.....	82.6	85.1
86	Sheep No. 3...	56.4	60.5	70.1	65.7	80.7	Do.
	Sheep No. 4...	61.3	65.2	.....	77.3	.....	69.4	84.5
	Average.	58.8	62.8	.....	73.7	.....	67.5	82.6

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
	MAINE EXPERIMENT STATION—continued.						
87	Ground Canada peas (fed with 1,500 gm. southern corn silage, same as No. 82), 400 gm.	<i>Per ct.</i> 12.48	<i>Per ct.</i> 2.36	<i>Per ct.</i> 23.50	<i>Per ct.</i> 2.53	<i>Per ct.</i> 57.69	<i>Per ct.</i> 1.44
88	Timothy hay (early cut in full bloom from same field as hay in No. 88), 700 gm.	10.40	4.86	7.06	32.51	41.67	3.5
89	Timothy hay (late cut, eighteen days past full bloom), 700 gm.	9.70	4.38	6.12	30.32	46.17	3.3
90	Hungarian grass (freshly cut), 2,250 gm.	75.29	2.29	2.73	7.58	11.29	.82
91	Hungarian grass hay (air-dry hay from same grass as in No. 90), 800 gm.	18.07	7.08	8.86	23.96	38.93	3.10
92	Partially cured southern corn fodder (whole plant immature, no ears formed), 3,378.8 <i>b</i> gm.	85.06	1.28	1.64	4.58	7.00	.44
93	Partially cured field-corn fodder (whole plant mature, kernels glazed), 2,553.2 <i>b</i> gm.	84.21	1.20	1.77	4.01	8.28	.53
94	Sweet-corn fodder (whole plant, ears past roasting), 2,521 <i>b</i> gm.	83.85	1.13	2.18	4.14	8.08	.62
95	Timothy hay (general crop grown on college farm, from mow), 700 gm.	7.63	4.61	6.88	30.15	46.33	4.40
96	.....do.....	7.63	5.22	6.69	30.34	46.32	3.80
97	Sugar beets (grown on college farm, fed with 500 gm. timothy hay, same as in No. 95), 2,000 gm.	83.70	1.11	1.56	.87	12.57	.14
98	Mangel-wurzels (grown on college farm, fed with 500 gm. timothy hay, same as in No. 95), 2,000 gm.	88.27	1.11	1.24	.73	8.53	.12
99	Ruta-bagas (grown on college farm, fed with 500 gm. timothy hay, same as in No. 95), 2,000 gm.	89.05	.72	.89	1.00	7.80	.54

No. 87: Jordan, Maine Sta. Rpt. 1889, p. 68.
 Nos. 88, 89: Jordan, Maine Sta. Rpt. 1890, p. 67.
 Nos. 90-99: Jordan, Maine Sta. Rpt. 1891, pp. 29-37.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
87	Sheep No. 1...	88.5	89.5	50.2	85.9	26.0	94.5	56.9	Feces collected 5 days.
	Sheep No. 2...	85.1	86.4	37.2	80.5	25.5	92.8	52.1	
	Average.	86.8	87.9	43.7	83.2	25.7	93.6	54.5	
88	Sheep No. 1...	55.6	56.4	42.6	51.9	55.8	57.3	59.8	Do.
	Sheep No. 3...	56.3	57.1	42.8	50.3	57.4	57.6	61.8	
	Average.	55.9	56.7	42.7	51.1	56.6	57.4	60.8	
89	Sheep No. 2...	52.1	53.1	31.7	42.9	43.9	60.1	59.6	Do.
	Sheep No. 4...	47.0	48.4	27.5	38.8	37.2	55.6	59.8	
	Average.	49.5	50.7	^a 29.6	40.8	40.5	57.8	59.7	
90	Sheep No. 1...	61.0	63.4	37.2	60.2	65.4	63.5	54.9	Ration fed 12 days, feces collected 5 days.
	Sheep No. 2...	62.5	65.1	37.0	59.4	66.8	66.7	47.8	
	Sheep No. 3...	63.1	65.2	42.5	63.6	67.2	61.8	50.5	
	Sheep No. 4...	67.0	68.8	41.5	66.4	71.7	68.4	56.0	
	Average.	63.4	65.6	^a 39.6	62.4	67.8	65.8	52.3	
91	Sheep No. 1...	65.8	66.8	47.9	59.9	68.5	67.4	63.9	Do.
	Sheep No. 3...	64.3	65.9	46.9	60.0	66.8	66.9	63.8	
	Average.	65.0	66.3	47.4	60.0	67.6	67.1	63.9	
92	Sheep No. 2...	70.3	71.4	58.2	66.1	74.9	70.4	72.3	Do.
	Sheep No. 4...	68.6	69.8	56.6	64.7	73.6	68.7	69.6	
	Average.	69.4	70.6	57.4	65.4	74.2	69.5	70.9	
93	Sheep No. 1...	71.8	73.7	56.3	64.6	76.3	73.4	71.4	Do.
	Sheep No. 3...	69.4	71.1	49.5	59.0	75.0	71.9	69.1	
	Average.	70.6	72.4	52.9	61.8	75.6	72.6	70.2	
94	Sheep No. 2...	69.3	73.2	37.0	60.2	76.9	71.8	78.3	Do.
	Sheep No. 4...	70.2	73.9	41.9	63.5	76.6	72.5	74.5	
	Average.	69.7	73.5	39.4	61.8	76.7	72.1	76.4	
95	Sheep No. 1...	58.7	60.5	25.7	41.9	53.9	66.1	75.9	Do.
	Sheep No. 2...	56.1	57.4	30.9	44.0	49.6	63.3	71.1	
	Sheep No. 3...	62.4	63.7	36.5	49.8	60.3	66.9	75.6	
	Sheep No. 4...	57.1	58.8	25.4	40.9	61.9	58.0	74.6	
	Average.	58.6	60.1	29.6	44.1	56.4	63.6	74.3	
96	Sheep No. 1...	57.5	58.8	35.6	45.3	53.1	63.3	72.5	Do.
	Sheep No. 2...	58.7	60.0	35.9	43.3	53.5	65.9	70.7	
	Sheep No. 3...	58.6	59.6	41.9	49.8	54.5	63.7	69.2	
	Sheep No. 4...	61.3	62.3	45.6	51.9	58.3	66.0	67.0	
	Average.	59.0	60.2	39.7	47.6	54.8	64.7	69.8	
97	Sheep No. 1...	94.2	97.6	43.2	90.0	88.5	99.8	53.5	Do.
	Sheep No. 3...	94.8	99.9	20.7	92.6	113.0	100.0	46.4	
	Average.	94.5	98.7	31.9	91.3	100.7	99.9	49.9	
98	Sheep No. 2...	77.1	82.7	21.1	69.7	26.8	90.8	Do.
	Sheep No. 4...	80.0	87.0	11.7	79.8	58.8	91.9	.....
	Average.	78.5	84.8	16.4	74.7	42.8	91.3	.....
99	Sheep No. 1...	90.0	93.0	45.8	85.9	87.5	94.4	91.6	Do.
	Sheep No. 3...	84.5	89.2	16.7	74.7	61.0	95.1	76.8	
	Average.	87.2	91.1	31.2	80.3	74.2	94.7	84.2	

^a Incorrect in report.^b Amount original green fodder equivalent to partly dry fodder fed.

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
	MAINE EXPERIMENT STATION—continued.						
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
100	English flat turnips (grown on college farm, fed with 500 gm. timothy hay, same as in No. 95), 2,000 gm.	90.24	0.92	1.10	1.02	6.32	0.40
101	Gluten meal (fed with 500 gm. timothy hay, same as in No. 96), 300 gm.	10.20	1.00	30.81	.98	47.22	9.79
102	Coarse roller-process wheat bran (fed with 500 gm. timothy hay, same as in No. 96), 300 gm.	11.73	6.00	15.50	9.66	52.01	5.10
103	Partially cured southern corn fodder (whole plant immature, no ears formed), 1,500 gm.	50.50	3.61	6.06	15.87	22.94	1.02
104	Partially cured field-corn fodder (whole plant, kernels glazed), 1,500 gm.	33.24	4.17	8.16	20.40	32.65	1.38
105	Partially cured sweet-corn fodder (whole plant, ears mature), 1,500 gm.	39.30	3.82	8.47	16.85	29.57	2.00
106	Barley hay (kernels not formed), sheep No. 1, 600 gm.; sheep Nos. 2, 3, and 4, 700 gm.	15.63	6.15	11.42	25.75	39.58	2.47
107	Southern corn silage (immature, a few ears just forming, fresh from silo), 2,500 gm.	86.50	1.11	1.69	4.03	6.30	.37
108	Field-corn silage (ears mature, kernels glazed, fresh from silo), 2,250 gm.	77.70	1.28	2.25	4.73	13.23	.81
109	Field-corn silage (ears mature, kernels glazed, fresh from silo), 2,000 gm.	79.60	.97	2.09	4.72	11.81	.81
110	Field-corn fodder (ears fully developed, kernels partly glazed, cut Sept. 21), 850 gm.	18.93	5.79	8.55	17.34	47.08	2.31
111	Field-corn fodder (cut Aug. 15, formation of ears just begun), 850 gm.	17.53	7.69	12.34	21.86	38.44	2.14
112	Timothy hay (mixed), 600 gm	10.1	4.65	6.68	29.4	46.39	2.74
113	Southern-corn silage (large, immature corn), sheep No. 1, 2,000 gm.; sheep Nos. 2 and 3, 2,500 gm.	86.4	1.15	1.52	4.18	6.28	.47

Nos. 100-102: Jordan, Maine Sta. Rpt. 1891, p. 37.

Nos. 103-111: Jordan, Maine Sta. Rpt. 1893, pp. 38-40, 49-56.

Nos. 112-113: Jordan, Maine Sta. Rpt. 1894, pp. 40, 41.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
100	Sheep No. 2...	90.7	93.2	64.1	84.5	89.2	96.0	82.5	Ration fed 12 days, feces collected 5 days.
	Sheep No. 4...	94.9	99.0	53.2	95.0	117.0	97.0	92.5	
	Average.	92.8	96.1	58.6	89.7	103.0	96.5	^a 87.5	
101	Sheep No. 2...	84.7	86.3	90.2	88.2	85.6	Do.
	Sheep No. 4...	90.2	91.9	.....	83.0	33.4	93.5	90.1
	Average.	87.4	89.1	.....	86.6	.....	90.8	87.8
102	Sheep No. 1...	65.3	68.5	82.7	46.9	69.6	59.5	Do.
	Sheep No. 3...	54.4	59.5	.....	81.5	25.5	58.6	68.6
	Average.	59.8	64.0	.....	82.1	36.2	64.1	64.0
103	Sheep No. 1...	61.2	62.6	46.2	67.2	63.2	61.1	60.6	Do.
	Sheep No. 3...	61.4	63.1	40.2	59.7	68.2	61.0	57.7	
	Average.	61.3	62.8	^a 43.2	63.4	65.7	61.0	59.1	
104	Sheep No. 1...	72.6	74.1	50.0	68.9	77.8	73.9	59.4	Do.
	Sheep No. 3...	72.9	74.3	51.4	66.4	79.5	73.7	70.0	
	Average.	72.7	74.2	50.7	67.6	78.6	73.8	64.7	
105	Sheep No. 2...	68.8	70.8	38.0	70.2	71.9	72.8	74.5	Do.
	Sheep No. 4...	73.1	74.6	50.0	72.8	77.3	73.4	79.6	
	Average.	70.9	72.7	44.0	71.5	74.6	73.1	77.0	
106	Average with 4 sheep.....	61.2	62.3	44.8	65.2	61.7	63.3	40.5	Ration fed 12 days, feces collected 5 days. Feces of 4 sheep mixed before analysis.
107do.....	64.4	65.8	48.2	64.8	66.7	65.4	67.8	Do.
108do.....	78.0	80.2	41.3	68.1	77.9	83.1	80.9	Do.
109do.....	76.0	77.9	36.6	73.3	77.8	78.5	80.9	Ration fed 12 days, feces collected 5 days. Feces of 2 sheep mixed before analysis.
110	Sheep No. 1...	71.2	74.8	25.2	65.1	70.7	77.9	77.0	
	Sheep No. 3...	68.1	72.3	13.0	60.9	69.3	75.5	70.5	
	Sheep No. 4...	70.0	73.8	21.9	59.8	72.2	76.9	73.6	
	Average.	69.8	73.6	20.0	61.9	70.7	76.8	73.7	
111	Sheep No. 1...	71.7	72.9	60.2	72.9	73.4	72.7	70.6	
	Sheep No. 3...	68.6	70.7	48.1	68.7	71.7	71.1	62.9	
	Sheep No. 4...	69.2	70.6	55.2	69.8	71.8	70.3	68.4	
	Average.	69.8	71.4	54.5	70.5	72.3	71.3	67.3	
112	Sheep No. 1...	54.4	55.7	28.8	48.2	48.7	61.3	57.2	Experiments Nos. 112 to 116 were made in an attempt to discover whether the mixing of unlike foods affects the digestibility of the components of a ration. Feces collected 5 days.
	Sheep No. 2...	52.7	54.0	28.2	42.7	48.9	59.6	41.8	
	Sheep No. 3...	54.1	55.3	31.3	44.7	48.5	61.2	52.7	
	Average.	53.7	55.0	29.4	45.2	48.7	60.7	50.6	
113	Sheep No. 1...	64.6	65.7	52.3	59.8	68.5	65.1	67.8	Do.
	Sheep No. 2...	64.5	65.8	50.0	60.4	68.2	65.3	67.6	
	Sheep No. 3...	61.8	63.1	46.5	59.7	65.8	61.8	68.4	
	Average.	63.6	64.8	49.6	60.0	67.5	64.1	67.9	

^a Incorrect in report.

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
	MAINE EXPERIMENT STATION—continued.						
114	Maine field flint corn silage (mature), 2,000 gm.	<i>Per ct.</i> 79.64	<i>Per ct.</i> 1.12	<i>Per ct.</i> 2.43	<i>Per ct.</i> 4.45	<i>Per ct.</i> 11.14	<i>Per ct.</i> 1.21
115	Timothy hay (same as in No. 112), sheep Nos. 1, 2, and 3, 300 gm. Southern-corn silage (same as in No. 113), sheep No. 1, 1,000 gm.; sheep Nos. 2 and 3, 1,250 gm.	12.6	4.69	6.57	28.22	45.07	2.84
116	Timothy hay (same as in No. 112), 300 gm. Maine field-corn silage (same as in No. 115), 1,000 gm.	86.18	1.14	1.54	4.22	6.28	.64
117	Timothy hay (same as in No. 112), 300 gm. Maine field-corn silage (same as in No. 115), 1,000 gm.	12.7	4.54	6.65	28.09	45.29	2.72
118	Flint-corn, horse-bean, and sunflower-head silage, (corn mature 1 acre, horse beans $\frac{1}{2}$ acre, sunflower heads $\frac{1}{2}$ acre, perfectly preserved), sheep No. 1 fed 3,000 gm.; sheep No. 2 fed 2,500 gm.	80.25	1.16	2.37	4.36	10.90	.98
119	Flint-corn, horse-bean, and sunflower-plant silage (as in No. 117, except entire sunflower plant instead of heads), sheep No. 1 fed 3,000 gm.; sheep No. 2 fed 2,500 gm.	79.85	1.70	2.72	5.00	9.99	.74
120	Corn silage (Sanford corn, flint, large white ears, partly glazed), 3,000 gm.	80.90	1.67	2.31	4.83	9.62	.67
121	Hay (mostly timothy), sheep No. 1 fed 600 gm.; sheep No. 2, 400 gm.; sheep No. 3, 600 gm.	81.50	1.27	1.80	4.90	9.97	.56
122	Corn-meal (fed with 400 gm. same hay as in No. 120), 300 gm.	16.50	4.92	7.91	26.57	42.33	1.77
123	Skim milk (fed to sheep Nos. 1 and 3 with 400 gm., same hay as in No. 120, to sheep No. 2 with 200 gm. hay), 3,500 gm.	14.84	1.71	10.31	1.67	68.43	3.04
124	Corn-meal (fed with 300 gm., same hay as in No. 120 and 3,500 gm., same skim milk as in No. 122), 300 gm.	14.84	1.71	10.31	1.67	68.43	3.04

Nos. 114-116: Jordan, Maine Sta. Rpt. 1894, pp. 42-44.
Nos. 117-123: Bartlett, Maine Sta. Rpt. 1897, pp. 144-154.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
114	Sheep No. 1 ...	75.1	77.2	41.0	68.5	78.1	77.4	88.5	Experiments Nos. 112 to 116 were made in an attempt to discover whether the mixing of unlike foods affects the digestibility of the components of a ration. Feces collected 5 days.
	Sheep No. 2 ...	76.0	78.2	39.4	64.9	79.2	79.8	85.8	
	Sheep No. 3 ...	76.2	78.4	39.0	68.9	78.2	79.5	87.2	
	Average.	75.7	77.9	39.8	67.4	78.5	78.9	87.2	
115	Sheep No. 1 ...	55.1	56.8	30.6	50.9	54.2	59.3	59.0	Do.
	Sheep No. 2 ...	58.9	60.3	38.4	52.0	56.0	62.9	64.4	
	Sheep No. 3 ...	57.0	58.4	37.4	51.4	53.9	61.7	65.0	
	Average.	57.0	58.5	35.5	51.4	54.7	61.3	62.8	
116	Sheep No. 1 ...	73.6	74.8	49.0	68.6	70.3	77.8	80.4	Feces collected 5 days.
	Sheep No. 2 ...	66.4	68.1	.....	56.7	64.4	72.1	68.7
	Sheep No. 3 ...	67.1	68.6	.....	59.6	63.1	72.7	73.2
	Average <i>a</i>	66.7	68.3	.....	58.1	63.7	72.4	70.9
117	Sheep No. 1 ...	67.6	70.0	41.2	64.9	63.7	74.0	77.6	
	Sheep No. 2 ...	63.5	65.6	40.9	60.4	56.5	70.8	74.7	
	Average.	65.6	67.8	41.1	62.7	60.1	72.4	76.7	
118	Sheep No. 1 ...	63.6	67.8	20.5	56.6	62.8	72.4	76.0	
	Sheep No. 2 ...	67.3	70.8	30.6	59.3	67.8	75.0	72.2	
	Average.	65.5	69.3	25.6	58.0	65.3	73.7	74.1	
119	Sheep No. 1, test No. 1.	69.5	72.3	31.5	56.5	71.9	75.2	73.8	
	Sheep No. 1, test No. 2.	70.3	72.7	37.3	56.1	72.2	76.0	71.9	
	Average.	69.9	72.5	34.4	56.3	72.1	75.6	72.9	
120	Sheep No. 1 ...	57.3	59.2	26.1	48.1	55.1	64.8	39.2	The average coefficient of digestibility of protein corrected for metabolic nitrogen = 62.2.
	Sheep No. 2 ...	54.1	56.9	24.9	38.8	53.3	61.6	35.3	
	Sheep No. 3 ...	53.7	55.0	32.3	46.3	49.0	60.6	44.1	
	Average.	55.0	57.0	27.8	44.4	52.5	62.3	39.5	
121	Sheep No. 1 ...	97.1	98.0	56.1	<i>b</i> 77.8	90.4	98.6	93.8	The hay assumed to have the same coefficient of digestibility as in No. 120.
	Sheep No. 2 ...	93.7	93.9	78.8	<i>b</i> 78.5	92.1	95.8	94.1	
	Sheep No. 3 ...	89.2	89.9	50.9	<i>b</i> 79.7	89.1	95.1	89.7	
	Average.	93.3	93.9	61.9	<i>b</i> 78.7	90.5	96.5	92.5	
122	Sheep No. 1 ...	95.7	99.9	46.1	<i>b</i> 93.1	97.1	98.9	106.7	Do.
	Sheep No. 2 ...	95.9	99.8	51.7	<i>b</i> 93.1	97.1	100.4	113.9	
	Sheep No. 3 ...	101.9	104.4	74.1	<i>b</i> 96.1	98.4	102.5	109.1	
	Average.	97.8	101.4	57.3	<i>b</i> 94.1	97.5	100.6	109.9	
123	Sheep No. 1 ...	92.3	92.4	76.4	<i>b</i> 83.4	92.6	96.2	97.8	The hay assumed to have the same coefficient of digestibility as in No. 120, the milk as in No. 122.
	Sheep No. 2 ...	91.4	91.6	20.0	<i>b</i> 78.9	93.7	96.1	97.6	
	Sheep No. 3 ...	85.1	88.0	52.1	<i>b</i> 68.3	83.1	93.5	98.9	
	Average.	<i>c</i> 89.6	90.7	49.5	<i>b</i> 76.9	93.5	95.3	98.1	

a Average covers sheep Nos. 2 and 3 only.*b* Result corrected for metabolic nitrogen.*c* Incorrect as reported.

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
MARYLAND STATION.							
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
124	Corn stover (from pulled fodder, well dried).....	8.64	4.98	7.23	29.33	45.94	3.88
	Cotton-seed meal.....	7.00	6.35	43.58	8.11	23.08	11.88
	Corn meal.....	13.65	.65	7.70	.78	74.96	2.26
125	Corn silage (from whole plant).....	82.85	1.37	2.17	5.23	7.36	1.02
	Cotton-seed meal.....	6.75	6.40	45.41	5.88	22.15	13.41
	Corn meal.....	13.30	1.30	7.96	.63	74.39	2.42
126	Corn silage (from whole plant).....	81.67	1.33	2.16	5.68	8.15	1.01
	Corn meal.....	12.30	1.00	7.96	.84	75.57	2.33
127	Corn silage (from whole plant).....	81.20	1.33	2.62	5.63	8.16	1.06
	Gluten meal.....	6.25	.85	35.62	2.03	37.96	17.29
	Germ feed.....	6.00	.90	9.88	11.49	56.10	15.63
128	Corn stover (from topped fodder).....	7.82	6.27	6.88	28.94	46.27	3.82
	Gluten meal.....	6.60	.80	37.80	2.31	35.42	17.07
	Germ feed.....	6.00	1.27	10.45	10.18	56.32	15.78
129	Corn stover (from topped fodder).....	6.47	7.03	7.10	28.91	46.64	3.85
	Gluten meal.....	6.60	1.15	37.80	2.40	35.18	18.67
	Wheat bran.....	10.60	4.45	16.63	8.53	53.64	6.15
130	Corn butts or stubble (no husks on stalks, portion below ear) 6 lbs.	46.74	2.59	1.76	20.46	27.37	1.08
131	Topped corn fodder (stalk and leaves above ear, cut at harvest), 6 lbs.	15.95	6.30	4.57	28.59	42.57	2.22
132	Corn husks, or shucks, 6 lbs.....	8.10	3.36	3.33	32.81	51.55	.85
133	Corn blades or leaves ("pulled fodder," blades below ears), 6 lbs.	7.45	10.45	5.24	26.99	47.65	2.22
134	Dry, shredded corn fodder (whole plant except ears) about 5,100 gm.	20.10	4.60	4.31	28.29	40.33	2.37
135	Wet, shredded corn fodder (same, watered, as in No. 134), about 4,900 gm.	20.10	4.60	4.31	28.29	40.33	2.37

Nos. 124-129: Patterson, Maryland Sta. Rpt. 1891, pp. 315-327.
 Nos. 130-133: Patterson, Maryland Sta. Bul. 20 (1893), pp. 8-11.
 Nos. 134-135: Patterson, Maryland Sta. Bul. 41 (1896), pp. 132, 133.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.	
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.		
124	Steer A	<i>Per ct.</i> 70.1	<i>Per ct.</i> 72.8	<i>Per ct.</i> 5.5	<i>Per ct.</i> 69.7	<i>Per ct.</i> 33.7	<i>Per ct.</i> 73.6	<i>Per ct.</i> 79.1	Experiments Nos. 124 to 126 were made to determine the effect of silage upon the digestibility of a ration as compared with corn stover or some similar material not fermented. The metabolic nitrogen in the feces was determined and coefficients of digestibility calculated after extraction. The coefficients of protein digestibility thus calculated are from 5 to 13 per cent higher than those given.	
	Steer C	69.5	72.1	9.2	67.4	38.2	78.2	82.9		
	Average.	69.8	72.5	7.3	68.5	35.9	75.9	81.0		
125	Steer A	71.3	74.8	1.5	68.2	43.5	81.5	84.8		
	Steer C	73.9	75.7	39.0	69.9	51.1	82.0	78.2		
	Average.	72.7	75.3	20.2	69.0	47.3	81.7	81.5		
126	Steer A	75.5	77.6	16.8	55.6	59.8	84.1	74.1		
127	Steer B	65.3	67.4	7.3	71.8	52.9	65.9	87.2		
	Steer D	69.1	71.2	6.1	73.1	57.6	70.5	84.8		
	Average.	67.2	69.3	6.7	72.5	55.3	68.2	86.0		
128	Steer B	56.2	58.5	5.6	69.3	43.8	55.9	81.2		
	Steer D	62.3	64.5	3.2	73.4	49.9	62.2	81.7		
	Average.	59.3	61.5	4.4	71.4	46.9	59.1	81.4		
129	Steer B	67.8	70.0	28.7	76.8	60.0	68.3	87.3		
	Steer D	65.1	67.3	29.9	75.5	56.8	65.5	87.1		
	Average.	66.5	68.7	29.3	76.2	58.4	66.4	87.2		
	Average of all silage rations.	71.8	.....	14.2	67.7	53.0	76.9	81.8	
	Average of all stover rations.	65.2	.....	13.7	72.0	43.7	67.5	83.2	
	Average same periods:									
	Silage 125, 127. Stover 124, 128.	69.9 64.5	..... .....	13.5 5.9	70.8 70.0	51.3 41.4	75.1 67.5	83.7 81.2	
Difference	5.4	.....	7.6	.8	9.9	7.6	2.5		
130	Steer A	69.0	72.0	11.0	27.0	75.0	73.0	80.0	Experiments Nos. 130 to 148 were made to determine the relative digestibility of different parts of the corn plant and the amount of digestible material each furnishes. Ears, 1,530 lbs. digestible material; topped fodder, 450 lbs.; blades, 197 lbs.; husks, 426 lbs.; stubble, 569 lbs.; total, 3,172 lbs. per acre. Preliminary feeding from 6 to 15 days. Feces collected 4 or 5 days.	
	Steer B	64.0	66.7	12.0	15.0	71.0	65.0	79.0		
	Average.	66.5	69.4	11.5	21.0	73.5	69.0	79.5		
131	Steer A	52.0	56.2	7.0	17.0	19.0	50.0	65.0		
	Steer B	58.0	62.6	8.0	27.0	72.0	57.0	62.0		
	Average.	55.0	59.4	7.5	22.0	70.5	53.5	63.5		
132	Steer A	73.0	74.9	24.0	35.0	81.0	75.0	42.0		
	Steer B	71.0	73.4	8.0	24.0	78.0	75.0	23.0		
	Average.	72.0	74.2	16.0	29.5	79.5	75.0	32.5		
133	Steer A	62.0	65.7	33.0	28.0	75.0	66.0	52.0		
	Steer B	67.0	69.8	45.0	41.0	80.0	70.0	59.0		
	Average.	64.5	67.8	39.0	34.5	77.5	68.0	55.5		
134	Steer No. 3....	57.37	58.9	32.44	41.82	64.83	55.67	72.89		Experiments Nos. 134 to 139 were made to test comparative digestibility of fodder fed wet and dry, 6-day digestive periods.
	Steer No. 4....	56.14	58.1	24.82	37.96	64.32	55.03	71.60		
	Average.	56.75	58.5	28.63	39.89	64.57	55.35	72.24		
135	Steer No. 1....	61.84	63.5	34.68	39.90	68.95	61.40	75.66		
	Steer No. 2....	59.09	61.2	25.13	33.05	70.30	57.09	72.70		
	Average.	60.46	62.4	29.90	36.48	69.64	59.24	74.18		

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
MARYLAND STATION—continued.							
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
136	Shredded corn fodder (same material as in No. 134), about 3,350 gm.	20.10	4.60	4.31	28.29	40.33	2.37
	Wheat bran, dry, about 3,350 gm	13.26	5.24	17.77	9.51	48.22	6.00
137	Wet shredded corn fodder (same material as in No. 135), steer No. 1, 2,000 gm.; steer No. 2, 2,000 gm.	20.10	4.60	4.31	28.29	40.33	2.37
	Dry wheat bran, steer No. 1, 4,000 gm.; steer No. 2, 4,000 gm.	13.26	5.24	17.77	9.51	48.22	6.00
138	Wet shredded corn fodder (same material as in No. 135) about 3,200 gm.	20.10	4.60	4.31	28.29	40.33	2.37
	Wet wheat bran, about 3,200 gm.....	13.26	5.24	17.77	9.51	48.22	6.00
139	Western wheat bran. Steer No. 3, 6,000 gm.; steer No. 4, 5,000 gm.	13.26	5.24	17.77	9.51	48.22	6.00
140	New corn product, from Kentucky-grown corn (fed wet). Steers Nos. 1 and 4, 5,000 gm.; steer No. 3, 6,000 gm.	9.22	4.00	6.38	28.70	48.86	2.84
b141	Shredded corn fodder, about 4,900 gm. fed wet to steers Nos. 1 and 2; about 5,100 gm. fed dry to steers Nos. 3 and 4.	20.10	4.60	4.31	28.29	40.33	2.37
142	Corn fodder finely ground (entire plant, same corn as in No. 140). Steer No. 1, 6,000 gm.; steer No. 2, 3,000 gm.	9.80	4.50	3.94	33.18	46.16	2.42
143	New corn product (steamed 15 minutes). Steer No. 2, 5,000 gm; Nos. 1 and 3, 6,000 gm.	9.22	4.00	6.38	28.70	48.86	2.84
144	Corn blades and husks. Steer No. 1, 4,500 gm.; Nos. 2 and 4, 5,500 gm.; No. 3, 7,000 gm.	8.92	6.70	6.56	29.96	45.61	2.25
c145	Wet shredded corn fodder (same material as in No. 135). About 3,200 gm.	20.10	4.60	4.31	28.29	40.33	2.37
	Wet wheat bran. About 3,200 gm.....	13.36	5.24	17.77	9.51	48.22	6.00
146	Corn blades (same material as in No. 144). Steer No. 3, 8,000 gm.; steer No. 4, 6,500 gm.	12.56	4.64	21.04	6.58	47.04	8.14
	Mixed grain ration L, steer No. 3, 5,000 gm.; steer No. 4, 3,500 gm.	8.92	6.70	6.56	29.96	45.61	2.25
147	Mixed ration K, 10,000 gm.....	10.71	4.57	10.32	23.71	46.68	4.01

Nos. 136-139: Patterson, Maryland Sta. Bul. 41 (1896), pp. 134-138.
 Nos. 140-147: Patterson, Maryland Sta. Bul. 43 (1896), pp. 170-184.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
136	Steer No. 3....	61.45	63.6	28.00	70.25	57.13	64.30	66.96	Fodder and bran fed separately.
	Steer No. 4....	56.02	58.1	22.56	69.76	44.97	59.72	69.91	
	Average..	58.74	60.9	25.28	70.00	51.05	62.05	68.44	
137	Steer No. 1....	55.15	57.8	12.44	68.46	48.53	58.34	65.91	Do.
	Steer No. 2....	65.05	67.1	32.56	71.48	61.90	67.55	73.96	
	Average..	60.10	62.5	^a 22.50	69.97	55.22	62.95	69.64	
138	Steer No. 1....	62.43	64.3	33.08	73.08	51.76	66.81	67.41	Fodder and bran mixed before feeding.
	Steer No. 2....	63.44	65.8	25.53	75.29	54.06	67.92	71.78	
	Steer No. 3....	61.25	63.3	28.54	70.05	57.59	64.96	53.24	
	Steer No. 4....	65.62	67.1	42.01	76.60	59.25	66.84	80.26	
	Average..	63.19	65.1	32.29	73.76	55.67	66.63	68.17	
139	Steer No. 3....	68.33	70.0	42.21	82.96	32.21	76.08	42.73	
	Steer No. 4....	66.30	67.1	52.04	81.71	17.98	73.05	66.67	
	Average..	67.32	68.6	47.13	82.33	25.10	74.57	54.70	
140	Steer No. 1....	62.84	63.6	45.64	57.22	59.75	65.71	82.19	Experiment covered 7 days.
	Steer No. 3....	63.57	64.0	54.88	59.55	60.53	65.52	83.35	
	Steer No. 4....	64.02	64.9	46.07	62.26	61.42	66.13	82.89	
	Average..	63.48	64.2	48.86	59.68	60.57	65.79	82.81	
141	Steer No. 1....	61.84	63.5	34.68	39.90	68.95	61.40	75.66	This experiment is a duplicate publication of Nos. 135 and 134.
	Steer No. 2....	59.09	61.2	25.13	33.05	70.30	57.09	72.70	
	Steer No. 3....	57.37	58.9	32.44	41.82	64.83	55.67	72.89	
	Steer No. 4....	56.14	58.1	24.82	37.96	64.32	55.03	71.60	
142	Steer No. 3....	57.43	58.9	30.26	37.22	59.75	59.04	78.94	Experiment covered 7 days.
	Steer No. 4....	48.89	50.2	23.49	32.85	52.12	49.00	75.98	
	Average..	53.16	54.6	26.88	35.04	55.94	54.02	77.46	
143	Steer No. 1....	51.44	51.6	47.38	59.65	36.79	57.44	70.34	Experiment made to test effect on digestibility, of steaming fodder.
	Steer No. 2....	56.61	57.0	47.50	60.53	53.72	56.93	84.56	
	Steer No. 3....	59.43	59.6	55.24	59.25	52.29	62.53	84.52	
	Average..	55.83	56.1	50.04	59.81	47.60	58.97	79.81	
144	Steer No. 1....	67.58	70.9	25.61	54.60	76.01	70.66	52.78	Mixture of blades and husks as stripped from stover in pith extraction.
	Steer No. 2....	65.79	68.3	34.66	49.35	74.87	66.88	63.67	
	Steer No. 3....	60.22	63.8	15.40	45.62	66.73	64.63	60.00	
	Steer No. 4....	61.64	65.4	14.70	41.19	74.09	63.57	56.11	
	Average..	^a 63.81	67.1	22.59	47.69	72.93	66.44	58.14	
145	Steer No. 1....	62.43	64.3	33.08	73.08	51.76	66.81	67.41	
	Steer No. 2....	63.44	65.8	25.53	75.29	54.06	57.92	71.78	
	Steer No. 3....	61.25	63.3	28.54	70.05	57.59	64.96	53.24	
	Steer No. 4....	65.62	67.1	42.01	76.60	59.25	66.84	80.26	
	Average..	63.19	65.1	32.29	73.76	55.67	66.63	68.17	
146	Steer No. 3....	56.28	3.68	64.61	51.32	61.29	73.96	Ration L consisted of hominy chop, wheat bran, cotton-seed meal, and linseed meal. Experiment covered 6 days.
	Steer No. 4....	60.33	.....	15.81	65.19	59.84	63.34	79.08
	Average..	58.31	.....	9.75	64.90	55.58	62.32	76.52
147	Steer No. 1....	61.93	48.02	75.46	48.94	64.94	86.03	Ration K, same ingredients as ration L, mixed with new corn product to equal corn blades fed in No. 146.
	Steer No. 2....	62.98	.....	52.20	75.24	51.41	65.22	86.14
	Average..	62.49	.....	50.11	75.35	50.18	65.08	86.09

^aIncorrect in report.^bReprint of No. 135 and No. 134.^cDuplicate of No. 138.

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
	MARYLAND STATION—continued.						
148	Timothy hay (in full bloom, well cured, superior quality). Horse No. 1, 5,000 gm.; horse No. 2 6,000 gm.	<i>Per ct.</i> 11.41	<i>Per ct.</i> 4.57	<i>Per ct.</i> 4.45	<i>Per ct.</i> 33.20	<i>Per ct.</i> 42.99	<i>Per ct.</i> 3.38
149	Oats (superior white, whole; fed with same timothy hay as in No. 148. Horse No. 1, 2,186 gm.; horse No. 2, 3,278 gm.), 6,000 gm.	8.56	3.68	12.42	11.91	56.53	6.90
150	Oats (superior white, ground; fed with 4,000 gm. same timothy hay as in No. 148). Horse No. 1, 2,960 gm.; horse No. 2, 3,100 gm.	8.59	3.61	13.21	8.81	59.38	6.40
151	Yellow dent corn, shelled, whole (fed with 3,000 gm.; same timothy hay as in No. 148), 3,000 gm.	22.22	1.33	8.53	1.72	62.27	3.93
152	Corn meal (same corn as in No. 151, fed with 3,000 gm. same timothy hay as in No. 148). Horse No. 1, 2,870 gm.; horse No. 2, 3,500 gm.	12.69	1.85	9.28	1.71	70.07	4.40
153	New corn product (from Illinois-grown corn, fed to horse No. 1 with 2,900 gm. same ground oats as in No. 150; to horse No. 2 with 3,350 gm.). Horse No. 1, 2,950 gm.; horse No. 2, 3,350 gm.	8.51	5.41	6.56	27.30	49.30	2.92
154	Mixed ration. Horse No. 1, 6,000 gm.; horse No. 2, 7,500 gm.	10.93	4.32	12.91	16.75	49.89	5.20
	MASSACHUSETTS STATE STATION.						
155	Hay of mixed grasses (English hay), 900 gm.	15.13	5.59	9.41	25.52	41.14	2.93
156	Buffalo gluten meal (fed with 600 gm. same hay as in No. 155), sheep No. 2, 300 gm.; No. 4, 250 gm.	9.75	.71	23.79	7.56	45.33	12.90
157	Hay of mixed grasses (English hay), 900 gm.	14.96	6.66	9.18	27.84	38.75	2.62
158	Linseed meal, new process (fed with 600 gm. same hay as in No. 157), 250 gm.	11.72	5.16	35.67	7.58	36.34	3.54
159	Linseed meal, old process (fed with 600 gm. same hay as in No. 157), 250 gm.	12.36	6.11	32.21	7.20	34.89	7.25

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
148	Horse No. 1...	47.77	48.3	39.03	23.97	48.34	50.51	50.78	Low protein digestibility in No. 148 probably due to smallness of ration and consequent large proportion of metabolic nitrogen in feces. Hay in amounts given not a maintenance ration. Experiment with horse No. 1 covered 5 days; with No. 2, 7 days.
	Horse No. 2...	39.30	39.8	28.96	18.35	36.90	44.05	43.79	
	Average.	43.54	44.1	33.99	21.16	42.62	47.27	47.28	
149	Horse No. 1...	77.24	79.2	30.61	87.98	49.01	83.52	80.00	Ration supported bodily functions. Feces collected 5 days.
	Horse No. 2...	67.51	68.9	35.60	84.22	13.26	75.23	84.83	
	Average.	72.38	74.1	33.10	86.10	31.14	79.38	82.42	
150	Horse No. 1...	72.91	75.5	9.55	81.44	0.61	85.23	78.77	Feces collected 5 days.
	Horse No. 2...	78.55	79.8	48.85	83.44	28.11	87.00	81.04	
	Average.	75.73	77.7	29.20	82.44	14.36	86.12	79.90	
151	Horse No. 1...	78.08	78.9	32.00	75.84	91.57	52.54	Experiments Nos. 151 and 152 to compare digestibility of whole and ground corn. Feces collected 5 days.
	Horse No. 2...	70.81	71.7	20.50	39.80	(?)	84.82	48.88	
	Average.	74.44	75.3	26.25	57.82	.....	88.19	47.71
152	Horse No. 1...	83.96	(?)	(?)	77.18	92.74	70.21	Feces collected 5 days.
	Horse No. 2...	92.82	93.5	62.66	73.95	(?)	98.70	75.99	
	Average.	88.39	.....	.....	75.57	.....	95.72	73.10
153	Horse No. 1...	59.32	60.7	37.47	70.04	70.75	54.37	47.56	Do.
	Horse No. 2...	40.40	42.6	5.96	65.05	38.39	39.53	72.00	
	Average.	49.86	51.7	21.72	67.54	54.57	46.95	59.78	
154	Horse No. 1...	63.82	15.35	79.96	38.66	71.28	73.60	Ration: New corn product hominy chop, ground oats, ground rye, linseed meal, gluten meal, wheat bran' 5:1:1:1:1:1:1:1.
	Horse No. 2...	61.34	.....	24.45	79.26	33.65	67.70	75.80
	Average.	62.58	.....	19.90	79.61	36.16	69.49	74.70
155	Sheep No. 2...	60.67	63.0	63.31	62.80	63.46	57.04	Each sheep in experiments Nos. 155 to 214 received 5 gm. salt daily. Experiment covered 7 days.
	Sheep No. 3...	62.00	63.6	.....	63.39	65.86	63.37	47.15
	Sheep No. 4...	61.43	63.3	.....	63.76	64.73	63.14	50.09
	Average.	61.37	63.3	.....	63.49	64.46	63.32	51.43
156	Sheep No. 2...	75.53	77.8	85.97	39.92	78.44	82.25	Mixed grasses, timothy, red top, Kentucky blue grass, meadow fescue, sweet-scented vernal, clover.
	Sheep No. 4...	80.44	80.5	.....	83.94	46.26	84.37	80.58
	Average.	77.98	79.2	.....	84.95	43.10	81.40	81.41
157	Sheep No. 1...	55.84	57.4	58.05	57.30	58.16	45.65	
	Sheep No. 2...	55.10	56.3	.....	58.13	55.90	56.80	47.22
	Sheep No. 3...	55.56	57.3	.....	56.08	57.38	58.24	47.47
	Sheep No. 4...	55.86	57.6	.....	57.04	57.98	58.19	47.26
	Average.	55.59	57.2	.....	57.32	57.14	57.85	46.90
158	Sheep No. 2...	79.86	83.1	86.32	49.24	86.31	90.50	
	Sheep No. 3...	82.60	85.4	.....	88.16	73.21	84.71	91.52
	Average.	81.23	84.3	.....	87.24	61.23	85.51	91.01
159	Sheep No. 2...	75.48	79.2	86.38	37.90	78.33	92.01	
	Sheep No. 3...	82.25	84.5	.....	93.36	71.47	78.73	85.30
	Sheep No. 4...	78.24	79.9	.....	86.64	61.79	75.58	88.45
	Average.	78.66	81.2	.....	88.79	57.05	77.55	88.59

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
	MASSACHUSETTS STATE STATION—continued.	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
160	Corn cobs, finely ground (fed to sheep No. 1 with 450 gm. same hay as in No. 157, and 250 gm. same new-process linseed meal as in No. 158; sheep No. 2, 400 gm. hay and 200 gm. linseed meal), 400 gm.	12.11	1.69	3.39	23.88	57.81	1.12
161	Dried brewers' grains (fed with 500 gm. same hay as in No. 157), 400 gm.	10.32	3.22	20.62	13.02	45.82	7.00
162	Spring-wheat bran (fed with 600 gm. same hay as in No. 157), 300 gm.	12.69	5.35	15.37	10.02	51.85	4.71
163	Winter-wheat bran (fed with 600 gm. same hay as in No. 157), 300 gm.	13.51	5.40	14.74	8.06	55.21	3.95
164	Wheat middlings (fed with 600 gm. same hay as in No. 157), 300 gm.	13.06	1.30	18.31	3.07	58.95	5.30
165	Hay, mixed grasses (English hay) (cut in bloom), 900 gm.	11.52	6.27	9.88	28.39	41.07	2.86
166	Hay of mixed grasses (English hay) (cut in bloom), 900 gm.	12.19	7.09	8.55	28.54	41.69	2.01
167	Hay of mixed grasses (English hay) (cut in bloom), 900 gm.	11.60	6.44	8.61	29.55	41.55	2.25
168	Vetch and oat hay (cut in late bloom), 900 gm	14.88	9.06	11.42	31.45	31.81	2.22
169	Linseed meal, new process (fed with 600 gm. same hay as in No. 165), 200 gm.	10.6	5.38	36.99	7.19	35.99	3.84
170	Buffalo gluten meal (fed with 600 gm. same hay as in No. 165), 250 gm.	8.14	.37	21.06	7.77	50.42	12.24
171	Peoria gluten feed (fed with 600 gm. same hay as in No. 165), 250 gm.	10.10	.76	17.59	7.47	58.75	5.64
172	Chicago maize feed (fed to sheep No. 3 with 550 gm. and to sheep No. 4 with 600 gm. same hay as in No. 165), 250 gm.	10.28	.72	23.44	8.13	49.35	8.07
173	Chicago gluten meal (fed with 650 gm. same hay as in No. 165), 200 gm.	9.69	.13	33.50	1.56	50.07	4.15

Nos. 160-164: Lindsey et al., Mass. State Sta. Rpt. 1893, pp. 174-178.

Nos. 165-173: Lindsey, Smith, and Holland, Mass. State Sta. Rpt. 1894, pp. 165-170.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
160	Sheep No. 1...	60.43	59.9	.....	21.88	64.50	60.37	56.00	
	Sheep No. 2...	58.51	59.5	.....	12.89	66.16	59.71	44.22	
	Average.	59.47	59.7	.....	17.38	65.33	60.04	50.11	
161	Sheep No. 1...	61.63	65.4	.....	77.71	55.11	58.70	92.79	
	Sheep No. 2...	61.68	65.3	.....	80.82	50.04	58.96	89.43	
	Average.	61.65	65.4	.....	79.26	52.57	57.83	91.11	
162	Sheep No. 2...	62.26	65.6	.....	77.68	22.18	69.55	75.67	
	Sheep No. 3...	62.80	67.8	.....	81.59	^a 25.00	71.22	75.53	
	Average.	62.53	66.7	.....	79.63	23.59	70.38	75.60	
163	Sheep No. 4...	66.45	70.0	.....	78.54	56.28	70.43	60.54	
164	Sheep No. 1...	79.48	88.2	.....	81.83	32.57	84.43	87.99	
	Sheep No. 4...	85.63	88.0	.....	87.75	40.06	91.08	81.71	
	Average.	82.55	88.1	.....	84.79	36.31	87.75	84.85	
165	Sheep No. 1...	57.93	59.0	.....	57.45	60.90	58.65	49.11	
	Sheep No. 2...	58.49	59.1	.....	57.11	61.24	58.52	51.82	
	Sheep No. 3...	58.17	59.3	.....	55.88	62.27	59.07	43.88	
	Sheep No. 4...	61.57	62.5	.....	62.49	65.32	61.07	53.73	
	Average.	59.04	60.0	.....	58.23	62.44	59.33	49.63	
166	Sheep No. 1...	53.89	55.6	.....	57.16	55.54	55.76	46.67	
	Sheep No. 2 ^b ...	54.33	56.3	.....	52.23	57.25	56.76	48.65	
	Average.	54.11	55.9	.....	54.70	56.40	55.88	47.66	
167	Sheep No. 3...	54.72	56.4	.....	57.32	57.30	56.12	45.28	
	Sheep No. 4...	56.20	58.4	.....	59.82	59.04	58.19	48.50	
	Average.	55.46	57.4	.....	58.57	58.17	57.16	46.89	
	Average.	54.94	.....	.....	58.10	57.29	56.69	46.82	Average sheep 1, experiment No. 166; sheep 3 and 4, experiment No. 167.
168	Sheep No. 3...	58.07	58.6	.....	60.92	65.16	54.42	16.75	
	Sheep No. 4...	58.14	58.8	.....	58.48	66.88	53.88	20.40	
	Average.	58.10	58.7	.....	59.70	66.02	54.15	18.57	
169	Sheep No. 1...	77.24	79.2	.....	83.12	99.47	86.60	102.20	
170	Sheep No. 3...	89.35	89.9	.....	88.69	94.69	88.93	92.74	
	Sheep No. 4...	91.11	91.6	.....	88.88	104.56	89.76	95.61	
	Average.	90.23	90.8	.....	88.78	99.00	89.34	94.17	
171	Sheep No. 1...	84.07	85.1	.....	81.42	58.69	89.77	81.63	
	Sheep No. 4...	87.19	88.6	.....	84.53	97.44	89.99	75.58	
	Average.	85.63	86.9	.....	82.97	78.06	89.88	78.60	
172	Sheep No. 3...	88.09	88.1	.....	84.92	86.45	89.52	91.00	
	Sheep No. 4...	86.19	86.0	.....	86.00	78.48	86.22	92.03	
	Average.	87.14	87.1	.....	85.46	82.46	87.87	91.51	
173	Sheep No. 1...	91.74	92.3	.....	88.52	39.04	96.17	96.05	
	Sheep No. 2...	93.70	93.9	.....	92.49	4.16	97.25	98.22	
	Average.	92.72	93.1	.....	90.50	21.60	96.71	97.13	

^a Incorrect in report.^b Excluded from second average under No. 167.

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
MASSACHUSETTS STATE STATION—continued.							
174	King gluten meal (fed with 650 gm. same hay as in No. 165), 200 gm.	8.38	1.37	35.34	1.29	35.58	18.03
175	Atlas meal (fed with 650 gm. of mixture of same hay as in Nos. 166 and 167), 200 gm.	8.96	.94	38.81	8.86	28.07	14.36
176	Peanut feed (ground shells with small amount of nut) (fed with 550 gm. of mixture of same hay as in Nos. 166 and 165), 300 gm.	9.57	4.58	10.91	49.19	20.74	5.01
177	Soy-bean meal (beans raised at Amherst) (fed with 600 gm. of mixture of same hay as in Nos. 166 and 165), 250 gm.	9.78	5.59	34.71	4.06	28.81	16.86
178	Rye meal (fed with 550 gm. of mixture of same hay as in Nos. 166 and 165), 300 gm.	14.26	.99	11.69	1.53	69.79	1.53
179	Winter wheat bran (fed with 600 gm. mixture of same hay as in Nos. 166 and 165), 300 gm.	13.71	6.55	13.47	9.18	52.79	4.29
MASSACHUSETTS HATCH STATION.							
180	Black grass hay (<i>Juncus bulbosus</i>) fine.....	15.00	9.91	8.08	22.78	42.00	2.23
181	High grown salt hay (<i>Spartina juncea</i>) with coarse grass, probably <i>Spartina stricta</i> , variety <i>glabra</i> .	15.00	6.92	6.36	22.45	47.14	2.13
182	Branch grass (same as No. 181, but coarser).....	15.00	8.75	7.03	22.50	44.84	1.88
183	Low meadow fox grass (<i>Spartina juncea</i>).....	15.00	4.96	6.06	22.58	49.22	2.18
184	Meadow or swale hay (fresh water grasses, sedges, brakes, and flowers).	15.00	5.27	6.77	26.40	44.97	1.59
185	Timothy hay	15.00	4.30	6.30	28.40	43.60	2.40
186	Rice meal (fed with 600 gm. hay), 200 gm.....	10.38	7.68	12.13	5.04	51.80	12.97
187	Pope gluten feed (fed with 600 gm. hay), 250 gm....	9.23	1.24	25.34	6.10	50.64	7.45
188	Pope gluten meal, not extra (fed with 700 gm. hay), 150 gm.	8.19	.68	35.86	1.57	45.94	7.76
189	Millet and soy-bean silage (fed with 400 gm. hay) sheep Nos. 1 and 2, 1,600 gm.; Nos. 3 and 4, 1,800 gm.	81.69	1.93	2.20	6.61	6.80	.77
190	Corn and soy-bean silage, 2:1 (Pride of the North corn and medium green soy bean, bright), 1,600 gm.	74.83	2.35	2.37	7.10	13.29	.6
191	Hay, mostly timothy, 850 gm.....	12.79	5.47	8.41	29.63	41.18	2.62

Nos. 174-179: Lindsey, Smith, and Holland, Mass. State Sta. Rpt. 1894, pp. 170-174.
 Nos. 180-185. Lindsey et al., Mass. Hatch. Sta. Rpt. 1895, p. 76.
 Nos. 186-191. Lindsey et al., Mass. Hatch. Sta. Rpt. 1896, p. 135.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	
174	Sheep No. 1...	86.98	88.5	.....	91.52	39.47	85.57	92.12	
	Sheep No. 2...	83.96	88.2	.....	92.34	.....	82.44	97.63	
	Average	85.47	88.4	.....	91.93	.....	84.00	94.87	
175	Sheep No. 3...	79.53	81.7	.....	73.04	94.88	84.00	92.43	
	Sheep No. 4...	79.75	84.7	.....	72.56	116.50	84.91	90.06	
	Average	79.64	83.4	.....	72.80	105.70	84.45	91.24	
176	Sheep No. 3...	31.93	33.9	.....	71.12	9.88	57.52	90.01	
	Sheep No. 4...	32.26	31.6	.....	70.00	13.49	40.59	89.36	
	Average	32.09	32.8	.....	70.56	11.68	49.05	89.68	
177	Sheep No. 3...	78.15	81.3	.....	89.97	48.27	75.57	81.28	
	Sheep No. 4...	85.58	86.7	.....	92.20	97.09	77.02	90.09	
	Average	81.86	84.0	.....	91.08	71.18	76.29	85.68	
178	Sheep No. 1...	89.51	90.7	.....	83.46	.....	94.47	65.37	
	Sheep No. 2...	85.18	86.7	.....	85.31	.....	89.34	62.98	
	Average	87.34	88.7	.....	84.38	.....	91.90	64.17	
179	Sheep No. 1...	60.68	64.3	.....	77.69	5.37	72.05	53.02	
	Sheep No. 2...	63.83	67.9	.....	78.65	23.29	71.76	80.39	
	Average	62.25	66.1	.....	78.17	14.33	71.90	66.70	
180	Average for 2 sheep.	59.5	.....	.....	63.0	60.5	57.0	41.5	
181	.....do.....	53.0	.....	.....	63.0	50.0	53.0	47.0	
182	.....do.....	56.0	.....	.....	62.5	52.0	54.0	32.0	
183	.....do.....	53.0	.....	.....	57.0	51.0	52.0	24.0	
184	.....do.....	39.0	.....	.....	34.0	33.0	46.0	44.0	
185	.....do.....	58.0	.....	.....	48.0	53.0	63.0	61.0	
186	Sheep No. 1...	71.47	79.9	.....	61.85	.....	89.23	90.66	
	Sheep No. 2...	76.19	83.2	.....	37.36	47.56	95.28	91.56	
	Average	73.83	81.6	.....	^a 61.85	.....	92.25	91.11	
187	Sheep No. 3...	85.90	87.0	.....	84.52	75.61	90.36	82.03	
	Sheep No. 4...	87.18	87.8	.....	88.46	78.30	89.97	79.12	
	Average	86.54	87.4	.....	86.49	76.95	90.16	80.57	Do.
188	Sheep No. 3...	91.61	92.9	.....	83.50	.....	90.97	99.14	
	Sheep No. 4...	94.89	89.1	.....	84.00	.....	84.71	96.22	
	Average	93.25	91.0	.....	83.75	.....	87.84	97.68	Do.
189	Sheep No. 1...	54.40	54.1	.....	58.13	^b 57.47	^b 51.49	^b 75.93	
	Sheep No. 2...	58.11	58.6	.....	55.16	64.32	55.78	72.04	
	Sheep No. 3...	57.95	61.5	.....	^b 41.79	70.11	58.66	68.59	
	Sheep No. 4...	64.75	65.4	.....	61.94	73.89	63.29	^b 80.00	
	Average	58.80	59.9	.....	58.41	69.44	59.24	72.19	Do.
190	Sheep No. 1...	66.42	68.0	.....	64.84	58.95	72.71	82.83	
	Sheep No. 2...	68.62	70.4	.....	63.07	64.74	74.31	79.81	
	Sheep No. 4...	71.84	74.7	.....	67.21	70.63	77.79	83.74	
	Average	68.96	71.0	.....	65.04	64.77	74.94	82.13	Do.
191	Sheep No. 1...	55.09	55.3	.....	57.15	55.52	54.72	56.76	
	Sheep No. 2...	55.87	56.6	.....	50.65	59.16	55.85	58.24	
	Average	55.48	56.0	.....	53.90	57.34	55.28	57.50	Do.

In Nos. 180-185 the composition of the feeding stuff was reduced to the same water content.

Many of these figures were supplied by correspondence.

Do.

Do.

Do.

Do.

Do.

^a Results from 1 sheep.

^b Excluded from average.

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
	MASSACHUSETTS HATCH STATION—continued.						
192	Cotton-seed feed (from manufacturers), seed and hulls, 4 to 1, 850 gm.	Per ct. 11.44	Per ct. 2.81	Per ct. 10.33	Per ct. 37.59	Per ct. 34.46	Per ct. 3.37
193	Cotton-seed feed (material same as in No. 192; fed with 450 gm. hay), 400 gm.	11.88	3.21	10.28	37.41	34.30	3.36
194	Cotton-seed feed (home-mixed seed and hulls, 4 to 1), 500 gm.	12.24	3.27	10.72	33.20	37.00	3.57
195	Cotton-seed feed (home-mixed seed and hulls, 4 to 1; fed with 400 gm. hay), 900 gm.	11.79	3.29	10.77	33.37	37.18	3.29
196	Black-grass hay (<i>Juncus gerardi</i> , fair, slightly moldy, bitter; fed with 400 gm. hay), 500 gm.	a16.21	6.59	7.30	24.05	43.77	2.08
197	Fox-grass hay (<i>Spartina patens</i> , excellent; fed with 490 gm. hay), 500 gm.	a17.28	6.21	7.24	22.30	44.93	2.04
198	Branch-grass hay (<i>Distichlys spicata</i> , poor, damp, musty; fed with 400 gm. hay), 500 gm.	a21.99	6.13	6.14	20.64	42.91	2.19
199	Red-top hay (<i>Agrostis vulgaris</i> , mixed with sedge; fed with 400 gm. hay), 500 gm.	a12.20	5.67	6.85	28.43	45.25	1.59
200	Cove mixture (mixture of same black-grass hay as in No. 196, and red-top hay as in No. 119; fed with 400 gm. hay), 500 gm.	a18.05	5.90	7.23	22.59	44.51	1.22
201	Salt-hay mixture (mixture of some fox-grass hay, branch-grass hay, and flat sage, as in Nos. 197, 198, and 202, respectively; fed with 400 gm. hay), 500 gm.	a18.00	8.19	5.31	22.03	44.52	2.05
202	Flat sage (<i>Spartina stricta maritima</i> ; fed with 400 gm. hay), 500 gm.	a16.97	8.12	6.72	24.67	41.33	2.41
203	Barnyard millet, green (in early bloom), 3,000 gm..	82.12	1.48	1.59	6.05	9.42	.33
204	Barnyard millet, green (late bloom), 3,000 gm.....	81.83	1.56	2.00	6.37	11.27	.31

Nos. 192-195: Lindsey et al., Mass. Hatch. Sta. Rpt. 1897, p. 84.

Nos. 196-202: Lindsey, Jones, et al., Mass. Hatch. Sta. Bul. 50, p. 16.

Nos. 203-204: Lindsey et al. Unpublished material obtained by correspondence.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
192	Sheep No. 1...	55.83	56.5	35.28	59.71	56.60	85.26	Many of these figures were supplied by correspondence.
	Sheep No. 2...	57.57	57.8	.....	41.86	57.33	59.75	92.65
	Average	56.70	57.2	.....	38.57	58.52	58.17	88.95
193	Sheep No. 1...	59.80	61.4	29.19	63.81	64.88	98.21	Do.
194	Sheep No. 2...	57.74	59.1	23.52	41.23	59.99	59.84	98.38	Do.
	Sheep No. 3...	57.12	58.5	22.54	40.03	57.51	60.43	102.97	
	Average	57.43	58.8	23.03	40.63	58.75	60.14	100.68	
195	Sheep No. 1...	54.74	55.5	34.68	42.17	50.89	59.84	93.78	Do.
	Sheep No. 4...	54.03	54.9	30.22	44.51	52.16	56.82	92.89	
	Average	54.38	55.2	32.45	43.34	51.52	58.33	93.33	
196	Sheep No. 2...	50.06	48.3	70.95	52.62	50.43	46.64	41.40	Do.
	Sheep No. 3...	51.37	50.0	66.96	52.57	56.06	46.44	44.39	
	Sheep No. 4...	58.82	58.0	69.00	57.60	65.55	54.04	51.35	
	Average	53.42	52.1	68.97	54.26	57.35	49.04	45.71	
197	Sheep No. 1...	55.82	55.6	58.11	55.69	58.67	54.65	41.91	Do.
	Sheep No. 2...	52.94	52.4	59.31	61.19	53.64	51.28	31.26	
	Sheep No. 4...	55.74	55.6	57.30	61.03	59.89	53.43	36.00	
	Average	54.83	54.5	58.24	59.30	57.40	53.12	36.39	
198	Sheep No. 2...	49.43	48.7	58.19	52.16	56.63	45.25	34.53	Do.
	Sheep No. 3...	50.08	49.2	60.30	50.97	56.33	46.54	33.24	
	Sheep No. 4...	49.54	48.9	55.90	51.93	56.27	45.42	42.17	
	Average	49.68	48.9	58.13	51.69	56.41	45.74	36.65	
199	Sheep No. 2...	45.7	47.9	14.6	36.6	54.5	45.1	55.8	Do.
	Sheep No. 3...	45.9	48.5	9.2	36.8	54.6	46.4	47.1	
	Sheep No. 4...	46.5	49.2	6.5	38.3	58.2	45.4	44.0	
	Average	46.0	48.5	10.1	37.2	55.7	45.6	49.0	
200	Sheep No. 2...	54.4	54.1	58.8	52.0	59.5	52.5	31.2	Do.
	Sheep No. 3...	52.8	52.2	57.2	46.5	56.9	51.2	48.0	
	Sheep No. 4...	56.6	56.6	56.6	45.2	62.6	55.9	41.8	
	Average	54.6	54.3	57.5	47.9	59.7	53.2	40.3	
201	Sheep No. 2...	52.18	50.4	67.83	42.32	53.91	50.57	30.18	Do.
	Sheep No. 3...	51.17	60.0	71.98	44.51	67.14	59.42	33.11	
	Sheep No. 4...	55.97	54.4	69.71	41.12	61.11	53.99	25.70	
	Average	56.44	54.9	69.84	42.65	60.72	54.66	29.66	
202	Sheep No. 2...	55.39	56.2	61.41	50.70	59.75	53.67	32.67	Do.
	Sheep No. 3...	57.62	58.4	62.32	49.75	61.36	56.74	39.70	
	Sheep No. 4...	56.55	57.3	62.15	54.86	60.16	54.75	36.06	
	Average	56.52	57.3	61.96	51.77	60.42	55.05	36.14	
203	Sheep No. 2...	71.51	72.1	64.79	66.59	70.94	74.10	61.39	Do.
	Sheep No. 3...	75.51	73.7	67.49	69.65	76.79	77.39	67.39	
	Average	73.51	72.9	66.14	68.12	73.86	75.74	64.39	
204	Sheep No. 4...	67.17	67.7	61.23	72.30	70.64	64.51	61.08	Do.

^a In Nos. 196-202, the composition of feeding stuffs was computed by the compilers.

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
MASSACHUSETTS HATCH STATION—continued.							
205	Vetch and oats, green (just in bloom when feeding began), 3,000 gm.	<i>Per ct.</i> 83.10	<i>Per ct.</i> 1.47	<i>Per ct.</i> 2.16	<i>Per ct.</i> 6.00	<i>Per ct.</i> 6.82	<i>Per ct.</i> 0.46
206	Peas and oats (in blossom), 3,000 gm.....	82.80	1.37	1.93	5.34	8.03	.52
207	Barnyard-millet hay (cut from soiling plats in late bloom), 500 gm.	12.77	8.89	9.37	30.12	37.59	1.36
208	Corn silage (Pride of the North dent corn, well eared, ears well glazed), 1,500 gm.	72.00	1.29	1.87	5.82	18.24	.79
209	Peoria gluten feed (fed with 600 gm. hay), 200 gm.	8.52	.94	20.78	6.54	57.67	5.56
210	Cerealine feed (fed with 600 gm. hay), 150 gm.....	12.10	2.23	9.53	4.39	65.06	6.67
211	Quaker-oat feed (fed with 600 gm. hay), 300 gm....	7.41	4.89	11.08	17.61	55.25	3.66
212	Victor corn-and-oat feed (fed with 600 gm. hay), 300 gm.	9.56	3.39	9.23	11.23	62.80	3.78
213	H. O. dairy feed (fed with 650 gm. hay), 250 gm..	8.19	3.68	18.00	12.71	52.93	4.47
214	H. O. horse feed (fed with 650 gm. hay), 250 gm....	9.78	3.08	12.93	9.85	60.58	3.76
MINNESOTA STATION.							
215	{ Pea silage (peas cut when green) 34 lbs.....	52.88	3.06	5.61	11.78	25.26	1.41
	{ Wheat bran, 12 lbs.....	10.00	3.78	11.88	5.04	66.15	2.71
216	Barley, 6 lbs.....	11.78	2.32	11.57	6.00	65.63	2.70
217	Shorts (fed with 4 $\frac{1}{2}$ lbs. same barley as in No. 216), 4 $\frac{1}{2}$ lbs.	10.12	2.79	13.75	8.35	60.09	4.90
218	Unground corn, 6 lbs.....	11.73	1.46	11.25	2.28	69.40	3.88
219	Shorts (fed with 5 $\frac{1}{2}$ lbs. same corn as in No. 218), 5 $\frac{1}{2}$ lbs.	10.12	2.79	13.75	8.35	60.09	4.90
220	Ground peas, 5 $\frac{1}{2}$ lbs.....	11.90	3.06	21.69	7.46	55.04	.85
221	Bran (fed with 2 $\frac{1}{2}$ lbs. same peas as in No. 220), 2 $\frac{1}{2}$ lbs.	9.40	5.95	15.18	10.25	54.17	5.05
222	Bran (same material as in No. 221; fed with 2 $\frac{1}{4}$ lbs. same corn as in No. 218), 2 $\frac{1}{4}$ lbs.	9.40	5.95	15.18	10.25	54.17	5.05

Nos. 205-214. Lindsey et al. Unpublished material obtained by correspondence.
Nos. 215-222: Snyder, Minnesota Sta. Bul. 26 (1893), pp. 12-35.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	
205	Sheep No. 2...	67.17	68.3	54.81	75.96	67.85	67.76	47.63	
	Sheep No. 3...	69.26	70.7	53.71	75.00	71.53	69.97	52.09	
	Sheep No. 4...	64.70	66.2	49.45	73.33	65.47	65.98	41.93	
	Average	67.04	68.4	52.66	74.76	68.28	67.90	47.22	
206	Sheep No. 2...	69.63	71.2	51.62	69.43	66.50	75.56	58.59	
	Sheep No. 3...	72.01	73.8	51.20	73.21	70.32	77.12	61.19	
	Sheep No. 4...	69.03	71.1	45.26	67.72	68.07	75.21	51.46	
	Average	70.22	72.0	49.36	70.12	68.29	75.96	57.08	
207	Sheep No. 1...	57.10	56.4	62.99	63.69	59.82	52.26	44.18	
	Sheep No. 5...	58.43	58.0	62.58	62.92	63.60	52.41	49.62	
	Sheep No. 6...	56.88	56.1	63.89	64.39	61.36	50.07	45.21	
	Average	57.37	56.8	63.15	63.67	61.59	51.58	46.34	
208	Sheep No. 1...	72.07	72.5	24.04	^a 13.40	73.44	80.90	72.05	
	Sheep No. 5...	75.62	77.9	27.78	45.34	72.44	82.78	81.78	
	Average	73.84	75.2	25.91	45.34	72.94	81.84	76.91	
209	Sheep No. 1...	93.61	94.1	45.01	84.59	99.77	97.81	89.00	} Test not very satisfactory.
	Sheep No. 5...	92.76	93.7	.....	86.39	.....	95.71	88.01	
	Sheep No. 6...	87.64	88.5	.....	82.79	84.94	92.93	83.87	
	Average	91.34	92.1	.....	84.59	92.35	95.48	86.96	
210	Sheep No. 1...	89.54	91.9	.....	69.69	.....	92.62	77.54	
	Sheep No. 6...	89.39	91.7	.....	80.59	72.08	96.88	80.94	
	Sheep No. 5...	92.24	94.6	.....	79.41	92.41	96.36	83.23	
	Average	90.39	92.7	.....	76.56	82.24	95.29	80.57	
211	Sheep No. 1...	63.30	66.9	13.75	82.35	44.05	68.14	91.52	
	Sheep No. 5...	63.51	67.0	.14	84.18	43.00	69.85	88.15	
	Sheep No. 6...	59.04	62.1	.....	76.87	40.66	64.27	87.24	
	Average	61.95	65.3	.....	81.13	42.57	67.42	88.97	
212	Sheep No. 1...	73.75	76.5	.....	65.70	35.90	84.89	84.39	
	Sheep No. 5...	74.01	76.7	.....	71.40	51.17	81.19	88.36	
	Sheep No. 6...	76.45	79.0	11.50	75.41	57.75	82.76	87.74	
	Average	74.74	77.4	.....	70.84	48.27	82.95	86.83	
213	Sheep No. 2...	63.70	66.4	.....	75.99	42.98	67.16	88.10	
	Sheep No. 3...	66.84	69.6	.....	79.64	38.69	72.61	82.83	
	Average	65.27	68.0	.....	77.82	40.84	69.89	85.47	
214	Sheep No. 3...	70.10	72.6	.....	74.38	35.16	78.70	84.04	
215	{ Cow Bess	75.5	77.0	61.4	80.6	56.9	82.0	79.6	
	{ Cow Sully	76.9	77.8	63.9	81.2	58.9	82.3	80.3	
	Average	76.2	77.4	62.6	80.9	57.9	82.1	79.9	
216	Pig	80.1	80.3	5.4	81.4	48.7	86.6	^b 57.0	
217	Pig	74.0	.....	6.6	71.0	25.0	85.5	.....	By difference.
218	Pig	89.7	91.3	.....	89.9	48.7	93.9	77.6	
219	Pig	79.0	.....	4.1	76.0	48.0	88.0	.....	Do.
220	Pig	89.8	91.5	40.3	88.6	77.9	95.1	50.0	
221	Pig	77.8	70.7	30.1	74.4	39.1	75.0	78.1	Feces collected 4½ days.
222	Pig	53.7	.....	.....	75.8	26.9	56.0	63.4	

^a Omitted in average.^b Incorrect as reported.

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
MINNESOTA STATION—continued.							
223	Unground wheat (fed with cracked corn).....	<i>Per ct.</i> 10.95	<i>Per ct.</i> 2.20	<i>Per ct.</i> 14.18	<i>Per ct.</i> 2.83	<i>Per ct.</i> 67.67	<i>Per ct.</i> 2.17
224	Cracked wheat (fed with cracked corn).....	10.95	2.20	14.18	2.83	67.67	2.17
225	Potato (raw) (fed with 3 lbs. shorts), 10 lbs.....	75.45	1.00	2.50	.33	20.64	.08
226	Potato (cooked) (fed with shorts).....	75.45	1.00	2.50	.33	20.64	.08
227	Linseed meal (fed with 9 lbs. raw potatoes), 1½ lbs						
MISSISSIPPI STATION.							
228	Red-clover hay, 700 gm.....	14.16	8.23	17.36	23.89	33.94	2.42
229	<i>Vicia sativa</i> , green, 3,000 gm.....	78.18	1.70	4.38	5.68	9.51	.55
220	<i>Vicia villosa</i> , green, 3,000 gm.....	79.65	1.77	4.53	6.09	6.87	.78
231	Crab-grass hay, 700 gm	13.90	7.56	7.85	25.61	43.13	1.94
232	Johnson-grass hay.....		6.43	8.02	34.44	49.38	1.73
233	Cotton-seed meal, crab-grass hay (1:15).....		8.72	11.41	28.21	48.84	2.82

Nos. 223, 224: Snyder, Minnesota Sta. Bul. 36 (1894), p. 146.
 Nos. 225, 226: Snyder, Minnesota Sta. Bul. 42 (1895), pp. 89, 90.
 No. 227: Snyder, Minnesota Sta. Bul. 47 (1896), p. 20.
 Nos. 228-233: Hutchinson, Mississippi Sta. Rpt. 1895, pp. 82-84.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
223	Average with 2 pigs.	72.0	44.0	70.0	30.0	74.0	60.0	Grains fed in equal amounts. Digestibility of wheat alone calculated; assuming values for cracked corn taken from other work at station.
224	.....do.....	82.0	.....	50.0	80.0	60.0	83.0	70.0
225	Pig Duke, test 1.	97.4	.....	45.5	85.6	.....	97.7	.....
	Pig Prince, test 1.	96.2	.....	40.0	83.4	.....	97.5	.....
	Pig Duke, test 2.	96.4	.....	41.0	82.0	.....	98.5	.....
	Pig Prince, test 2.	98.1	.....	52.0	86.8	.....	98.6	.....
	Average.	97.0	.....	44.6	84.5	.....	98.1	.....
226	Average with 2 pigs.	95.0	40.0	82.0	97.6	Average of 2 trials.
227	Pig Prince, test 1.	77.0	10.0	83.0	12.0	82.0	80.0	Digestibility of linseed meal alone calculated by using coefficients for potatoes as in No. 225.
	Pig Duke, test 1.	79.0	.....	10.0	90.0	10.0	85.0	80.0
	Pig Prince, test 2.	76.0	.....	12.0	84.0	14.0	86.0	78.0
	Pig Duke, test 2.	78.0	.....	8.0	88.0	12.0	87.0	82.0
	Average.	77.5	.....	10.0	86.0	12.0	85.0	80.0
228	Sheep No. 1...	56.4	58.8	34.1	61.2	57.0	59.3	50.9	Ration fed 12 days. Feces collected 5 days.
	Sheep No. 2...	54.6	57.1	31.4	58.1	55.1	58.6	45.9	
	Average.	55.5	58.0	32.7	59.7	56.1	58.9	48.4	
229	Sheep No. 1...	61.6	65.4	17.2	71.2	45.8	74.8	57.2	
	Sheep No. 2...	62.1	65.9	17.5	71.7	42.5	77.4	60.0	
	Average.	61.8	65.7	17.3	71.4	44.2	76.1	58.6	
230	Sheep No. 1...	67.7	69.8	45.7	82.7	54.8	75.0	62.6	
	Sheep No. 2...	67.2	71.0	48.9	79.6	51.8	81.5	70.9	
	Average.	67.4	70.4	47.3	81.1	53.3	78.2	66.7	
231	Sheep No. 1...	57.23	59.6	32.2	55.7	58.1	58.9	52.0	
	Sheep No. 2...	55.70	58.2	29.0	54.6	61.3	57.1	49.8	
	Average.	56.50	58.9	30.8	55.1	59.7	58.0	50.9	
232	Sheep No. 1...	58.0	61.5	7.3	38.8	72.1	58.6	37.9	
	Sheep No. 2...	58.7	62.6	2.4	37.4	74.8	59.9	36.4	
	Average.	58.4	62.2	4.8	38.1	73.5	59.3	37.2	
233	Sheep No. 1...	57.1	23.9	61.3	62.4	59.4	48.0	
	Sheep No. 2...	55.4	.....	23.0	56.8	62.6	57.7	47.9
	Sheep No. 3...	58.7	.....	28.0	58.8	64.4	60.8	56.9
	Sheep No. 4...	64.8	.....	38.4	62.3	68.5	68.0	64.6
	Sheep No. 5...	60.1	.....	29.8	64.7	62.8	62.5	58.8
	Sheep No. 6...	62.1	.....	31.3	67.8	65.5	64.2	63.7
	Average.	59.7	.....	29.1	61.9	64.4	62.1	56.6

^a Assumed to have the same composition as the raw potato fed in No. 226.

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
MISSISSIPPI STATION—continued.							
234	<i>Vicia villosa</i> , green, 3,000 gm	<i>Per ct.</i> 81.92	<i>Per ct.</i> 1.84	<i>Per ct.</i> 4.21	<i>Per ct.</i> 5.29	<i>Per ct.</i> 6.05	<i>Per ct.</i> 0.78
235	Red-clover hay, steers Nos. 1 and 2, 20 lbs.; steer No. 3, 12 lbs.	11.92	7.13	15.62	26.18	35.84	3.32
236	Red-clover hay (same material as in No. 235), 800 gm.	11.92	7.13	15.62	26.18	35.84	3.32
237	<i>Vicia villosa</i> , green		8.85	26.58	29.21	31.05	4.31
238	<i>Vicia villosa</i> hay, 800 gm.....	11.28	7.21	23.79	24.81	25.06	3.59
NEW YORK STATE STATION.							
239	Fodder corn (partly air dry) (fed with 4 lbs. corn meal and 4 lbs. wheat bran), 30 lbs.	56.49	2.71	3.40	15.46	20.64	1.30
240	Corn silage (fed with 4 lbs. corn meal and 4 lbs. wheat bran), 70 lbs	84.58	.91	1.13	5.01	7.22	1.15
241	Soy-bean fodder (fed with 4 lbs. corn meal and 4 lbs. wheat bran), 20 lbs.	21.23	8.37	8.42	22.34	38.29	1.35
242	Hay (mixed grasses, largely timothy, early cut, poor quality) (fed with 4 lbs. corn meal and 4 lbs. wheat bran), 20 lbs.	15.22	4.94	5.04	31.28	41.36	2.06
243	Orchard-grass hay, cow Jem, 19.7 lbs.; cow Meg, 18.3 lbs	14.65	5.40	8.27	33.56	34.92	3.20
244	Corn meal (fed with 17 lbs. same orchard-grass hay as in No. 243), 8 lbs.	18.45	1.13	9.58	1.49	65.62	3.67
245	Alfalfa hay (cut in bloom), 24.3 lbs.....	15.02	6.69	13.81	27.28	34.97	2.26
246	Mixed hay (mostly clover and timothy), 15.9 lbs....	14.29	4.19	7.88	28.91	41.93	2.80
247	Mixed hay (same as in No. 245), 13.2 lbs	14.29	4.19	7.88	28.91	41.93	2.80
	Turnips, 8.7 lbs.....	91.26	.66	.99	1.16	5.60	.33
248	Mixed hay (same as in No. 245, 8.79 lbs. (fed with wheat bran 7 lbs., cotton-seed meal 3 lbs., corn meal 4 lbs.)	14.29	4.19	7.88	28.91	41.93	2.80
249	Mixed hay (same as in No. 245), 8.83 lbs. (fed with wheat bran (same as in No. 248) 2 lbs., corn meal (same as in No. 248) 10 lbs.	14.29	4.19	7.88	28.91	41.93	2.80

Nos. 234-238: Hutchinson, Mississippi Sta. Rpt., pp. 85-88.

Nos. 239-242: Sturtevant, New York State Sta. Rpt. 1884, pp. 45, 46.

Nos. 243, 244: Ladd, New York State Sta. Rpt. 1888, pp. 277-279.

Nos. 245-249: Ladd, Emery, and Wheeler, New York State Sta. Rpt. 1889, pp. 143-147.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	
234	Sheep No. 1...	78.5	81.1	55.4	88.5	72.9	83.0	81.2	
	Sheep No. 2...	73.9	76.7	49.5	85.8	68.6	77.0	79.5	
	Sheep No. 3...	75.8	76.8	47.3	85.5	65.7	80.1	76.9	
	Sheep No. 4...	76.6	79.5	50.6	86.7	70.3	82.1	81.6	
	Sheep No. 5...	72.4	75.6	44.6	85.2	64.1	78.8	75.6	
	Average..	75.4	77.9	49.5	86.3	68.3	80.2	78.9	
235	Steer No. 1....	61.0	64.7	20.5	61.5	55.4	69.5	70.1	
	Steer No. 2....	52.3	56.9	00.0	50.5	48.4	62.0	62.6	
	Steer No. 3....	55.9	59.4	16.2	56.9	54.0	63.8	65.2	
	Average..	56.4	60.3	12.2	56.3	52.6	65.1	65.9	
236	Sheep No. 1...	67.3	69.7	41.0	65.0	70.0	71.6	67.8	
	Sheep No. 2...	64.8	67.4	36.5	68.0	62.9	70.2	68.3	
	Sheep No. 3...	62.9	65.6	33.2	64.3	59.5	70.5	64.5	
	Sheep No. 4...	60.8	63.5	30.4	59.4	62.1	66.5	62.0	
	Sheep No. 5...	63.3	66.2	31.6	63.9	62.7	69.4	67.9	
	Average..	63.8	66.5	34.5	64.1	63.4	69.6	66.1	
237	Sheep No. 1...	66.5	69.0	41.6	79.4	59.7	69.0	66.3	Experiments Nos. 237 and 238 were to compare same fodder fed green and dried.
	Sheep No. 2...	68.9	72.1	36.3	81.8	62.5	73.3	69.1	
	Sheep No. 3...	65.9	69.2	33.0	79.8	59.4	69.6	65.7	
	Sheep No. 4...	66.8	70.0	35.4	80.6	62.1	68.1	70.4	
	Sheep No. 5...	72.2	74.7	46.6	83.7	65.5	73.2	74.5	
	Average..	68.1	71.0	38.5	81.0	61.8	70.6	69.2	
238	Sheep No. 1...	69.1	71.4	43.1	81.0	61.1	72.8	69.8	
	Sheep No. 2...	69.2	71.6	42.8	82.3	61.4	71.4	74.0	
	Sheep No. 3...	69.6	71.8	45.6	82.5	60.6	73.0	69.7	
	Sheep No. 4...	68.0	71.1	34.0	81.8	60.0	72.4	69.9	
	Sheep No. 5...	71.2	73.4	46.3	83.2	63.0	75.1	69.4	
	Sheep No. 6...	69.2	71.7	41.8	83.2	60.4	72.5	69.3	
	Average..	69.4	71.8	42.2	82.3	61.1	72.9	70.3	
239	Average with 2 cows.	62.5	49	67	61	73	In computing digestibility of fodder corn alone, meal and bran are assumed to have average digestibility. Feces saved only one day. Feeding period very short.
240	.....do.....	.....	68.1	.....	49	69	67	90
241	.....do.....	.....	72.7	.....	70	58	82	54
242	.....do.....	.....	52.9	.....	40	49	58	50
243	Cow Jem	60.0	61.5	.....	60.1	66.7	57.3	57.4
	Cow Meg	57.5	57.9	.....	60.9	60.0	55.3	55.4
	Average..	58.7	59.7	.....	60.5	63.3	56.3	56.4
244	Cow Jem	86.7	81.3	.....	56.9	.....	85.2	87
	Cow Meg	82.6	84.3	.....	59.7	.....	89.1	96.9
	Average..	84.6	82.8	.....	58.3	.....	87.1	91.9
245	Cow	59.4	60.7	.....	68.8	43.3	71.8	48.4
246	Cow	54.3	50.8	.....	46.9	45.8	55.5	50.0
247	Heifer	53.8	38.1	51.4	61.4	48.1	The authors conclude that the roots decreased the digestibility of protein of hay and increased that of carbohydrates. Experiments Nos. 248-250 were made to compare digestibility of a more or less nitrogenous ration. Large percentage of bran would lower digestibility of No. 248.
248	Steer Broad...	69.3	.....	.....	73.4	44.8	77.4	68.7
249	Steer Whitey.	75.0	.....	.....	67	50.9	83.5	70.3

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
NEW YORK STATE STATION—continued.							
250	Mixed hay (same as in No. 246), 21.5 lbs. Fed with wheat bran (same as in No. 248), 3.25 lbs.; corn meal (same as in No. 248), 2.2 lbs.; cottonseed meal (same as in No. 248), 2.2 lbs.; linseed meal, 1.1 lbs.; oats, 3.25 lbs.	<i>Per ct.</i> 14.29	<i>Per ct.</i> 4.19	<i>Per ct.</i> 7.88	<i>Per ct.</i> 28.91	<i>Per ct.</i> 41.93	<i>Per ct.</i> 2.80
251	Corn silage (dent corn, immature grain in milk stage), 957.5 oz.	82.58	.75	1.58	5.60	8.73	.70
252	Corn fodder (mature flint corn, field cured), 400 oz.	50.48	2.19	3.62	14.27	27.89	1.54
253	Corn silage (mature flint corn), 800 oz.	76.92	1.04	1.98	5.55	13.40	1.13
254	Timothy hay, 10 lbs.	10.46	.....	6.24	.....	.....	1.62
	Corn meal, 6 lbs.	14.55	.....	8.62	.....	.....	4.22
	Ground oats, 5 lbs.	11.89	.....	12.24	.....	.....	4.20
	Wheat gluten, 1 lb.	6.48	.....	72.9	.....	.....	.87
255	Timothy hay (same material as in No. 254, with fat extracted), 10 lbs.	8.00	.....	5.94	.....	.....	.71
	Corn meal (fat extracted), 6 lbs.	11.23	.....	9.25	.....	.....	.38
	Ground oats (fat extracted), 5 lbs.	8.46	.....	13.38	.....	.....	.65
	Wheat gluten (fat extracted), 1 lb.	5.09	.....	74.5	.....	.....	.05
256	Timothy hay (fat extracted), 10 lbs.	8.02	.....	6.24	.....	.....	.75
	Corn meal (fat extracted), 7.5 lbs.	10.80	.....	9.19	.....	.....	.38
	Ground oats (fat extracted), 5 lbs.	8.22	.....	13.20	.....	.....	.61
257	Timothy hay (same material as in No. 256, fat extracted), 6½ lbs.	8.02	.....	6.24	.....	.....	.75
	Corn meal (fat extracted), 5 lbs.	10.73	.....	9.37	.....	.....	.41
	Ground oats (fat extracted), 3.3 lbs.	9.16	.....	13.71	.....	.....	.66
258	Corn stover (entire stalk and husks, finely ground, well cured, bright), 600 gm.	19.81	4.55	4.19	26.02	42.87	2.56
259	Corn stover "new product" (without pith, made from same material as in No. 258).	12.21	4.58	4.60	28.55	47.35	2.71
260	Timothy hay, 100 gm.	12.63	4.09	5.49	29.18	45.33	3.28
	Corn silage, 800 gm.	77.26	1.07	1.81	5.56	12.41	1.82
	Ground oats, 100 gm.	10.57	2.95	12.48	10.54	58.37	5.09
	Ground peas, 120 gm.	11.35	2.59	23.39	5.20	56.26	1.21
261	Timothy hay (same material as in No. 260), 50 gm.	12.63	4.09	5.49	29.18	45.33	3.28
	Corn silage (same material as in No. 260), 400 gm.	76.63	1.18	1.90	5.76	13.76	1.87
	Ground oats (same material as in No. 260), 50 gm.	10.57	2.95	12.48	10.54	58.37	5.09
	Ground peas (same material as in No. 260), 60 gm.	11.35	2.59	23.39	5.20	56.26	1.21
262	Timothy hay, 300 gm.	12.63	4.09	5.49	29.18	45.33	3.28
	Silage, 500 gm.	75.56	1.24	2.13	5.57	13.68	1.83
	Malt sprouts, 40 gm.	9.58	5.34	26.18	11.05	44.52	3.33
	Brewers' grains, 60 gm.	7.68	2.82	27.59	13.01	40.46	8.44
	Gluten feed, 60 gm.	10.29	3.29	24.95	5.28	52.97	3.22
263	Timothy hay (same material as in No. 262), 150 gm.	12.63	4.09	5.49	29.18	45.33	3.28
	Silage (same material as in No. 262), 250 gm.	77.20	1.03	1.82	5.46	12.67	1.87
	Malt sprouts (same material as in No. 262), 20 gm.	9.58	5.34	26.18	11.05	44.52	3.33
	Brewers' grains (same material as in No. 262), 30 gm.	7.68	2.82	27.59	13.01	40.46	8.44
	Gluten feed (same material as in No. 262), 30 gm.	10.29	3.29	24.95	5.28	52.97	3.22

No. 250: Ladd, Emery and Wheeler, New York State Sta. Rpt. 1889, p. 148.

Nos. 251-253: Ladd, Jour. Amer. Chem. Soc., 12 (1889), p. 8.

Nos. 254-257: Jordan and Jenter, New York State Sta. Bul. 132 (1897), p. 473.

Nos. 258-263: Jordan and Jenter, New York State Sta. Bul. 141 (1897), pp. 699-709.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
250	Cow Nellie....	<i>Per ct.</i> 62.7	<i>Per ct.</i>	<i>Per ct.</i> 32.9	<i>Per ct.</i> 65.2	<i>Per ct.</i> 44.3	<i>Per ct.</i> 67.4	<i>Per ct.</i> 70.8	In calculating the digestibility of mixed hay alone average values α were assumed for the digestibility of grain.
251	Heifer No. 1 ..	66.4	.....	.....	53.1	69.3	70.0	83.6
	Heifer No. 2 ..	65.6	.....	.....	52.2	70.3	68.7	83.6
	Average ..	66.0	.....	.....	52.6	69.8	69.3	83.6
252	Heifer No. 1 ..	61.6	.....	.....	38.0	69.7	61.8	73.7
	Heifer No. 2 ..	64.3	.....	.....	37.8	73.4	65.1	76.4
	Average ..	62.9	.....	.....	37.9	71.5	63.4	75.0
253	Heifer No. 1 ..	68.6	.....	.....	57.0	68.8	70.7	86.4
	Heifer No. 2 ..	70.8	.....	.....	60.4	69.1	73.1	86.5
	Average ..	69.7	.....	.....	58.7	68.9	71.9	86.4
254	Cow	68.1	.....	28.9	66.0	.....	70.1	70.7
255	Cow	63.5	.....	27.3	59.4	.....	67.9	45.6
256	Cow	60.1	.....	21.8	44.9	.....	63.0	52.6
257	Cow	55.6	.....	16.9	39.6	.....	59.1	51.4
258	Sheep No. 1...	53.9	56.7	7.7	10.7	63.2	56.5	69.0	
	Sheep No. 2...	54.6	58.1	.....	17.1	63.5	57.6	77.4
	Sheep No. 3...	52.7	56.3	.....	16.7	63.8	54.5	74.2
	Sheep No. 4...	52.9	55.8	5.1	22.0	66.9	58.8	76.3	
	Average ..	53.5	56.7	.....	16.6	64.3	56.8	76.2
259	Sheep No. 1...	53.6	55.3	21.8	16.5	59.6	55.7	69.8	
	Sheep No. 3...	55.1	57.2	15.6	28.1	63.1	55.5	75.3	
	Sheep No. 4...	56.7	59.0	14.7	16.9	65.5	58.5	70.9	
	Average ..	55.1	57.2	17.3	20.5	62.7	56.6	72.0	
260	Sheep No. 1...	69.5	71.8	13.1	70.7	59.0	75.7	79.3	
	Sheep No. 2...	69.3	71.7	13.8	71.0	58.9	75.2	81.8	
	Average ..	69.4	71.7	13.4	70.8	59.0	75.4	80.5	
261	Sheep No. 3...	75.7	77.2	40.6	76.0	70.3	79.4	82.1	
	Sheep No. 4...	73.1	75.4	20.8	75.2	64.2	78.6	82.2	
	Average ..	74.4	76.3	30.7	75.6	67.2	79.0	82.1	
262	Sheep No. 1...	62.2	64.7	9.7	69.7	59.0	65.2	73.9	
	Sheep No. 2...	61.1	63.8	4.1	60.9	61.1	64.9	73.8	
	Average ..	61.6	64.2	6.9	65.3	60.1	65.0	73.8	
263	Sheep No. 3...	66.9	68.7	27.6	69.8	64.8	69.5	76.5	
	Sheep No. 4...	65.1	67.4	15.5	71.7	59.9	69.0	75.7	
	Average ..	66.0	68.0	21.5	71.2	62.3	69.2	76.1	

α The coefficients of digestibility used in No. 248 were dry matter, 76.0; protein, 74.8; fiber, 48.6; nitrogen free extract, 87.0; fat, 75.4. In No. 249 dry matter, 91.0; protein, 78.2; fiber, 91.3; nitrogen free extract, 95.0; fat, 81.6. In No. 250, dry matter, 78.2; protein, 79.1; fiber, 32.6; nitrogen free extract, 82.4; fat, 91.8.

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
NORTH CAROLINA STATION.							
264	Cotton-seed hulls, 21 lbs.....	<i>Per ct.</i> 11.44	<i>Per ct.</i> 2.93	<i>Per ct.</i> 4.37	<i>Per ct.</i> 40.32	<i>Per ct.</i> 35.48	<i>Per ct.</i> 5.41
265	Cotton-seed feed (hulls and meal 7:1), 24 lbs. {Hulls. Meal .	11.44 6.93	2.93 6.85	4.37 40.06	40.32 7.93	35.48 28.05	5.41 9.39
266	Dry corn fodder, "pulled" (leaves of corn). Sheep fed 807.4 gm., goat fed 907.2 gm.	10.72	7.21	9.61	22.87	45.65	3.95
267	Crimson clover hay. Sheep fed 403.7 gm., goat fed 811.9 gm.	10.85	8.2	16.1	25.45	37.15	2.29
268	Cowpea vine hay (overripe, leaves fallen). Sheep fed 562.3 gm., goat fed 816.7 gm.	11.26	4.76	12.64	29.58	40.44	1.33
269	Soy-bean silage, 2,761.6 gm.....	74.2	11.02	15.71	37.65	26.96	8.66
270	Corn silage, 19.7 lbs.....	70.27	4.12	7.52	25.01	60.88	2.47
271	Cotton seed, raw (fed with 12 lbs. same corn silage as in No. 270), 4.5 lbs.	17.51	3.52	17.56	24.61	30.82	23.49
272	Cotton seed, roasted (fed with 12 lbs. same corn silage as in No. 270), 6 lbs.	9.32	2.50	17.75	26.51	28.44	24.80
273	Cotton-seed hulls. Cow fed 9 lbs., two goats fed 3 lbs.	16.18	2.01	4.02	37.95	35.76	2.06
274	Soy-bean hay (cut when some mature, some in bloom; barn-cured), goat fed 1,200 gm., cow fed 16 lbs.	17.38	5.58	13.65	22.46	29.58	2.24
275	Cat-tail millet (<i>Pennisetum spicatum</i>) (cut when panicles just appearing), 900 gm.	11.04	8.1	11.56	26.82	40.2	2.28
276	Johnson-grass hay (cut when panicles forming for bloom. Wet in dull weather), 3 lbs.	12.31	5.15	5.77	30.3	44.8	1.67
277	Sorghum fodder (pulled from Black African and Collier canes), goat fed 1,200 gm., cow fed 18 lbs.	12.43	4.56	9.60	23.94	44.92	4.54
278	Peanut vine hay (containing some puffs and some nuts with meats) (good), 900 gm.	10.44	6.80	10.32	25.96	42.92	3.57
279	Sorghum bagasse, 900 gm.....	11.25	2.88	3.43	30.53	50.41	1.44
280	Cotton-seed meal (fed with 900 gm. same sorghum bagasse as in No. 279), 225 gm.	7.03	6.27	15.1	26.73	38.48	2.01
281	Crimson clover hay (same material as in No. 267, but one year older), goat fed 2.47 lbs., cow fed 15.07 lbs.	11.46	7.08	17.00	30.19	43.46	2.27

Nos. 264, 265: Emery and Kilgore, North Carolina Sta. Bul. 80c (1891), pp. 7-9.

Nos. 266-273: Emery and Kilgore, North Carolina Sta. Bul. 87d (1892), pp. 7-35.

Nos. 274-281: Emery and Kilgore, North Carolina Sta. Bul. 97 (1894), pp. 102-112.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
264	Cow	<i>Per ct.</i> 35.9	<i>Per ct.</i> 36.2	<i>Per ct.</i> 27.1	<i>Per ct.</i> 24.6	<i>Per ct.</i> 27.4	<i>Per ct.</i> 40.3	<i>Per ct.</i> 80.6	
265	Cow	44.9	45.3	34.2	44.3	33.9	51.4	81.0	
266	Sheep, horned.	55.5	60.3	13.5	55.9	60.6	58.9	63.0	
	Goat, black ...	54.8	58.4	15.7	68.8	54.3	57.1	65.4	
	Average .	55.1	59.4	14.6	62.3	57.4	58.0	64.2	
267	Sheep, hornless	62.2	66.1	53.5	69.1	48.7	71.5	48.8	
	Goat, gray	59.4	60.0	53.4	68.5	42.6	69.3	43.7	
	Average .	60.8	63.1	53.5	68.8	45.6	70.4	46.2	
268	Sheep, horned.	59.2	60.4	45.1	64.5	42.9	70.7	50.0	
	Goat, black ...	59.3	59.6	53.9	65.1	41.2	70.6	53.7	
	Average .	59.2	60.0	49.5	64.8	42.0	70.6	51.8	
269	Goat, black ...	52.3	52.9	47.1	71.3	47.1	45.9	66.4	
	Goat, gray	65.8	65.7	66.3	80.2	62.5	58.2	77.3	
	Average .	59.0	59.3	56.7	75.7	54.8	52.0	71.9	
270	Cow, brindle..	53.2	54.3	26.9	34.4	43.2	60.5	66.0	
271	Cow, 1st trial..	69.3	70.1	48.3	70.0	85.9	49.2	87.0	Same cow as in No. 270.
	Cow, 2d trial..	62.9	61.5	38.3	65.7	65.1	50.0	87.2	
	Average .	66.1	65.8	43.3	67.8	75.5	49.6	87.1	
272	Heifer, spotted	58.4	59.2	.....	49.6	69.3	53.0	74.9	
	Steer No. 3....	53.4	54.4	.....	44.3	62.5	49.8	68.5	
	Average .	55.9	56.8	.....	46.9	65.9	51.4	71.7	
273	Cow, brindle..	44.97	45.5	21.52	.....	47.28	45.68	89.33	
	Goat, gray ...	37.38	37.9	21.90	.....	47.25	28.01	88.98	
	Goat, black ...	39.82	41.7	19.87	6.75	43.14	36.88	85.13	
274	Goat, black ...	61.97	63.7	.....	70.07	62.14	71.47	18.75	
	Cow Spot	62.75	64.0	47.41	72.10	59.54	66.15	39.69	
	Average .	62.36	63.9	.....	71.08	60.8	68.8	29.2	
275	Goat, 1st trial.	63.55	62.9	69.35	64.58	68.36	60.0	44.66	Gray goat.
	Goat, 2d trial .	61.06	60.3	67.45	60.57	64.66	58.27	47.55	
	Average .	62.3	61.6	68.4	62.57	66.51	59.13	46.10	
276	Goat, black ...	54.52	54.4	56.1	44.71	57.83	54.37	39.48	
277	Goat, black ...	59.80	62.0	17.64	59.46	64.88	62.51	47.14	
	Cow Spot	66.29	67.6	41.31	62.20	75.88	66.55	46.25	
	Average .	63.09	64.8	29.47	60.83	70.38	64.53	46.69	
278	Goat, gray	59.46	62.5	21.24	63.03	51.20	69.34	62.12	
	Goat, black ...	60.24	63.6	19.65	63.59	52.61	69.67	69.77	
	Average .	59.85	63.1	20.44	63.31	51.90	69.50	65.94	
279	Goat, gray	60.60	62.2	13.35	13.65	63.75	64.84	46.42	
280	Goat, gray	65.0	69.1	3.01	85.48	.....	55.06	92.01	The bagasse was not well eaten.
281	Goat, black ...	65.44	65.3	67.37	69.97	58.12	69.66	51.44	
	Cow Miss Haley.	56.79	57.2	51.47	66.49	44.69	63.44	35.13	
	Average .	61.11	61.3	59.42	68.23	51.40	66.55	43.28	

^a Correct figures given in North Carolina Sta. Bul. 87d, p. 34.

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
NORTH CAROLINA STATION—continued.							
282	Cotton-seed meal (same material as in No. 279), cow fed (with 14.43 lbs. same hay as in No. 281) 2½ lbs., goat fed (with 27.81 lbs. same hay as in No. 281), 9 oz.	<i>Per ct.</i> 7.03	<i>Per ct.</i> 6.27	<i>Per ct.</i> 15.1	<i>Per ct.</i> 26.73	<i>Per ct.</i> 38.48	<i>Per ct.</i> 2.01
283	Cotton-seed meal (same material as in No. 289) (in first trial fed with 15.74 lbs. same hay as in No. 281; in second trial with 15.88 lbs.), 4½ lbs.	7.03	6.27	15.1	26.73	38.48	2.01
284	Cotton-seed hulls, steer Yellow 2 (fed with 6 lbs. same cotton-seed meal used in No. 282) 18 lbs.; steer Lophorn (fed with 7½ lbs. same cotton-seed meal as in No. 282), 21 lbs.	12.35	1.65	4.22	43.48	35.56	2.74
285	Cotton-seed feed (hulls and meal, 3:1), steer Yellow 2 fed 24 lbs.; steer Lophorn fed 28½ lbs. hulls and meal.	12.35 7.03	1.65 6.27	4.22 15.1	43.48 26.73	35.56 38.48	2.74 2.01
286	Cotton-seed hulls, steer Lophorn (fed with 10½ lbs. same cotton-seed meal as in No. 282), 21 lbs. steer Yellow (fed with 9 lbs. same cotton-seed meal as in No. 282), 18 lbs.	12.35	1.65	4.22	43.48	35.56	2.74
287	Cotton-seed feed 2:1 (same material as in Nos. 282 and 286), steer Lophorn fed 31½ lbs. steer Yellow 2 fed 27 lbs.	12.35 7.03	1.65 6.27	4.22 15.1	43.48 26.73	35.56 38.48	2.74 2.01
288	Corn meal, 208.9 gm.....	12.68	1.32	8.79	1.55	71.25	4.39
289	Corn meal (same material as in No. 288, fed to goat, gray, with 708.8 gm. same crimson clover hay as in No. 281, and to goat, black, with 549.3 gm.), 300 gm.	12.68	1.32	8.79	1.55	71.25	4.39
290	Corn-and-cob meal, 800.4 gm.....	12.43	1.23	7.91	8.00	67.1	3.32
291	Corn-cobs (fed with 652.3 gm. corn meal), 148.1 gm..	11.35	.....	.....	.....	.....	.....
292	Corn-and-cob meal (same material as in No. 290; fed to black goat with 539.3 gm. same crimson clover hay as in No. 281, and to gray goat with 406 gm.), 300 gm.	12.43	1.23	7.91	8.00	67.1	3.32
293	Cotton-seed hulls, steer No. 1 (fed with 9.3 lbs. cotton-seed meal), 17.2 lbs.; steer No. 2 (fed with 8.13 lbs. cotton-seed meal), 15.6 lbs.	11.71	2.48	5.44	44.18	31.40	4.81
294	Cotton-seed feed, meal and hulls, 2:1 (same hulls as in No. 293, 26.5 lbs.) 23½ lbs.	8.32	6.38	43.27	6.17	26.44	9.42
295	Cotton-seed hulls, steer No. 3 (fed with 95.9 lbs. cotton-seed meal), 14.1 lbs.; steer No. 4 (fed with 8.26 lbs. cotton-seed meal), 12.4 lbs.	11.71	2.48	5.44	44.18	31.40	4.81
296	Cotton-seed feed (meal and hulls) 1½:1 (same hulls as in No. 295); steer No. 3 fed 23.7 lbs.; steer No. 4 fed 20.46 lbs.	8.32	6.38	43.27	6.17	26.44	9.42

Nos. 282-292: Emery and Kilgore, North Carolina Sta. Bul. 97 (1894), pp. 114-132.
 Nos. 293-296: Emery and Kilgore, North Carolina Sta. Bul. 118 (1895), pp. 240-242.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
282	Cow Miss Haley.	66.82	69.9	19.77	88.12	46.83	43.84	92.37	Cow, Spot. In calculating the digestibility of cotton-seed hulls alone, the digestibility of cotton seed was assumed from average figures. These were dry matter 73.3; organic matter, 76.4; ash, 31.5; protein, 87.8; fiber, 46.4; nitrogen-free extract, 61.5, and fat, 89.7 per cent.
	Goat, gray....	83.95	87.0	37.98	96.12	100.00	71.02	91.55	
283	Cow, 1st trial.	67.46	69.5	36.5	82.87	9.64	56.58	87.91	
	Cow, 2d trial..	74.86	77.7	31.77	84.19	29.41	74.60	86.85	
	Average.	71.6	73.6	34.1	83.5	19.5	60.5	90.1	
284	Steer Yellow 2	48.46	48.9	25.79	.....	49.79	53.60	83.04
	Steer Lophorn	43.30	43.5	34.89	.....	43.39	48.88	75.74
	Average.	45.88	46.2	28.24	.....	46.5	51.2	79.39
285	Steer Yellow 2	54.95	57.9	28.87	60.98	49.63	55.31	86.96	
	Steer Lophorn	51.54	52.2	33.01	62.33	43.55	51.76	84.20	
	Average.	53.25	55.1	30.94	61.65	46.59	53.54	85.58	
286	Steer Lophorn	42.66	42.9	28.40	.....	42.93	50.77	72.79
	Steer Yellow 2, 1st trial.	40.61	41.3	5.77	.....	52.98	37.12	50.64
	Steer Yellow 2, 2d trial.	45.64	45.9	31.77	.....	46.56	51.88	82.16
	Average.	41.1	44.5	25.3	.....	47.1	48.4	72.8
287	Steer Lophorn	52.04	52.7	30.27	61.55	43.12	53.55	83.68	
	Steer Yellow 2, 1st trial.	51.86	52.8	22.08	63.18	52.53	44.23	77.22	
	Steer Yellow 2, 2d trial.	55.23	56.5	31.59	66.16	46.54	54.70	87.30	
	Average.	52.42	53.7	28.55	63.11	46.33	51.51	82.97	
288	Goat, gray....	86.89	87.7	.....	66.89	.....	94.22	80.47
289	Goat, gray....	98.00	98.1	91.96	77.34	34.46	100.00	98.20	
	Goat, black...	86.70	88.0	.....	39.86	.....	100.00	97.09
	Average.	92.35	93.1	.....	58.00	.....	100.00	97.65
290	Goat.....	78.73	79.8	.....	65.21	47.67	85.84	84.59
291	Goat.....	43.34	.....	.....	21.13	49.7	36.48	.....
292	Goat, black...	74.28	75.4	.....	48.51	1.59	88.09	84.79
	Goat, gray....	82.84	84.0	.....	43.34	85.52	90.60	82.20
	Average.	78.6	79.7	.....	45.93	43.55	89.35	83.50
293	Steer No. 1....	46.26	46.2	49.23	22.54	45.12	53.89	82.48	
	Steer No. 2....	43.85	43.8	46.05	64.02	47.24	49.77	74.26	
	Average.	45.06	45.0	47.64	43.48	46.18	51.83	78.36	
294	Steer No. 1....	55.53	.....	39.20	65.16	45.21	56.15	86.04
	Steer No. 2....	54.58	.....	37.37	62.88	47.18	53.49	82.36
	Average.	55.06	.....	38.29	64.02	46.20	54.82	84.20
295	Steer No. 3....	45.50	45.4	49.54	51.59	45.63	54.20	93.76	
	Steer No. 4....	43.03	43.5	26.05	48.31	45.72	52.81	65.53	
	Average.	44.27	44.5	37.80	49.95	45.68	53.51	79.65	
296	Steer No. 3....	56.68	.....	38.29	64.61	49.70	56.78	91.49
	Steer No. 4....	55.39	.....	29.50	65.56	45.78	55.93	79.18
	Average.	56.04	.....	33.90	65.09	47.74	56.36	85.34

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
NORTH CAROLINA STATION—continued.							
297	Timothy hay (old hay), 2½ lbs	<i>Per ct.</i> 9.35	<i>Per ct.</i> 3.50	<i>Per ct.</i> 5.13	<i>Per ct.</i> 29.41	<i>Per ct.</i> 50.69	<i>Per ct.</i> 1.91
298	Timothy hay (same material as in No. 297), 36 oz... Cotton-seed meal, 2½ oz	9.35 9.76	3.50 6.25	5.13 43.12	29.41 4.96	50.69 26.44	1.91 9.46
299	Timothy hay (same material as in No. 297, fed with with 2½ oz. cotton-seed meal), 36 oz.	9.35	3.50	5.13	29.41	50.69	1.91
300	Timothy hay, 33 oz..... Cotton-seed meal (same material as in No. 298), 2½ oz.	10.88 9.76	4.06 6.25	5.34 43.12	30.76 4.96	47.04 26.44	1.91 9.46
301	Timothy hay (same material as in No. 300, fed with 2½ oz. cotton-seed meal), 33 oz.	10.88	4.06	5.34	30.76	47.04	1.91
302	Timothy hay, 32 oz..... Cotton-seed meal, 4 oz.....	10.88 9.76	4.06 6.25	5.34 43.12	30.76 4.96	47.04 26.44	1.91 9.46
303	Timothy hay (fed with 4 oz. cotton-seed meal), 32 oz.	10.88	4.06	5.34	30.76	47.04	1.91
304	Timothy hay, 26 oz..... Cotton-seed meal, 6½ oz	10.88 9.76	4.06 6.25	5.34 43.12	30.76 4.96	47.04 26.44	1.91 9.46
305	Timothy hay (fed with 6½ oz. cotton-seed meal), 26 oz.	10.88	4.06	5.34	30.76	47.04	1.91
306	Timothy hay, 20 oz..... Cotton-seed meal, 10 oz.....	10.88 9.76	4.06 6.25	5.34 43.12	30.76 4.96	47.04 26.44	1.91 9.46
307	Timothy hay (fed with 10 oz. cotton-seed meal), 20 oz.	10.88	4.06	5.34	30.76	47.04	1.91
308	Timothy hay, 18 oz	10.88	4.06	5.34	30.76	47.04	1.91
	Cotton-seed meal, 18 oz	9.76	6.25	43.12	4.96	26.44	9.46
309	Timothy hay (fed with 18 oz. cotton-seed meal), 18 oz	10.88	4.06	5.34	30.76	47.04	1.91
310	Timothy hay, 36 oz.....	10.88	4.06	5.34	30.76	47.04	1.91

Nos. 297-310: Emery and Kilgore, North Carolina Sta. Bul. 148 (1898), pp. 284-296.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.	
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.		
297	Sheep No. 1...	54.12	57.8	22.56	34.43	52.30	60.34	22.40	Feces collected 10 days.	
	Sheep No. 2...	48.35	49.3	23.46	32.53	43.60	55.82	12.72		
	Average.	51.2	53.6	23.00	33.50	48.0	58.1	17.60		
298	Sheep No. 1...	57.04	58.2	28.54	52.51	57.97	62.95	49.05		In this and experiment No. 299 the effect is shown of increasing amounts of cotton-seed meal in the ration. Digestibility of hay calculated by assuming same digestibility of cotton-seed meal as in No. 287.
	Sheep No. 2...	53.59	55.1	17.08	48.88	45.85	61.31	51.09		
	Average.	55.30	56.7	22.8	50.7	48.9	62.1	50.1		
299	Sheep No. 1...	55.97	57.0	28.16	32.44	52.04	63.0	35.74		
	Sheep No. 2...	52.13	53.8	16.63	24.28	45.84	61.30	36.69		
	Average.	54.1	55.4	22.4	28.4	48.9	62.2	36.2		
300	Sheep No. 1...	56.70	58.0	30.66	58.19	51.02	62.01	64.78		
	Sheep No. 2...	50.54	52.0	11.78	51.65	43.33	57.81	63.39		
	Average.	53.6	55.0	21.2	55.9	47.2	59.9	64.1		
301	Sheep No. 1...	55.29	56.5	30.55	37.97	51.09	62.03	54.37		
	Sheep No. 2...	48.60	50.5	9.32	26.99	43.29	57.63	52.42		
	Average.	52.0	53.0	19.9	32.5	47.2	59.8	53.4		
302	Sheep No. 1...	50.67	52.5	13.40	56.10	43.73	56.68	62.29		
	Sheep No. 2...	47.13	49.1	7.35	53.77	39.74	53.29	60.66		
	Average.	48.9	50.8	10.4	54.9	41.7	55.0	61.5		
303	Sheep No. 1...	47.78	49.6	9.87	23.39	43.68	56.34	45.11		
	Sheep No. 2...	43.73	45.7	2.55	18.17	39.60	52.70	42.12		
	Average.	45.8	47.7	6.2	20.8	41.6	54.5	43.6		
304	Sheep No. 1...	51.58	54.4	.....	59.80	43.04	57.67	79.19	
	Sheep No. 2...	51.37	53.8	.....	61.37	42.43	56.93	70.26	
	Average.	51.5	54.1	.....	60.6	42.7	57.3	74.7	
305	Sheep No. 1...	46.16	48.8	.....	3.80	42.91	57.14	66.28	
	Sheep No. 2...	45.52	47.7	.....	4.06	42.25	56.25	44.51	
	Average.	45.8	48.3	.....	3.9	42.6	56.7	55.4	
306	Sheep No. 1...	61.93	64.2	21.09	72.80	44.21	69.17	85.26		
	Sheep No. 2...	56.27	59.0	8.26	70.04	34.68	64.67	84.48		
	Average.	59.1	61.6	14.7	71.4	39.5	66.9	84.9		
307	Sheep No. 1...	56.24	58.3	13.22	12.68	44.04	71.3	74.33		
	Sheep No. 2...	47.73	50.1	.....	.....	33.76	65.55	71.65
	Average.	52.0	54.2	.....	.....	38.9	68.4	73.0
308	Sheep No. 1...	62.75	64.8	20.22	75.98	26.89	71.91	89.35		
	Sheep No. 2...	60.06	62.1	26.61	75.23	28.79	65.67	87.82		
	Average.	61.4	63.5	27.4	75.6	27.8	68.8	89.0		
309	Sheep No. 1...	51.7	51.1	22.99	.....	23.69	77.89	87.50	
	Sheep No. 2...	46.73	48.1	18.67	.....	25.99	68.00	78.57	
	Average.	49.24	49.6	20.83	.....	24.84	72.95	83.03	
310	Sheep No. 1...	58.03	59.2	33.05	39.17	46.83	69.05	53.09		
	Sheep No. 2...	50.34	51.6	24.43	30.93	37.60	63.08	45.27		
	Average.	54.2	55.4	28.7	35.1	42.2	66.1	49.2		

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
NORTH CAROLINA STATION—continued.							
311	Crab-grass hay, sheep No. 1, 32 oz.; sheep No. 2, 36 oz.; sheep Nos. 3 and 4, 26 oz.	<i>Per ct.</i> 13.02	<i>Per ct.</i> 5.58	<i>Per ct.</i> 4.35	<i>Per ct.</i> 36.65	<i>Per ct.</i> 39.50	<i>Per ct.</i> 1.90
OREGON STATION.							
312	Whole corn silage (dent, overripe, slightly frosted, silage first class), 1,589 gm.	73.72	1.97	1.79	7.47	13.63	1.60
313	Whole corn silage, cooked (same material as in No. 312), 1,226 gm.	61.6	2.95	2.69	11.20	20.14	2.40
314	Cheat hay (<i>Bromus secalinus</i>), 16 lbs.....	7.00	9.09	6.06	31.80	44.1	1.95
315	Clover hay, 15 lbs.....	4.27	8.50	14.84	28.83	40.20	3.35
PENNSYLVANIA STATION.							
316	Corn fodder (air dry, 10 per cent loss in drying), steers Nos. 1, 2, 3, and 4, fed 9.2, 5.4, 9.4, and 11 lbs., respectively.	9.58	5.05	4.61	29.45	49.99	1.05
	Corn meal, steers Nos. 1, 2, 3, and 4, fed 11, 9.5, 11, and 11 lbs., respectively.	10.05	1.60	8.53	2.05	73.20	4.57
317	Corn fodder (air dry, 15.55 per cent loss in drying), steer No. 1 fed 7.45 lbs.; steer No. 4 fed 8 lbs.	6.55	5.80	6.53	29.20	50.27	1.65
	Corn meal, steers Nos. 1 and 4 each fed 7 lbs.....	5.70	1.55	8.87	2.80	77.15	3.93
	Cotton-seed meal, steers Nos. 1 and 4 each fed 3.50 lbs.	8.70	6.85	40.18	5.18	26.69	12.40
318	Corn fodder, steer No. 2 fed 3.6 lbs; steer No. 3 fed 5.65 lbs.	6.55	5.80	6.53	29.20	50.27	1.65
	Corn meal, steers Nos. 2 and 3 each fed 14 lbs.....	5.70	1.55	8.87	2.80	77.15	3.93
319	Hay, 11 lbs.....	6.75	4.95	5.82	28.37	52.98	1.13
	Corn meal, 7 lbs.....	9.45	1.50	10.44	2.00	72.31	4.30
	Cotton seed meal, 3.5 lbs.....	8.70	6.85	40.18	5.18	26.69	12.40
320	Hay, steer No. 2 fed 3.4 lbs.; steer No. 3 fed 9.6 lbs.	6.75	4.95	5.82	28.37	52.98	1.13
	Corn meal, steer No. 2 fed 13.2 lbs.; steer No. 3 fed 14 lbs.	9.45	1.50	10.44	2.00	72.31	4.30
321	Corn stover (fine, clean, no mold; in barn 6 weeks before using). Steer No. 1, 11.4 lbs. in period No. 1; 11.7 lbs. in period No. 2. Steer No. 2, 11.3 lbs. in period No. 1; 11.1 lbs. in period No. 2.	15.53	6.36	5.76	25.87	44.49	1.99
322	Uncured pasture grass (as cut), 79.4 lbs.....	74.49	2.71	5.45	6.67	10.57	1.12

No. 311: Emery and Kilgore, North Carolina Sta. Bul. 148 (1898), p. 292.
 Nos. 312, 313: Irish, Oregon Sta. Bul. 6 (1890), pp. 6, 7.
 Nos. 314, 315: Shaw and French, Oregon Sta. Bul. 47 (1897), p. 7.
 Nos. 316-320: Frear, Pennsylvania Sta. Rpt. 1886, pp. 199-201.
 No. 321: Armsby and Frear, Pennsylvania Sta. Rpt. 1887, p. 148.
 No. 322: Armsby and Caldwell, Pennsylvania Sta. Rpt. 1888, p. 64.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	
311	Sheep No. 1...	53.45	54.3	42.62	.....	63.74	51.83	42.21	
	Sheep No. 2...	51.43	52.4	38.57	.50	59.37	52.13	45.33	
	Sheep No. 3...	47.46	47.5	46.73	6.89	50.19	49.63	49.78	
	Sheep No. 4...	50.26	50.3	49.74	.....	60.10	50.35	32.98	
	Average.	50.7	51.1	44.4	.....	58.4	51.0	42.6	
312	Sheep.....	63.6	67.8	32.0	45.4	59.2	71.1	86.11	Amount of dry matter fed was too small.
313	.....do.....	68.6	73.7	31.0	39.4	70.3	74.7	87.2	Do.
314	Steer.....	45.0	47.3	23.0	42.0	46.0	49.0	32.0	Feces collected 6 days.
315	.....do.....	62	64.8	37	63	59	71	55	Do.
316	Steer No. 1...	76.1	.....	11.9	56.8	69.5	82.7	79.8	Feces collected 5 days.
	Steer No. 2...	81.0	.....	25.8	63.8	77.0	85.9	86.0	
	Steer No. 3...	74.1	.....	9.7	55.3	72.0	80.2	66.5	
	Steer No. 4...	74.0	.....	.6	58.5	74.1	79.7	73.1	
	Average.	76.3	.....	.....	58.6	73.1	82.1	76.3	
317	Steer No. 1...	72.2	.....	18.7	72.5	60.6	79.3	71.0	Do.
	Steer No. 4...	74.8	.....	31.7	74.8	68.0	78.8	88.0	
	Average.	73.5	.....	25.2	73.6	64.3	79.0	79.5	
318	Steer No. 2...	76.8	.....	13.5	60.9	68.9	82.3	68.3	Do.
	Steer No. 3...	76.5	.....	14.8	61.9	56.5	84.1	66.2	
	Average.	76.6	.....	14.1	61.4	62.7	83.2	67.2	
319	Steer No. 1...	72.7	.....	36.3	71.2	65.4	78.4	67.8	Do.
	Steer No. 4...	71.6	.....	34.7	74.8	51.5	79.4	78.0	
	Average.	72.1	.....	35.5	73.0	58.4	78.9	72.9	
320	Steer No. 2...	73.7	.....	12.00	66.2	40.0	81.2	72.8	Do.
	Steer No. 3...	68.4	.....	26.2	63.3	44.3	76.3	57.7	
	Average.	71.0	.....	19.1	64.7	42.1	78.7	65.2	
321	Steer No. 1, 1st period.	62.0	63.7	41.9	49.6	67.4	64.2	50.5	Amids assumed to be all digested; 42.3 per cent true albuminoids digested.
	Steer No. 2, 1st period.	62.4	64.1	48.9	54.8	64.9	64.5	54.2	
	Steer No. 1, 2d period.	62.4	63.6	42.5	49.7	68.3	64.4	48.1	
	Steer No. 2, 2d period.	61.1	62.4	46.2	52.8	65.2	62.5	55.8	
	Average.	62.0	63.5	44.9	51.7	66.4	63.9	52.1	
322	Cow.....	68.7	70.0	49.7	65.5	74.3	72.5	54.7	It was calculated that 55.5 per cent albuminoids was digested.

a Contained 95 per cent amids.

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
	PENNSYLVANIA STATION—continued.						
323	Dried pasture grass (same material as in No. 322, carefully dried over furnace). Amount equivalent to that fed in No. 322.	<i>Per ct.</i> a74.49	<i>Per ct.</i> a2.71	<i>Per ct.</i> a5.45	<i>Per ct.</i> a6.67	<i>Per ct.</i> a10.57	<i>Per ct.</i> a1.12
324	Uncured soiling rye (somewhat mature), 80 lbs.	84.33	1.33	2.50	4.72	6.35	.77
325	Uncured soiling clover (mature heads, brown at last feeding), 60-80 lbs.	86.64	2.33	3.43	3.06	5.73	.81
326	Uncured soiling corn (immature, not hardened), 100 lbs.	90.04	1.22	1.72	2.70	3.92	.40
327	Uncured sweet corn (ears in roasting stage), 4,500 gm.	86.54	1.13	1.88	3.32	6.71	.42
328	Uncured dent corn, thin seeded (ears just forming), 3,538 gm.	79.87	1.19	1.64	5.22	11.48	.60
329	Uncured dent corn, thick seeded (ears well formed, scarcely glazed), 3,463 gm.	77.25	1.05	1.82	5.77	13.27	.84
330	Uncured dent corn, thick seeded (ears not commenced to form), 3,000 gm.	86.35	1.01	2.02	3.52	6.40	.70
331	Pasture grass dried (mainly blue grass and white clover, cut with lawn mower; dried in house), 9,000 gm.	12.29	7.41	20.45	16.41	38.41	5.13
332	Early Amber sorghum (2 weeks after coming into tassel), 3,000 gm.	78.05	4.30	5.38	22.23	64.93	3.16
333	Corn silage (in milk, silo rapidly filled), 45 lbs.	72.8	1.48	2.35	7.13	15.25	1.51
334	Corn silage (in milk, silo slowly filled), 35 lbs.	71.07	1.43	2.34	7.10	16.41	1.65
335	Corn fodder (in milk, field cured), 16 lbs.	27.22	4.41	4.83	24.43	36.62	2.49
336	Ensilage corn fodder (Burrill and Whitman corn, no ears, only nubbins, cut immature, and dried under cover), 1,000 gm.	11.46	4.16	4.91	24.90	50.44	4.13

Nos. 323: Armsby and Caldwell, Pennsylvania Sta. Rpt. 1888, p. 64.

Nos. 324-326: Frear, Caldwell, Holter, and Sweetser, Pennsylvania Sta. Rpt. 1888, pp. 83-91.

Nos. 327-331: Frear, Caldwell, and Holter, Pennsylvania Sta. Rpt. 1889, pp. 74-89.

No. 332: Frear, Caldwell, and Holter, Pennsylvania Sta. Rpt. 1889, p. 95.

Nos. 333-335: Armsby and Caldwell, Pennsylvania Sta. Rpt. 1889, pp. 125-131.

Nos. 336: Frear, Pennsylvania Sta. Rpt. 1890, pp. 52.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
323	Cow	<i>Per ct.</i> 71.3	<i>Per ct.</i> 71.4	<i>Per ct.</i> 55.5	<i>Per ct.</i> 71.5	<i>Per ct.</i> 76.7	<i>Per ct.</i> 72.9	<i>Per ct.</i> 60.1	It was calculated that 63.2 per cent albuminoids was digested.
324	Steer No. 1.... Steer No. 2....	73.2 73.6	74.8 75.7	56.1 55.5	79.7 79.1	78.9 79.6	69.7 70.6	74.8 74.2	
	Average.	73.4	75.3	55.8	79.4	79.2	70.1	74.5	
325	Steer No. 1.... Steer No. 2....	67.3 64.9	69.2 67.0	56.7 53.4	68.3 65.8	52.9 52.3	79.2 76.1	66.1 63.0	
	Average.	66.1	68.1	55.0	67.0	52.6	77.6	64.5	
326	Steer No. 1.... Steer No. 2....	70.2 67.2	71.1 68.5	63.5 57.9	79.9 76.4	75.6 73.8	67.7 64.0	37.5 42.6	
	Average.	68.7	69.8	60.7	78.1	74.7	^b 65.8	40.1	
327	Sheep No. 1... Sheep No. 2...	78.0 76.5	78.9 77.2	68.6 69.0	77.3 77.7	75.6 74.2	81.4 79.6	74.4 73.4	It was calculated that 69.6 per cent true albuminoids was digested.
	Average.	77.3	78.1	68.8	77.5	74.9	80.5	73.9	
328	Sheep No. 1... Sheep No. 2...	68.0 67.2	69.0 68.6	52.2 46.3	55.9 56.8	61.4 60.1	74.1 74.1	73.4 71.6	It was calculated that 47.9 per cent true albuminoids was digested.
	Average.	67.6	68.8	49.3	56.3	60.7	74.1	72.5	
329	Sheep No. 1... Sheep No. 2...	73.4 70.9	74.9 72.0	43.9 48.1	63.7 56.3	68.0 64.8	78.8 76.7	83.8 81.2	It was calculated that 42.7 per cent true albuminoids was digested.
	Average.	72.2	73.5	46.0	60.0	66.4	77.8	82.5	
330	Sheep No. 1... Sheep No. 2...	73.7 71.4	74.7 72.2	61.1 60.7	75.2 72.4	72.0 70.8	75.3 74.6	81.6 76.1	It was calculated that 66.5 per cent true albuminoids was digested.
	Average.	72.5	73.5	60.9	73.8	71.4	74.9	78.9	
331	Steer No. 1.... Steer No. 2....	75.6 71.9	75.8 74.1	50.5 45.5	76.4 74.0	76.5 74.5	77.1 73.8	74.9 74.0	It was calculated that 71.3 per cent true albuminoids was digested.
	Average.	73.8	75.0	48.0	75.2	75.5	75.4	74.4	
332	Sheep No. 1... Sheep No. 2...	61.7 60.9	62.7 61.6	39.8 46.5	42.6 57.8	45.3 41.7	70.8 70.7	67.0 67.0	Uneaten residues ranged from 150 to 1,600 gms.
	Average.	61.3	62.2	43.1	40.2	43.5	70.8	67.0	
333	Steer No. 1... Steer No. 2...	60.0 67.0	61.8 68.1	28.0 40.0	44.3 48.0	60.0 67.0	63.0 70.0	85.0 87.0	
	Average.	63.5	65.0	34.0	46.1	63.5	66.5	86.0	
334	Steer No. 1... Steer No. 2...	62.0 61.0	63.4 62.7	39.0 19.0	47.3 43.2	56.0 56.0	67.0 66.0	86.0 86.0	
	Average.	61.5	63.1	29.0	45.2	56.0	66.5	86.0	
335	Steer No. 1.... Steer No. 2...	68.0 64.0	70.0 65.3	51.0 47.0	..... .....	73.0 69.0	70.0 65.0	80.0 79.0	
	Average.	66.0	67.7	49.0	44.0	71.0	67.5	79.5	
336	Sheep No. 1... Sheep No. 2...	50.9 53.7	52.5 54.7	21.4 34.2	20.1 28.1	45.5 46.6	57.1 61.4	74.0 82.2	
	Average.	52.3	53.6	27.8	24.1	46.1	59.2	78.1	

^a Before drying.^b Incorrect in report.

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
PENNSYLVANIA STATION—continued.							
337	Field-cured ensilage corn fodder (same material as in No. 336, field cured, poor), 9,000 gm.	<i>Per ct.</i> 36.51	<i>Per ct.</i> 3.67	<i>Per ct.</i> 3.49	<i>Per ct.</i> 21.64	<i>Per ct.</i> 31.53	<i>Per ct.</i> 3.16
338	Silage, coarse (same material as in No. 336, ensiled; fresh from silo, cut long and not tramped), 15,000 gm.	80.08	1.28	1.21	6.63	9.75	1.05
339	Silage, cut fine, crushed (same material as in No. 336, ensiled, cut short, crushed, tramped in silo); steer fed 20,000 gm., sheep fed 2,500 gm.	80.40	1.31	1.20	7.10	9.23	7.6
340	Clover and timothy hay (large proportion clover poorly cured, cut late, had lodged and become wet), 6,000 gm.	13.28	4.87	6.06	30.77	42.80	3.12
341	Uncured silage corn (dent corn, small, thin seeded, kernels unglazed).	75.13	1.00	2.43	5.08	15.32	1.04
342	Uncured silage corn (dent corn, small, thick seeded, kernels glazing).	77.11	1.17	2.14	5.07	13.61	.90
343	Uncured silage corn (large, thin seeded, milk stage)	78.63	1.00	2.13	5.07	12.48	.69
344	Uncured silage corn (large, thick seeded, milk stage)	76.86	1.04	2.10	5.34	13.45	1.21
345	Uncured silage corn (dent for silage, thin seeded, silking), 3,000 gm.	85.54	1.06	1.99	3.91	6.98	9.52
346	Uncured silage corn (dent corn, thin seeded, glazing), 2,500 gm.	68.65	1.12	2.65	5.29	21.05	1.26
347	Barn-cured silage corn (dent corn, thin seeded, nearly mature), 720 gm.	62.0	1.31	3.09	6.09	26.10	1.41
348	Uncured silage corn (dent, thick seeded, glazing), 2,500 gm.	69.11	1.11	2.29	5.22	20.95	1.32
349	Barn-cured silage corn (thin seeded, kernels dented and hardening), 714.7 gm.	74.98	1.19	1.98	5.80	15.28	.77
350	Barn-cured silage corn (thick seeded, milk stage), 709.3 gm., 684.7 gm.	71.15	1.32	2.06	7.06	17.49	.92
351	Barn-cured silage corn (dent, thin seeded, silking), 504 gm.	80.39	1.17	2.00	6.18	9.91	.35
352	Uncured silage corn (dent, thin seeded, glazing), 2,000 gm.	74.69	1.04	1.97	5.58	16.28	.44
353	Barn-cured silage corn (dent, thin seeded, mature), 728 gm.	53.12	1.33	3.73	7.30	33.03	1.49
354	Barn-cured silage corn (dent, thick seeded, mature), 504 gm.	48.8	1.49	3.25	9.31	35.54	1.61
355	Uncured silage corn (thin seeded, kernels hardening), 2,000 gm.	74.63	.94	1.45	6.02	16.50	.46
356	Barn-cured silage corn (thick seeded, milk stage), 504 gm.	76.47	1.11	1.41	6.13	14.33	.55
357	Corn fodder, green (whole plant, milk stage), 2,000 gm.	76.86	1.04	2.10	5.34	13.45	1.21
358	Corn fodder (same material as in No. 357, field cured), 6,500 gm.	29.3	3.49	6.43	21.24	36.81	2.73
359	Corn fodder (same material as in No. 357, field cured), 700 gm.	29.3	3.49	6.43	21.24	36.81	2.73
360	Corn silage (same material as in No. 357), 15,000 gm.	81.3	1.02	1.80	5.22	9.21	1.42
361	Corn silage (same material as in No. 357), 2,000 gm.	81.3	1.02	1.80	5.22	9.21	1.42
362	Corn silage (same material as in No. 357), 15,000 gm.	81.44	1.00	1.89	5.64	8.84	1.19

Nos. 337-340: Frear, Pennsylvania Sta. Rept. 1890, pp. 54-68.
 Nos. 341-344: Armsby, Pennsylvania Sta. Rpt. 1891, p. 23.
 Nos. 345-350: Armsby, Pennsylvania Sta. Rep. 1892, p. 28.
 Nos. 351-356: Ibid., p. 29.
 Nos. 357-362: Ibid., p. 16.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
337	Steer No. 1 . . .	<i>Per ct.</i> 63.9	<i>Per ct.</i> 66.2	<i>Per ct.</i> 25.6	<i>Per ct.</i> 35.9	<i>Per ct.</i> 74.3	<i>Per ct.</i> 65.5	<i>Per ct.</i> 84.2	It was calculated that 22.2 per cent albuminoids was digested.
	Steer No. 2 . . .	57.6	60.5	9.9	22.4	66.7	59.9	65.7	
	Average . . .	60.8	63.4	17.7	29.2	70.5	62.7	74.9	
338	Steer No. 1 . . .	65.9	67.3	46.3	48.5	77.8	70.3	85.2	It was calculated that 38.5 per cent albuminoids was digested.
	Steer No. 2 . . .	66.2	68.0	39.7	44.9	72.6	66.1	83.7	
	Average . . .	66.0	67.7	43.0	46.7	75.2	68.1	84.5	
339	Steer No. 1 . . .	68.1	70.4	35.9	44.0	77.6	69.7	76.6	It was calculated that 32 per cent true albuminoids was digested.
	Sheep No. 1 . . .	56.0	59.4	7.3	22.0	67.7	57.3	69.0	
	Sheep No. 2 . . .	51.5	53.8	19.4	21.0	59.5	52.6	67.5	
	Average . . .	53.8	56.6	13.3	21.5	63.6	54.9	68.3	
340	Steer No. 1 . . .	55.3	55.9	44.8	37.4	54.4	59.4	58.0	
	Steer No. 2 . . .	54.3	55.1	39.9	37.9	52.1	59.5	58.1	
	Average . . .	54.8	55.5	42.4	37.7	53.3	59.5	58.0	
341	Average re- sults, 2 sheep	63.6	65.6	16.7	58.0	51.3	70.7	76.2	
342	do	67.3	69.9	20.0	59.2	64.8	73.1	73.3	
343	do	65.9	67.7	29.0	60.0	58.7	72.6	67.4	
344	do	69.2	70.7	37.1	62.6	65.2	73.7	80.6	
345	do	64.2	70.0		69.0	67.7	71.2	74.3	
346	do	66.3	68.6	4.9	51.6	40.0	76.8	84.8	
347	do	72.6	73.9	34.8	61.6	47.2	81.2	82.3	
348	do	64.7	66.5	(15.7)	48.5	33.2	75.6	85.9	
349	do	66.9	69.0	24.5	53.2	60.1	74.0	79.3	
350	do	61.0	62.7	24.2	44.3	50.4	69.2	74.6	
351	do	65.5	66.4	51.1	62.8	69.6	65.5	57.3	
352	do	70.8	72.2	39.6	52.3	61.7	78.1	72.3	
353	do	69.1	70.7	13.6	57.7	42.8	77.8	78.0	
354	do	70.1	72.0	6.6	48.8	60.2	77.0	77.8	
355	do	66.6	68.4	19.5	44.3	58.6	74.0	69.4	
356	do	62.6	64.6	23.3	43.1	60.6	68.0	72.1	
357	Sheep A	69.9	71.5	35.1	61.4	67.8	73.9	79.3	Result not considered satisfactory.
	Sheep B	68.5	70.2	32.2	63.6	62.5	73.2	81.8	
358	Steer A	67.08	69.9	32.3	55.7	76.0	66.5	76.8	
	Steer B	67.72	70.0	42.9	61.5	72.9	67.1	81.6	
	Average	67.4	70.0	37.6	58.6	74.4	66.8	79.2	
359	Sheep A	62.5	64.7	38.1	55.8	68.1	61.6	77.8	Do.
	Sheep B	54.03	57.4	5.6	45.0	57.6	57.5	76.5	
360	Steer A	72.1	74.5	30.7	60.4	79.6	72.1	89.7	
361	Sheep A	66.5	68.7	28.5	54.4	70.3	67.3	89.6	
362	Steer A	81.0	82.2	59.1	72.7	85.5	81.0	91.0	Results with this steer probably abnormal.
	Steer B	73.6	75.3	43.6	62.8	80.6	72.8	87.7	
	Average	77.3	77.8	51.4	66.8	83.1	76.9	89.4	

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen free extract.	Fat.
PENNSYLVANIA STATION—continued.							
363	Corn silage (same material as in No. 357), 2,000 gm.	<i>Per ct.</i> 81.44	<i>Per ct.</i> 1.00	<i>Per ct.</i> 1.89	<i>Per ct.</i> 5.64	<i>Per ct.</i> 8.84	<i>Per ct.</i> 1.19
364	Cotton-seed feed (seed and hulls, 5:1).....	13.07	2.55	8.43	32.54	40.66	2.75
TEXAS STATION.							
365	Sorghum (cut when in dough state; fed green)....	70.6	1.97	1.81	8.56	15.93	1.13
366	Cotton-seed hulls	9.99	3.07	4.72	52.44	27.75	2.00
367	Corn fodder, "pulled and topped" (blades and tops of stalks).	11.77	8.51	6.81	27.09	43.07	2.74
UTAH STATION.							
368	Uncured timothy (freshly cut), 50 lbs.....	60.65	2.46	2.05	11.88	22.07	0.94
369	Timothy hay (dried in field), 50 lbs. when green....	13.8	5.76	4.48	27.54	46.91	1.54
370	Field-cured shredded corn fodder (flint corn, entire plant, kernels glazed, finely shredded), steer No. 1 fed 5,873 gm.; steer No. 2 fed 7,814 gm.	18.64	6.09	6.87	17.90	47.91	2.59
371	Alfalfa hay (first crop, fair quality), steer No. 1 fed 9,268.5 gm.; steer No. 2 fed 7,656 gm.	14.61	8.45	11.54	26.11	36.9	2.39
372	Timothy hay (slightly mixed, fair sample), steer No. 1 fed 3,080.5 gm.; steer No. 2 fed 6,658 gm.	13.10	5.87	5.84	31.62	42.08	1.49
373	Wheat bran (71.5 per cent) and shorts (28.5 per cent) (fed with same shredded corn fodder as in No. 370) (bran to fodder 1: 1.7) 3,645 gm.	9.72	4.26	14.14	8.28	60.13	3.48

No. 363: Armsby, Pennsylvania Sta. Rept. 1892, p. 16.

No. 364: Armsby and Hess, Pennsylvania Sta. Rpt. 1894, p. 48.

No. 365: Harrington, Adriance, and Tilson, Texas Sta. Bul. 13 (1890), p. 37.

Nos. 366, 367: Harrington, Wipprecht, and Adriance, Texas Sta. Bul. 15 (1890), pp. 87, 88.

Nos. 368, 369: Cutter, Utah Sta. Bul. 16 (1892), p. 5.

Nos. 370-373: Widtsoe, McLaughlin, and Stewart, Utah Sta. Bul. 54 (1897), pp. 145-149.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
363	Sheep A	66.2	67.5	33.3	57.6	70.9	69.9	87.4	
364	Steer No. 1....	42.0	42.6	20.0	36.0	28.0	53.0	83.0	Feces collected 7 days.
	Steer No. 2....	45.0	47.2	.....	32.0	33.0	59.0	86.0	
	Steer No. 3....	43.0	43.9	24.0	41.0	32.0	50.0	84.0	
	Average	43.3	44.5	15.0	36.0	31.0	54.0	84.0	
365	Cow No. 1.....	73.3	75.8	43.8	55.7	75.0	78.2	81.6	
	Cow No. 2.....	73.1	75.6	39.5	51.1	74.0	78.7	81.3	
	Average	73.2	75.7	41.6	53.4	74.5	78.3	81.4	
366	Steer No. 1....	40.2	41.6	1.8	3.3	55.0	23.4	58.2	Two experiments combined.
	Steer No. 2....	35.0	44.6	24.4	2.6	48.7	12.9	85.8	
	Steer No. 3....	45.4	46.9	5.8	11.6	57.6	37.7	80.3	
	Steer No. 4....	41.4	41.6	32.6	2.6	46.3	37.4	83.8	
	Steer No. 5....	47.5	47.8	38.4	7.3	54.1	40.8	82.3	
	Average	42.4	44.5	20.6	5.7	52.1	30.4	78.1	
367	Steer No. 1....	59.0	64.7	0.06	54.2	71.1	61.9	71.9	
	Steer No. 2....	60.5	65.5	0.14	56.6	71.7	62.6	70.6	
	Average	59.7	65.1	0.10	55.4	71.4	62.2	71.2	
368	Steer No. 3....	63.27	65.3	32.63	48.02	57.60	65.38	52.03	Experiments Nos. 368 and 369 to test digestibility of green and dry timothy.
	Steer No. 4....	64.60	66.7	33.03	48.50	54.26	66.08	53.78	
	Steer No. 5....	62.71	64.9	30.98	47.81	55.00	65.80	53.60	
	Average	63.53	65.6	32.21	48.11	55.62	65.75	53.14	
369	Steer No. 1....	63.73	66.1	31.32	47.61	56.42	67.28	51.23	
	Steer No. 2....	64.35	66.7	32.06	49.32	55.09	68.40	53.30	
	Average	64.04	66.4	31.69	48.46	55.75	67.84	52.36	
370	Steer No. 1....	65.39	67.5	33.32	57.57	78.21	65.19	76.16	Experiment covered 7 days.
	Steer No. 2....	63.06	65.3	33.75	55.99	73.60	63.06	78.88	
	Average	64.23	66.4	33.54	56.78	75.91	64.13	77.52	
371	Steer No. 1....	59.58	61.5	41.72	70.27	44.09	71.39	54.09	Do.
	Steer No. 2....	60.74	63.0	39.97	70.33	47.25	72.21	47.05	
	Average	60.16	62.3	40.85	70.30	45.67	71.80	50.57	
372	Steer No. 1....	58.51	60.8	25.62	46.59	57.92	65.57	37.94	Do.
	Steer No. 2....	57.28	59.5	26.14	44.30	58.78	61.09	38.14	
	Average	57.90	60.2	25.88	45.45	58.35	63.33	38.04	
373	Steer No. 1....	58.14	6.07	7.50	75.75	18.33	64.25	44.98	Experiment covered 7 days. Accident vitiated results with steer No. 2.
	Steer No. 2....	62.23	.....	.....	.....	.....	.....	.....
	Average	60.19	.....	.....	.....	.....	.....	.....

a Incorrect in report.

TABLE 2.—Data for digestion experiments with

Number of experiment.	Kind and amount of food per day.	Composition of food.					
		Water.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
	WISCONSIN STATION.						
374	Clover hay, 700 gm.	<i>Per ct.</i> 16.07	<i>Per ct.</i> 4.10	<i>Per ct.</i> 11.37	<i>Per ct.</i> 27.37	<i>Per ct.</i> 40.56	<i>Per ct.</i> 1.56
375	Malt sprouts (soaked in water and fed warm) (fed with 600 gm. same clover hay as in No. 374.), 175 gm.	11.97	3.75	21.0	11.99	50.0	1.29
376	Cotton-seed meal (fed with 700 gm. same clover hay as in No. 374), 175 gm.	7.59	6.48	44.0	2.77	25.72	13.44
377	Field-cured fodder corn (Sibley Sheep Tooth variety; mature), cow Bessie fed 20 lbs.; cow Bunn fed 26.17 lbs.	38.58	2.70	4.32	35.99	17.03	1.38
378	Corn silage (same material as in No. 377), cow Bessie fed 43.07 lbs.; cow Bunn fed 55 lbs.	62.37	1.44	2.77	7.84	24.13	1.22

No. 374-376: Armsby, Wisconsin Sta. Rpt. 1884, pp. 71-75.
Nos. 377, 378: Woll, Wisconsin Sta. Rpt. 1889, p. 113.

animals (arranged by States)—Continued.

Number of experiment.	Subject of experiment.	Digestion coefficients.							Remarks.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.	
374	Sheep No. 1, 1st period.	<i>Per ct.</i> 50.8	<i>Per ct.</i> 51.6	<i>Per ct.</i>	<i>Per ct.</i> 48.0	<i>Per ct.</i> 47.1	<i>Per ct.</i> 56.8	<i>Per ct.</i> 26.2	In average for fat, results for sheep 1, period 1, excluded.
	Sheep No. 2, 1st period.	51.1	51.9	.....	47.0	47.2	57.1	40.2	
	Sheep No. 1, 2d period.	51.5	52.5	.....	50.2	46.8	57.5	40.9	
	Sheep No. 2, 2d period.	53.7	54.5	.....	52.4	49.3	59.0	48.6	
	Average.	51.8	52.6	.....	49.4	47.7	57.6	42.7	
375	Sheep.....	67.1	67.2	.....	80.2	32.9	68.1	104.6	
376	Sheep No. 1...	81.8	81.3	.....	89.2	.....	69.3	103.9	
	Sheep No. 2...	80.4	80.0	.....	88.1	.....	66.2	102.5	
	Average.	81.1	80.7	.....	88.7	.....	67.8	103.2	
377	Cow Bessie ...	60.9	62.8	23.2	51.2	58.9	66.0	70.4	
	Cow Bunn	58.8	59.6	14.9	46.4	53.4	64.0	66.7	
	Average.	59.8	61.2	19.0	48.8	56.1	65.0	68.5	
378	Cow Bessie ...	63.4	65.3	21.2	52.2	48.9	71.6	82.7	
	Cow Bunn	62.9	65.0	18.2	55.3	45.4	71.8	82.1	
	Average.	63.1	65.2	19.7	53.7	47.1	71.7	82.4	

DATA FOR DIGESTION EXPERIMENTS, CLASSIFIED ACCORDING TO ANIMALS AND FEEDING STUFFS USED.

The following table summarizes the results of the digestion experiments, arranging the coefficients for the several materials according to the different animals experimented upon. The table also includes maximum, minimum, and average figures.

TABLE 3.—*Digestion coefficients classified by animals and food, with maxima, minima, and averages.*

DIGESTION BY RUMINANTS.

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
<i>Green fodder.</i>									
MEADOW GRASSES.									
			<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>
17	2 sheep ..	Hungarian meadow grass, nearly full grown, beginning to bloom.	70.9	72.2	58.3	69.3	74.4	70.0	83.5
20	2 sheep ..	Hungarian meadow grass, more advanced than in No. 617, quite woody.	67.2	68.0	58.7	61.3	71.3	67.8	61.2
90	4 sheep ..	Hungarian meadow grass.....	63.4	65.6	39.6	62.4	67.8	65.8	52.3
		Maximum.....	70.9	72.2	58.7	69.3	74.4	70.0	83.5
		Minimum.....	63.4	65.6	39.6	61.3	67.8	65.8	52.3
		Average.....	67.2	68.6	52.2	64.3	71.2	67.9	65.7
203	2 sheep ..	Barnyard millet, early bloom.....	73.5	72.9	66.1	68.1	73.9	75.7	64.4
204	1 sheep ..	Barnyard millet, late bloom.....	67.2	67.7	61.2	73.2	70.6	64.5	61.1
41	1 sheep ..	Barnyard millet, from bloom to early seed, succulent to slightly woody.	61.5	61.8	58.1	57.3	58.8	64.4	59.8
44	2 sheep ..	.....do.....	64.2	65.4	52.7	47.2	62.8	68.4	71.7
		Maximum.....	73.5	72.9	66.1	73.2	73.9	75.7	71.7
		Minimum.....	61.5	61.8	52.7	47.2	58.8	64.4	59.8
		Average.....	66.6	67.0	59.5	61.5	66.5	68.3	64.3
368	Steers ...	Timothy.....	63.5	65.6	32.2	48.1	55.6	65.7	53.1
26	2 sheep ..	Timothy rowen, two-thirds grown, with clover and fine grasses, not very succulent.	64.8	66.4	45.2	71.7	63.8	67.8	52.9
322	1 cow	Pasture grass as cut.....	68.7	70.0	49.7	65.5	74.3	72.5	54.7
47	2 sheep ..	Mixed grass rowen, including some clover.	65.6	67.4	46.2	67.4	62.6	71.6	55.2
CEREAL PLANTS.									
7	2 sheep ..	Barley, full bloom and week following.	64.6	66.5	55.9	70.4	56.3	72.8	62.2
27	2 sheep ..	Barley, heads three-fourths grown to full grown.	67.1	68.5	52.8	73.1	65.2	69.6	57.6
		Average.....	65.9	67.5	54.4	71.8	60.8	71.2	59.9
330	2 sheep ..	Dent corn fodder, thick seeded, ears had not begun to form.	72.5	73.5	60.9	73.8	71.4	74.9	78.9
328	2 sheep ..	Dent corn fodder, thin seeded, ears just forming.	67.6	68.8	49.3	56.3	60.7	74.1	72.5
326	2 sheep ..	Dent corn fodder, soiling, immature, kernels not hardened.	68.7	69.8	60.7	78.1	74.7	65.8	40.1
345	2 sheep ..	Dent corn fodder, thin seeded, ears in milk stage.	64.2	70.0	.....	69.0	67.7	71.2	74.3
329	2 sheep ..	Dent corn fodder, thick seeded, ears well formed, kernels scarcely glazed.	72.2	73.5	46.0	60.0	66.4	77.8	82.5
343	2 sheep ..	Dent corn fodder silage, large, thin seeded in milk stage.	65.9	67.7	29.0	60.0	58.7	72.6	67.4
344	2 sheep ..	Dent corn fodder silage, large, thick seeded, in milk stage.	69.2	70.7	37.1	62.6	65.2	73.7	80.6
357	2 sheep ..	Dent corn fodder silage, whole plant, milk stage.	69.9	71.5	35.1	61.4	67.8	73.9	79.3
342	2 sheep ..	Dent corn fodder, small thick seeded, kernels glazing.	67.3	69.9	20.0	59.2	64.8	73.1	73.3

a Results for one sheep excluded.

TABLE 3.—*Digestion coefficients classified by animals and food, with maxima, minima, and averages—Continued.*

DIGESTION BY RUMINANTS—Continued.

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
<i>Green fodder—Continued.</i>									
CEREAL PLANTS—continued.									
			<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>
346	2 sheep ..	Dent corn fodder, thin seeded, kernels glazed.	66.3	68.6	4.9	51.6	40.0	76.8	84.8
348	2 sheep ..	Dent corn fodder, thick seeded, kernels glazed.	64.7	66.5	(15.7)	48.5	33.2	75.6	85.9
352	2 sheep ..	Dent corn fodder, thin seeded, kernels glazed.	70.8	72.2	39.6	52.3	61.7	78.1	72.3
341	2 sheep ..	Dent corn fodder, small thin seeded, kernels unglazed.	63.6	65.6	16.7	58.0	51.3	70.7	76.2
355	2 sheep ..	Dent corn fodder silage, thin seeded, kernels hardening.	66.6	68.4	19.5	44.3	58.6	74.0	69.4
		Maximum	72.5	73.5	60.9	78.1	74.7	78.1	85.9
		Minimum	63.6	65.6	4.9	44.3	33.2	65.8	40.1
		Average of 14 experiments.....	67.8	69.8	35.6	59.7	60.2	73.7	74.1
		Before kernels have glazed:							
		Maximum	72.5	73.5	60.9	78.1	74.7	77.8	82.5
		Minimum	64.2	67.7	29.0	56.3	58.7	65.8	40.1
		Average of 8 experiments.....	68.8	70.7	45.4	65.2	66.6	73.0	72.0
		After kernels have glazed:							
		Maximum	70.8	72.2	39.6	59.2	64.8	78.1	85.9
		Minimum	63.6	65.6	4.9	44.3	33.2	70.7	69.4
		Average of 6 experiments.....	66.6	68.5	19.4	52.3	51.6	74.7	77.0
22	2 sheep ..	Sweet corn fodder, early roasting stage, many small ears.	66.8	68.0	50.7	55.5	54.3	74.1	78.3
25	2 sheep ..	Sweet corn fodder, early roasting stage, stalks green.	73.2	74.6	50.4	63.3	65.0	79.2	78.0
48	2 sheep ..	Sweet corn fodder, early roasting stage.	68.5	69.4	58.3	60.3	62.9	73.7	70.3
45	2 sheep ..	Sweet corn fodder, roasting stage, succulent.	67.9	68.9	53.0	60.7	59.4	73.5	71.4
327	2 sheep ..	Sweet corn fodder, roasting stage.....	77.3	78.1	68.8	77.5	74.9	80.5	73.9
23	2 sheep ..	Sweet corn fodder, two weeks later than No. 22, stalks and leaves yellow, ears past roasting.	72.7	73.9	50.3	66.5	60.7	78.3	81.7
		Maximum	77.3	78.1	68.8	77.5	74.9	80.5	81.7
		Minimum	66.8	68.0	50.3	55.5	54.3	73.5	70.3
		Average.....	71.1	72.2	55.3	64.0	62.9	76.6	75.6
16	2 sheep ..	Oats, beginning bloom, many heads not full grown.	62.6	64.5	44.8	75.3	60.2	63.1	69.8
40	2 sheep ..	Oats, early seed to early milk stages....	62.1	61.8	66.4	72.3	54.6	63.5	70.2
37	1 sheep ..	Oats, seeds half to full grown, stems quite woody.	53.8	56.5	49.1	67.8	43.5	61.1	67.5
		Maximum	62.6	64.5	66.4	75.3	60.2	63.5	70.2
		Minimum	53.8	56.5	44.8	67.8	43.5	61.1	67.5
		Average.....	59.5	60.9	53.4	71.8	52.8	62.6	69.2
324	2 steers..	Rye, somewhat mature	73.4	75.3	55.8	79.4	79.2	70.1	74.5
332	2 sheep..	Sorghum, Early Amber, two weeks after tasseling.	61.3	62.2	43.1	40.2	43.5	70.8	67.0
365	2 cows...	Sorghum, cut when in dough state.....	73.2	75.7	41.6	53.4	74.5	78.3	81.4
		Average	67.3	69.0	42.4	46.8	59.0	74.6	74.2
CLOVERS.									
6	3 sheep ..	Crimson clover, from just before to just after bloom.	67.9	69.1	56.1	77.1	56.1	74.5	66.5
325	2 steers..	Red clover, heads mature, brown at last feeding.	66.1	68.1	55.0	67.0	52.6	77.6	64.5
19	2 sheep ..	Red clover rowen, past full bloom to early seed, containing one-tenth grass, mainly timothy.	59.3	60.8	43.4	61.9	52.5	65.3	60.8

TABLE 3.—*Digestion coefficients, classified by animals and food, with maxima, minima, and averages—Continued.*

DIGESTION BY RUMINANTS—Continued.

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
<i>Green fodder—Continued.</i>									
LEGUMES OTHER THAN CLOVERS.									
			<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>
28	2 sheep ..	Canada peas, vines large and succulent, three-fourths grown; no blossoms.	68.4	71.3	42.3	82.0	62.4	71.0	52.4
24	2 sheep ..	Cowpea, medium heavy, not fully grown; no runners.	70.3	76.0	23.9	74.0	57.5	84.2	59.4
46	2 sheep ..	Cowpea, vines three-fourths grown, medium heavy.	66.3	72.1	21.6	77.2	61.7	77.0	59.3
		Average	68.3	74.1	22.8	75.6	59.6	80.6	59.4
18	2 sheep ..	Soy bean, heavy growth, plants in bloom.	59.2	66.0	7.8	78.8	50.1	72.0	54.1
42	2 sheep ..	Soy bean, early to full bloom, succulent.	58.6	62.6	24.8	77.2	47.3	70.9	50.1
43	2 sheep ..	Soy bean, from bloom to early seed.....	62.8	67.1	22.7	75.2	49.8	76.4	57.7
21	2 sheep ..	Soy bean, seeds formed to half grown, stems quite hard.	58.6	62.3	20.3	69.3	40.9	73.5	54.3
		Maximum.....	62.8	67.1	24.8	78.8	49.8	76.4	57.7
		Minimum.....	58.6	62.3	7.8	69.3	40.9	70.9	50.1
		Average.....	59.8	64.5	18.9	75.1	47.0	73.2	54.1
229	2 sheep ..	Common or spring vetch (<i>Vicia sativa</i>).	61.8	65.7	17.3	71.4	44.2	76.1	58.6
230	2 sheep ..	Hairy vetch (<i>Vicia villosa</i>)	67.4	70.4	47.3	81.1	53.3	78.2	66.7
234	5 sheep ..	do.....	75.4	77.9	49.5	86.3	68.3	80.2	78.9
237	5 sheep ..	do.....	68.1	71.0	38.5	81.0	61.8	70.6	69.2
		Maximum.....	75.4	77.9	49.5	86.3	68.3	80.2	78.9
		Minimum.....	67.4	70.4	38.5	81.0	53.3	70.6	66.7
		Average.....	70.3	73.1	45.1	82.8	61.1	76.3	71.6
MIXED CROPS.									
8	2 sheep ..	Barley and peas, barley full bloom and week following; peas in early bloom.	53.4	60.2	46.2	77.2	43.5	61.4	59.7
206	3 sheep ..	Oats and peas, in bloom.....	70.2	72.0	49.4	70.1	68.3	76.0	57.1
15	2 sheep ..	Oats and peas, oats just in bloom to full bloom; peas in bloom.	64.4	67.9	31.2	81.5	57.5	66.4	73.6
39	2 sheep ..	Oats and peas, oats early milk; peas fairly succulent, lodged, brown, pods and seeds developed.	65.5	66.0	58.9	79.6	63.8	61.5	69.7
38	1 sheep ..	Oats and peas, oats turning yellow, stems woody, seeds half grown; peas lodged, some blackened, some seeds full grown.	61.4	62.9	41.9	73.2	49.1	66.9	70.3
		Maximum.....	70.2	72.0	58.9	81.5	68.3	76.0	73.6
		Minimum.....	61.4	62.9	31.2	70.1	49.1	61.5	57.1
		Average.....	65.4	67.2	45.4	76.1	59.7	67.7	67.7
205	3 sheep ..	Vetch and oats, both in bloom.....	67.0	68.4	52.7	74.8	68.3	67.9	47.2
<i>Silage.</i>									
MAIZE.									
82	2 sheep ..	Southern dent corn, no ears formed....	63.2	66.3	14.9	46.6	73.8	65.6	65.3
107	4 sheep ..	Southern dent corn, immature, a few ears just forming.	64.4	65.8	48.2	64.8	66.7	65.4	67.8
113	3 sheep ..	Southern dent corn, large, immature....	63.6	64.8	49.6	60.0	67.5	64.1	67.9
251	2 heifers ..	Dent corn, immature, grain in milk stage.	66.0	.....	.....	52.6	69.8	69.3	83.6
333	2 steers ..	Dent corn in milk stage, silo rapidly filled.	63.5	65.0	34.0	46.1	63.5	66.5	86.0
334	2 steers ..	Dent corn in milk stage, silo slowly filled.	61.5	63.1	29.0	45.2	56.0	66.5	86.0
338	2 steers ..	Dent corn, "Burrill and Whitman," no ears, some nubbins immature, cut long and not tramped in silo.	66.0	67.7	43.0	46.7	75.2	68.1	84.5
339	1 steer ...	Same corn as in No. 338, cut short, crushed, and tramped in silo.	68.1	70.4	35.9	44.0	77.6	69.7	76.6

TABLE 3.—*Digestion coefficients classified by animals and food, with maxima, minima, and averages—Continued.*

DIGESTION BY RUMINANTS—Continued.

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
<i>Silage—Continued.</i>									
MAIZE—Continued.									
			<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>
339	2 sheep ..	Same corn as in No. 338, cut short, crushed, and tramped in silo.	53.8	56.6	13.3	21.5	63.6	54.9	68.3
360	1 steer ...	Dent corn silage, whole plant, milk stage.	72.1	74.5	30.7	60.4	79.6	72.1	89.7
361	1 sheep ..	do	66.5	68.7	28.5	54.4	70.3	67.3	89.6
362	2 steers ..	do	77.3	77.8	51.4	66.8	83.1	76.9	89.4
363	1 sheep ..	do	66.2	67.5	33.3	57.6	70.9	69.9	87.4
208	2 sheep ..	Dent corn "Pride of the North," well eared, well glazed.	73.8	75.2	25.9	45.3	72.9	81.8	76.9
378	2 cows ...	Dent corn, "Sibley Sheep Tooth," mature	63.1	65.2	19.7	53.7	47.1	71.7	82.4
312	1 sheep ..	Dent corn, overripe, slightly frosted ..	63.6	67.8	32.0	45.4	59.2	71.1	86.1
313	1 sheep ..	Same as 312 cooked	68.6	73.7	31.0	39.4	70.3	74.7	87.2
49	4 steers ..	Dent corn, fair sample, several varieties.	61.7	64.1	32.0	52.4	56.7	68.1	80.1
240	2 cows ...	do		<i>a</i> 68.1		<i>a</i> 49.0	<i>a</i> 69.0	<i>a</i> 67.0	<i>a</i> 90.0
270	1 cow	do	53.2	54.3	26.9	34.4	43.2	60.5	66.0
		Maximum	77.3	77.8	51.4	66.8	83.1	81.8	89.7
		Minimum	53.8	56.6	13.3	21.5	36.7	54.9	65.3
		Average	65.1	67.1	32.2	49.3	66.7	68.6	80.0
119	1 sheep ..	Flint corn, "Sanford," partly glazed ..	<i>b</i> 69.9	72.5	34.4	56.3	72.1	75.6	72.9
108	4 sheep ..	Flint corn, "Sanford," kernels glazed ..	78.0	80.2	41.3	68.1	77.9	83.1	80.9
83	2 sheep ..	Flint corn, "Sanford," many ears fully developed.	69.1	72.1	12.2	52.8	75.2	73.3	82.6
109	2 sheep ..	Flint corn, "Sanford," ears mature, kernels glazed.	76.0	77.9	36.6	73.3	77.8	78.5	80.9
114	3 sheep ..	Flint corn, "Sanford," mature	75.7	77.9	39.8	67.4	78.5	78.9	87.2
253	2 heifers ..	Flint corn, "Sanford," mature	69.7			58.7	68.9	71.9	86.4
		Maximum	78.2	80.2	41.3	73.3	78.5	83.1	87.1
		Minimum	69.1	72.1	12.2	52.8	68.9	71.9	72.9
		Average	73.1	76.1	32.9	62.8	75.1	76.9	81.8
		Dent corn before kernels glazed :							
		Maximum	77.3	77.8	51.4	66.8	83.1	76.9	89.7
		Minimum	53.8	56.6	13.3	21.5	56.0	54.9	65.3
		Average, 13 experiments	65.6	67.4	34.3	51.3	70.6	67.4	80.2
		Dent and flint corn after kernels glazed :							
		Maximum	78.2	80.2	41.3	73.3	78.5	83.1	87.2
		Minimum	63.1	65.2	12.2	39.4	47.1	71.1	76.9
		Average, 10 experiments	70.8	73.6	30.3	56.0	70.0	76.1	82.4
84	2 sheep ..	Sweet corn, some ears fully formed	68.1	70.1	31.9	54.0	71.1	71.8	83.5
MISCELLANEOUS.									
50	4 steers ..	Cowpea	59.6	63.4	30.3	57.5	52.0	72.5	62.6
51	4 steers ..	Soy bean	49.8	53.8	28.0	55.3	42.9	61.2	48.9
269	2 goats ..	Soy bean	50.0	59.3	56.7	75.7	54.8	52.0	71.9
190	3 sheep ..	Corn and soy bean	68.96	71.0		65.04	64.77	74.94	82.13
189	4 sheep ..	Millet and soy bean	58.8	59.9		58.41	69.44	59.24	72.19
117	2 sheep ..	Corn, horse beans, and sunflower heads.	65.6	67.8	41.1	62.7	60.1	72.4	76.7
118	2 sheep ..	Corn, horse beans, and sunflower plants.	65.5	69.3	25.6	58.0	65.3	73.7	74.1
<i>Dried or cured fodders.</i>									
MEADOW GRASSES.									
180	2 sheep ..	Black grass (<i>Juncus bulbosus</i>), fine quality.	59.5			63.0	60.5	57.0	41.5
196	3 sheep ..	Black grass (<i>Juncus gerardi</i>), fair quality, slightly moldy, bitter.	53.4	52.1	69.0	54.3	57.35	49.0	45.7
76	2 sheep ..	Blue-joint grass, in bloom	68.6	69.8	48.7	70.2	72.4	68.6	52.3
63	1 sheep ..	Blue-joint grass, cut late in July	39.9	41.8	10.0	56.5	36.5	43.2	37.0
		Average	54.3	55.8	29.4	63.4	54.5	55.9	44.7

a Excluded from averages.*b* Average of 2 trials.

TABLE 3.—*Digestion coefficients classified by animals and food, with maxima, minima, and averages—Continued.*

DIGESTION BY RUMINANTS—Continued.

Ref- er- ence No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry mat- ter.	Or- ganic mat- ter.	Ash.	Pro- tein.	Fiber.	Nitro- gen- free ex- tract.	Fat.
<i>Dried or cured fodders—Continued.</i>									
MEADOW GRASSES—continued.									
			<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>
182	2 sheep ..	Branch grass (<i>Spartina stricta</i> var. <i>glabra</i>), coarse.	56.0	.....	.....	62.5	52.0	54.0	32.0
198	3 sheep ..	Branch grass (<i>Distichlys spicata</i>), poor quality, damp, musty.	49.7	48.9	58.1	51.7	56.4	45.7	36.6
314	1 steer ...	Chess or cheat (<i>Bromus secalinus</i>), ordinary quality.	45.0	47.3	23.0	42.0	46.0	49.0	32.0
231	2 sheep ..	Crab grass	56.5	58.9	30.8	55.1	59.7	58.0	50.9
311	4 sheep ..	.....do.....	50.7	51.1	44.4	.....	58.4	51.0	42.6
		Average.....	53.6	55.0	37.6	.....	59.1	54.5	46.8
197	3 sheep ..	Fox grass (<i>Spartina patens</i>), high marsh, excellent quality.	54.8	54.5	58.2	59.3	57.4	53.1	36.4
183	2 sheep ..	Fox grass (<i>Spartina juncea</i> with <i>Spartina stricta</i> var. <i>glabra</i> , low meadow grass).	53.0	.....	.....	57.0	51.0	52.0	24.0
202	3 sheep ..	Flat sage grass (<i>Spartina stricta maritima</i>).	56.1	57.3	62.0	51.8	60.4	55.1	36.1
91	2 sheep ..	Hungarian grass, air dry.....	65.0	66.3	47.4	60.0	67.6	67.1	63.9
232	2 sheep ..	Johnson grass.....	58.4	62.2	4.8	38.1	73.5	59.3	37.2
276	1 goat ...	Johnson grass, cut when panicles were forming for bloom. Wet in dull weather.	54.5	54.4	56.1	44.7	57.8	54.4	39.5
		Average	56.5	58.3	30.5	41.4	65.7	56.9	38.4
207	3 sheep ..	Barnyard millet in late bloom <i>a</i>	57.4	56.8	63.1	63.7	61.6	51.6	46.3
275	1 goat ...	Cat-tail millet (<i>Pennisetum spicatum</i>) cut when panicles were just appearing <i>a</i>	62.3	61.6	68.4	62.6	66.5	59.1	46.1
243	2 cows ...	Orchard grass (<i>Dactylis glomerata</i>)	58.7	59.7	.....	60.5	63.3	56.3	56.4
64	1 sheep ..	Orchard grass, seven to ten days past bloom.	54.4	55.8	35.0	58.5	57.5	54.4	51.2
		Average	56.6	57.8	.....	59.5	60.4	55.4	53.8
65	1 sheep ..	Red top (<i>Agrostis vulgaris</i>) in full bloom.	57.6	59.3	24.3	60.4	61.2	59.1	44.2
75	2 sheep ..	.....do.....	61.8	63.0	33.7	62.2	61.3	64.6	56.8
		Average	59.7	61.2	29.0	61.3	61.3	61.9	50.5
199	3 sheep ..	Redtop mixed with some sedge	46.0	48.5	10.1	37.2	55.7	45.6	49.0
72	2 sheep ..	Timothy hay in early bloom, cut July 9.	60.4	61.1	48.2	58.9	57.7	63.7	56.9
53	1 sheep ..	Timothy in bloom, or very near it.....	.....	<i>b</i> 59.3	.....	<i>b</i> 42.1	<i>b</i> 52.0	<i>b</i> 65.7	<i>b</i> 47.6
66	1 sheep ..	Timothy hay in full bloom	65.7	66.8	41.8	60.4	62.1	71.8	51.5
88	2 sheep ..	Timothy hay, early cut, in full bloom..	55.9	56.7	42.7	51.1	56.6	57.4	60.8
67	1 sheep ..	Timothy hay past bloom.....	54.1	55.5	28.0	44.5	51.7	61.0	34.6
73	2 sheep ..	Timothy hay, ten days past bloom, cut July 24.	58.3	59.4	33.2	50.0	53.3	63.9	58.3
57	2 sheep ..	Timothy hay, two weeks past bloom. .	51.6	52.4	.....	45.2	42.8	58.9	55.0
89	2 sheep ..	Timothy hay, eighteen days past bloom; late cut.	49.5	50.7	29.6	40.8	40.5	57.8	59.7
297	2 sheep ..	Timothy hay, old	51.2	53.6	23.0	33.5	48.0	58.1	17.6
310	2 sheep ..	.....do.....	54.2	55.4	28.7	35.1	42.2	66.1	49.2
95	4 sheep ..	Timothy hay, general crop from mow ..	58.6	60.1	39.6	44.1	56.4	63.6	74.3
96	4 sheep ..	.....do.....	59.0	60.2	39.7	47.6	54.8	64.7	69.8
112	3 sheep ..	Timothy hay, mixed	53.7	55.0	29.4	45.2	48.7	60.7	50.6
185	2 sheep ..	.....do.....	58.0	.....	.....	48.0	53.0	63.0	61.0
369	2 steers ..	Timothy hay, dried in field	64.1	66.4	31.7	48.5	55.7	67.8	52.3
372	2 steers ..	Timothy hay, fair sample, slightly mixed.	57.9	60.2	25.9	45.5	58.4	63.3	38.0
191	2 sheep ..	Timothy hay, somewhat mixed, mostly timothy.	55.5	56.0	.....	53.9	57.3	55.3	57.5

a Average results of two trials.*b* Excluded from averages.

TABLE 3.—*Digestion coefficients classified by animals and food, with maxima, minima, and averages—Continued.*

DIGESTION BY RUMINANTS—Continued.

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
<i>Dried or cured fodders—Continued.</i>									
MEADOW GRASSES—continued.									
			<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>
120	3 sheep..	Timothy hay, somewhat mixed, mostly timothy.	55.0	57.0	27.8	44.4	52.5	62.3	39.5
		Maximum.....	65.7	66.8	48.2	60.4	62.1	71.8	74.3
		Minimum.....	49.5	50.7	23.0	33.5	40.5	55.3	17.6
		Average.....	56.6	57.9	32.8	46.9	52.5	62.3	52.2
		Before or in bloom:							
		Maximum.....	65.7	66.8	48.2	60.4	62.1	71.8	60.8
		Minimum.....	55.9	56.7	41.8	51.1	56.6	57.4	51.5
		Average 3 experiments.....	60.7	61.5	44.2	56.8	58.8	64.3	58.4
		Past bloom:							
		Maximum.....	58.3	59.4	33.2	50.0	53.3	63.9	59.7
		Minimum.....	49.5	50.7	28.0	40.8	40.5	57.8	34.6
		Average 4 experiments.....	53.4	54.5	30.3	45.1	47.1	60.4	51.9
299	2 sheep..	Timothy hay, old (fed with one-sixteenth cotton-seed meal).	54.1	55.4	22.4	28.4	48.9	62.2	36.2
301	2 sheep..	Timothy hay, old (fed with one-twelfth cotton-seed meal).	52.0	53.0	19.9	32.5	47.2	59.8	53.4
303	2 sheep..	Timothy hay, old (fed with one-eighth cotton-seed meal).	45.8	47.7	6.2	20.8	41.6	54.5	43.6
305	2 sheep..	Timothy hay, old (fed with one-fourth cotton-seed meal).	45.8	48.3	.....	3.9	42.6	56.7	55.4
307	2 sheep..	Timothy hay, old (fed with one-half cotton-seed meal).	52.0	54.2	.....	.....	38.9	68.4	73.0
309	2 sheep..	Timothy hay, old (fed with equal amount cotton-seed meal).	49.2	49.6	20.8	.....	24.8	72.9	83.0
10	4 sheep..	Timothy rowen, including some barnyard grass.	62.2	64.4	56.4	68.0	66.5	63.4	49.5
68	1 sheep..	Wild-oat grass in full bloom.....	59.6	61.2	17.1	48.6	65.1	62.1	38.2
74	1 sheep..	.....do.....	68.3	69.1	52.2	68.0	70.6	68.8	62.8
		Average.....	64.0	65.2	34.7	58.3	67.9	65.5	50.5
71	1 sheep..	Witch grass in bloom.....	59.9	61.0	40.3	64.2	67.6	62.1	60.0
77	2 sheep..	Witch grass in full bloom.....	62.4	63.6	41.5	52.9	57.9	69.0	54.4
		Average.....	61.2	62.3	40.9	58.6	62.8	65.6	57.2
200	3 sheep..	Black grass and red top, "Cove mixture."	54.6	54.3	57.5	47.9	59.7	53.2	40.3
155	3 sheep..	Hay from mixed grasses, fair average quality, "English hay."	61.4	63.3	.....	63.5	64.5	63.3	51.4
157	4 sheep..	Hay from mixed grasses, "English hay"	55.6	57.2	.....	57.3	57.1	57.8	46.9
165	4 sheep..	Hay from mixed grasses, in bloom, "English hay."	59.0	60.0	.....	58.2	62.4	59.3	49.6
166	2 sheep..	.....do.....	54.1	55.9	.....	54.7	56.4	55.9	47.7
167	2 sheep..	.....do.....	55.5	57.4	.....	58.6	58.2	57.2	46.9
242	2 cows...	Hay from mixed grasses, early cut, poor quality, much timothy.	.....	^a 52.9	.....	^a 40.0	^a 49.0	^a 58.0	^a 50.0
		Maximum.....	61.4	63.3	.....	63.5	64.5	63.3	51.4
		Minimum.....	54.1	55.9	.....	54.7	56.4	55.9	46.9
		Average.....	57.1	58.8	.....	58.5	59.7	58.7	48.5
323	1 cow....	Pasture grass, mainly blue grass and white clover.	71.3	71.4	55.5	71.5	76.7	72.9	60.1
331	2 steers..	.....do.....	73.8	75.0	48.0	75.2	75.5	57.4	74.4
		Average.....	72.6	73.2	51.8	73.4	76.1	74.2	67.3
184	2 sheep..	Swale hay: Fresh-water grasses, sedges, brakes, and flowers.	39.0	.....	.....	34.0	33.0	46.0	44.0
181	2 sheep..	High-grown salt hay (<i>Spartina juncea</i>) with coarse grass.	53.0	.....	.....	63.0	50.0	53.0	47.0
201	3 sheep..	Salt-hay mixture: Fox grass, branch grass, and flat sage, in good condition.	56.4	54.9	69.8	42.6	60.7	54.7	29.7

^a Excluded from averages.

TABLE 3.—*Digestion coefficients classified by animals and food, with maxima, minima, and averages—Continued.*

DIGESTION BY RUMINANTS—Continued.

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
<i>Dried or cured fodders—Continued.</i>									
MEADOW GRASSES—continued.									
9	4 sheep ..	Rowen hay, Kentucky blue grass, orchard grass, and meadow fescue.	<i>P. ct.</i> 64.3	<i>P. ct.</i> 65.2	<i>P. ct.</i> 53.0	<i>P. ct.</i> 69.1	<i>P. ct.</i> 66.5	<i>P. ct.</i> 65.1	<i>P. ct.</i> 64.2
31	4 sheep ..	Rowen hay, mixed grasses	64.4	66.4	40.1	69.0	66.6	67.2	48.6
		Average	64.4	65.8	46.6	69.1	66.6	66.2	47.4
CEREAL PLANTS.									
106	4 sheep ..	Cured barley hay: Kernels not formed.	61.2	62.3	44.8	65.2	61.7	63.3	40.5
351	2 sheep ..	Dent corn fodder, thin seeded, silking, barn cured.	65.5	66.4	51.1	62.8	69.6	65.5	57.3
79	2 sheep ..	Southern dent corn, no ears formed, partly dried.	64.8	67.1	34.9	58.1	74.6	64.5	68.8
92	2 sheep ..	do	69.4	70.6	57.4	65.4	74.2	69.5	70.9
103	2 sheep ..	do	61.3	62.8	43.2	63.4	65.7	61.0	59.1
336	2 sheep ..	Dent corn fodder, "Burrill and Whitman," no ears, some nubbins immature, air-dried under cover.	52.3	53.6	27.8	24.1	46.1	59.2	78.1
337	2 steers ..	No. 336, field cured, poor	60.8	63.4	17.7	29.2	70.5	62.7	74.9
335	2 steers ..	Dent corn fodder, in milk, field cured...	66.0	67.7	49.0	44.0	71.0	67.5	79.5
350	2 sheep ..	Dent corn fodder silage, thick seeded, milk stage, barn cured.	61.0	62.7	24.2	44.3	50.4	69.2	74.6
356	2 sheep ..	do	62.6	64.6	23.3	43.1	60.6	68.0	72.1
358	2 steers ..	Dent corn fodder, "Breck Boston Market" silage milk stage, field cured.	67.4	70.0	37.6	58.6	74.4	66.8	79.2
359	2 sheep ..	do	62.5	64.7	38.1	55.8	68.1	61.6	77.8
349	2 sheep ..	Dent corn fodder, "Breck Boston Market" silage thin seeded, kernels dented and hardening, barn cured.	66.9	69.0	24.5	53.2	60.1	74.0	79.3
347	2 sheep ..	Dent corn fodder, thin seeded, nearly mature, barn cured.	72.6	73.9	34.8	61.6	47.2	81.2	82.3
353	2 sheep ..	Dent corn fodder, thin seeded, mature, barn cured.	69.1	70.7	73.6	57.7	42.8	77.8	78.0
354	2 sheep ..	Dent corn fodder, thick seeded, mature, barn cured.	70.1	72.2	6.6	48.8	60.2	77.0	77.8
377	2 cows ...	Dent corn fodder, "Sibley Sheep Tooth," mature, field cured.	59.8	61.2	19.0	48.8	56.1	65.0	68.5
52	4 steers ..	Dent corn fodder, entire plant with ears cut short not shredded.	61.5	63.8	19.4	37.2	66.0	65.6	72.4
239	2 cows ...	Dent corn fodder, partly air dried .....	.....	<i>b</i> 62.5	.....	<i>b</i> 49.0	<i>b</i> 67.0	<i>b</i> 61.0	<i>b</i> 73.0
		Maximum	72.6	73.9	57.4	65.4	74.6	81.2	82.3
		Minimum	52.3	53.6	6.6	24.1	42.8	59.2	57.3
		Average	64.3	66.1	30.7	50.4	62.2	68.0	73.6
111	3 sheep ..	Flint corn fodder, ears just forming, immature.	69.8	71.4	54.5	70.5	72.3	71.3	67.3
110	3½ sheep ..	Flint corn fodder, ears developed, kernels partly glazed.	67.8	73.6	20.0	61.9	70.7	76.8	73.7
104	2 sheep ..	Flint corn fodder, kernels glazed, partly dried.	72.7	74.2	50.7	67.6	78.6	73.8	64.7
370	2 steers ..	Flint corn fodder, kernels glazed, field cured, finely shredded.	64.2	66.4	33.5	56.8	75.9	64.1	77.5
80	2 sheep ..	Flint corn fodder, many ears fully developed, partly dried.	70.2	72.3	44.2	63.6	79.8	70.3	71.6
93	2 sheep ..	Flint corn fodder, mature, kernels glazed, partly dry.	70.6	72.4	52.9	61.8	75.6	72.6	70.2
252	2 heifers ..	Flint corn fodder, field cured	62.9	.....	.....	37.9	71.5	63.4	75.0
		Maximum	72.7	74.2	54.5	70.5	79.8	76.8	77.5
		Minimum	62.9	66.4	20.0	37.9	70.7	63.4	64.7
		Average	68.6	71.7	42.6	60.0	74.9	70.3	71.4
		Dent and flint corn fodder before kernels glazed, 13 experiments:							
		Maximum	69.8	71.4	57.4	70.5	74.6	74.0	79.5
		Minimum	52.3	53.6	17.7	24.1	46.1	59.2	57.3
		Average	63.9	65.7	37.2	51.7	66.0	66.2	72.2
		Dent and flint corn fodder after kernels glazed, 10 experiments:							
		Maximum	72.7	74.2	52.9	67.6	79.8	81.2	82.3
		Minimum	59.8	61.2	6.6	37.9	42.8	63.4	64.7
		Average	68.2	70.7	30.6	56.7	65.8	72.2	73.9

a Results for 1 sheep excluded.

b Excluded from averages.

TABLE 3.—*Digestion coefficients classified by animals and food, with maxima, minima, and averages—Continued.*

DIGESTION BY RUMINANTS—Continued.

Ref- er- ence No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry mat- ter.	Or- ganic mat- ter.	Ash.	Pro- tein.	Fiber.	Nitro- gen- free ex- tract.	Fat.
<i>Dried or cured fodders—Continued.</i>									
CEREAL PLANTS—continued.									
			<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>
81	2 sheep ..	Sweet corn fodder, some ears fully formed, partly dry.	60.9	63.1	23.4	59.0	70.2	59.4	67.4
94	2 sheep ..	Sweet corn fodder, ears past roasting, partly dry.	69.7	73.5	39.4	61.8	76.7	72.1	76.4
105	2 sheep ..	Sweet corn fodder, ears mature, partly dry.	70.9	72.7	44.0	71.5	74.6	73.1	77.0
		Maximum	70.9	73.5	44.0	71.5	76.7	73.1	77.0
		Minimum	60.9	63.1	23.4	59.0	70.2	59.4	67.4
		Average	67.2	69.8	35.6	64.1	73.8	68.2	73.6
134	2 steers..	Corn stover, ^a shredded	56.8	58.5	28.6	39.9	64.6	55.4	72.2
135	2 steers..	Same material as No. 134, fed wet	60.5	62.4	29.9	36.5	69.6	59.2	74.2
142	2 steers..	Same material as No. 134, finely ground.	53.2	54.6	26.9	35.0	55.9	54.0	77.5
258	4 sheep ..	Same material as No. 134, well cured, bright.	53.5	56.7	.....	16.6	64.3	56.8	76.2
321	2 steers..	Same material as No. 134, fine quality, clean, no mold.	62.0	63.5	44.9	51.7	66.4	63.9	52.1
		Maximum	62.0	63.5	44.9	51.7	69.6	63.9	77.5
		Minimum	53.2	54.6	26.9	16.6	55.9	54.0	52.1
		Average	57.2	59.1	32.6	35.9	64.2	57.9	70.4
140	3 steers..	"New corn product," ^a fed wet.....	63.5	64.2	48.9	59.7	60.6	65.8	82.8
143	3 steers..	"New corn product," steamed fifteen minutes.	55.8	56.1	50.0	59.8	47.6	59.0	79.8
259	2 sheep ..	"New corn product," prepared at station to resemble commercial product.	55.1	57.2	17.3	20.5	62.7	56.6	72.0
		Maximum	63.5	64.2	50.0	59.8	62.7	65.8	82.8
		Minimum	55.1	56.1	17.3	20.5	47.6	56.6	72.0
		Average	58.1	59.2	38.7	46.7	51.0	60.5	78.2
131	2 steers..	Topped corn fodder, ^c cut at harvest....	55.0	59.4	7.5	22.0	70.5	53.5	63.5
367	2 steers..	do	59.7	65.1	.1	55.4	71.4	62.2	71.2
		Average	57.4	62.3	3.8	38.7	71.0	57.9	67.4
144	4 steers ..	Corn blades and husks	63.8	67.1	22.6	47.7	72.9	66.4	58.1
133	2 steers ..	Corn leaves (pulled fodder made up of blades below ear).	64.5	67.8	39.0	64.5	77.5	68.0	55.5
266	1 sheep, 1 goat.	do	55.1	59.4	14.6	62.3	57.4	58.0	64.2
		Average	59.8	63.6	26.8	48.4	67.5	63.0	59.9
132	2 steers ..	Corn husks	72.0	74.2	16.0	29.5	79.5	75.0	32.5
130	2 steers ..	Corn butts	66.5	69.4	11.5	21.0	73.5	69.0	79.5
32	4 sheep ..	Oat hay; fair grade; seeds two-thirds grown.	49.3	50.1	34.6	54.2	43.5	52.0	61.9
59	2 sheep ..	Oat straw	50.3	52.0	.....	.....	57.6	53.2	38.3
277	1 goat, 1 cow.	Sorghum fodder, "pulled"	63.1	64.8	29.5	60.8	70.4	64.5	46.7
279	1 goat....	Sorghum bagasse.....	60.6	62.2	13.4	13.7	63.8	64.8	46.4
CLOVERS.									
61	1 sheep ..	Alsike clover, in full bloom	61.9	62.7	53.0	64.0	51.0	74.1	35.1
78	2 sheep ..	do	62.7	63.6	51.4	68.2	55.9	67.3	65.2
		Average.....	62.3	63.2	52.2	66.1	53.5	70.7	50.2

^a Entire plant except ears.^b Ears and pith removed; remainder of plant finely ground.^c Stalk and leaves above ear.

TABLE 3.—*Digestion coefficients classified by animals and food, with maxima, minima, and averages—Continued.*

DIGESTION BY RUMINANTS—Continued.

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
<i>Dried or cured fodders—Continued.</i>									
CLOVERS—continued.									
			<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>
12	3 sheep ..	Crimson clover, in full bloom, barn dried and cured.	56.3	57.2	47.5	69.3	46.2	61.8	34.9
11	4 sheep ..	Crimson clover, past full bloom, dried in bunches.	54.1	54.8	47.0	68.3	43.7	60.0	49.2
267	1 sheep, 1 goat.	Crimson clover.....	60.8	63.1	53.5	68.8	45.6	70.4	46.2
281	1 goat, 1 cow.	Crimson clover, taken from same mow as material in No. 267, but one year later.	61.1	61.3	59.4	68.2	51.4	66.6	43.3
		Maximum.....	61.1	63.1	59.4	69.3	51.4	70.4	49.2
		Minimum.....	54.1	54.8	47.0	68.2	43.7	60.0	34.9
		Average.....	58.1	59.1	51.9	68.7	46.7	64.6	43.4
58	2 sheep ..	Red clover, partly out of bloom.....	54.9	56.2	.....	55.5	46.2	64.1	53.2
228	2 sheep ..	Red clover.....	55.5	58.0	32.7	59.7	56.1	58.9	48.4
235	3 steers ..	do.....	56.4	60.3	12.2	56.3	52.6	65.1	65.9
236	5 sheep ..	do.....	63.8	66.5	34.5	64.1	63.4	69.6	63.1
312	1 steer ...	Red clover.....	62.0	64.8	37.0	63.0	59.0	71.0	55.0
374	2 sheep ..	do.....	51.8	52.6	.....	49.4	47.7	57.6	42.7
		Maximum.....	63.8	66.5	37.0	64.1	63.4	71.0	66.1
		Minimum.....	51.8	52.6	12.2	49.4	46.2	57.6	42.7
		Average.....	57.4	59.7	29.1	58.0	54.2	64.4	55.2
29	2 sheep ..	Red clover rowen, little past full bloom, field cured.	58.0	59.3	44.1	62.7	49.1	63.6	59.4
30	2 sheep ..	Red clover rowen, little past full bloom, barn cured.	57.9	58.9	47.4	66.9	45.6	61.9	60.2
		Average.....	58.0	59.1	45.8	64.8	47.4	62.8	59.8
62	1 sheep ..	White clover, in bloom for some time...	66.0	66.6	58.5	73.2	60.6	69.5	50.6
LEGUMES OTHER THAN CLOVERS.									
245	1 cow	Alfalfa, in bloom.....	59.4	60.7	.....	68.8	43.3	71.8	48.4
371	2 steers ..	Alfalfa, first crop, fair quality.....	60.2	62.3	40.9	70.3	45.7	71.8	50.6
1	2 steers ..	Alfalfa, second crop, overripe, dry.....	57.0	59.0	38.0	77.0	49.0	64.0	54.0
		Maximum.....	60.2	62.3	40.9	77.0	49.0	71.8	54.0
		Minimum.....	57.0	59.0	38.0	68.8	43.3	64.0	48.4
		Average.....	58.9	60.7	39.5	72.0	46.0	69.2	51.0
268	1 sheep, 1 goat.	Cowpea vine, overripe, leaves fallen....	59.2	60.0	49.5	64.8	42.0	70.6	51.8
278	2 goats...	Peanut vine, good, contained some puffs and some nuts with meats.	59.9	63.1	20.4	63.3	51.9	69.5	65.9
241	2 cows...	Soy bean.....	(a)	72.7	.....	70.0	58.0	82.0	54.0
274	1 goat, 1 cow.	Soy bean, cut when some vines were mature, some vines in bloom, barn cured.	62.4	63.9	.....	71.1	60.8	68.8	29.2
238	6 sheep ..	Hairy vetch (<i>Vicia villosa</i>).....	69.4	71.8	42.2	82.3	61.1	72.9	70.3
MISCELLANEOUS AND MIXED.									
70	1 sheep ..	Buttercup hay, in full bloom.....	56.1	56.6	48.1	56.3	41.1	66.9	69.7
71	1 sheep ..	Whiteweed hay, in full bloom.....	57.8	58.3	52.0	58.4	45.5	66.7	62.0
246	1 cow	Clover and timothy hay.....	54.3	50.8	.....	46.9	45.8	55.5	50.0
340	2 steers ..	Clover and timothy hay; large proportion of clover poorly cured, cut late, had lodged and become wet.	54.8	55.5	42.4	37.7	53.3	59.5	58.0
		Average.....	54.6	53.2	.....	42.3	49.6	57.5	54.0
168	2 sheep ..	Vetch and oats, in late bloom.....	58.1	58.7	.....	59.7	66.0	54.2	18.6

a Excluded from average.

TABLE 3.—*Digestion coefficients classified by animals and food, with maxima, minima, and averages—Continued.*

DIGESTION BY RUMINANTS—Continued.

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
<i>Grains and seeds.</i>			<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>	<i>P. ct.</i>
123	3 sheep ..	Corn meal	89.6	90.7	49.5	76.9	.....	95.3	98.1
244	2 cows ..	do	84.6	82.8	.....	58.3	.....	87.1	91.9
288	1 goat ..	do	86.9	87.7	.....	66.9	.....	94.2	80.5
289	2 goats ..	do	92.4	93.1	.....	58.6	.....	100.0	97.7
121	3 sheep ..	do	93.3	93.9	61.9	78.7	.....	96.5	92.5
		Maximum	93.3	93.9	.....	78.7	.....	100.0	98.1
		Minimum	84.6	82.8	.....	58.3	.....	87.1	80.5
		Average	89.4	89.6	.....	67.9	.....	94.6	92.1
290	1 goat ..	Corn-and-cob meal.....	78.7	79.8	.....	65.2	47.7	85.8	84.6
292	2 goats ..	do	78.6	79.7	.....	45.9	43.6	89.4	83.5
		Average	78.7	79.8	.....	55.6	45.7	87.6	84.1
178	2 sheep ..	Rye meal, good average quality.....	87.3	88.7	.....	84.4	.....	91.9	64.2
87	2 sheep ..	Pea meal, from Canada peas.....	86.8	87.9	43.7	83.2	25.7	93.6	54.5
177	2 sheep ..	Soy-bean meal.....	81.9	84.0	.....	91.1	71.2	76.3	85.7
271	1 cow ..	Cotton seed, raw <i>a</i>	66.1	65.8	43.3	67.8	75.5	49.6	87.1
272	1 steer, 1 heifer.	Cotton seed, roasted.....	55.9	56.8	.....	46.9	65.9	51.4	71.7
<i>By-products.</i>									
CEREALS.									
175	2 sheep ..	Atlas meal	79.6	83.4	.....	72.8	105.7	84.5	91.2
34	4 sheep ..	Bran, coarse	58.7	61.6	17.3	70.2	16.1	67.2	72.1
86	2 sheep ..	Bran, coarse, ground by roller process..	58.8	62.8	.....	73.7	.....	67.5	82.6
102	2 sheep ..	do	59.8	64.0	.....	82.1	36.2	64.1	64.0
139	2 steers ..	Bran from Western wheat.....	67.3	68.6	47.1	82.3	25.1	74.6	54.7
162	2 sheep ..	Bran from spring wheat, good quality..	62.5	66.7	.....	79.6	23.6	70.4	75.6
163	1 sheep ..	Bran from winter wheat, good quality..	66.5	70.0	.....	78.5	56.3	70.4	60.5
179	2 sheep ..	Bran from winter wheat, fair quality...	62.2	66.1	.....	78.2	14.3	71.9	66.7
		Average.....	62.3	65.7	.....	77.8	28.6	69.4	68.0
373	2 steers ..	Bran and shorts—71.5 per cent bran, 28.5 per cent shorts. <i>b</i>	60.2	60.7	7.5	75.8	18.3	64.3	45.0
160	2 sheep ..	Corn-cobs, finely ground.....	59.5	59.7	.....	17.4	65.3	60.0	50.1
291	1 goat ..	do	43.3	.....	.....	21.1	49.7	36.5	.....
		Average.....	51.4	.....	.....	19.3	57.5	48.3	.....
210	3 sheep ..	Cerealine feed.....	90.4	92.7	.....	76.6	82.2	95.3	80.6
161	2 sheep ..	Dried brewers' grains, good quality....	61.6	65.4	.....	79.3	52.6	57.8	91.1
171	2 sheep ..	Gluten feed, containing 17.3 per cent protein.	85.6	86.9	.....	83.0	78.1	89.9	78.6
209	3 sheep ..	Gluten feed, containing 20.8 per cent protein.	91.3	92.1	.....	84.6	92.4	95.5	87.0
170	2 sheep ..	Gluten feed, containing 21.1 per cent protein.	90.2	90.8	.....	88.8	99.6	89.3	94.2
156	2 sheep ..	Gluten feed, containing 23.8 per cent protein.	78.0	79.2	.....	84.9	43.1	81.4	81.4
187	2 sheep ..	Gluten feed, containing 25.3 per cent protein.	86.5	87.4	.....	86.5	77.0	90.1	80.6
		Maximum.....	91.3	92.1	.....	88.8	99.6	95.5	94.2
		Minimum	78.0	79.2	.....	83.0	43.1	81.4	78.6
		Average.....	86.3	87.3	.....	85.6	78.0	89.2	84.4
101	2 sheep ..	Gluten meal, containing 30.8 per cent protein.	87.4	89.1	.....	86.6	.....	90.8	87.8
173	2 sheep ..	Gluten meal, containing 33.5 per cent protein.	92.7	93.1	.....	90.5	21.6	96.7	97.1
174	2 sheep ..	Gluten meal, containing 35.3 per cent protein.	85.5	88.4	.....	91.9	.....	84.0	94.9

a Two trials.*b* Figures include 1 steer only, except for dry matter.

TABLE 3.—*Digestion coefficients classified by animals and food, with maxima, minima, and averages—Continued.*

DIGESTION BY RUMINANTS—Continued.

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
<i>By-products—Continued.</i>									
CEREALS—continued.									
188	2 sheep ..	Gluten meal, containing 35.9 per cent protein.	<i>P. ct.</i> 93.3	<i>P. ct.</i> 91.0	<i>P. ct.</i>	<i>P. ct.</i> 83.8	<i>P. ct.</i>	<i>P. ct.</i> 87.8	<i>P. ct.</i> 97.7
		Maximum	93.3	93.1	.....	91.9	21.6	96.7	97.7
		Minimum	85.5	88.4	.....	83.8	.....	84.0	87.8
		Average	89.7	90.4	.....	88.2	.....	89.8	91.4
213	2 sheep ..	H. O. dairy feed	65.3	68.0	.....	77.8	40.8	69.9	85.5
214	1 sheep ..	H. O. horse feed	70.1	72.6	.....	74.4	35.2	78.7	84.0
172	2 sheep ..	Chicago maize feed	87.1	87.1	.....	85.5	82.5	87.9	91.5
375	1 sheep ..	Malt sprouts	67.1	67.2	.....	80.2	32.9	68.1	104.6
211	3 sheep ..	Quaker oat feed	62.0	65.3	.....	81.1	42.6	67.4	89.0
212	3 sheep ..	Victor corn-and-oat feed	74.7	77.4	.....	70.8	48.3	83.0	86.8
36	4 sheep ..	Wheat middlings No. 2	67.6	70.2	22.6	75.6	29.9	73.5	88.9
85	2 sheep ..	Wheat middlings No. 2, very fine (fancy quality).	74.9	77.2	.....	78.9	.....	82.6	85.1
164	2 sheep ..	Wheat middlings No. 2, good quality, finely ground.	82.5	88.1	.....	84.8	36.3	87.8	84.8
		Maximum	82.5	88.1	22.6	84.8	36.3	87.8	88.9
		Minimum	67.6	70.2	.....	75.6	29.9	73.5	84.8
		Average	75.0	78.5	.....	79.8	33.1	81.3	86.3
OIL-BEARING SEEDS.									
296	2 steers ..	Cotton-seed feed, meal and hulls, 1½ to 1.	56.0	.....	33.9	65.1	47.7	56.4	85.3
294	2 steers ..	Cotton-seed feed, meal and hulls, 2 to 1.	55.1	.....	38.3	64.0	46.2	54.8	84.2
287	2 steers ..	do	52.4	53.7	28.6	63.1	46.3	51.5	83.0
285	2 steers ..	Cotton-seed feed, meal and hulls, 3 to 1.	53.3	55.1	30.9	61.7	46.6	53.5	85.6
192	2 sheep ..	Cotton-seed feed, meal and hulls, 4 to 1.	56.7	57.2	.....	38.6	58.5	58.2	.....
193	1 sheep ..	do	59.8	61.4	.....	29.2	63.8	64.9	98.2
195	2 sheep ..	do	54.4	55.2	32.5	43.3	51.5	58.3	93.3
194	2 sheep ..	do	57.4	58.8	23.0	40.6	58.8	60.1	100.7
364	3 steers ..	Cotton-seed feed, meal and hulls, 5 to 1.	43.0	44.5	15.0	36.0	21.0	54.0	84.0
265	1 cow	Cotton-seed feed, meal and hulls, 7 to 1.	44.9	45.3	34.2	44.3	33.9	51.4	81.0
264	1 cow	Cotton-seed hulls	35.9	36.2	27.1	24.6	27.4	40.3	80.6
273	2 goats ..	do	38.6	39.8	20.9	.....	45.2	37.4	87.1
	1 cow	do	45.0	45.5	21.5	.....	47.3	45.7	89.3
284	2 steers ..	Cotton-seed hulls (fed with cotton-seed meal, 3 to 1).	45.9	46.2	28.2	.....	46.5	51.2	.....
286	2 steers ..	Cotton-seed hulls (fed with cotton-seed meal, 2 to 1).	44.1	44.5	25.3	.....	47.1	48.4	72.8
293	2 steers ..	do	45.1	45.0	47.6	43.5	46.2	51.8	78.4
295	2 steers ..	Cotton-seed hulls (fed with cotton-seed meal, 1½ to 1).	44.3	44.5	37.8	49.9	45.7	53.5	79.6
366	5 steers ..	Cotton-seed hulls	42.4	44.5	20.6	5.7	52.1	30.4	78.1
		Maximum	45.0	45.5	27.1	24.6	47.3	45.7	89.3
		Minimum	35.9	36.2	20.9	5.7	27.4	37.4	80.6
		Average	39.8	40.5	23.2	.....	40.0	41.1	85.7
280	1 goat ...	Cotton-seed meal	65.0	69.1	3.0	85.5	.....	55.1	92.0
282	1 goat ...	do	66.8	69.9	19.8	88.1	46.8	43.8	92.4
	1 cow	do	83.9	87.0	38.0	96.1	100.0	71.0	91.6
283	1 cow	do <i>a</i>	71.6	73.6	34.1	83.5	19.5	65.2	87.3
376	2 sheep ..	do	81.1	80.7	.....	88.7	.....	67.8	103.2
		Maximum	83.9	87.0	38.0	96.1	100.0	71.0	103.2
		Minimum	65.0	69.1	3.0	83.5	19.5	43.8	87.3
		Average	73.7	76.1	23.7	88.4	55.5	60.6	93.3
		Linseed meal, old process, good quality.	78.7	81.2	.....	88.8	57.0	77.6	88.6

a Average of two trials.

TABLE 3.—*Digestion coefficients classified by animals and food, with maxima, minima, and averages—Continued.*

DIGESTION BY RUMINANTS—Continued.

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
<i>By-products—Continued.</i>									
OIL-BEARING SEEDS—continued.									
159	3 sheep ..	Linseed meal, new process, good quality	<i>P. ct.</i> 81.2	<i>P. ct.</i> 84.3	<i>P. ct.</i>	<i>P. ct.</i> 87.2	<i>P. ct.</i> 61.2	<i>P. ct.</i> 85.5	<i>P. ct.</i> 91.9
		.....do.....	77.2	79.2	.....	83.1	99.5	86.6	102.2
158	2 sheep ..	Average.....	79.2	81.8	.....	85.2	80.4	86.1	96.6
169	1 sheep ..								
MISCELLANEOUS.									
176	2 sheep ..	Peanut feed (ground shells, with small amount of nut).	32.1	32.8	.....	70.6	11.7	49.1	89.7
186	2 sheep ..	Rice meal ^b	73.8	81.6	.....	61.9	.....	92.3	91.1
<i>Roots.</i>									
98	2 sheep ..	Mangolds	78.5	84.8	16.4	74.7	42.8	91.3	.....
60	2 sheep ..	Potatoes, raw.....	75.7	77.0	.....	44.7	.....	90.4	13.0
60	1 sheep ..	Potatoes, boiled	80.1	81.2	.....	43.4	.....	92.1	.....
		True average	77.9	79.1	.....	44.1	.....	91.3	13.0
		Weighted average.....	77.4	78.4	.....	44.2	.....	90.9	13.0
99	2 sheep ..	Ruta-bagas.....	87.2	91.1	31.2	80.3	74.2	94.7	84.2
97	2 sheep ..	Sugar beets	94.5	98.7	31.9	91.3	100.7	99.9	49.9
100	2 sheep ..	Turnips, English flat variety.....	92.8	96.1	58.6	89.7	103.0	96.5	87.5

DIGESTION BY SWINE.

GRAINS AND SEEDS.									
216	1	Barley, whole kernel	80.1	80.3	5.4	81.4	48.7	86.6	57.0
54	1	Flint corn, unground.....	82.5	83.4	.....	68.7	38.3	88.8	45.6
218	1	.....do.....	89.7	91.3	.....	89.9	48.7	93.9	77.6
55	1	Corn meal, same material as No. 54, finely ground.....	89.5	91.2	.....	86.1	29.4	94.2	81.7
56	1	Corn and cob meal, whole ear ground...	75.6	76.7	.....	75.7	28.5	83.6	82.0
223	?	Wheat, unground	72.0	.....	44.0	70.0	30.0	74.0	60.0
224	?	Wheat, cracked	82.0	.....	50.0	80.0	60.0	83.0	70.0
220	1	Peas, ground	89.8	91.5	40.3	88.6	77.9	95.1	50.0
BY-PRODUCTS.									
221	1	Wheat bran	77.8	70.7	30.1	74.4	39.1	75.0	78.1
222	1	.....do.....	53.7	.....	.....	75.8	26.9	56.0	65.4
		Average.....	65.8	.....	.....	75.1	33.0	65.5	71.8
217	1	Wheat shorts	74.0	.....	6.6	71.0	25.0	85.5	.....
219	1	.....do.....	79.0	.....	4.1	76.0	48.0	88.0	.....
		Average.....	76.5	.....	5.4	73.5	36.5	86.8	.....
227	2	Linseed meal.....	77.5	.....	10.0	86.0	12.0	85.0	80.0
ROOTS.									
225	2	Potatoes, raw.....	97.0	.....	44.6	84.5	.....	98.1	.....
226	2	Potatoes, cooked.....	95.0	.....	40.0	82.0	.....	97.6	.....

DIGESTION BY HORSES.

DRIED FODDERS.									
148	2	Timothy hay in full bloom, well cured..	43.5	44.1	34.0	21.2	42.6	47.3	47.3
153	2	New corn product.....	49.9	51.7	21.7	67.5	54.6	46.9	59.8

^b Figures include results for one sheep only.

TABLE 3.—*Digestion coefficients classified by animals and food, with maxima, minima, and averages—Continued.*

DIGESTION BY HORSES—Continued.

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
GRAINS.									
151	2	Dent corn, unground	<i>P. ct.</i> 74.4	<i>P. ct.</i> 75.3	<i>P. ct.</i> 26.3	<i>P. ct.</i> 57.8	<i>P. ct.</i> (1)	<i>P. ct.</i> 88.2	<i>P. ct.</i> 47.7
152	2	Corn meal, same material as No. 151, ground	88.4	.....	.....	75.6	(1)	95.7	73.1
149	2	White oats, first quality, unground	72.4	74.1	33.1	86.1	31.1	79.4	82.4
150	2	Oats, same material as No. 149, ground ..	75.7	77.7	29.2	82.4	14.4	86.1	79.9

MAXIMUM, MINIMUM, AND AVERAGE COEFFICIENTS OF DIGESTION.

The following table gives only the maximum, minimum, and average results of the different digestion experiments:

TABLE 4.—*Digestion coefficients by ruminants—maxima, minima, and averages.*

Number of experiments.	Kind and condition of food.	Digestion coefficients.						Fat.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	
<i>Green fodders.</i>								
MEADOW GRASSES.								
3	Hungarian:	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
	Maximum	70.9	72.2	58.7	69.3	74.4	70.0	83.5
	Minimum	63.4	65.6	39.6	61.3	67.8	65.8	52.3
	Average	67.2	68.6	52.2	64.3	71.2	67.9	65.7
4	Barnyard millet:							
	Maximum	73.5	72.9	66.1	73.2	73.9	75.7	71.7
	Minimum	61.5	61.8	52.7	47.2	58.8	64.4	59.8
	Average	66.6	67.0	59.5	61.5	66.5	68.3	64.3
1	Timothy	63.5	65.6	32.2	48.1	55.0	65.7	53.1
1	Timothy rowen	64.8	66.4	45.2	71.7	63.8	67.8	52.9
1	Pasture grass	68.7	70.0	49.7	65.5	74.3	72.5	54.7
1	Mixed-grass rowen	65.6	67.4	46.2	67.4	62.6	71.6	55.2
CEREAL PLANTS.								
2	Barley:							
	Maximum	67.1	68.5	55.9	73.1	65.2	72.8	62.2
	Minimum	64.6	66.5	52.8	70.4	56.3	69.6	57.6
	Average	65.9	67.5	54.4	71.8	60.8	71.2	59.9
8	Dent corn, immature:							
	Maximum	77.5	73.5	60.9	78.1	74.7	77.8	82.5
	Minimum	64.2	67.7	29.0	56.3	58.7	65.8	40.1
	Average	68.8	70.7	45.4	65.2	66.6	73.0	72.0
6	Dent corn, mature:							
	Maximum	70.8	72.2	39.6	59.2	64.8	78.1	85.9
	Minimum	63.6	65.6	4.9	44.3	33.2	70.7	69.4
	Average	66.6	68.5	19.4	52.3	51.6	74.7	77.0
14	Dent corn, all samples:							
	Maximum	77.5	73.5	60.9	78.1	74.7	78.1	85.9
	Minimum	63.6	65.6	4.9	44.3	33.2	65.8	40.1
	Average	67.8	69.8	35.6	59.7	60.2	73.7	74.1
6	Sweet corn:							
	Maximum	77.3	78.1	68.8	77.5	74.9	80.5	81.7
	Minimum	66.8	68.0	50.3	55.5	54.3	73.5	70.3
	Average	71.1	72.2	55.3	64.0	62.9	76.6	75.6
3	Oats:							
	Maximum	62.6	64.5	66.4	75.3	60.2	63.5	70.2
	Minimum	53.8	56.5	44.8	67.8	43.5	61.1	67.5
	Average	59.5	60.9	53.4	71.8	52.8	62.6	69.2

TABLE 4.—*Digestion coefficients by ruminants—maxima, minima, and averages—Cont'd.*

Number of experiments.	Kind and condition of food.	Digestion coefficients.						Fat.
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	
	<i>Green fodders—Continued.</i>							
	CEREAL PLANTS—continued.	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
1	Rye.....	73.4	75.3	55.8	79.4	79.2	70.1	74.5
2	Sorghum:							
	Maximum.....	73.2	75.7	43.1	53.4	74.5	78.3	81.4
	Minimum.....	61.3	62.2	41.6	40.2	43.5	70.8	67.0
	Average.....	67.3	69.0	42.4	46.8	59.0	74.6	74.2
	CLOVERS AND LEGUMES.							
1	Crimson clover.....	67.9	69.1	56.1	77.1	56.1	74.5	66.5
1	Red clover.....	66.1	68.1	55.0	67.0	52.6	77.6	64.5
1	Red clover rowen.....	59.3	60.8	43.4	61.9	52.5	65.3	60.8
1	Canada peas.....	68.4	71.3	42.3	82.0	62.4	71.0	52.4
2	Cowpea:							
	Maximum.....	70.3	76.0	23.9	77.2	61.7	84.2	59.4
	Minimum.....	66.3	72.1	21.6	74.0	57.5	77.0	59.3
	Average.....	68.3	74.1	22.8	75.6	59.6	80.6	59.4
4	Soy bean:							
	Maximum.....	62.8	67.1	24.8	78.8	49.8	76.4	57.7
	Minimum.....	58.6	62.3	7.8	69.3	40.9	70.9	50.1
	Average.....	59.8	64.5	18.9	75.1	47.0	73.2	54.1
1	Common vetch.....	61.8	65.7	17.3	71.4	44.2	76.1	58.6
3	Hairy vetch:							
	Maximum.....	75.4	77.9	49.5	86.3	68.3	80.2	78.9
	Minimum.....	67.4	70.4	38.5	81.0	53.3	70.6	66.7
	Average.....	70.3	73.1	45.1	82.8	61.1	76.3	71.6
	MIXED.							
1	Barley and peas.....	53.4	60.2	46.2	77.2	43.5	61.4	59.7
4	Oats and peas:							
	Maximum.....	70.2	72.0	58.9	81.5	68.3	76.0	73.6
	Minimum.....	61.4	62.9	31.2	70.1	49.1	61.5	57.1
	Average.....	65.4	67.2	45.4	76.1	59.7	67.7	67.7
1	Vetch and oats.....	67.0	68.4	52.7	74.8	68.3	67.9	47.2
	<i>Silage.</i>							
	MAIZE.							
9	Dent corn:							
	Maximum.....	77.3	77.8	51.4	66.8	83.1	81.8	89.7
	Minimum.....	53.8	56.6	13.3	21.5	36.7	54.9	65.3
	Average.....	65.1	67.1	32.2	49.3	66.7	68.6	80.0
6	Flint corn:							
	Maximum.....	78.2	80.2	41.3	73.3	78.5	83.1	87.1
	Minimum.....	69.1	72.1	12.2	52.8	68.9	71.9	72.9
	Average.....	73.1	76.1	32.9	62.8	75.1	76.9	81.8
13	Dent corn, immature:							
	Maximum.....	77.3	77.8	51.4	66.8	83.1	76.9	89.7
	Minimum.....	53.8	56.6	13.3	21.5	36.7	54.9	65.3
	Average.....	65.6	67.4	34.3	51.3	70.6	67.4	80.2
10	Dent and flint corn, mature:							
	Maximum.....	78.2	80.2	41.3	73.3	78.5	83.1	87.2
	Minimum.....	63.1	65.2	12.2	39.4	47.1	71.1	76.9
	Average.....	70.8	73.6	30.3	56.0	70.0	76.1	82.4
1	Sweet corn.....	68.1	70.1	31.9	54.0	71.1	71.8	83.5
	MISCELLANEOUS.							
1	Cowpea.....	59.6	63.4	30.3	57.5	52.0	72.5	62.6
1	Soy bean (steers).....	49.8	53.8	28.0	55.3	42.9	61.2	48.9
1	Soy bean (goats).....	59.0	59.3	56.7	75.7	54.8	52.0	71.9
1	Corn and soy bean.....	69.0	71.0	.....	65.0	64.8	74.9	82.1
1	Millet and soy bean.....	58.8	59.9	.....	58.4	69.4	59.2	72.2
1	Corn, horse beans, and sunflower heads.....	65.6	67.8	41.1	62.7	60.1	72.4	76.7
1	Corn, horse beans, and sunflower plants.....	65.5	69.3	25.6	58.0	65.3	73.7	74.1
	<i>Dried fodders.</i>							
	MEADOW GRASSES.							
1	Black grass (<i>Juncus bulbosus</i>).....	59.5	.....	.....	63.0	60.5	57.0	41.5
1	Black grass (<i>Juncus gerardi</i>).....	53.4	52.1	69.0	54.3	57.4	49.0	45.7

TABLE 4.—*Digestion coefficients by ruminants—maxima, minima, and averages—Cont'd.*

Number of experiments.	Kind and condition of food.	Digestion coefficients.						
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
<i>Dried fodders—Continued.</i>								
MEADOW GRASSES—continued.								
2	Blue joint:	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
	Maximum	68.6	69.8	48.7	70.2	72.4	68.6	52.3
	Minimum	39.9	41.8	10.0	56.5	36.5	43.2	37.0
	Average	54.3	55.8	29.4	63.4	54.5	55.9	44.7
1	Branch grass (<i>Spartina stricta glabra</i>)	56.0	.....	.....	62.5	52.0	54.0	32.0
1	Branch grass (<i>Distichlys spicata</i>)	49.7	48.9	58.1	51.7	56.4	45.7	36.6
1	Chess or cheat	45.0	47.3	23.0	42.0	46.0	49.0	32.0
2	Crab grass:							
	Maximum	56.5	58.9	44.4	55.1	59.7	58.0	50.9
	Minimum	50.7	51.1	30.8	.....	58.4	51.0	42.6
	Average	53.6	55.0	37.6	.....	59.1	54.5	46.8
1	Fox grass (<i>Spartina patens</i>)	54.8	54.5	58.2	59.3	57.4	53.1	36.4
1	Fox grass (<i>Spartina juncea</i> , etc.)	53.0	.....	.....	57.0	51.0	52.0	24.0
1	Flat sage	56.5	57.3	62.0	51.8	60.4	55.1	36.1
1	Hungarian grass	65.0	66.3	47.4	60.0	67.6	67.1	63.9
2	Johnson grass:							
	Maximum	58.4	62.2	56.1	44.7	73.5	59.3	39.5
	Minimum	54.5	54.4	4.8	38.1	57.8	54.4	37.2
	Average	56.5	58.3	30.5	41.4	65.7	56.9	38.4
1	Barnyard millet	57.4	56.8	63.1	63.7	61.6	51.6	46.3
1	Cat-tail millet	62.3	61.6	68.4	62.6	66.5	59.1	46.1
2	Orchard grass:							
	Maximum	58.7	59.7	35.0	60.5	63.3	56.3	56.4
	Minimum	54.4	55.8	.....	58.5	57.5	54.4	51.2
	Average	56.6	57.8	.....	59.5	60.4	55.4	53.8
2	Redtop:							
	Maximum	61.8	63.0	33.7	62.2	61.3	64.6	56.8
	Minimum	57.6	59.3	24.3	60.4	61.2	59.1	44.2
	Average	59.7	61.2	29.0	61.3	61.3	61.9	50.5
1	Redtop and sedge	46.0	48.5	10.1	37.2	55.7	45.6	49.0
17	Timothy:							
	Maximum	65.7	66.8	48.2	60.4	62.1	71.8	74.3
	Minimum	49.5	50.7	23.0	33.5	40.5	55.3	17.6
	Average	56.6	57.9	32.8	46.9	52.5	62.3	52.2
3	Timothy, before or in bloom:							
	Maximum	65.7	66.8	48.2	60.4	62.1	71.8	60.8
	Minimum	55.9	56.7	41.8	51.1	56.6	57.4	51.5
	Average	60.7	61.5	44.2	56.8	58.8	64.3	58.4
4	Timothy, past bloom:							
	Maximum	58.3	59.4	33.2	50.0	53.3	63.9	59.7
	Minimum	49.5	50.7	28.0	40.8	40.5	57.8	34.6
	Average	53.4	54.5	30.3	45.1	47.1	60.4	51.9
1	Timothy rowen	62.2	64.4	56.4	68.0	66.5	63.4	49.5
2	Wild-oat grass:							
	Maximum	68.3	69.1	52.2	68.0	70.6	68.8	62.8
	Minimum	59.6	61.2	17.1	48.6	65.1	62.1	38.2
	Average	64.0	65.2	34.7	58.3	67.9	65.5	50.5
2	Witch grass:							
	Maximum	62.4	63.6	41.5	64.2	67.6	69.0	60.0
	Minimum	59.9	61.0	40.3	52.9	57.9	62.1	54.4
	Average	61.2	62.3	40.9	58.6	62.8	65.6	57.2
1	Black grass and redtop (cove mixture)	54.6	54.3	57.5	47.9	59.7	53.2	40.3
5	Mixed grasses:							
	Maximum	61.4	63.3	.....	63.5	64.5	63.3	51.4
	Minimum	54.1	55.9	.....	54.7	56.4	55.9	46.9
	Average	57.1	58.8	.....	58.5	59.7	58.7	48.5
2	Pasture grass:							
	Maximum	73.8	75.0	55.5	75.2	76.7	75.4	74.4
	Minimum	71.3	71.4	48.0	71.5	75.5	72.9	60.1
	Average	72.6	73.2	51.8	73.4	76.1	74.2	67.3
1	Swale hay	39.0	.....	.....	34.0	33.0	46.0	44.0
1	High grown salt hay	53.0	.....	.....	63.0	50.0	53.0	47.0
1	Salt-hay mixture	56.4	54.9	69.8	42.6	60.7	54.7	29.7
2	Rowen hay:							
	Maximum	64.4	66.4	53.0	69.1	66.6	67.2	48.6
	Minimum	64.3	65.2	40.1	69.0	66.5	65.1	46.2
	Average	64.4	65.8	46.6	69.1	66.6	66.2	47.4
CEREAL PLANTS.								
1	Barley hay	61.2	62.3	44.8	65.2	61.7	63.3	40.5

TABLE 4.—*Digestion coefficients by ruminants—maxima, minima, and averages—Cont'd.*

Number of experiments.	Kind and condition of food.	Digestion coefficients.						
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
	<i>Dried fodders—Continued.</i>							
	CEREAL PLANTS—continued.							
17	Dent corn fodder:	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
	Maximum	72.6	73.9	57.4	65.4	74.6	81.2	82.3
	Minimum	52.3	53.6	6.6	24.1	42.8	59.2	57.3
	Average	64.3	66.1	30.7	50.4	62.2	68.0	73.6
7	Flint corn fodder:							
	Maximum	72.7	74.2	54.5	70.5	79.8	76.8	77.5
	Minimum	62.9	66.4	20.0	37.9	70.7	63.4	64.7
	Average	68.6	71.7	42.6	60.0	74.9	70.3	71.4
13	Dent and flint corn fodders (immature):							
	Maximum	69.8	71.4	57.4	70.5	74.6	74.0	79.5
	Minimum	52.3	53.6	17.7	24.1	46.1	59.2	57.3
	Average	63.9	65.7	37.2	51.7	66.0	66.2	72.2
10	Dent and flint corn fodders (mature):							
	Maximum	72.7	74.2	52.9	67.6	79.8	81.2	82.3
	Minimum	59.8	61.2	6.6	37.9	42.8	63.4	64.7
	Average	68.2	70.7	30.6	56.1	55.8	72.2	73.9
3	Sweet corn fodder:							
	Maximum	70.9	73.5	44.0	71.5	76.7	73.1	77.0
	Minimum	60.9	63.1	23.4	59.0	70.2	59.4	67.4
	Average	67.2	69.8	35.6	64.1	73.8	68.2	73.6
5	Corn stover:							
	Maximum	62.0	63.5	44.9	51.7	69.6	63.9	77.5
	Minimum	53.2	54.6	26.9	16.6	55.9	54.0	52.1
	Average	57.2	59.1	32.6	35.9	64.2	57.9	70.4
3	New corn product:							
	Maximum	63.5	64.2	50.0	59.8	62.7	65.8	82.8
	Minimum	55.1	56.1	17.3	20.5	47.6	56.6	72.0
	Average	58.1	59.2	38.7	46.7	57.0	60.5	78.2
2	Topped corn fodder:							
	Maximum	59.7	65.1	7.5	55.4	71.4	62.2	71.2
	Minimum	55.0	59.4	0.1	22.0	70.5	53.5	63.5
	Average	57.4	62.3	3.8	38.7	71.0	57.9	67.4
1	Corn blades and husks.....	63.8	67.1	22.6	47.7	72.9	66.4	58.1
2	Corn leaves (pulled fodder):							
	Maximum	64.5	67.8	39.0	62.3	77.5	68.0	64.2
	Minimum	55.1	59.4	14.6	34.5	57.4	58.0	55.5
	Average	59.8	63.6	26.8	48.4	67.5	63.0	59.9
1	Corn husks	72.0	74.2	16.0	29.5	79.5	75.0	32.5
1	Corn butts	66.5	69.4	11.5	21.0	73.5	69.0	79.5
1	Oat hay	49.3	50.1	34.6	54.2	43.5	52.0	61.9
1	Oat straw	50.3	52.0	.....	.....	57.6	53.2	38.3
1	Sorghum fodder (pulled)	63.1	64.8	29.5	60.8	70.4	64.5	46.7
1	Sorghum bagasse	60.6	62.2	13.4	13.7	63.8	64.8	46.4
	CLOVERS.							
2	Alsike clover:							
	Maximum	62.7	63.6	53.0	68.2	55.9	74.1	65.2
	Minimum	61.9	62.7	51.4	64.0	51.0	67.3	35.1
	Average	62.3	63.2	52.2	66.1	53.5	70.7	50.2
4	Crimson clover:							
	Maximum	61.1	63.1	59.4	69.3	51.4	70.4	49.2
	Minimum	54.1	54.8	47.0	68.2	43.7	60.0	34.9
	Average	58.1	59.1	51.9	68.7	46.7	64.6	43.4
6	Red clover:							
	Maximum	63.8	66.5	37.0	64.1	63.4	71.0	66.1
	Minimum	51.8	52.6	12.2	49.4	46.2	57.6	42.7
	Average	57.4	59.7	29.1	58.0	54.2	64.4	55.2
2	Red clover rowen:							
	Maximum	58.0	59.3	47.4	66.9	49.1	63.6	60.2
	Minimum	57.9	58.9	44.1	62.7	45.6	61.9	59.4
	Average	58.0	59.1	45.8	64.8	47.4	62.8	59.8
1	White clover	66.0	66.6	58.5	73.2	60.6	69.5	50.6
	LEGUMES OTHER THAN CLOVERS.							
3	Alfalfa:							
	Maximum	60.2	62.3	40.9	77.0	49.0	71.8	54.0
	Minimum	57.0	59.0	38.0	68.8	43.3	64.0	48.4
	Average	58.9	60.7	39.5	72.0	46.0	69.2	51.0
1	Cowpea vine	59.2	60.0	49.5	64.8	42.0	70.6	51.8
1	Peanut vine	59.9	63.1	20.4	63.3	51.9	69.5	65.9
1	Soy bean	62.4	63.9	.....	71.1	60.8	68.8	29.2
1	Hairy vetch	69.4	71.8	42.2	82.3	61.1	72.9	70.3

TABLE 4.—*Digestion coefficients by ruminants—maxima, minima, and averages—Cont'd.*

Number of experiments.	Kind and condition of food.	Digestion coefficients.						
		Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
<i>By-products—Continued.</i>								
MISCELLANEOUS.		<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
1	Peanut feed	32.1	32.8	.....	70.6	11.7	49.1	89.7
1	Rice meal.....	73.8	81.6	.....	61.9	.....	92.3	91.1
<i>Roots.</i>								
1	Mangolds.....	78.5	84.8	16.4	74.7	42.8	91.3	.....
1	Potatoes, raw.....	75.7	77.0	.....	44.7	.....	90.4	13.0
1	Potatoes, boiled.....	80.1	81.2	.....	43.4	.....	92.1	.....
1	Ruta-bagas	87.2	91.1	31.2	80.3	74.2	94.7	84.2
1	Sugar beets.....	94.5	98.7	31.9	91.3	100.7	99.9	49.9
1	Turnips	92.8	96.1	58.6	89.7	103.0	96.5	87.5

For averages of digestion coefficients by swine, see Table 3, p. 81.

For averages of digestion coefficients by horses, see Table 3, pp. 81, 82.

FACTORS AFFECTING DIGESTIBILITY.

The digestibility of any material is affected by two sorts of factors: (1) The kind and condition of the animal used and (2) the method of treatment of the feeding stuff and the quality and combination of the different food materials. It is obvious that in order to secure normal results under any condition the subject must be in sound health.

INFLUENCE OF KIND AND CONDITION OF ANIMAL USED UPON DIGESTIBILITY.

In discussing the influence of the first factor, there are two points which should be considered, namely: (1) How far the results obtained with one animal may be applied to other animals of the same genus, in other words, how great is the influence of individual peculiarities; and (2) how far may the results obtained with one species be applied to another species, that is, can the results obtained with small animals, for instance sheep, be applied to large animals, for instance steers.

EFFECT OF INDIVIDUAL PECULIARITIES.

The influence of individual peculiarities of the experimental animal upon the digestibility of any feeding stuff is a matter of importance. It has been referred to briefly on page 8. Very often when a single food is fed to four sheep as many different coefficients of digestibility are obtained for the total organic matter. The variations are generally not wide, but they nearly always occur, and it seems almost impossible to determine which of the factors—individuality, digestive activity, and irregularity of excretion—is chiefly responsible for them.

The results obtained are doubtless influenced by all three conditions, sometimes working together to increase the variation in one direction and sometimes counterbalancing each other. We can learn of the extent and importance of these apparently unavoidable sources of error only by a study of the actual results reached when several animals are used in ascertaining the digestibility of the same foods. It is a usual practice to make digestion experiments with two or more animals, since it is believed that the average results are a more accurate measure of the true digestibility than would be obtained with one animal.

It is commonly assumed that the results obtained with animals of any given genus are applicable to other animals of the same genus, due allowance being made for the effect of individual peculiarities.

Several American experimenters have used from three to six animals in testing a single food. Digestion experiments were conducted at the Connecticut (Storrs) Station by Woods and Phelps from 1894 to 1896, in which the same animals were used to determine the digestibility of several substances. Similar conditions have prevailed in experiments by Hopkins in Illinois, Jordan in Maine, Patterson in Maryland, Lindsey in Massachusetts, and Hutchinson in Mississippi. All or nearly all the experiments of this kind are summarized in Table 5. Such data form practically our only basis for discussing the nature and extent of the inaccuracies or unreliability of digestion coefficients. The reason for selecting for this table only the experiments where more than two animals were used is that such tests offer a greater opportunity for the observation of variation due to individuality and fluctuations of digestive energy. In the table only the coefficients of digestibility of total organic matter have been included, since it was believed that such data were sufficient for the purpose. The variation observed may be readily seen in the table though the figures representing the actual differences have not been given as in the succeeding tables (Nos. 6-14) in this section.

TABLE 5.—*Influence of individual peculiarity upon digestibility.*

Reference No.	Kind and condition of food.	Coefficients of digestibility of organic matter with animal.					
		No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.
CONNECTICUT.							
Experiments with sheep:							
9	Rowen hay	66.7	63.5	64.1	66.3	.....
10	Timothy rowen hay	64.4	62.0	62.2	62.3	.....
11	Crimson clover hay	52.9	54.9	54.8	56.6	.....
13	Timothy rowen and soy-bean meal	68.5	70.5	71.5	.....	65.4
14	Do	67.0	69.5	66.9	.....	73.7
31	Rowen hay from mixed grasses	65.6	66.2	68.1	65.6	.....
32	Oat hay	50.7	49.2	52.6	47.9	.....
33	Rowen from mixed grasses and bran	62.0	62.7	67.1	63.1	.....
36	Rowen from mixed grasses and middlings	68.5	69.2	69.1	68.7	.....
ILLINOIS.							
Experiments with steers:							
49	Corn silage	64.3	64.1	62.0	65.9	.....
50	Cowpea silage	63.5	63.2	62.9	64.0	.....
51	Soy-bean silage	53.9	53.6	53.4	54.1	.....
52	Corn fodder, cured	68.0	60.9	59.1	67.1	.....

TABLE 5.—*Influence of individual peculiarity upon digestibility*—Continued.

Reference No.	Kind and condition of food.	Coefficients of digestibility of organic matter with animal.					
		No. 1.	No. 2.	No. 3.	No. 4.	No. 5.	No. 6.
MAINE.							
Experiments with sheep:							
90	Hungarian grass	63.4	65.1	65.2	68.8	.....	.....
95	Timothy hay	60.5	57.4	63.7	58.8	.....	.....
96	Do.....	58.8	60.0	59.6	62.3	.....	.....
112	Do.....	55.7	54.0	55.3	.....	.....	.....
113	Sweet corn silage.....	65.7	65.8	63.1	.....	.....	.....
114	Field corn silage.....	77.2	78.2	78.4	.....	.....	.....
115	Timothy hay and silage.....	56.8	60.3	58.4	.....	.....	.....
MARYLAND.							
Experiments with steers:							
138	Corn fodder (shredded, fed wet) and bran.....	64.3	65.8	63.3	67.1	.....	.....
140	New corn product, fed wet	63.6	.....	64.0	64.9	.....	.....
143	New corn product, steamed.....	51.6	57.0	59.6	.....	.....	.....
144	Corn blades and husks	70.9	68.3	63.8	65.4	.....	.....
145	Shredded corn fodder and bran.....	64.3	65.8	63.3	67.1	.....	.....
MASSACHUSETTS.							
Experiments with sheep:							
155	English hay, mixed grasses .....	.....	63.0	63.6	63.3	.....	.....
157	Do.....	57.4	56.3	57.3	57.6	.....	.....
165	Do.....	59.0	59.1	59.3	62.5	.....	.....
MISSISSIPPI.							
Experiments with sheep:							
234	Green vetch.....	81.1	76.7	76.8	79.5	75.6	.....
236	Clover hay.....	69.7	67.4	65.6	63.5	66.2	.....
237	Green vetch.....	69.0	72.0	69.2	70.0	74.7	.....
238	Vetch hay.....	71.4	71.6	71.8	71.1	73.4	71.7
233	Crab-grass hay and cotton-seed meal.....	57.1	55.4	58.7	64.8	60.1	62.1

An examination of the foregoing figures does not make clear the effect of individuality in causing variations in digestion coefficients. If such an effect existed it was counterbalanced in these experiments by conditions having a more marked influence, for we see that where the digestibility of several fodders is studied by the use of the same sheep, any given animal does not uniformly take the same place in the scale of efficiency. In some instances the animal which gives the maximum coefficient with one food shows the minimum with another food. In no series of experiments with the same animals do the coefficients as a whole have a consistent relation with reference to individuality. It is evident that either the animals digested their food more efficiently at one time than at another, or else there was an irregularity of excretion, or both. It seems reasonable to regard the former of these two factors as the more influential, especially where the feces are collected for five to seven days.

In thirty-two experiments in which from three to six sheep have been used in the digestion trials of the same feeding stuff, the difference between the maximum and minimum coefficients in each experiment has varied from 0.6 to 8 per cent, the average variation being 3.7 per cent. In many cases the uniformity of results has been notably good and in others it has been far from satisfactory. All this emphasizes the desirability of using more than two animals for a digestion trial.

INFLUENCE OF KIND OF ANIMAL.

It is a matter of considerable interest and importance to determine whether the same coefficients of digestibility are obtained when any given feeding stuff is consumed by different genera of the same order; whether, for instance, a sheep will digest a given material as thoroughly as a steer or other ruminant. The animals may vary greatly in size as well as in other ways, and how far these differences affect the power of digesting feeding stuffs is a matter of considerable importance. This question has a decided practical value, since it is customary to use the coefficients of digestibility obtained with one genus of animals when computing the value of the material for other animals of the same order. The work of the American stations which has to do with the subject is summarized in the following table:

TABLE 6.—*Influence of size upon digestibility, as shown by using different genera of the same species.*

Reference No.	Number of animals.	Kind of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
339	1 steer	Corn silage	68.1	70.4	35.9	44.0	77.6	69.7	76.6
339	2 sheep	do.	53.8	56.6	13.3	21.5	63.6	54.9	68.3
		Difference in favor of steer.	14.3	13.8	22.6	22.5	14.0	14.8	8.3
360)	3 steers	Corn silage	75.6	76.7	44.5	65.0	81.9	75.3	89.5
362)									
361)	2 sheep	do.	66.4	68.1	30.9	56.0	70.6	68.6	88.5
363)									
		Difference in favor of steers.	9.2	8.6	3.6	9.0	11.3	6.7	1.0
358	2 steers	Corn fodder	67.4	70.0	37.6	58.6	74.4	66.8	79.2
359	1 sheep	do.	62.5	64.7	38.1	55.8	68.1	61.6	77.8
		Difference in favor of steers.	4.9	5.3	-0.5	2.8	6.3	5.2	1.4
277	1 cow	Sorghum fodder	66.3	67.6	41.3	62.2	75.9	66.6	46.3
277	1 goat	do.	59.9	62.0	17.6	59.5	64.9	62.5	47.1
		Difference in favor of cow.	6.4	5.6	23.7	2.7	11.0	4.1	-0.8
281	1 goat	Crimson clover hay	65.4	65.3	67.4	70.0	58.1	69.7	51.4
281	1 cow	do.	56.8	57.2	51.5	66.5	44.7	63.4	35.1
		Difference in favor of goat	8.6	8.1	15.9	3.5	13.4	6.3	16.3
236	5 sheep	Red clover hay	63.8	66.5	34.5	64.1	63.4	69.6	66.1
235	3 steers	do.	56.4	60.3	12.2	56.3	52.6	65.1	65.9
		Difference in favor of sheep.	7.4	6.2	22.3	7.8	10.8	4.5	0.2
274	1 cow	Soy-bean hay	62.7	64.0	47.4	72.1	59.5	66.2	39.7
274	1 goat	do.	62.0	63.7	.....	70.1	62.1	71.5	18.8
		Difference unimportant ..	0.7	0.3	.....	2.0	-2.6	-5.3	20.9
273	1 cow	Cotton-seed hulls	45.0	45.5	21.5	.....	47.3	45.7	89.3
273	2 goats	do.	38.6	38.8	20.9	3.4	45.2	32.5	87.0
		Difference in favor of cow.	6.4	6.7	0.6	.....	2.1	12.2	2.3
282	1 goat	Cotton-seed meal	83.9	87.0	38.0	96.1	100.0	71.0	91.6
282	1 cow	do.	66.8	69.9	19.8	88.1	46.8	43.8	92.4
		Difference in favor of goat	17.1	17.1	18.2	8.0	53.2	27.2	0.8

The conclusion of German experimenters that the different genera of ruminants digest coarse fodders with practically the same efficiency has been generally accepted and taught in this country. American experiments neither confirm nor disprove this conclusion. In nine comparisons with ruminants it will be seen that the higher coefficients of digestibility were obtained in five cases with large animals (steers and cows), and higher coefficients in three cases with small animals (sheep), there being no difference in one case. In three of the four comparisons with steers and sheep included in Table 6, the sheep show a materially larger digestibility. Five comparisons of cows and goats furnish contradictory evidence, the cows affording the larger digestibility in two cases and the goats in two, with no important difference in one case. In view of these results more experiments, or experiments under different conditions, are needed in order to ascertain the influence of this factor upon digestibility.

INFLUENCE OF CONDITION AND TREATMENT OF FEEDING STUFFS UPON THEIR DIGESTIBILITY.

As stated above, one of the principal factors affecting the digestibility of any feeding stuff is the way in which it is prepared and fed. In the present discussion, this factor is treated of under the following heads: (1) The influence of the stage of growth of any crop upon its digestibility; (2) the influence of cooking feeding stuffs; (3) the influence of curing; that is, how much more or how much less thoroughly is a green crop digested than the same material when dried and cured, as hay; (4) the effect of ensiling upon digestibility as compared with feeding any given material green or dried and cured; (5) the influence of grinding; that is, are finely divided foods more thoroughly digested than the same material fed without previous grinding; (6) the influence of wetting or moistening food; (7) the influence of the quantity fed; and (8) the influence of the proportion of nutrients, i. e., the nutritive ratio, upon digestibility.

INFLUENCE OF STAGE OF GROWTH.

As a plant matures, it has been found to change more or less in composition. Usually the soluble bodies which serve as nutritive material for the plant are changed into reserve materials. The formation of the flower and the maturing of the seed are also characterized by more or less marked changes in chemical composition. The influence of stage of growth on the composition of different crops has been studied by a number of experiment stations. The influence of the maturity of any crop on its digestibility may be studied by reference to Table 7, which summarizes the American digestion experiments on this subject.

TABLE 7.—*Influence of stage of growth on digestibility.*

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
17	2 sheep ...	Hungarian grass, green, nearly full grown, beginning to bloom.	70.9	72.2	58.3	69.3	74.4	70.0	83.5
20	2 sheep ...	Hungarian grass, green, more advanced than in No. 17; quite woody.	67.2	68.0	58.7	61.3	71.8	67.8	61.2
		Difference in favor of early cutting.	3.7	4.2	-0.4	6.0	3.1	2.2	22.3
23	2 sheep ...	Sweet-corn fodder, green, two weeks later than in No. 22.	72.7	73.9	50.3	66.5	60.7	78.3	81.7
22	2 sheep ...	Sweet-corn fodder, green, early roasting stage, many small ears.	66.8	68.0	50.7	55.5	51.3	74.1	78.3
		Difference in favor of late cutting.	5.9	5.9	-0.4	11.0	6.4	4.2	3.4
40	2 sheep ...	Oat fodder, green, early-seed to early-milk stage.	62.1	61.8	66.4	72.3	54.6	63.5	70.2
37	1 sheep ...	Oat fodder, green, seeds half to full grown, stems quite woody.	53.8	56.5	49.1	67.8	43.5	61.1	67.5
		Difference in favor of early cutting.	8.3	5.3	17.3	4.5	11.1	2.4	2.7
18	2 sheep ...	Soy-bean fodder, green, plants in bloom.	59.2	66.0	7.8	78.8	50.1	72.0	54.1
21	2 sheep ...	Soy-bean fodder, green, seeds formed to half grown, stems quite hard.	58.6	62.3	20.3	69.3	40.9	73.5	54.3
		Difference in favor of early cutting.	0.6	3.7	-12.5	9.5	9.2	-1.5	-0.2
43	2 sheep ...	Soy-bean fodder, green, from bloom to early seed.	62.8	67.1	22.7	75.2	49.8	76.4	57.7
42	2 sheep ...	Soy-bean fodder, green, early to full bloom.	58.6	62.6	24.8	77.2	47.3	70.9	50.1
		Difference in favor of late cutting.	4.2	4.5	-2.1	-2.0	2.5	5.5	7.6
39	2 sheep ...	Oat-and-pea fodder, green, oats early milk, peas fairly succulent, pods and seeds developed.	65.5	66.0	58.9	79.6	63.8	61.5	69.7
38	1 sheep ...	Oat-and-pea fodder, green, oats turning yellow, stems woody, seeds half grown, some peas full grown.	61.4	62.9	41.9	73.2	49.1	66.9	70.3
		Difference in favor of early cutting.	4.1	3.1	17.0	6.4	14.7	-5.4	-0.6
66	1 sheep ...	Timothy hay, in full bloom.....	65.7	66.8	41.8	60.4	62.1	71.8	51.5
67	1 sheep ...	Timothy hay, past bloom.....	54.1	55.5	28.0	44.5	51.7	61.0	34.6
		Difference in favor of early cutting.	11.6	11.3	13.8	15.9	10.4	10.8	16.9
72	2 sheep ...	Timothy hay, in early bloom, cut July 9.	60.4	61.1	48.2	58.9	57.7	63.7	56.9
73	2 sheep ...	Timothy hay, ten days past bloom, cut July 24.	58.3	59.4	33.2	50.0	53.3	63.9	58.3
		Difference in favor of early cutting.	2.1	1.7	15.0	8.9	4.4	-0.2	-1.4
88	2 sheep ...	Timothy hay, early cut, in full bloom.	55.9	56.7	42.7	51.1	56.6	57.4	60.8
89	2 sheep ...	Timothy hay, late cut, eighteen days past full bloom.	49.5	50.7	29.6	40.8	40.5	57.8	59.7
		Difference in favor of early cutting.	6.4	6.0	13.1	10.3	6.1	-0.4	1.1
		Average difference in favor of early-cut over late-cut timothy.	6.7	6.3	14.0	11.7	7.0	3.4	5.5

These experiments indicate that the influence of the stage of growth varies with different species of plants. With timothy and Hungarian grass and also with oats the approach to ripeness diminished the digestibility, whereas with maize it materially increased the proportion of digestible material. With soy beans the results are contradictory. The above facts have a rational explanation. In the maturity of timothy hay there is an increase in the percentage of woody fiber and a relative decrease in the proportion of the more soluble carbohydrates, but when maize matures and forms its kernels there is a material increase in the proportion of starch and other carbohydrates which are regarded as wholly digestible.

INFLUENCE OF COOKING.

It is commonly believed that cooking has more or less effect upon the digestibility of different foods by animals. Table 8 summarizes the experiments made at the different stations on this subject.

TABLE 8.—*Influence of cooking upon digestibility.*

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
			<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
60	1 sheep ...	Potatoes, boiled.....	80.1	81.2	.....	43.4	.....	92.1	.....
60	2 sheep ...	Potatoes, raw.....	75.7	77.0	.....	44.7	.....	90.3	13.0
		Difference in favor of cooked feed.	4.4	4.2	.....	-1.3	.....	1.8	.....
140	3 steers...	New corn product, fed wet.....	63.5	64.2	48.9	59.7	60.6	65.8	82.8
143	3 steers...	New corn product, steamed fifteen minutes.	55.8	56.1	50.0	59.8	47.6	59.0	79.8
		Difference in favor of raw feed.	7.7	8.1	-1.1	-0.1	13.0	6.8	3.0
225	2 pigs.....	Potatoes, raw.....	97.0	.....	44.6	84.5	.....	98.1	.....
226	2 pigs.....	Potatoes, cooked.....	95.0	.....	40.0	82.0	.....	97.6	.....
		Difference in favor of raw feed.	2.0	.....	4.6	2.5	.....	0.5	.....
271	1 cow.....	Cotton seed, raw <i>a</i>	66.1	65.8	43.3	67.8	75.5	49.6	87.1
272	1 heifer, 1 steer.	Cotton seed, roasted <i>b</i>	55.9	56.8	.....	46.9	65.9	51.4	71.7
		Difference in favor of raw feed.	10.2	9.0	.....	20.9	9.6	-1.8	5.4
313	1 sheep ...	Corn silage, cooked.....	68.6	73.7	31.0	39.4	70.3	74.7	87.2
312	1 sheep ...	Corn silage, whole plant.....	63.6	67.8	32.0	45.4	59.2	71.1	86.1
		Difference in favor of cooked feed.	5.0	5.9	-1.0	-6.0	11.1	3.6	1.1

a Average of two trials.

b The cotton seed lost 17.66 per cent material (mostly water) in roasting.

These experiments show that on the whole cooking of the foods experimented upon was detrimental to digestibility, although with some products the evidence is contradictory. This is true of potatoes

and corn products. Roasting cotton seed materially diminished its digestibility. This was especially marked with the protein. This is in harmony with the investigations made by methods of artificial digestion on the effect of cooking.

INFLUENCE OF DRYING AND CURING.

The curing of any forage crop consists in drying it in such a way that it will keep well. Various fermentative changes take place in drying under ordinary conditions. These changes are not well understood, but it is known that they are important in imparting aroma and flavor to the cured product, and possibly in other ways. Some idea of the effects which drying and other changes incident to curing have upon the digestibility of feeding stuffs may be learned from the comparison in the following table:

TABLE 9.—*Influence upon digestibility of feeding materials green or cured.*

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
91	2 sheep ...	Hungarian hay, same material as in No. 90, air dried.	65.0	66.3	47.4	60.0	67.6	67.1	63.9
90	4 sheep ...	Hungarian grass, freshly cut ..	63.4	65.6	39.6	62.4	67.8	65.8	52.3
		Difference in favor of cured fodder.	1.6	0.7	7.8	-2.4	-0.2	1.3	11.6
369	2 steers ...	Timothy hay, field cured.....	64.1	66.4	31.7	48.5	55.7	67.8	52.3
368	3 steers ...	Timothy, green, freshly cut	63.5	65.6	32.2	48.1	55.6	65.7	53.1
		Difference in favor of cured fodder.	0.6	0.8	-0.5	0.4	0.1	2.1	-0.8
323	1 cow.....	Pasture grass, dried, same material as in No. 322, carefully dried over furnace.	71.3	71.4	55.5	^a 71.5	76.7	72.9	60.1
322	1 cow.....	Pasture grass, green, freshly cut.	68.7	70.0	49.7	^b 65.5	74.3	72.5	54.7
		Difference in favor of cured fodder.	2.6	1.4	5.8	6.0	2.4	0.4	5.4
6	3 sheep ...	Crimson clover, green, from just before to just after bloom.	67.9	69.1	56.1	77.1	56.1	74.5	66.5
12	3 sheep ...	Crimson clover hay in full bloom, barn cured.	56.3	57.2	47.5	69.3	46.2	61.8	34.9
		Difference in favor of green fodder.	11.6	11.9	8.6	7.8	9.9	12.7	31.6
238	6 sheep ...	Hairy vetch (<i>Vicia villosa</i>) hay.	69.4	71.8	42.2	82.3	61.1	72.9	70.3
237	5 sheep ...	Hairy vetch (<i>Vicia villosa</i>), green	68.1	71.0	38.5	81.0	61.8	70.6	69.2
		Difference in favor of cured fodder.	1.3	0.8	3.7	1.3	-0.7	2.3	1.1
357	1 sheep ...	Corn fodder, green, whole plant, milk stage.	69.9	71.5	35.1	61.4	67.8	73.9	79.3
359	1 sheep ...	Corn fodder, same material as in No. 357, field cured.	62.5	64.7	38.1	55.8	68.1	61.6	77.8
		Difference in favor of green fodder.	7.4	6.8	-3.0	5.6	-0.3	12.3	1.5

^a Containing 62.2 per cent digestible albuminoids.
^b Containing 55.5 per cent digestible albuminoids.

Four out of six experiments for the purpose of comparing the digestibility of green and cured fodders show no important differences. In the other two cases included in the table the green fodder was considerably more digestible. The consensus of opinion, based upon experimental evidence, seems to be that when any forage crop is dried under circumstances which admit of no fermentation or loss of the finer parts of the plant (leaves, etc.), the mere withdrawal of water from the tissues causes no change in the digestibility of the different constituents of the plant. It must be remembered, however, that it is not easy to obtain such conditions in curing crops, especially plants like maize, with thick tissues. It is to be noted in the experiments with green and dry corn fodders cited in the table that the dried product was field cured, and must have sustained a loss of some of its valuable constituents by fermentation, thus lowering its digestibility. No explanation of the results of the experiments with clover can be drawn from the evidence at hand.

INFLUENCE OF ENSILING.

When fodder is preserved by ensiling it retains the greater portion of the moisture originally present in it. It undergoes fermentations of different kinds, some of which materially change the character of certain of the important food constituents. When the proper conditions are present the fermentation may also develop a considerable amount of heat. Table 10 summarizes the American experiments which have to do with the effect of ensiling a crop upon its digestibility as compared with the same crop (1) when fed green and (2) when fed after drying and curing:

TABLE 10.—Comparative digestibility of silage as compared with same crops green or cured.

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
ENSEILED AND GREEN CROPS.									
357	1 sheep ...	Green-corn fodder (whole plant, milk stage).	<i>Per ct.</i> 69.9	<i>Per ct.</i> 71.5	<i>Per ct.</i> 35.1	<i>Per ct.</i> 61.4	<i>Per ct.</i> 67.8	<i>Per ct.</i> 73.9	<i>Per ct.</i> 79.3
361 363	} 2 sheep ...	{ Corn silage (same material as in No. 357, ensiled).	66.4	68.1	30.9	56.0	70.6	68.6	88.5
		Difference in favor of ensiled fodder.	3.5	3.4	4.2	5.4	-2.8	5.3	-9.2
ENSEILED AND CURED CROPS.									
79	2 sheep ...	Southern corn fodder (same corn as in No. 82, fed partly dry).	64.8	67.1	34.9	58.1	74.6	64.5	68.8
82	2 sheep ...	Southern corn silage (no ears formed; fresh from silo).	63.2	66.3	14.9	46.6	73.8	65.6	65.3
		Difference in favor of cured fodder.	1.6	0.8	20.0	11.5	0.8	-1.1	3.5
84	2 sheep ...	Sweet-corn silage (some ears fully formed; fresh from silo).	68.1	70.1	31.9	54.0	71.1	71.8	83.5
81	2 sheep ...	Sweet-corn fodder (same corn as in No. 84, fed partly dry).	60.9	63.1	23.4	59.0	70.2	59.4	67.4
		Difference in favor of ensiled fodder.	7.2	7.0	8.5	-5.0	0.9	12.4	16.1

TABLE 10.—Comparative digestibility of silage as compared with same crops green or cured—Continued.

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
		ENSEILED AND CURED CROPS—c't'd.							
80	2 sheep ...	Field-corn fodder (same corn as in No. 83, fed partly dry).	70.2	72.3	44.2	63.6	79.8	70.3	71.6
83	2 sheep ...	Field-corn silage (many ears fully developed, fresh from silo).	69.1	72.1	12.2	52.8	75.2	73.3	82.6
		Difference in favor of cured fodder.	1.1	0.2	32.0	10.8	4.6	-3.0	-11.0
125	2 steers...	Corn silage (made from whole plant), cotton-seed meal, corn meal. Digestibility of entire ration.	72.7	75.3	20.2	69.0	47.3	81.7	81.5
124	2 steers...	Corn stover (pulled fodder, well dried), cotton-seed meal, corn meal. Digestibility of entire ration.	69.8	72.5	7.3	68.5	35.9	75.9	81.0
		Difference in favor of ration containing ensiled fodder.	2.9	2.8	12.9	0.5	11.4	5.8	0.5
127	2 steers...	Corn silage (made from whole plant), gluten meal, germ feed.	67.2	69.3	6.7	72.5	55.3	68.2	86.0
128	2 steers...	Corn stover (topped fodder), gluten meal, germ feed.	59.3	61.5	4.4	71.4	46.9	59.1	81.4
		Difference in favor of ensiled fodder.	7.9	7.8	2.3	1.1	8.4	9.1	4.6
253	2 heifers ..	Corn silage (mature flint corn) ..	69.7	.....	.....	58.7	68.9	71.9	86.4
252	2 heifers ..	Corn fodder (mature flint corn, field cured).	62.9	.....	.....	37.9	71.5	63.4	75.0
		Difference in favor of ensiled fodder.	6.8	.....	.....	20.8	-2.6	8.5	11.4
339	2 sheep ...	Corn silage (Burrill and Whittman corn, no ears, some nubbins, immature, cut short, crushed and tramped in silo).	53.8	56.6	13.3	21.5	63.6	54.9	68.3
336	2 sheep ...	Corn fodder (same corn as in No. 339, air dried under cover).	52.3	53.6	27.8	24.1	46.1	59.2	78.1
		Difference in favor of ensiled fodder.	1.5	3.0	-14.5	-2.6	17.5	-4.3	-9.8
360	} 3 steers ...	Corn silage (whole plant, milk stage).	75.6	76.7	44.5	65.0	81.9	75.3	89.5
362		Corn fodder (same corn as in Nos. 360 and 362, field cured).	67.4	70.0	37.6	58.6	74.4	66.8	79.2
358	2 steers ...								
		Difference in favor of ensiled fodder.	8.2	6.7	6.9	6.4	7.5	8.5	10.3
361	} 2 sheep ...	Corn silage (whole plant, milk stage).	66.4	68.1	30.9	56.0	70.6	68.6	88.5
363		Corn fodder (same corn as in Nos. 361 and 363, field cured).	62.5	64.7	38.1	55.8	68.1	61.6	77.8
359	1 sheep ...								
		Difference in favor of ensiled fodder.	3.9	3.4	-7.2	0.2	2.5	7.0	10.7
378	2 cows	Corn silage (mature corn).....	63.1	65.2	19.7	53.7	47.1	71.7	82.4
377	2 cows	Corn fodder (same material as in No. 378, field cured).	59.8	61.2	19.0	48.8	56.1	65.0	68.5
		Difference in favor of ensiled fodder.	3.3	4.0	0.7	4.9	-9.0	6.7	13.9

But one American experiment is available in which fodder from the same field was compared as to its digestibility in the fresh green state and after ensiling. In this case the outcome was favorable to the green fodder, and this is perhaps explained by the fact that the fermentations of the silo destroy the greater part of the sugar present, a substance which the maize plant contains in comparative abundance, and which is wholly soluble in the digestive juices. On the other hand, the average coefficients of digestibility are not unfavorable to silage. More experiments are needed before definite deductions can be drawn.

Of the ten comparisons here cited of the digestibility of ensiled and cured corn fodders, the ensiled material was found to be more digestible in eight cases. The reasons for this are somewhat a matter of conjecture, a possible explanation being that in these particular cases curing in the field caused a larger loss of soluble protein and carbohydrates than did ensiling. The hardening of the stalks in the field curing and the less perfect mastication resulting, may also be a factor which influences the results.

INFLUENCE OF GRINDING.

It might reasonably be expected that grinding would increase the digestibility of any grain, since the finer the material when taken into the digestive tract the more accessible it is to the action of the digestive juices. The experiments made by the stations, which have to do with this subject, are summarized in Table 11.

TABLE 11.—*Influence upon digestibility of feeding materials whole or ground.*

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
55	1 pig.....	Corn meal, flint corn, finely ground.	89.5	91.2	.....	86.1	29.4	94.2	81.7
54	1 pig.....	Corn, flint corn, unground.....	82.5	83.4	.....	68.7	38.3	88.8	45.6
		Difference in favor of grinding.	7.0	7.8	.....	17.4	-8.9	5.4	36.1
152	2 horses ..	Corn meal, yellow dent, ground.	88.4	.....	.....	75.6	.....	95.7	73.1
151	2 horses ..	Corn, yellow dent, whole kernels	74.4	75.3	26.3	57.8	.....	88.2	47.7
		Difference in favor of grinding.	14.0	.....	.....	17.8	.....	7.5	25.4
150	2 horses ..	Oats, No. 1 white, ground.....	75.7	77.7	29.2	82.4	14.4	86.1	79.9
149	2 horses ..	Oats, No. 1 white, whole.....	72.4	74.1	33.1	86.1	31.1	79.4	82.4
		Difference in favor of grinding.	3.3	3.6	-3.0	-3.7	-16.7	6.7	-2.5
224	Pigs.....	Wheat, cracked kernels.....	82	.....	50	80	60	83	70
223	Pigs.....	Wheat, whole kernels.....	72	.....	44	70	30	74	60
		Difference in favor of grinding.	10	.....	6	10	30	9	10

The testimony of American experiments as to the influence of grinding upon digestion is fairly extensive and is unanimous. In all cases in the experiments with horses and pigs the unground corn, oats, and wheat have been considerably less digestible than the ground material, the difference in favor of the latter varying from 3.3 to 14 per cent.

In this connection it is important to consider the cost of grinding, as has been done by many of the experiment stations, in comparative tests of the feeding value of ground and unground grain. When the feeding stuff must be hauled some distance to the mill, the improvement in its digestibility due to grinding or the greater gains made on the ground grain are oftentimes not sufficient to cover the cost of grinding.

INFLUENCE OF WETTING.

When corn or other grain is stored, it sometimes becomes very hard. Such grain is often soaked before feeding. It is quite commonly believed that soaking improves the palatability of many feeding stuffs. The experiment stations have made a number of feeding tests in which this point has been studied.

Few experiments have been made by the stations on the effect upon digestibility of feeding any material wet or dry. Table 12 summarizes the results on the subject:

TABLE 12.—*Influence upon digestibility of feeding materials wet or dry.*

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
135	2 steers...	Shredded corn fodder, whole plant except ears, fed wet.	60.5	62.4	29.9	36.5	69.6	59.2	74.2
134	2 steers...	Shredded corn fodder, same material as in No. 135, fed dry.	56.8	58.5	28.6	39.9	64.6	55.4	72.2
		Difference in favor of wet feed.	3.7	3.9	1.3	-3.4	5.0	4.8	2.0
138	4 steers...	Shredded corn fodder and wheat bran, fed wet.	63.2	65.1	32.3	73.8	55.7	66.6	68.2
136	2 steers...	Shredded corn fodder and wheat bran, fed dry.	58.7	60.9	25.3	70.0	51.1	62.1	68.4
		Difference in favor of wet feed.	4.5	4.2	7.0	3.8	4.6	4.5	-0.2

The two experiments recorded in the above table on the influence of wetting a ration gave results favorable to the practice. More testimony on this point is needed before definite deductions can be drawn.

Somewhat contradictory results were also obtained in the feeding experiments with wet and dry feeding stuffs made at a number of the experiment stations.

INFLUENCE OF QUANTITY FED.

Many feeding tests have been made at the experiment stations to compare the gains made when different amounts were fed. In this connection it is important to consider the cost of the feeding stuffs and the returns obtained by the different methods of feeding.

In a number of digestion experiments conducted at the stations it has been possible to compare the influence upon digestibility of feeding large and small quantities of a given material. Table 13 gives a summary of these experiments:

TABLE 13.—*Influence upon digestibility of consuming different quantities of food.*

Reference No.	Number of animals.	Kind and condition of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
13	4 sheep ...	Ration composed of soy-bean meal, $\frac{1}{2}$ lb.; timothy rowen hay, 1 lb.	Per ct.	69.0	48.4	77.2	60.6	66.3	74.2
14	4 sheep ...	Ration composed of soy-bean meal, $\frac{3}{4}$ lb.; timothy rowen hay, $1\frac{1}{2}$ lbs.	.....	69.3	45.7	78.2	62.0	66.0	73.1
		Difference in favor of smaller ration.	.....	-0.3	2.7	-1.0	-1.4	0.3	1.1
257	1 cow	Timothy hay, $6\frac{3}{4}$ lbs.; corn meal, 5 lbs.; ground oats, $3\frac{3}{4}$ lbs. ^a	55.6	.....	16.9	39.6	.....	59.1	51.4
256	1 cow	Timothy hay, 10 lbs.; corn meal, $7\frac{1}{2}$ lbs.; ground oats, 5 lbs. ^a	60.1	.....	21.8	44.9	.....	63.0	52.6
		Difference in favor of large ration.	4.5	.....	4.9	5.3	.....	3.9	1.2
261	2 sheep ...	Timothy hay, 50 gms.; corn silage, 400 gms.; ground oats, 50 gms.; ground peas, 60 gms.	74.4	76.3	30.7	75.6	67.2	79.0	82.1
260	2 sheep ...	Timothy hay, 100 gms.; corn silage, 800 gms.; ground oats, 100 gms.; ground peas, 120 gms.	69.4	71.7	13.4	70.8	59.0	75.4	80.5
		Difference in favor of smaller ration.	5.0	4.6	17.3	4.8	8.2	3.6	1.6
263	2 sheep ...	Timothy hay, 150 gms.; corn silage, 250 gms.; malt sprouts, 20 gms.; brewers' grains, 30 gms.; gluten feed, 30 gms.	66.0	68.0	21.5	71.2	62.3	69.2	76.1
262	2 sheep ...	Timothy hay, 300 gms.; corn silage, 500 gms.; malt sprouts, 40 gms.; brewers' grains, 60 gms.; gluten feed, 60 gms.	61.6	64.2	6.9	65.3	60.1	65.0	73.8
		Difference in favor of smaller ration.	4.4	3.8	14.6	5.9	2.2	4.2	2.3

^a This ration was composed of foods from which the fat had been extracted.

It will be seen that the results summarized in the above table are contradictory. In two cases the small ration was more digestible, in another there was no observable difference, while in one case the best results were obtained with the large ration. More experiments are needed before definite conclusions can be drawn regarding the effect of the quantity consumed upon digestibility.

INFLUENCE OF PROPORTION OF NUTRIENTS.

The effect of wide and narrow rations upon digestibility may be studied in a number of experiments which have been carried on at the stations, as will be seen by the following table, summarizing such work:

TABLE 14.—*Influence upon digestibility of feeding rations with wide and narrow nutritive ratios.*

Reference No.	Number of animals.	Kind of food.	Digestion coefficients.						
			Dry matter.	Organic matter.	Ash.	Protein.	Fiber.	Nitrogen-free extract.	Fat.
1	4 sheep ...	Wheat bran, corn meal, hay (wide ration, nutritive ratio=1:8.7).	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
5			.....	69.0	23.0	55.0	55.3	76.4	68.5
3	4 sheep ...	Wheat bran, corn meal, linseed meal, oat-and-pea meal, hay (narrow ration, nutritive ratio=1:4.1).	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>	<i>Per ct.</i>
4			.....	71.6	29.2	73.4	62.5	74.8	70.5
		Difference in favor of narrow ration.	.....	2.6	6.2	18.4	7.2	-1.6	2.0
249	1 steer	Mixed hay, wheat bran, corn meal (wide ration, nutritive ratio=1:8.6).	75.0	.....	.....	67.0	50.9	83.5	70.3
248	1 steer	Mixed hay, wheat bran, cottonseed meal, corn meal (narrow ration nutritive ratio=1:4.3).	69.3	.....	.....	73.4	44.8	77.4	68.7
		Difference in favor of wide ration.	5.7	.....	.....	-6.4	6.1	6.1	1.6
316	6 steers ...	Corn fodder, corn meal (wide ration, average of 6 trials).	76.4	.....	13.2	59.5	69.6	82.4	69.7
317	2 steers ...	Corn fodder, corn meal, cottonseed meal (narrow ration).	73.5	.....	25.2	73.6	64.3	79.	79.5
		Difference in favor of wide ration.	2.9	.....	-12.0	-14.1	5.3	3.4	-9.8
319	2 steers ...	Hay, corn meal, cottonseed meal (narrow ration).	72.1	.....	35.5	73.0	58.4	78.9	72.9
320	2 steers ...	Hay, corn meal (wide ration)...	71.	.....	19.1	64.7	42.1	78.7	65.2
		Difference in favor of narrow ration.	1.1	.....	16.4	8.3	16.3	0.2	6.7

In some of the experiments recorded the wide ration was more digestible and in others the narrow. No constant difference was observed and no definite conclusion can be drawn as to the effect of this factor upon the digestibility.



