this station has shown that under certain conditions ordinarily met with, the alpha amino nitrogen percentage decreases while in storage. Work on the factors responsible for these changes is progressing but of necessity must cover a long period of time and involve a great number of factors. Several interesting results have been secured to date, and it is felt that they are of enough importance to the field of plant chemistry to be published prior to the main body of the work which will be published at a later date.

One of the most interesting facts discovered is that the term "calcium carbonate added to neutralize the acidity" is most uncertain. Plant samples prepared in the usual manner by adding an excess of $CaCO_3$ have been found in most cases to be distinctly acid, the amount of acidity, of course, depending upon the material preserved. Approximate hydrogen ion determinations have been made on a number of solutions using the colorimetric procedure, and they have been found to range from pH 4.6 to 6.0. The following figures may be given as an example of their acidity. Five cc portions of several of these samples were brought to approximate neutrality, using N/10 NaOH.

Plant	1	4.	drops	N/10	NaOH
"	2	3.	"	"	"
"	3	4.	"	"	"
"	4	8.	"	"	"

From these figures it is at once apparent that the acidity varies considerably, and the solution being acid even when treated with $CaCO_3$, changes may result that we did not expect on theoretical grounds. Perhaps the acidity has little, if any, bearing on carbohydrate changes in these stored extracts, but until all the conditions surrounding this point are critically examined, we must hold such determinations at least open to question. A recent publication[3] takes note of this fact and brings alcoholic solutions to a pH of 5.8 to 6.0 using tenth-normal NaOH to neutralize the acidity of the extracts. This procedure must certainly be recognized as a great advance over the addition of an excess of $CaCO_3$.

While the importance of acidity is not so apparent in the carbohydrate analyses, in the nitrogen changes it is most important, as the following figures show, at least, on the amount of ammonia present. Only one set of figures is given but they are representative. Samples were prepared and analyzed as outlined in my previous work.[2]

[3] Nightingale, Addoms and Blake, "Development and Ripening of Peaches as Correlated with Physical Characteristics, Chemical Composition, and Histological Structure of the Fruit Flesh: III. Macrochemistry," N. J. Agr. Expt. Sta. Bull. 494, 1930.

TABLE I

pH 4.2		pH 8.+	
Date	NH_3	Date	NH_3
2–27–29	2.72	2–27–29	2.14
3–12–29	2.90	3–12–29	4.60
5–22–29	4.00	5–22–29	7.89
11– 7–29	4.62	11– 7–29	8.50

Celery extract in approximately 80 per cent. alcohol. Ammonia in terms of N/50 HCl.

From Table I we see that there is a continuous increase in the amount of ammonia and that this increase is much greater in the alkaline solution. In all the solutions examined (grapes, celery, lettuce, spinach) there has been found some increase in ammonia on standing, both in acid and alkaline solutions. In some, however, the increase has been small and perhaps in samples of other materials would be negligible.

No explanation of these changes can be given until further work is completed, but on the basis of the present work it does not seem that the increase in ammonia results from a deaminization of amino acids even though we do know that the amount of alpha amino nitrogen decreases in some of these solutions.

In conclusion it seems that this question of alcoholic storage has not received the attention it should and that to make our plant analyses of value when we use this procedure a host of questions bearing on this field should be answered. This laboratory is continuing its work, but the need for some satisfactory method of preserving plant material for analyses is so pressing that it offers a ready field to the experimenter, and one that should well repay the research workers.

JAMES E. WEBSTER

OKLAHOMA AGRICULTURAL AND MECHANICAL COLLEGE

BOOKS RECEIVED

BROOM, R. *The Origin of the Human Skeleton.* Pp. iv + 164. Witherby. 10/6.

CLIFFORD, JAMES L. *Experiments in Atomic Science for the Amateur.* Pp. 119. 44 figures. Badger.

Library of Congress. *Report of the Librarian, 1930.* Pp. xvi + 420. Government Printing Office.

MACKAYE, JAMES. *The Dynamic Universe.* Pp. xi + 308. Scribner's. $3.50.

PAYNE, CECILIA H. *The Stars of High Luminosity.* Pp. xiii + 320. Harvard Observatory Monographs. No. 3. McGraw-Hill. $3.50.

RICE, STUART A., Editor. *Methods in Social Science. A Case Book.* Pp. xiii + 822. University of Chicago Press.

VOLTERRA, VITO. *Theory of Functionals.* Pp. xiv + 226. Blackie. 25/.

WILLIAMS, SAMUEL ROBINSON. *Magnetic Phenomena.* Pp. xxii + 230. McGraw-Hill. $3.00.