Since equally uniform results are possible with either the water or the alcohol extraction and since the alcohol extracts contain a high percentage of acidity in every case, it must follow that some of the acids in silage which are soluble in alcohol are insoluble in water. The amounts of these insoluble in water are different in the various kinds of silage, corn silage having the largest relative amount.

Since preparing the above paper we have learned that Dr. C. A. Browne several years ago obtained similar results when determining the free acid in rice bran and other cattle feeds and found that the increase in acid in the alcoholic extract occurred only in old feeds. Dr. Browne suggests that the liberation of free fatty acids from the oil of the feed was due to the action of lipase and that this might also occur in silage, the fats and oils of the fresh cut material undergoing hydrolysis in the silo.

ON THE DISTRIBUTION OF ANTE-MORTEM ADMINISTERED ARSENIC IN THE HUMAN CADAVER.

By John B. Ekeley.

Received February 18, 1913.

Some years ago the writer made a very complete chemico-legal examination of the organs of G..... R....., who had died from the effects of arsenic, criminally administered. The results of the analyses appeared at the time in a publication of local circulation. The writer is not aware of any other investigation carried out to such an extent upon the body of a person *known to have died from arsenic poisoning.* It is therefore desirable that the results of this investigation find their way into the literature of arsenical poisoning.

The stomach, liver, kidneys, and heart had been removed from the body previous to burial by the physicians who had attended the case, in the belief that the cause of death was arsenical poisoning. An analysis of a very small portion of the stomach contents showing arsenic, it was deemed advisable that the body should be exhumed in order to obtain further material for analysis. The body was found to be in an advanced state of moist decomposition. The casket, being of very thin material, had been soaked through by the moisture percolating through the gravel soil in which it had been buried for six weeks of very wet weather. Samples of earth from both sides of the casket were taken and analyzed for arsenic. It is interesting to note that soil which had been very near to the casket showed marked traces of arsenic, while that a little removed was almost arsenic free. The intestines, brain, spinal cord, a section of the thigh, and the right foot were taken for examination. The intestines were practically empty. The brain was in a liquid condition, about the consistency of thin gravy. The stomach walls, having been removed before burial, were in good condition. They showed about forty square

centimeters of highly congested surface, against which, on opening, the stomach contents were found more or less attached. The stomach contents were mostly of a vegetable nature. The other organs showed nothing unusual.

The parts were finely macerated and analyzed according to Johnson and Chittenden's modification of Gautier's method. This method works splendidly, and its use of nothing but volatil reagents leaves very little to be desired. The different parts were analyzed separately so as to be able to calculate the distribution of the arsenic throughout the body. The contents of the stomach were worked up in a separate portion.

The following table shows the amount of arsenic found, being, of course, only a part of the total amount present in the body:

60 g. stomach contents.....	0.0177 g.	As equivalent to	0.02336 g.	As_2O_3
72 g. stomach walls.....	0.0124 g.	As equivalent to	0.01637 g.	As_2O_3
821 g. liver.....	0.0598 g.	As equivalent to	0.07893 g.	As_2O_3
763 g. intestines.....	0.0218 g.	As equivalent to	0.02877 g.	As_2O_3
193 g. kidneys.....	0.0355 g.	As equivalent to	0.04686 g.	As_2O_3
127 g. heart.....	0.0012 g.	As equivalent to	0.00158 g.	As_2O_3
932 g. brain.....	0.0009 g.	As equivalent to	0.00118 g.	As_2O_3
18 g. spinal cord.....	trace g.	As equivalent to	trace g.	As_2O_3
100 g. thigh.....	0.0003 g.	As equivalent to	0.00039 g.	As_2O_3
82 g. toes.....	0.0002 g.	As equivalent to	0.00026 g.	As_2O_3
Totals.....	0.1498 g.	As equivalent to	0.19770 g.	As_2O_3

The following shows the number of grams of arsenic calculated as arsenious oxide in 100 grams of tissue:

Kidneys.....	0.02466 g.
Stomach walls.....	0.02273 g.
Liver.....	0.00961 g.
Intestines.....	0.00377 g.
Heart.....	0.00125 g.
Thigh.....	0.00039 g.
Toes.....	0.00031 g.
Brain.....	0.00012 g.
Spinal cord.....	Trace

From the above tables it will be seen that by far the greater portion of the arsenic was taken up by the liver and kidneys. When calculated to 100 grams, the greatest amounts were found in the kidneys and stomach walls. The next largest quantities, disregarding the unabsorbed portion in the stomach contents, were found in the liver and intestine walls. The heart came next, while the brain contained only a small amount. Only a small trace found its way into the spinal cord. The figures for the thigh and even the extreme portion of the body, the toes, show that considerable arsenic had been absorbed throughout the body by the muscle tissues, the amount per hundred grams in muscle tissue decreasing toward the extremities.

These results are entirely at variance with those of Scolosuboff[1] who says that arsenic is generally found greatest in the spinal marrow, then in the brain, next in the liver, and least in the muscles. His figures calculated to 100 grams of tissue are, taking the muscle content as 1,

Spinal marrow	37.3
Brain	36.5
Liver	10.8
Muscle	1.0

They agree, however, in general with those of Ludwig[2] whose results were

Liver	0.0010 %
Kidneys	0.0004 %
Muscle	0.00025%
Brain	0.0002 %

and with Chittenden[3] who found in material which came to him partly dry and partly preserved in alcohol

1471 g. intestines, contents, and alcohol	0.314 grain As_2O_3
1482 g. liver and alcohol	0.218 grain As_2O_3
331 g. lungs, and spleen (moist)	0.172 grain As_2O_3
603 g. stomach and contents, and esophagus	0.158 grain As_2O_3
411 g. heart and alcohol	0.112 grain As_2O_3
175 g. trachea, larynx, and tongue (dry)	0.081 grain As_2O_3
336 g. brain and alcohol	0.075 grain As_2O_3
83 g. kidneys (dry)	0.029 grain As_2O_3
155 g. diaphragm (dry)	0.010 grain As_2O_3

Chittenden's analyses were made on one or more 100 grams or so samples and the amount of arsenic in the whole organ then calculated. Any conclusions as to the distribution of arsenic in the cadaver drawn from the analyses submitted in the present paper are more to be relied upon than those drawn from any of those quoted, since the material was all obtained in good condition from a cadaver of known history. The contention of Chittenden that "the finding of arsenic in the brain is an indication amounting almost to positive proof that the poison was not *post mortem*" would seem to be confirmed by my findings in this case.

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THE DEVELOPMENT OF FAT IN THE BLACK WALNUT. II.
(Juglans Nigra)

BY F. M. MCCLENAHAN.

Received January 29, 1913.

The author has called attention[4] to the significant absence of starch, sugar and especially tannin in the ovule of the black walnut at any time

[1] *Bull. soc. chim.*, [2] **24**, 124.

[2] *Med. Jahrbuch.*, 1880.

[3] *Amer. Chem. J.*, **5**, 8.

[4] THIS JOURNAL, 31, 1093.