or by applying a low flame to the Kjeldahl flask and continuing the aeration for one hour longer. Either of these two ways allowed all of the ammonia to be recovered.

These results are at variance with those of the authors of the previously mentioned article, and I am unable to account for the large quantities of ammonia which remained in the residual liquid. Possibly under the conditions of the experiments, a double salt of ammonia is formed which fails to give up all of the ammonia by aeration alone. Possibly the lower rate of aeration may account for the failure. I hope to be able to investigate this point further.

This failure to recover all of the ammonia, by aeration alone, suggested a modification of the method has been carefully tried out and which it is desired to offer. The modification consists in utilizing the heat of neutralization and in heating the liquid in the Kjeldahl flask over a low flame during the entire period of aeration. Pieces of zinc may be added to prevent bumping. It is well also to use a larger amount of water than the original method calls for. The outlet tube of the Kjeldahl flask should be provided with a glass trap to prevent carrying over of the sodium hydroxide. This modification will allow all of the ammonia to be recovered from ammonia sulfate in one and one-half hours. The liquid in the absorption bottle naturally becomes quite hot from the steam, but no loss of ammonia occurs, provided the standard acid is present in excess. When the absorption of ammonia is complete the absorption bottle may be cooled and the excess of standard acid titrated in the usual manner.

AMMONIUM SULFATE RECOVERED BY MODIFIED METHOD.

Amt. of $(NH_4)_2SO_4$ taken. G.	$(NH_4)_2SO_4$ equivalent to ammonia recovered by aeration and heating. G.	Per cent.	Time of aeration. Hours.
0.2020	0.2015	= 99.76	1.5
0.2013	0.2009	= 99.80	1.5
0.4023	0.4017	= 99.86	1.5

It seems to me that this modification is of especial value in those instances where a powerful suction pump is not available, as the time of distillation by aeration can be shortened to one and one-half hours, or possibly less, by the application of gentle heat during the period of aeration.

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NOTE.

The Survival of Amylase in Dried Fodders.—The wide distribution of amylase in green plants is well known, and the literature on this subject has become quite extensive. No work seems to have been recorded, however, on the fate of this enzyme when the plant is subjected to the

curing process common in agricultural practice. When the possible function of the plant amylase in the digestion of the feed by herbivorous animals is considered, a new interest attaches to the amylase content of the plant and the loss that occurs in curing. This paper presents a preliminary study of the amount of amylase present in four dried fodders, *viz.*, alfalfa hay, clover hay, timothy hay and corn stover.

The method used in this work is based upon the new gravimetric method recently proposed by Sherman.[1] A crude enzyme preparation was obtained in the following manner: 200 g. of the finely ground fodder, about six months old, were allowed to remain in contact with 500 cc. water for one hour at a temperature not exceeding 15° C. The wet mass was then subjected to a pressure of 300 kg. per sq. cm. in a Buchner press. From 350–375 cc. of juice were recovered. Sufficient 95% alcohol was added to bring the alcohol concentration to 35%; a heavy flocculent precipitate resulted which was filtered off as rapidly as possible and rejected. To 350 cc. of the filtrate more alcohol was added until a concentration of 66% was reached. The resulting precipitate was filtered, washed with alcohol and ether and dried *in vacuo* over sulfuric acid. Further purification of the enzyme was not attempted.

The starch used in testing the saccharogenic power of the enzyme was Baker's soluble starch which had been further purified by the method of Ford[2] until a portion gave a clear solution in boiling water, and was practically neutral to rosolic acid. One-tenth of a gram of the enzyme powder was dissolved in 5 cc. water at 40° and added to 45 cc. of a starch solution of the same temperature and of such concentration that the mixture contained exactly 2% soluble starch. The mixture was kept at 40° for one hour. At the expiration of that time 20 cc. of 0.1 *N* NaOH was added to inhibit further enzyme action and the volume made up to 100 cc. with distilled water. The saccharogenic power was found by determining the reducing power of 25 cc. of this solution by Allihn's method. The results are set forth in the following table.

Source.	Enzyme preparation. Amount obtained, g.	Enzyme preparation. Amount used, g.	Total maltose formed, g.	Saccharogenic power.
Alfalfa hay I	1.6	0.1	0.427	4.27
Alfalfa hay II	1.9	0.1	0.400	4.00
Clover hay	2.4	0.1	0.181	1.81
Timothy hay	1.6	0.1	0.043	0.43
Corn stover	1.2	0.1	0.019	0.19

Recalculating these results into terms of amylolytic activity of 100 g. of the dry fodder, the following figures are obtained:

[1] THIS JOURNAL, **32**, 1073 (1910).

[2] *J. Soc. Chem. Ind.*, **23**, 414 (1904).

Fodder.	Saccharogenic power of 100 g.	Fodder.	Saccharogenic power of 100 g.
Alfalfa hay I	7.67	Timothy hay	0.77
Alfalfa hay II	8.50	Corn stover	0.26
Clover hay	4.88		

These figures represent of course minimal values, since a slight loss of enzyme might be expected to occur in each step of the process of preparation. The addition of sodium phosphate and sodium chloride as electrolytes failed to increase the activity, probably because electrolytes were abundantly present in the crude enzyme preparations. It is interesting to note, however, that the fodder retains some amylolytic activity after drying and that this activity is roughly proportional to the number of living cells in the plant at the time of cutting.

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NEW BOOKS.

Chemistry in America. Chapters from the History of the Science in the United States. By EDGAR F. SMITH, Blanchard Professor of Chemistry, University of Pennsylvania. Illustrated. D. Appleton & Company: New York and London. 1914. pp. 356 + xiii. Price, $2.50.

The appearance of this book brings to mind an address by Professor Benjamin Silliman on "American Contributions to Chemistry," which was delivered in August, 1874, at Northumberland, Pa., on the occasion of the celebration of the Centennial of Chemistry, at the grave of Priestley. Dr. Smith has, however, brought to light much matter that was apparently not discovered by Silliman and, by quoting the authors whose work be describes, he is able to give a clearer idea of the nature and value of this work. It must be confessed that most of the chemical publications to which attention is called are of little value and have naturally been forgotten.

It is nevertheless interesting to learn that the earliest contribution to chemistry from this country appeared September 10, 1768, in the Transactions of the American Philosophical Society. The title is "An Analysis of the Chalybeate Waters of Bristol in Pennsylvania." The author is Dr. John de Normandie. Liberal quotations from the article are given which show that the author used the balance. Then follow quotations from an article by James Madison, who was Professor of Chemistry and Natural Philosophy at William and Mary College as early as 1774, and from an article by Dr. Robert McCauslin. The author of the book then remarks: "These communications testify to a spirit of inquiry, at least, on the part of our early devotees to science. They are, further, interesting in that they show the use of the balance as early as 1768 and indicate the steps of analysis."

In 1792 James Woodhouse founded the Chemical Society of Philadelphia. "As far as can be learned, Woodhouse was its first and only presi-