until to date (February 8, 1911), showing only a slight trace around the inner part of the core.

It is interesting to note that early in the season several normal fruits were injured by passing a sharp instrument through them from side to side and allowing them to remain on the tree for 48 hours thereafter. A section was then made through the injury and the guiacum solution applied. The blue color developed first quite strongly around the walls of the injury, followed gradually by the other parts of the pear.

From the preceding it will be readily seen that there exists in the normal living fruit two enzymes, a catalase and an oxidase. The latter is probably most abundant in the early part of the season, gradually decreasing in activity as the fruit approaches maturity and ripens. Furthermore, from the above results it appears that tannin as such does not exist in any part of the normal, uninjured fruit previous to maturity, except possibly a small amount in the peel, but exists as a poly-atomic phenol, which upon injury is acted upon by the oxidase and forms a tannin or tannin-like body having the property of precipitating proteid matter, and at the same time forming a germicidal fluid. This oxidase acts only in an acid solution, and when present in an amount above a certain undetermined minimum. The above conditions are always present in normal immature pomaceous fruits. When normal, immature fruits are subjected to injury by fungi, insects, or mechanical agencies, the action of the oxidase on poly-atomic-phenol is brought about with the effects as stated above.

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THE RELATION OF PERMEABILITY CHANGE TO CLEAVAGE, IN THE FROG'S EGG

UNFERTILIZED eggs (taken from the uterus) of the wood frog, *Rana sylvatica,* were caused to assume the normal orientation in the jelly, and to segment, by electrical stimulation. An alternating current of 60 cycles and 110 volts was passed through the tap water containing the eggs, from platinum electrodes about two inches apart. Stimulation for one second seemed to give the best results. The eggs were placed in fresh water immediately after stimulation.

Similar eggs were caused to segment by mechanical stimulation, even while the jelly remained intact. However, the most reliable mechanical means of inducing cleavage was found to be Bataillon's method of pricking the egg with an extremely fine needle. The first cleavage furrow often passed through the point of puncture.

Thousands of eggs were operated on. Control eggs were kept to both sets of experiments, and showed no segmentation or rotation within the jelly.

The following indirect evidence is given to show that a change in permeability is associated with both of these means of inducing cleavage:

1. These "stimuli," if applied in greater intensity or duration than is necessary to produce cleavage, result in rapid osmotic exchange with the medium and death of the egg.

2. Similar electrical and mechanical "stimuli" produce segmentation in the sea-urchin's egg, a process which I have shown to be preceded by an increase in permeability.

With the exception of the rate of oxidation, this change in permeability is the only known common intermediate step between fertilization or artificial "stimulation," on the one hand, and cleavage on the other. Furthermore, there is indirect evidence to show that increase in permeability is associated with fertilization, in the frog's egg, as I have shown to be the case in the sea-urchin's egg: Backman and Runnström[1] observed that, whereas the osmotic pressure (freezing point lowering) of the ripe ovarian egg of the frog is the same as that of frog's serum, the osmotic pressure of the fertilized egg is the same as that of the pond water in which it lies. Since the frog's

[1] *Biochem. Zeitschr.*, 1909, XXII., 390.

egg does not swell enormously after oviposition, it is improbable that the fall in osmotic pressure is due to the absorption of water. The simplest explanation is that the egg is, at this time, permeable to the internal osmotic substances. That this permeability is only a temporary condition is indicated by the fact that the osmotic pressure of the resulting embryo rises until it reaches that of frog's serum.

In conclusion, I wish to thank the Carnegie Institution, and especially Dr. Chas. B. Davenport, the director of the laboratory.

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THE BACTERIOLOGY OF "TÄTTÉ MELK"

This milk is a favorite food article in Norway and Sweden and is prepared by inoculating sweet cow's milk with leaves of *Pinguicula vulgaris* or with a small amount of the finished product. Sometimes pieces of linen are dipped into the fermented milk, allowed to dry, and used for inoculation. This method makes it feasible to send the material by mail. The milk is thick and slightly stringy and has a slight cheesy taste and odor.

I obtained three samples of the milk and one of the impregnated linen from a reliable source for the purpose of determining the active agents in it. A microscopic examination of the samples showed streptococci in large numbers, mostly in diplococcus form, but frequently in chains of ten to sixteen members. Two species of yeasts were also in abundance, one being an oval yeast, the other a large organism with square ends, often forming long filaments. Besides these organisms there were present some bacilli resembling *B. coli* in shape and size, which proved to be gram-negative. There were also a few large bacilli resembling that group of bacilli, which is found in milk almost invariably and forms larger amounts of acid than ordinary lactic acid bacteria. Microscopic examination of the impregnated linen did not show yeast cells.

Plates were prepared from the four samples in dextrose-litmus-agar and in beerwort agar; litmus milk was inoculated with the original material. The milk, when intended for consumption, is inoculated at body temperature, and therefore all plates and cultures were incubated at 37° C.

There was no difficulty in isolating the different organisms from the plates. The streptococcus could not be distinguished microscopically from *S. lacticus*, but its action on sterile milk differed in that it coagulated but slowly; after coagulation the coagulum was stringy, similar to the coagulum formed by *B. bulgaricus*, but in a smaller degree. The oval yeast gave the microscopic picture of *Saccharomyces cerevisiae*. It ferments lactose and saccharose with violent gas production, levulose slowly, and maltose not at all. Cultures of this yeast in liquid beerwort impart a somewhat stringy consistency to the medium. The other yeast proved to be *Oïdium lactis*, which is always present in milk and in this milk is probably responsible for a slight cheesy taste and odor.

Cultures of the samples were also made in broth with the addition of 2 per cent. dextrose and 0.5 per cent. acetic acid. The presence of the acid restrains most bacteria, so that those forming a large amount of acid can be detected by this method. Dextrose also favors the growth of these bacilli. After twenty-four hours' incubation they were found in abundance in the cultures. These organisms, however, do not multiply readily in milk in competition with other bacteria and I do not believe that they have any bearing upon the production of "Tättė Melk." In fact sterilized milk, inoculated with streptococci, isolated from the samples, and with the two species of yeasts, resembled the original product closely after twenty-four hours. Whether the yeast has anything to do with the stringiness of the milk is doubtful, but it adds to the palatability of the milk. It does not produce nearly as much gas in the milk as it does in pure culture.

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