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## Klebs-Leoffler Bacillus

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Rocky woods; May; fruit ripe in September; infrequent; Johnson and Jefferson counties. The type was collected along Rock creek, in the southeastern part of Jefferson county. The specimens from Johnson county have heretofore been referred to *V. dentatum* L. It is possible that many Iowa specimens labeled *V. dentatum* L. belong here. Britton and Brown in their Illustrated Flora, Vol. 3, p. 230 in commenting on a form of *V. pubescens* (Ait.) Pursh. say, "A form of this species, or a related plant, with petioles one-half inch long or more, occurs in Missouri." They, doubtless, refer to the above named variety. Further study may warrant the raising of the variety to specific rank.

*V. dentatum* L. This species often reaches a height of twelve to fifteen feet. The leaves are glabrous on both sides or pubescent in the axils of the veins beneath. Drupe globose-ovoid, stone grooved on one side, rounded on the other. This species has been reported from Dubuque, Delaware, Jackson, Johnson, Dallas, and Winnebago counties. We have not been able to examine the material since our attention has been especially given to the genus except as to the Johnson county material which so far as we have seen belongs to the preceding. Hence its reference to *V. dentatum* L., Proc. Iowa Acad. of Sciences, Vol. 6, p. 186, is an error.

Flora of Iowa, p. 69; Iowa Geol. Sur., Vol. 8, p. 197; Macbride Forestry notes of Dubuque county, p. 20, Iowa Geol. Sur., Vol. 10; Iowa Geol. Sur., Vol. 7, p. 106.

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## KLEBS—LEOFFLER BACILLUS.

BY GERSHOM H. HILL, M. D., INDEPENDENCE, IOWA.

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This is a scientific age. The use of scientific methods in the vocation by which a man gains a livelihood makes it both interesting and profitable. The scientific man realizes the necessity of telling the truth, the whole truth and nothing but the truth. Scientific work makes a man careful, accurate and a close observer. The scientific American is somewhat different from the scientific German. The former places a high cash value on his time; he is intensely utilitarian. The geologist is expected to furnish the cities with clay and coal to make brick

for paving and for other purposes. Students in zoology and in botany must help the farmer. Thus the American people are provided with comforts and luxuries. Money is getting plenty and is being freely paid to high priced doctors and to trained nurses. The common people are learning sanitation, thus health is promoted and life prolonged.

I am a new member of the Academy of Sciences, and represent the medical profession. I embrace this opportunity to give evidence that physicians are becoming more and more scientific—hence more skillful. The physician who is not well educated, who cannot use the microscope and who does not persist in the study of medicine is not fit to practice in this one of the learned professions.

The microscope has long been used in medical colleges by students in physiology and in the examination of post mortem specimens. Now this all important instrument is being used daily by the practitioner in diagnosing disease of the kidneys, of the lungs and of other organs. Physicians no longer put money into leather covered books. The cheapest bound books will outlive their usefulness. In order to succeed in the practice of medicine and surgery nowadays the physician must be familiar with the contents of new books and take time to glance through the latest medical journals. The microscope is as necessary to the study of some diseases as the telescope is to the obtaining an exact knowledge of the stars.

Dr. Edwin Klebs of Chicago, formerly of Zurich, discovered the disease germ which is peculiar to diphtheria. Since this same germ was independently detected, identified, and utilized by Loeffler, one of our most famous bacteriologists, the medical profession has decided to call this germ peculiar to diphtheria the Klebs-Loeffler bacillus. While this germ may be found occasionally in the throats of persons who are not sick, and disease of the throat is not diphtheria unless these particular germs are present, the causative agent of diphtheria is this germ. Each case comes from some other case, and this disease is highly contagious. The period of infection is from two to seven days—oftenest two days. The constitutional symptoms of diphtheria are an elevation in the body temperature, slight chilliness, and aching in the bones. In mild cases the indisposition is not sudden nor well marked at first. The local symptoms are swelling about the neck and soreness of the throat.

Diphtheria is a Greek word which means skin. Its chief characteristic is a grayish-yellow membrane on the tonsils and other parts of the throat. This disease is endemic in large cities and more prevalent now than ever before.

Diphtheria is very contagious, being communicated not only by persons having it, but in various ways by persons who have it not, but who have been exposed to the disease by association or contact. Children and young people in delicate health or having enlarged tonsils are most susceptible to it.

The Klebs-Loeffler bacillus is always present in the exudate during diphtheria. It is non-mobile, from 1.5 to 6.5 micromillimeter in length and from .3 to .8 of a micromillimeter in thickness. It is rod-like with rounded ends. It grows best on a mixture of glucose, bouillon, and blood serum at the temperature of the human body, and forms on the surface of the culture medium large grayish-white colonies.

This germ is occasionally found in the mouths of healthy persons when an epidemic prevails; but no matter how badly the throat may be diseased it is not diphtheria if, by repeated and careful examination, the Klebs-Loeffler bacillus cannot be found. These germs do not enter the blood. They are not found in any of the organs of the patient having diphtheria. Although this disease rapidly destroys more or less of the mucous membrane lining the air-passages, yet the greatest mischief is due to poisoning the blood, and the virus causing this condition is called toxin.

Dr. Edward Jenner, 100 years ago, discovered that immunity from smallpox can be secured with cowpox virus, but only five years ago was it found that the serum of the immunized horse will both prevent and cure diphtheria. This medicine is called anti-diphtheretic serum, also antitoxin.

Parke, Davis & Co., the famous pharmaceutical manufacturers of Detroit, have stables in which are kept heifers from which bovine virus is obtained, and horses from which anti-diphtheretic serum is procured. The sero-therapeutic method of treating diphtheria is a great discovery. This way of curing diphtheria has only been in use four years. The remedy is administered with a hypodermic syringe.

Prior to the antitoxin period the average case mortality in hospital and private practice in Chicago was about 35 per cent. In 1896 this was reduced to about 20 per cent, or a little more than three times greater than the mortality shown in the cases

treated by the department of health physicians; in 1897 the average case mortality was only 15 per cent, or more than twice as great as the department cases; and in 1898 the average case mortality was only 12.5 per cent, but still one-third greater than the department case mortality. Hence the total 956 deaths represent 4,785 cases; the 702 cases in 1897 and the 622 deaths in 1898 represent about 9,000 cases.

The conclusions from the above are irresistible that Chicago physicians are using antitoxin in the treatment of diphtheria more generally and more successfully than any other similar number of their brethren elsewhere in the world; and that to the facilities afforded by the department and to the cordial co-operation of the profession with the department of health is due the most astonishing results.

If only the three years before and after the introduction of antitoxin be compared, the decline is still more striking. In 1893-95 there were 4,505 deaths from diphtheria and all croup; in 1896-98 there were only 2,552 such deaths—a decline of 43 per cent, or an actual saving of 1,953 lives in the last three years as compared with the preceding three years. A prominent factor of success in the antitoxin treatment is the early injection of the serum. In Chicago the mortality rate was .28 in those treated the first day; 1.67 in those treated the second day; 3.77 in those treated the third day; 11.39 in those treated the fourth day and 25.37 in all cases treated after the fourth day.

In preparing the blood serum of the immunized horse it is very desirable, of course, to have a uniform standard of strength. One-tenth of 1 c. m. of what Behring calls his normal serum will counteract ten times the minimum of diphtheria poison fatal for a guinea-pig weighing 300 grammes. 1 c. m. of this normal serum he calls an antitoxin unit.

Parke, Davis & Co., also H. K. Mulford Co., Philadelphia, put up antitoxin serum in bottles which they number 1, 2, 3, 4 and 5. No. 1 contains 500 units; No. 2, 1,000 units; No. 3, 1,500 units; No. 4, 2,000 units; No. 5, 3,000 units. It has been determined by experimentation that 500 units will immunize the attending physician, or the nurse or members of the family who have been exposed to diphtheria for a period of thirty days. Unless the case of diphtheria seems to be severe, a dose of 1,000 units is sufficient if administered the first day of the attack. If this treatment is not given until the second day 2,000 units

should be used; on the third day 3,000 units and on the fourth day 4,000 units. If the case seems to be dangerous when first seen by the physician 2,000 or 3,000 units should be given at once, even though it is said to be only the first day of the attack. If the patient does not yield to the treatment very satisfactorily by an improved condition of all the symptoms within thirty-six hours a second 2,000 units should be given.

This serum is now so well adapted for this purpose that it can be administered without hesitation to small children in large doses and can be repeated with impunity when heroic doses are indicated. When this remedy does not work like a charm in this disease it is probable that the patient does not have diphtheria and is not suffering from toxin poison or else that the dose already given was not large enough to neutralize the poison.

Local applications should frequently be made to the throat, and nerve tonics given often at first and continued more moderately until convalescence is completed.

Quarantine rules and regulations are made by boards of health, but in diphtheria every case should remain in quarantine until repeated examinations demonstrate that all the Klebs-Loeffler bacilli have certainly disappeared from the throat.

The best means of disinfection is by fire. Thus, everything which has been exposed to the germs of this disease should be destroyed unless too valuable to be lost. The next method of disinfection is by boiling all articles of clothing which will not be damaged by this process. The best means of disinfecting letters written by patients and other persons in quarantine to be mailed is by sterilizing them with dry heat in an oven. Large ovens are sometimes used, furnished wholly with dry heat or partially with dry heat and partially with live steam, for sterilizing mattresses, pillows and bedding.

The two germicides most commonly in use for disinfecting dishes and various other articles in the sick room are solutions of carbolic acid and of bichloride of mercury. The latter is more desirable because it is without odor. It is inexpensive; can be used freely to soak bedding and wearing apparel in, also to use in washing ceilings, walls and floors.

Formaldehyde gas is par excellence the thing to use in disinfecting valuable garments which would be damaged by washing, or by being roasted in an oven, or by being fumigated with sulphur. Tablets in convenient form and a stove in which to

burn them, and thus create gas, are furnished by Schering & Glatz of New York. H. K. Mulford Co. have also devised a regenerator which converts formaldehyde solution into gas in large quantities so that the work of disinfecting public institutions, like schoolrooms and hospital wards, can be done quickly and in a thoroughly satisfactorily manner. The work of disinfection should always be under the direction of a physician or some other scientific person who knows how strong the disinfectant must be in order to surely destroy all of the disease germs. Some skill is also required in order to properly expose carpets, upholstered furniture, books papers, bedding and wearing apparel so that the disinfecting gas may thoroughly penetrate every part of the thing which requires disinfection.

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## TREES AND SHRUBS OF HAMILTON COUNTY.

H. A. MUELLER.

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Hamilton county is the fourth from the north and the sixth county from the Missouri river, thus placing it in the north central portion of Iowa.

The county is a distinctly prairie country, situated on a level divide between the Des Moines river on the west and Iowa river on the east, neither stream touching the borders of the county.

The general surface of the county is quite level, dotted here and there with small lakes and ponds. Of late, these depressions have been drained and converted into valuable farm land. The only streams of any note within the borders of the county are Boone river in the western and Skunk river in the southeastern part. The latter stream has its source near the east central portion, flows south, crossing the south line about six miles from the southeast corner. Skunk river has cut a narrow, shallow channel through the Wisconsin drift plain, and there are no banks worth mentioning. The timber along this stream is limited to an area about ten miles long and about one-fourth mile wide.

The only hills of any importance in the county are found along the Boone river. This stream enters the county about