injected alone intraperitoneally either did not kill or whenever it did, the peritoneum was found filled with free typhoid bacilli. In some of the experiments the bacteria found in the peritoneal cavities of dead guinea-pigs appeared larger than organisms of the same strain taken from agar, having some of the characteristics of which Bail speaks as "Tierische bazillen." In one of our experiments, so far, they have shown resistance to agglutination.

We have carried out several experiments to determine whether or not this "aggressin" action is specific but owing to the difficulties of entirely ridding the anaphylatoxin of the bacteria with which it was produced we have been prevented from coming to definite conclusions. Filtration through Berkefeld candles in a few cases in which it was tried seemed to render the anaphylatoxin harmless when intravenously injected. From a number of experiments carried out with the *Staphylococcus aureus* and the *Bacillus prodigiosus*, however, we are inclined to believe that the action is not specific.

It seems not unlikely to us that the aggressins with which Bail worked were rather of the nature of "anaphylatoxin" and that the invasive properties of bacteria may well be gradually enhanced in the animal body as contact with the serum induces the formation of these substances. We abstain from further theoretical expansion of the ideas suggested by these experiments at present.

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(a) The lipolytic activities of human duodenal contents. (b) The separation of the castor bean lipases.

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Some years ago, Loevenhart[1] showed that extracts of the pancreas and of the liver of various animals contained different lipases. The pancreas extracts exerted greater lipolytic action under comparable conditions toward complex esters such as glyceryl triacetate, and the liver extracts showed greater action toward simple esters such as ethyl butyrate.

[1] *J. Biol. Chem.*, 2, 429 (1907).

During the past year, a number of experiments were carried out on the lipolytic actions of duodenal contents of human beings, both after fasting and after taking food. The Einhorn or the Palefski tube was used to collect the secretions. The behavior was tested, with toluol as antiseptic, toward ethyl butyrate and triacetin under various conditions. The results obtained may be divided into two groups. Greater action toward ethyl butyrate than toward triacetin was observed when no food had been taken for at least twelve hours and the pancreatic juice therefore probably absent. Very much greater action toward triacetin than toward ethyl butyrate was observed in the cases in which food had been taken and the pancreatic juice was present. These relations were observed in a number of cases, but in several cases exceptional results were obtained. Under apparently normal conditions of digestion, when the activity should have been that of the pancreatic juice, that is, very large toward triacetin, a greater action toward ethyl butyrate was observed. Also, when pancreatic juice was expected to be absent, the activity observed in several cases was similar to that observed when it was present. Since, however, relatively few of these cases were observed, the greater activity toward triacetin of duodenal contents containing pancreatic juice, and the greater activity toward ethyl butyrate of contents without pancreatic juice, may for the present therefore be looked upon as the normal.

From the diagnostic point of view, these results indicate that the lipolytic activity, and perhaps also the activities of the other enzymes of duodenal contents, may sometimes be caused by secretions other than the pancreatic juice, even if the conditions for obtaining the latter are apparently favorable.

Since vegetable substances offer a more constant and satisfactory material for an extended experimental investigation, the lipase of the castor bean is being studied from various points of view. Two active preparations have been obtained from castor beans, which correspond to the two lipases just spoken of. One of these is more active toward ethyl butyrate than toward triacetin, the other more active toward triacetin than toward ethyl butyrate. In brief, the former may be obtained by extracting oil- and husk-free castor beans with water and precipitating with ammonium

sulphate or acetone, the latter by extracting the castor bean preparation with 1.5 normal sodium chloride solution and removing the salt by dialysis.

It is interesting to note that the different lipases found in extracts of animal organs, are present in the duodenal contents of human beings and may also be obtained from a vegetable substance such as castor beans.

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Modifications of the Abel vividiffusion apparatus.

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The apparatus for the study of the circulating blood by a process of diffusion devised by Drs. Abel, Rowntree and Turner has impressed us as such a brilliant stroke of inventive genius that we have hastened to imitate it and apply it. The scope of this method is perhaps not yet fully appreciated, but it has interested us particularly in affording a hopeful way of studying the inorganic constituents of the blood, especially in connection with tetany where we think that calcium plays a considerable rôle. The results of these experiments are as yet entirely incomplete but we wish to describe several modifications in the technique which may have been tried and discarded by Dr. Abel but which seem to us to be helpful.

The branched glass end pieces which allow the current of blood a choice of several paths are extremely difficult to make and are very fragile. Unless they are made very precisely, one path becomes easier than another in which blood may circulate slowly or stagnate. With this arrangement blood passes once only through the length of the apparatus and back again, but since the stream bed, with these many possible channels, is very wide, the current must be relatively slow.

We have constructed two or three machines in which the blood circulates back and forth eight or ten times before returning to the vein. In the first model the connections were made as in a