Title:Prof Geo Bachman Sworn In For The Defendant, 115th To Testify
Category:LEO FRANK TRIAL BRIEF OF EVIDENCE

PROF. GEO. BACHMAN, sworn for the Defendant.

Prof. of Physiology and Physiological Chemistry Atl. Col. Phys. & Surgeons.

Bomar says it takes 4 hours and a half to digest cabbage.

That's for the cabbage to pass from the stomach into the intestines.

The gastric digestion takes 4 hours and a half.

That is the time it is supposed to be in the stomach.

More digestion occurs in the small intestine.

The pancreatic juice helps digestion mostly in the small intestine.

It consists of water in organic salts of which sodium carbonate is the most important, and a number of ferments.

The ordinary time that it takes wheat bread to pass out of the stomach is not less than three hours.

The time for a meal consisting of cabbage cooked for about an hour and wheat biscuit to pass out of the stomach depends a great deal upon the mastication of the food.

The times given above have reference to the most favorable conditions.

If the cabbage is not well chewed it would take considerably longer.

It is impossible to tell exactly how long.

There is no regular rules about how long such substances as cabbage and wheat bread will be found in a person's stomach.

It depends upon too many different factors.

Even in a healthy normal stomach the digestion might be arrested or retarded at any stage, as by strong emotion such as fear and anger or violent physical exercise, or in the state of mastication.

The pyloris prevents passage of food to the intestines except when it is liquid and when there is free hydrochloric acid in the stomach.

If solid food touches the pyloris it closes immediately and nothing passes for a time.

If there were particles of cabbage in the stomach unmasticated in which you can see part of the leaf, they are liable to keep the contents of the

stomach in it seven or eight hours or longer by coming into contact with the pyloris.

The liquid contents would pass into the intestines.

The solid part would be retained for a very long time.

The pyloris works mechanically, and unless a chemist knows to what extent those unchewed portions have affected the pyloris he can give no reliable estimate as to how long such food has been in the stomach.

It's a guess.

The acid in the stomach is hydrochloric, consisting of one atom of hydrogen and one of chlorine.

It combines with protein; only one percent of cabbage is protein, and only about one percent of the cabbage is acted upon in the stomach; the balance is acted upon in the small intestines, and in the mouth, where digestion begins to a certain extent.

The salts in the saliva act on the starch in the cabbage.

This cabbage (State's Exhibit G)

I don't think has been masticated at all so far as these pieces are concerned.

There can be no doubt that these pieces would retard the digestion and the passage from the stomach into the small intestines.

The presence of such cabbage would make it very uncertain as to how long before the food would pass out of the stomach.

I couldn't say, and I don't think anybody could say, how long cabbage and wheat bread in such condition would stay in the stomach.

As far as wheat bread and water are concerned the acidity of the stomach with reference to hydrochloric acid may go between 40 and 60 degrees, which is the average height of the acidity.

With wheat bread in the same shape of biscuit it would take the acidity about an hour to reach that height.

With cabbage we don't know how long it would take it to reach that height.

The acidity may rise very quickly and decline slowly.

It would not necessarily take it one-half of the 4 1/2 hours necessary for digestion.

When the acidity reaches a certain height it begins to descend.

The longer it stays in the stomach it decreases.

If you find 32 degrees in the body of a corpse you cannot tell whether it is on the ascending or decreasing scale.

There is no data on how long it would take the acidity to reach its height in case of cabbage.

If a gallon of the juices of a corpse are taken from the body and a gallon of embalming fluid, which is 8% formalin, is put in, it would destroy the ferments in the pancreatic juices.

There would be no way to tell by testing such a body whether any of that pancreatic juice had been in the lower intestine or not, for the only way to tell that is to find the action of the ferment, and if the formalin has destroyed it you can't tell anything about that at all.

After formalin has been in the body it is difficult to tell how long food has been in the stomach.

Formalin destroys the pepsin in the stomach.

I never heard of hydrochloric acid being measured by drops before, because it is vapor.

If I investigated a stomach and found wheat bread and cabbage, some of which was in that condition (State's Exhibit "G") and approximately a drop and a half or two drops of combined hydrochloric acid, the stomach being taken out during a post mortem on a subject that has been interred nine or ten days, a gallon of the liquids of the body having been taken out and a gallon of embalming fluid put in it, and if I further found the acidity of the stomach to be 32 degrees and practically no pepsin, and practically nothing in the lower intestine, the body having been embalmed with formaldehyde, it would be impossible for me or any other chemist or physician to tell anything about the time it had been in the stomach.

The acidity of the stomach does not suffice to show it, because it may have been higher than that.

There may have been considerable free hydrochloric acid, and that may have disappeared after the body had been embalmed, or even before that some of it will combine with the walls of the body and some passes out.

Not finding anything in the lower intestine would be of no value at all, because the ferments would be destroyed entirely.

CROSS EXAMINATION.

If I took the contents of an absolutely normal stomach and made a positive test and found starch there, and there was nothing to indicate that anything was stopped up, and the intestines six feet below were absolutely clear, and nothing has moved out of the stomach, that would show me nothing as to how far digestion had pressed, for starch is found in the stomach from the beginning of digestion until the last particle of bread has passed out of the stomach and that may be three or four hours.

Medical men are able to compile tables showing how long it takes to digest cabbage and other things by testing for protein, but not for starch, because proteins are the only substances which combine with the hydrochloric acid and which are digested in the stomach, and that can be done only within certain limits and not with mathematical certainty.

If the starch digestion is not interrupted, maltose would be found in the stomach, but if I made a test and found starch, but no maltose, I could express no opinion unless the food had been well masticated, and unless I knew how soon after the food entered the stomach that free hydrochloric acid appeared, because free hydrochloric acid stops the starch digestion.

Finding starch and no maltose would not necessarily mean that digestion had not progressed very far, because free hydrochloric acid may have appeared soon after the food entered the stomach and stopped starch digestion.

In the average case I would say the starch had not been in the stomach very long.

In an ordinary normal stomach you might find maltose before the food reaches the stomach, even in the mouth.

It depends on mastication.

If I did not find it in the mouth or stomach I could not say how long digestion had progressed.

If I was told that these samples (State's Exhibit "G") were taken from a normal stomach within from 40 to 60 minutes after they were taken in it, I would answer that they might have been in the stomach 7 or 8 hours.

When it is said in the books that it takes four hours to digest cabbage it means cabbage which has been well chewed, not cabbage of that kind.

(State's Exhibit "G").

RE-DIRECT EXAMINATION.

Cabbage, like this (State's Exhibit "G") could pass from the body whole.

Before it could be told with any degree of certainty how long after eating a meal of bread and cabbage 32 degrees of hydrochloric acid would be found, numerous observations would have to be made.