cumulating in the caves underwent bacterial decomposition with the formation of nitric acid which reacted with the limestone to form calcium nitrate. The calcium nitrate was leached from the cave earth with water, and the resulting solution allowed to percolate through wood-ashes where a reaction took place between the calcium nitrate and potassium carbonate with the formation of potassium nitrate. During the first World War, Thomas L. Bailey explored the caves in the eastern part of Middle Tennessee for the State Geological Survey in order again to determine the value of the caves as possible sources of niter.[3]

The "niter beds" visited by LeConte are also referred to as "niter plantations" and "nitriaries." The largest nitriary, according to Colonel St. John, was located at Columbia, S. C., with 45,000 square feet of surface under cover of open sheds. Here, 122 laborers were employed with 12 horses and 13 mules.[4]

Beds of manure and other nitrogenous animal refuse, loosely piled in contact with wood-ashes derived from oak trees, were periodically moistened with urine. The sheds protected the beds from rain while permitting ready access of air. Decomposition resulted in the formation of ammonia, which, through oxidation, was converted into nitric acid. The nitric acid in turn reacted with the potassium carbonate of the wood-ashes to yield potassium nitrate. The important role played by bacteria in this process for the formation of nitric acid was not discovered until several years after the close of the war. One group of bacteria brings about the formation of ammonia from organic matter, a second group oxidizes the ammonia to form nitrous acid, and a third group oxidizes the nitrous acid to nitric acid.

Some nitrate was also obtained from the earth under tobacco barns, smoke houses and other buildings.

The importance of the nitriaries is evidenced by the fact that the applications of officers of the Niter and Mining Bureau for transfer to field service were denied and by the fact that conscript labor was used to supplement the work of slave and volunteer labor.

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THE EFFECT OF DEHYDRATION UPON THE VITAMIN A CONTENT OF EGGS[1]

TREMENDOUS quantities of fresh eggs are being dried for shipment to our armed forces and to our allies under the Lend-Lease Program. It is vitally important to know whether or not the nutritive value of eggs has been lowered during the dehydration process. Since vitamin A is one of the most labile food factors, a study was made to determine the effect of the dehydration process upon the vitamin A value of dried eggs.

The samples of fresh liquid and dried eggs were collected at a commercial plant which employed a Mojonnier spray drier. In order to minimize sampling error, samples were collected every half hour during a six-hour period from large batches of mixed eggs as the homogenized eggs entered the drier and from the dried eggs a few minutes later. From the samples collected on the hour, definite quantities of each sample were taken and made into one composite sample of liquid eggs and one composite sample of dried eggs. Similarly, the samples collected on the half hour were made into composite samples. In order to test the uniformity of sampling, spectroscopic examinations were made upon the two series of composite samples of liquid and dried eggs as well as upon the individual samples.

For spectroscopic observations, samples were saponified and extracted with ether. Determinations of absorption were made at 3,240 A to indicate changes in vitamin A content and at 4,370 A to indicate changes in total carotenoid content. The characteristic absorption curves of extracts from fresh homogenized and dried eggs were identical in the visible region and very similar in the ultraviolet. The drying process caused less than 2 per cent. loss of carotenoid and ca. 5 per cent. loss of absorption in the ultraviolet. These losses are comparable to the sampling errors, which were small. Losses during storage of both liquid and dried eggs at $-18°$ C. for 14 weeks were no greater than those caused by drying.

For the biological assays, the composite samples of liquid eggs were broken down into weighed portions of 25 grams each which were stored at $-18°$ C. until needed when they were diluted to 500 ml with one per cent. saline solution. The samples were assayed by the usual rat-growth method, using U.S.P. Reference Oil as a standard. The results of the biological assays indicated that little or no deterioration of the vitamin A took place during the dehydration. These samples compared very favorably on a moisture-free basis, with potencies of approximately 44 I.U. per gram.

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[3] Report on the Caves of the Eastern Highland Rim and Cumberland Mountains, "The Resources of Tennessee," VIII, 85–138, 1918.

[4] Official Records of the Union and Confederate Armies, Ser. IV, Vol. 3, p. 698–9.

[1] Journal Paper No. 52 of the Purdue University Agricultural Experiment Station.