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Notes from the Botanical Laboratory of Iowa Agricultural College

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An interesting feature connected with the attacks of this fungus and different parts is that a hybrid of *Prunus americana* (DeSoto) and Oregon Plum, (*Prunus domestica* or possibly a Japan Plum) show the disease in a very marked form. This is interesting as indicating that the mother plant was strongly prepotent in carrying over a tendency to take a disease.

The fungus, or what appears to be the same thing, has been cultivated in nutrient agar, but innoculation experiments tried on matured plums did not show the characteristic appearance. The fungus grown in agar is either different or it attacks plums before the epidermal cells are uncuticularized. Field observations indicate that plums become affected early and that these spots increase in size as the season advances.

NOTES FROM THE BOTANICAL LABORATORY OF IOWA AGRICULTURAL COLLEGE.

BY L. H. PAMMEL.

It is a good plan to make a permanent record of some of the work done by undergraduate students, provided the observations are carefully made and recorded. During the winter of 1892 and 1893 there was a serious epidemic of typhoid fever in La Crosse, Wisconsin, which came to my notice through my brother, H. A. Pammel. I was asked to make a bacteriological examination of the water and report. It was impossible for me to do so because of other work on hand at that time. Two senior students, Messrs. McCall and Patton, then at work in the bacteriological laboratory, consented to work it up for their thesis. My brother collected the samples on May 2. They were placed in thoroughly scalded bottles and sent to me by express. Most of the samples of water were submitted to an analysis on May 10.

It is an extremely difficult matter to get satisfactory results made in this way. Some of the successful results in obtaining the typhoid fever bacillus of polluted water have been reported by Mr. Rafter and Dr. H. C. Ernst[1] in this country, and my friend, Dr. Ravold has reported some from Mississippi water taken at St. Louis. The number of successful cultures of this organism from polluted water is, however, somewhat limited, and in some cases, at least, there are doubts as to whether the investigators had the Koch Eberth bacillus or some closely related species. Cassedebat[2], who made an extended study of the river water at Marseilles, found several species closely related to it, but the true typhoid fever bacillus could not be found. This uncertainty is also indicated by the results of Babe's work[3].

The tabulated results of the work of Messrs. McCall and Patton show the number of colonies present to be as follows:

[1]Report on an epidemic of typhoid fever at the village of Springwater, N. Y., in October and November, 1889.

[2]Zur un bacille pseudo typhique trouve dans les eaux de riviere Compt. rend. Acad. des Sci. Vol. CX, 1889. Le bacille d' Eberth-Gaffky et les bacillis pseudo-typhiques dans les eaux de riviere, Ann. d l'Institut Pasteur, 1890, p. 625.

[3]Ueber variabilitat und varietaten des typhus-bacillus, Zeitschrift fur Hygiene, Vol. IX, 1890, p. 823.

Upon an outbreak of typhoid fever in Iron Mountain, Michigan, see Vaughan and Novy: The Medical News, 1888, p. 92. On the detection of typhoid fever bacillus see Foote: Medical Record, New York, 1891, p. 506.

DATE OF EXAMINATION.	NUMBER OF SAMPLE AND SOURCE.	Number of colonies per c. c.	LIQUEFACTION OF GELATINE.	KIND OF ORGANISM MOST ABUNDANT.	COLOR.	Pathogenesis.	Typhoid fever bacillus.	
No. 1. May 10.	Hydrant on Fourth street.	4,000	None.	Bacillus 4.5x1.2u, odorless, without formation of gas. Facult., anaerobes.	Yellow.	Not.	None.	
No. 1. August 16. Water kept on ice.	do.	2,750				Not.	None.	
No. 2. May 10.	Well No. 1128, Third and State streets.	5,725	Both kinds. No. 1 liquefying, No. 2 not.	Bacillus No. 1 2.25 u, in length; No. 2, 2.3u.x 1.5u.	White.	Not.	None.	
No. 2. August 16.	do.	3,600				Not.	None.	
No. 3. May 10.	Mississippi river.	3,000	Both kinds. No. 1 liquefying.	Bacillus, 1.5x.5: strong odor. No. 2, 4x2.3.	White.	Not.	None.	
No. 3. August 17.	do.	1,240				Not.	None.	
No. 4. May 10.	State and Eleventh streets. Well 100 feet deep.	7,804	Liquefying.	Baccillus No. 1, 1.5x.4u. No. 2, 1x3u.	Yellowish white and white: medium greenish.	Not.	None.	
No. 4. August 17.	do.	4,000				Not.	None.	
No. 5. June 2.	Well on Fourth street, Dr. Tillman's residence.	1,345	Both. No. 1 liquefying: No. 2 non-liquefying.	Bacillus, 1.5x6u.; No. 2, 2x.4u.	White. No. 1 greenish tinge.	Not.	None.	
No. 5. August 21.	do.	1,250				Not.	None.	

No. 6. May 10.	Artesian well supply.	6,804	Bacillus, liquefying. Micrococcus, non-liquefying.	Bacillus No. 1, 5x.4u. Micrococcus, .3u.	White. B., medium greenish tinge. M., white.	Not.	None.	Bacillus had odor of stale eggs.
No. 6. August 21.	do.	3,560				Not.	None.	
No. 7. September 1.	Creamery supply. 1. A. C. hydrant.	320				Not.		
No. 7. September 13.	Farm house.	56				Not.		

Some experiments were also made in filtering germs out with the following results:

Water from veterinary hospital filtered through two, three and five thicknesses of filter paper, funnel, flasks and filter paper previously sterilized:

	Unfiltered.	Filtered.
Two filter papers	250 germs per c. c.	129 germs per c. c.
Three filter papers	250 germs per c. c.	24 germs per c. c.
Five filter papers	250 germs per c. c.	4 germs per c. c.

College water supply from main building filtered through a Pasteur-Chamberland filter after sterilization:

Unfiltered.	Filtered.
Fifty germs per c. c.	Sample No. 1, 4 germs per c. c.
	Sample No. 2, none.

Water supply of North Hall standing in tank partially open, filtered through sterilized asbestos:

Unfiltered.	Filtered.
Six hundred and fifty germs per c. c.	4 germs per c. c.

October 11th. Water taken from farm barn and filtered through sterilized glass wool.

Unfiltered.	Filtered.
Four hundred and eighty germs per c. c.	Sample No. 1, 120 germs per c. c.
	Sample No. 2, 100 germs per c. c.

These results show that so far as studying the Bacillus of Typhoid Fever, samples should be collected on the spot; examinations and cultures should be made immediately. A good many species were obtained, but none of these could be identified with the *Bacillus typhi-abdominalis*. Nor were any pathogenic germs present. Water kept in a cool place showed that in the course of several months, there was considerable diminution in the number of germs, but the number was still large for potable purposes. Water can be advantageously filtered by the Pasteur-Chamberland filter, ordinary glass wool; asbestos, and filter papers also remove many of the germs.

BACTERIOLOGICAL STUDY OF MILK AND ITS RELATION TO PUBLIC HYGIENE.

We present here also a very brief report of the work done by Mr. B. F. White on the above topic. By ordinary methods it is an extremely difficult matter to get milk from cows without germs. This, however, was accomplished quite easily by using sterilized milking tubes. The number of germs was determined by taking .25 c. c. of milk and pouring it in a known quantity of agar, making three dilutions. Each tube was poured out on sterilized glass plates and allowed to stand from 48 to 72 hours. They were then counted and some of the species cultivated in the usual media.

The following table shows the results of the work:

Number of sample.	Date of collection.		Number of germs per c. c.	REMARKS.
1	August	27	540,000	Fresh milk in sterilized flask, without precautions, from College farm.
2	September	15	1,976,000	Skim milk from veterinary barn, brought from I. A. C. creamery.
3	September	26	2,246,400	Buttermilk, I. A. C. creamery.
4	September	27	1,701,000	Morning and evening milk brought to I. A. C. creamery. Six hours on road.
5	September	28	1,200,000	Milk from I. A. C. creamery.
6	October	2	3,510,000	College kitchen milk kept in room over night.

Many of the species were cultivated and tests were made with several species and different disinfectants. Corrosive sublimate, 1-1,000; pyoktanin, 1-1,000. They were left in the solution for 30 seconds, 5 minutes and 10 minutes. The material was taken up on the end of a platinum loop and placed in the disinfectant solution with the following results:

A COMMON BACILLUS.

	THIRTY SECONDS.	FIVE MINUTES.	TEN MINUTES.
CORROSIVE SUBLIMATE.	Rapid growth.	Slow.	Very slow.
PYOKTANIN.	Rapid growth.	Quite rapidly.	Very slow.

It was evident from the work that the material in direct contact with the disinfectant was destroyed, but that in the interior of the mass was less readily acted on, and grew, after a longer time, the disinfectant having not destroyed, but merely inhibited the growth of the germ.

Another experiment was tried in this case. The germs were thoroughly distributed in the solution and allowed to remain for a given length of time. A platinum loop full of the material was added to a known quantity of agar, and poured. The plates were allowed to stand twenty-four hours, with the following results:

CORROSIVE SUBLIMATE.

1-1000	Ten minutes.	No growth.
1-2000	Ten minutes.	No growth.
1-3000	Ten minutes.	No growth.
1-4000	Ten minutes.	No growth.

PYOKTANIN.

1-1000	Ten minutes.	No growth.
1-2000	Ten minutes.	No growth.
1-3000	Ten minutes.	No growth.
1-4000	Ten minutes.	Not all destroyed.