

Thought Lab 6.2: An Accident and an Opportunity

Purpose: Infer some of William Beaumont's discoveries about human digestion based on excerpts from his journal.

Procedure

During a period of several years, surgeon William Beaumont gathered gastric juice, had its components identified, introduced food into the hole in trapper Alexis St. Martin's stomach with a string attached so he could retrieve the food particles that were partially digested, and observed the effect of emotion on digestion. Much of what Beaumont discovered was new to science—and contrary to the accepted teachings of the time. He recounted many of his observations and experiments in his journal. The following are selections from that journal.

Excerpt A: I consider myself but a humble inquirer after truths—a simple experimenter. And if I have been led to conclusions opposite to the opinions of many who have been considered luminaries of physiology, and in some instances, from all the professors of this science, I hope the claim of sincerity will be conceded to me, when I say that such difference of opinion has been forced upon me by the convictions of experiment, and the fair deductions of reasoning.

Excerpt B: But from the result of a great number of experiments and examinations, made with a view to asserting the truth of this opinion, in the empty and full state of the organ,... I am convinced that there is no alteration of temperature.

Excerpt C: I think I am warranted, from the result of all the experiments, in saying, that the gastric juice, so far from being “inert as water,” as some authors assert, is the most general solvent in nature of alimentary [food-related] matter—even the hardest bone cannot withstand its action.

Excerpt D: The gastric juice does not accumulate in the cavity of the stomach until alimentary matter is received and excites its vessels to discharge their contents for the immediate purpose of digestion.

Excerpt E: At 2 o'clock P.M.—twenty minutes after having eaten an ordinary dinner of boiled, salted beef, bread, potatoes, and turnips, and drank a gill [about 142 mL] of water, I took from stomach, through the artificial opening, a gill of the contents... Digestion had evidently commenced, and was perceptually progressing, at the time.

Excerpt F: To ascertain whether the sense of hunger would be allayed without food being passed through the oesophagus, he fasted from breakfast time, til 4 o'clock, P.M., and became quite hungry. I then put in at the aperture, three and a half drachms [about 13 mL] of lean, boiled beef. The sense of hunger immediately subsided, and stopped the borborygmus, or croaking noise, caused by the motion of the air in the stomach and intestines, peculiar to him since the wound, and almost always observed when the stomach is empty.

CHAPTER 6	Thought Lab 6.2: An Accident and an Opportunity (cont'd)	BLM 6.2.4
HANDOUT		

Analysis

1. The prevailing view of Beaumont's time was that the stomach heated up when people ate. Beaumont discovered this was not the case. Identify the excerpt in which he makes this statement.
2. It was believed that once food had been ingested the stomach remained idle for an hour or more before digestion began. Identify the excerpt in which Beaumont found otherwise.
3. Many scientists before Beaumont's time asserted that stomach fluid is essentially water. Although some evidence had been produced to disprove this assertion, the belief proved strong enough to persist to the 1800s. What evidence did Beaumont cite in response to this belief?
4. In which excerpt did Beaumont suggest that gastric juice is not stored in the stomach, as was believed to be the case?
5. Summarize the significance of the discoveries Beaumont describes in Excerpt F.

