

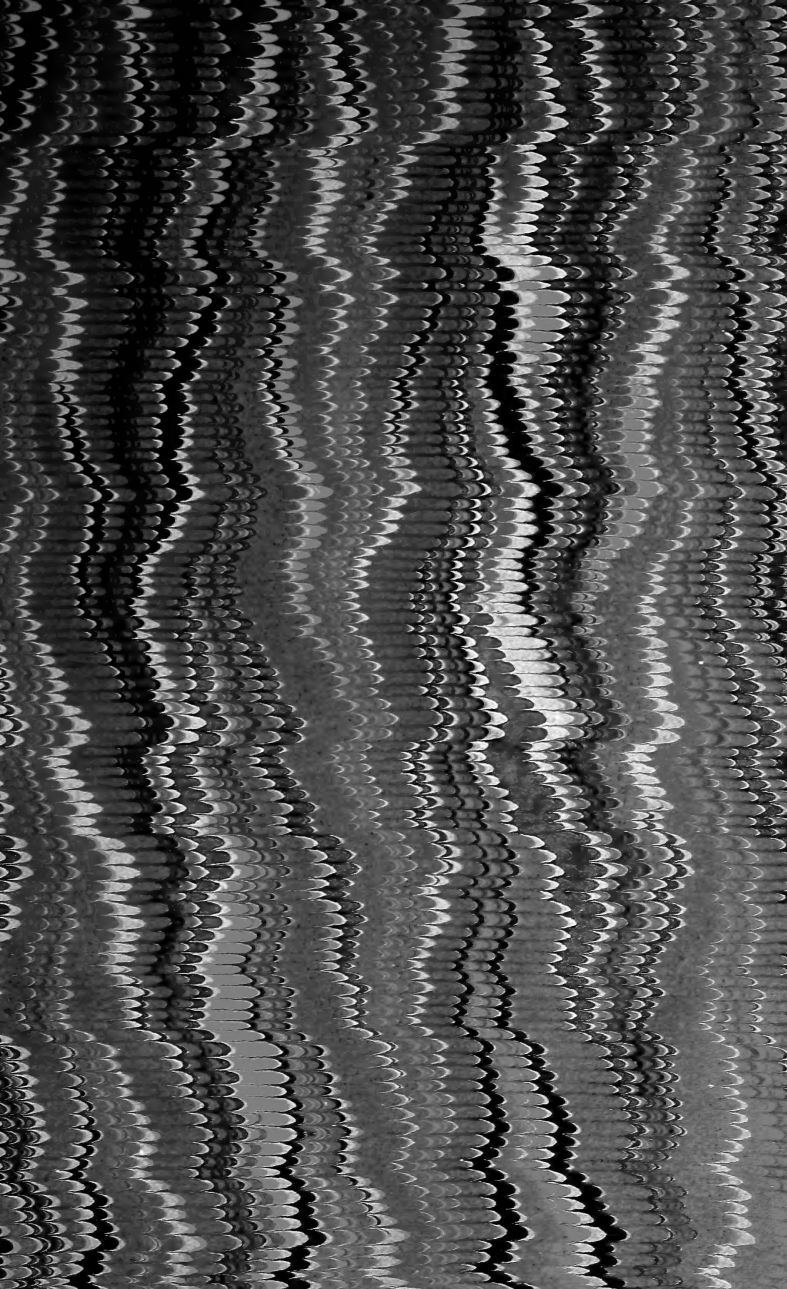
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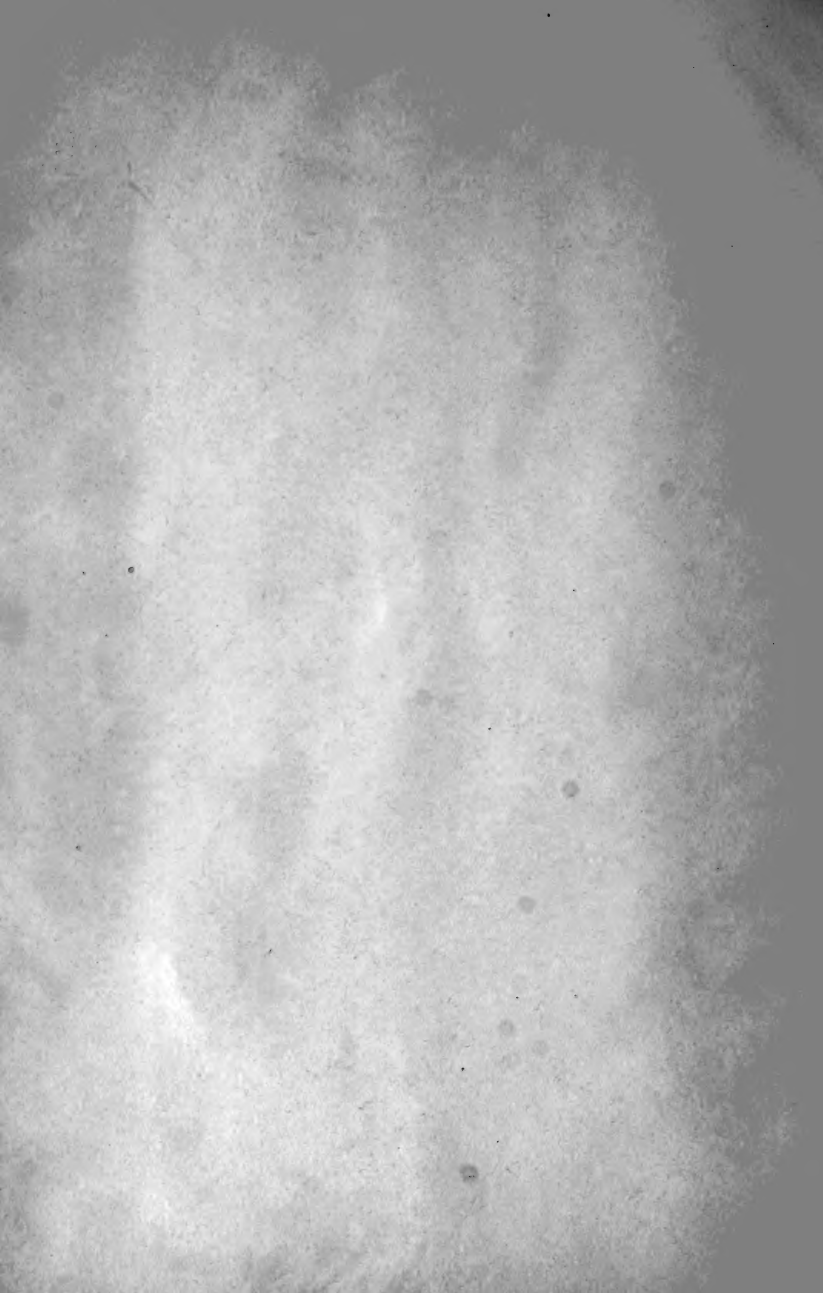
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ANIMAL VACCINATION.

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VACCINATION

AS A

Preventive Remedy

AGAINST

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DISEASES OF LIVE STOCK.

By Harold Sorby

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## INTRODUCTION.

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Anthrax appears to exist in the United States and Canada to a greater extent than is generally supposed. The dangerous and fatal character of this contagious disease is only too well known.

It will be conceded that if the owners of live stock can effectually protect their flocks and herds against one of the most deadly diseases to which they are always exposed, much will be accomplished. Thanks to Louis Pasteur, protection against anthrax can be obtained by the simple process of "vaccination."

Pasteur discovered a "vaccine" against anthrax in 1882. Beginning with France, the European countries have, one after the other, adopted Pasteur's system of vaccination, and now the Anthrax Vaccine seems destined to become universally used in Europe. Australia is following and deriving benefit from its commendable course.

Pasteur's Anthrax Vaccine has now found its way across the North Atlantic, and we think that the American and Canadian farmer and stock-owner will be quick to realize the advantages of vaccination. The leading veterinarians have already expressed their approval of *preventive inoculation* for anthrax in domestic animals, and the introduction of Pasteur's system will, we hope, meet with the hearty co-operation of veterinary surgeons in all parts of the North American Continent.

HAROLD SORBY.

New York, May, 1885

## I.—LOUIS PASTEUR.

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### HIS WONDERFUL DISCOVERIES.

Louis Pasteur, the French scientist, whose name and discoveries are known all over the world, was born in 1822, and at an early age began to devote himself to physical science. His career has been one of uninterrupted success, and during the last 40 years honors have been showered upon him. M. Pasteur's principal discoveries have been in connection with microscopic organisms. He studied the phenomena of fermentation, and proved that ferments were living things. He rendered incalculable service by revealing the cause and devising means of preventing the disorders of wine and beer and milk. He proved the fallacy of spontaneous generation and demonstrated the germ theory of disease. Pasteur saved the silk industry from ruin; he discovered the cause of disease in silkworms and the mode of dealing with them.

In 1876 Pasteur began his investigation of the bacillus anthracis—the germ of the disease known as anthrax, splenic fever, malignant pustule, etc. (Ger.: Milzbrand; Fr.: Charbon), and which commits its ravages in all parts of the world. His announcement of the discovery of a vaccine against this mortal disease was enthusiastically received in 1881.

Pasteur's more recent discoveries and researches in regard to rabies or hydrophobia are fresh in the mind of every one; and the latest achievement of the Paris Pasteur Institute—Dr. Roux's Anti-diphtheric Serum—is already too well known to need comment. The Pasteur Institute founded in Paris by public subscription in 1888, is a worthy memorial to the great scientist; and from within the precincts of the Institute we may expect further important discoveries from the eminent men who, led by Messrs. Chamberland and Roux, are, like Pasteur, devoting their lives to scientific research.

## II.—ANTHRAX.

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Anthrax is a dangerous, contagious and fatal disease. It exists in all parts of the world. It affects most animals, especially herbivora, particularly cattle, sheep, horses, mules, goats and swine. The disease is communicable to man, being known as malignant pustule and woollsorters' disease. It manifests itself in different forms, varying with the country and the species of animal. Anthrax is or has been known under a variety of names, particularly: splenic apoplexy, gangrene of the spleen, anthrax fever, splenic fever, apoplectic anthrax, malignant anthrax, malignant carbuncle, carbuncular fever, bloody murrain, black murrain, black quarter, \**black leg*, bloodstriking, braxy, etc. It is also known as Charbon (France), Milzbrand (Germany), Cumberland disease (Australia), Siberian pest (Russia), Andhra disease (India), etc.

Some of the above names are no longer used to express true anthrax, yet there is little doubt but that deaths from anthrax have been erroneously attributed to some of the above-named diseases.

Anthrax is caused by the introduction of a germ into the body, usually with the food. The sources of contagion are innumerable. The pasture may be infected by the proximity of graves of animals that have died of anthrax or by the ante-mortem or post-mortem discharges of the diseased animal. The germ remains alive in the ground for several years, and cattle grazing over anthrax graves will invariably contract the disease; a stream passing near such graves will scatter the germs everywhere along its course; fodder from an infected field will occasion an outbreak; manure is a constant source of infection. The malady is also caused by actual contact, the germ entering the body through scratches, sores or wounds. Moreover it is believed that flies carry the germ.

The innumerable channels by which anthrax may be introduced upon a farm or range causes the danger of an outbreak to be always present. In many cases the source is quite unaccountable, and the disease appears, apparently, spontaneously. Again, the difficulty of effectually disposing of carcasses and of thoroughly disinfecting the surroundings renders the recurrence of an outbreak of anthrax almost inevitable. All sudden deaths or heavy mortality in cattle, sheep, horses, mules and goats should be suspected as being caused by anthrax.

Owing to the rapidly fatal termination of a case of anthrax—death following a few hours' sickness—treatment is unsatisfactory and even impossible, especially at the beginning of an outbreak. Hence the importance of a *preventive remedy*.

In studying anthrax we must remember that the disease is communicable to man, and every year we hear of a large number of deaths from malignant pustule and woollsorters' disease among veterinarians, butchers, tanners, farmers and others engaged in tending or handling domestic animals.

\* See note on page 13 regard to Special Black Leg Vaccine.

The germ of anthrax is known as the *bacillus anthracis*. It is a short, straight filament or rod, detached and motionless, visible only through a microscope and magnified to 400 or 500 diameters.

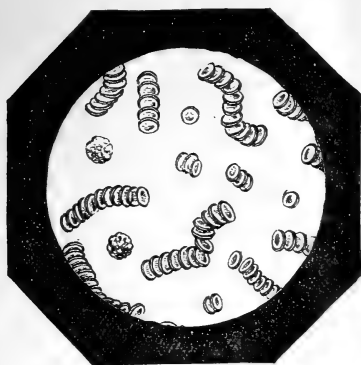


FIG. 1.

Fig. 1 represents the blood of a healthy animal, magnified to 400 diameters.

Fig. 2 represents the blood of an animal which has died of anthrax. The globules of blood have lost their roundness; but this character of the globules is not always present. The only constant and certain characteristic of anthrax is the presence of bacilli among the blood corpuscles.

To definitely ascertain if an animal has died of anthrax it is necessary to obtain, within 12 hours after death,\* a small quantity of blood from the heart and subject it to a microscopic examination at the hands of an experienced bacteriologist. The presence of anthrax bacilli denotes the disease.

As a contributory measure against the spread of anthrax, carcasses should be burnt, or a small plot of ground set apart as a cemetery, enclosed by walls whose foundations are deep enough to prevent the surface water from penetrating to the adjoining land, and high enough to exclude

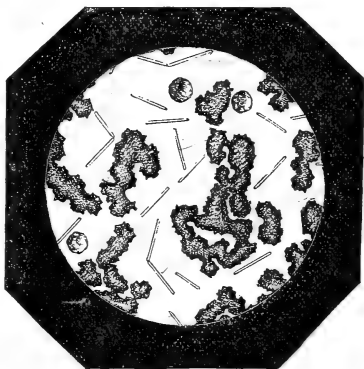


FIG. 2.

\* If more than 12 hours have elapsed, other organisms of a misleading nature may have developed.

cattle. *But the only effectual preventive remedy against the contagion of anthrax is the inoculation of individual animals with PASTEUR'S ANTHRAX VACCINE, of which we will now proceed to speak.*

### III.—PASTEUR'S ANTHRAX VACCINE.

The heavy mortality following an outbreak of anthrax, and the rapidity with which the disease runs its course when once its victim is selected, caused M. Pasteur to direct his efforts to the discovery of a preventive remedy rather than a cure. It had long ago been proved that human beings could be vaccinated against small-pox, and it seemed to M. Pasteur that it might also be possible to *vaccinate animals against anthrax.*

In 1880 Pasteur discovered the first example of a malady (chicken cholera) produced by a special microbe, which by a peculiar process could be deprived of a part of its virulence, and then fowls might be inoculated with it without danger. By means of this attenuated virus the disease in a mild form was communicated to the fowl; and, on account of this mild and harmless attack, the fowl was protected against the disease, even if presented in an acute form.

M. Pasteur thought that the process that had enabled him to attenuate the action of the chicken cholera microbe was likely to be a general process for the attenuation of the virulence of microbes in general. The anthrax bacillus was known; by cultivating it an antidote might be obtained. By following this reasoning Pasteur discovered a "vaccine" for anthrax.

On February 28, 1881, Pasteur, in his own name and in those of his two fellow-workers, Messrs Chamberland and Roux, communicated his great discovery to the Academy of Sciences, Paris. *The theory of vaccination against anthrax was established.*

The first public experiment was made at Pouilly-le-Fort, France, in the early part of 1881, and was remarkably successful. Sixty animals were obtained; 31 were vaccinated, 29 not. The whole number were then inoculated with crude virus. The 31 vaccinated animals were not in the least inconvenienced, while of the 29 not vaccinated 25 died and the remainder suffered from intense fever, exhibited large swellings and were generally very sick. More than 200 persons witnessed the result of the experiments—Government officials, senators, counsellors, journalists, physicians, veterinary surgeons and stock-owners. Great enthusiasm was manifested at the truly remarkable results obtained, and which fully confirmed M. Pasteur's assertions. *Pasteur's method of vaccination against anthrax was practicable.* During the years 1881 and 1882 a series of experiments on a large scale was carried out in France and in several other European countries. These experiments confirmed the results previously arrived at, and irrefutably proved the efficacy of Pasteur's

**Anthrax Vaccine.** The average annual mortality from anthrax was 15%; it was proved by these experiments that the mortality could by vaccination be practically reduced to zero. The year 1882 saw the close of the experimental stage and the Pasteur method entered the field of public utility.

#### IV.—PRACTICAL RESULTS.

##### PASTEUR'S SYSTEM OF VACCINATION AGAINST ANTHRAX.

Vaccination consists in two inoculations, the first being destined to prepare the animal to receive the second, twelve days being allowed to elapse between the two inoculations. The injection is made in the neck or shoulder of cattle, horses and mules, and on the inside of the thigh of sheep and goats. The dose for the former consists in  $\frac{1}{4}$  c. c. (about 4 minims) of the vaccine lymph, and for the latter  $\frac{1}{8}$  c. c.

Vaccination, being a preventive remedy, it should, to insure its full effects, be practised upon healthy animals, that is to say, upon herds that are not already under the influence of the disease. If practised upon a herd into which anthrax has already made inroads, the animals may continue to die until the vaccination be complete, that is until twelve days after the second inoculation. However, herds already decimated by anthrax have been vaccinated, the disease has at once diminished, and disappeared entirely after the second inoculation. But vaccination, if delayed, will not prevent the death of animals already impregnated with the anthrax bacilli.

Several millions of inoculations have now been made with Pasteur's Anthrax Vaccine, and the results obtained from its use cannot for a moment be questioned. *The mortality from anthrax among vaccinated animals is practically nil.* Vaccination is a simple, harmless and inexpensive operation.

**I. France.**—Inasmuch as it was in France that Pasteur's Anthrax Vaccine was discovered, it is only natural that it should have been in that country that vaccination was first practised. The legislature sanctioned vaccination and in certain cases imposed it. The ministerial decree of June 22, 1882, containing regulations for the execution of the laws regarding sanitary inspection of animals stipulates (1) that *the quarantine of pastures, etc., declared infected should not apply to animals that had just been vaccinated*, and (2) that *animals whose importation was prohibited might enter the country if vaccinated immediately.* Anthrax was declared a contagious disease by decree of July 23, 1888, and regulations were issued for the inspection of herds affected, the destruction of animals attacked and the special disposition of animals exposed to contagion; but *animals that had been vaccinated were especially exempted.*

Up to this date reports have been received from veterinary surgeons giving the result of the vaccination of over 4,000,000 animals in France.

These returns show that *the annual mortality from anthrax has dropped from 10% to 0.69% in sheep, and from 5% to 0.18% in cattle.* Two millions of dollars have in this way been saved to French stock-owners alone!

In 1886 Pasteur's Anthrax Vaccine began its commercial life. In that year was formed the *Société du Vaccin Charbonneux Pasteur* (Pasteur Anthrax Vaccine Company), of Paris, and of which M. Chamberland, Pasteur's collaborator in the discovery of anthrax vaccine, is technical director. The company acquired from Messrs. Pasteur, Chamberland and Roux the sole right to establish laboratories for the preparation and sale of Pasteur's Anthrax Vaccine in all countries outside of France, the latter undertaking to supply the necessary cultures. Messrs. Pasteur, Chamberland and Roux are now the chiefs of the celebrated Paris Pasteur Institute.

A silver medal was awarded to the Pasteur Company at the Paris Exposition in 1889, Hygienic Section, Group VI, Class 64.

It is important to note that the French Live Stock Insurance Company, "*L'Avenir.*" requires a certificate of vaccination before covering the risk of death from anthrax. This condition practically renders vaccination compulsory.

**II. Austro-Hungary.**—In Austro-Hungary anthrax (milzbrand) was very prevalent, the *mortality from the disease among live stock being from 10 to 60 per cent.* The initial experiments were conducted in 1881, at the Buda-Pesth Veterinary Institute, under the auspices of the Ministry of Agriculture. These experiments were completely successful and confirmed the absolute efficacy of Pasteur's method of vaccination against anthrax. Pasteur's Anthrax Vaccine is now extensively used in these countries. A laboratory was established in Vienna in 1886 and transferred to Buda-Pesth in 1890. In 1887, 57,864 inoculations were made; in 1894 (up to 20th August) 946,693 vaccinations were effected. Over four millions of animals have been vaccinated in Austro-Hungary, and more than 1,000 stock-owners have availed themselves of the benefits of vaccination. *The mortality from anthrax has now dropped to 0.18% for sheep, 0.06% for cattle, and to 0.09% for horses.*

The laboratory in Buda-Pesth is under the patronage of the Royal Hungarian Ministry of Agriculture; it prepares the lymph from cultures received from the Paris Pasteur Institute. Instruction in animal vaccination is given to veterinary surgeons and to pupils at the Royal Veterinary Academy, Buda-Pesth.

**III. Germany.**—The German cattle industry was a great sufferer from anthrax (milzbrand). In the spring of 1882, the Minister of Agriculture appointed a commission to conduct experiments with Pasteur's Anthrax Vaccine. The experiments took place at Packisch and Borischutz in the months of April and May, 1882, and the reports of the commission once more confirmed the advantages and value of Pasteur's method of vaccination against anthrax. The commission was of the opinion that vaccination



would be economical and advantageous. Vaccination against anthrax became so general in Germany that at the beginning of 1894 a laboratory for the preparation of the vaccine was established in Stuttgart. The laboratory was placed by the Government under the control and supervision of the Wurtemberg Royal Medical College.

**IV. Italy.**—In Italy anthrax was extensively known. It raged principally among cattle, and the *annual loss was from 10 to 20%*. In 1882 the Minister of Agriculture appointed a commission to study the question. One of its members, M. Perroncito, visited the Pasteur Laboratory in Paris, and upon his return to Italy made extensive experiments which confirmed the value and efficacy of vaccination by Pasteur's method. The Italian government recommended its use. A laboratory for the preparation of the vaccine was established at Turin in 1887. In 1894 it was purchased by the Italian government and transferred to Rome. The cultures are supplied by the Paris Pasteur Institute to the Public Health Department of the Italian Ministry of the Interior which prepares and distributes the vaccine. A ministerial circular, dated Rome, October 25, 1894, contains directions and fixes the veterinary surgeons' fees for vaccinating.

**V. Belgium.**—In 1882 experiments with Pasteur's Anthrax Vaccine took place at Hervé before the governmental and provincial authorities, the President of the Royal Agricultural Society of Eastern Belgium, the Clinical Professor of the Veterinary College, the delegates of several medical and surgical societies, and numerous veterinary surgeons and stock-owners. The experiments once more confirmed the results already obtained in France and elsewhere, namely, that *Pasteur's method of vaccination was a certain preventive against anthrax in herbivorous animals*. Since that date Pasteur's Vaccine has been regularly obtained from the Pasteur Company in Paris, and used with uniform success.

**VI. Spain.**—In this country anthrax prevailed among cattle, sheep and horses, the *mortality being about 20%*. In the year 1882, 2,400 doses were supplied to Spain; in 1886 the number of doses was over 40,000 and has since gradually increased. *As a result of the use of Pasteur's Anthrax Vaccine the mortality from anthrax in Spain is now below 1%*.

**VII. Russia.**—Siberian pest (anthrax) has long been a cause of terrible loss among domestic animals throughout the Russian empire. In July, 1894, experiments were made with Pasteur's Anthrax Vaccine which resulted in the confirmation of M. Pasteur's representations, namely: that *animals vaccinated in accordance with his method were protected against anthrax*. The use of Pasteur's Anthrax Vaccine was in due course authorized by the Russian government, and inoculations are practised on a considerable scale. A laboratory is being established at Nijni Novgorod for the preparation and sale of Pasteur's Anthrax Vaccine, the cultures being supplied by the Paris Pasteur Institute. (Imperial Decree No. 4,427, August 26, 1894.) There is already a very large demand for vaccine

from all parts of the country, and Pasteur's method of inoculation appears destined to become the popular preventive remedy against the deadly scourge, Siberian pest, which has heretofore occasioned such disastrous losses throughout the Russian empire.

**VIII. Great Britain.**—In some parts of Great Britain anthrax has a constant existence, but it is only during recent years that outbreaks have occurred to any appreciable extent. In the year 1889 the reported losses from anthrax were 288 animals, while in 1893 the number had gradually increased to 1175. (Report of the Director of the Veterinary Department of the English Board of Agriculture, 1893.)

Pasteur's Anthrax Vaccine has hitherto been used in Great Britain to only a limited extent, but, owing to the continued increase of anthrax, the attention of the government authorities, veterinarians and stock-owners has recently been directed to the subject. Great interest is now manifested in Pasteur's Anthrax Vaccine throughout the country, and the President of the Board of Agriculture has taken steps to obtain reports respecting the feasibility of inoculation for anthrax and as to the measures adopted in other countries to prevent the spread of the disease.

All the leading English veterinarians recommend Pasteur's system of preventive inoculation, and there is no doubt but that Pasteur's Anthrax Vaccine will soon be in general use throughout Great Britain, it being recognized that the only efficacious means of checking anthrax must be of a protective character.

**IX. Australasia.**—Cumberland disease causes terrible ravages in Australia, the *annual mortality* in many districts being between 30 and 40% representing a loss of about 200,000 animals per annum. In 1888 the dreaded Cumberland disease was proved to be nothing more nor less than anthrax. At the request of the New South Wales government a committee was formed for the purpose of ascertaining the practical value of Pasteur's method of vaccination against anthrax. The demonstration took place at Junee, in October, 1888. The efficacy of Pasteur's Anthrax Vaccine was proved and the committee unanimously recommended its adoption and use.

In July, 1890, a laboratory was established at Rodd Island, near Sydney, N. S. W., where the lymph is prepared from the cultures sent from the Paris Pasteur Institute. In the first eighteen months 250,000 animals were vaccinated in Australia, while in the year 1893, 119,000 were successfully vaccinated in New South Wales alone. The constantly increasing demand for lymph gives a correct idea of the value of Pasteur's Anthrax Vaccine.

In March, 1893, the United States Consul-General in Australia was directed by the State Department at Washington to institute inquiries regarding the use of Pasteur's Anthrax Vaccine in Australia. The report, dated July 24, 1893, was a carefully prepared document of 24 pages and showed that Australian stock-owners recognized the value of Pasteur's

Anthrax Vaccine, were strongly in favor of it, and that its use was becoming general.

**X. Other Countries.**—In addition to the countries already mentioned, Pasteur's Anthrax Vaccine is being used with the same successful results in South America and the West Indies. After preliminary inquiries by the British Ambassador at Paris M. Saint-Marie, of the Pasteur Institute, was, at the request of the Viceroy of India, sent to Calcutta to establish a laboratory and otherwise assist in the introduction of Pasteur's Anthrax Vaccine in India, where anthrax is known under the name of "Loodiana disease."

In August, 1894, the Sultan of Turkey sanctioned the establishment within his dominions of a laboratory for the preparation of Pasteur's Anthrax Vaccine, thereby rendering inestimable service to the Turkish farmers by enabling them to combat the terrible disease by means of Pasteur's Anthrax Vaccine.

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From the foregoing resumé it will be seen to what a large extent Pasteur's method of vaccination against anthrax is resorted to, and what a notable reduction in mortality has followed its use. Step by step the vaccine has been introduced into all European countries and Australia. Experiments and practical demonstrations have been made with the same unvarying result—it was proved that *the vaccinated animal was protected against anthrax*. Several laboratories are preparing the vaccine, namely: in Paris, Stuttgart, Buda-Pesth, Rome, Nijni-Novgorod and Sydney (Australia). Several millions of animals, cattle, horses, mules, sheep, goats and swine are being inoculated every year, and hundreds of thousands of dollars are annually saved to the owners and breeders of live stock. The efficacy and economy of vaccination as a preventive and protective remedy is unquestionable. Like all new discoveries it encountered its full share of opposition: scientists questioned its efficacy, veterinarians doubted its practicability, stock-owners feared its results. But Pasteur's Anthrax Vaccine has overcome all opposition and prejudice, and its scientific and commercial value is well established. Stock-owners, in their own interest, gladly avail themselves of its beneficial effects.

Pasteur's Anthrax Vaccine is inexpensive in price, simple in its application and sure in its results. It is within the reach of all stock-owners, large and small. Its use is rapidly becoming universal, and we shall soon no longer hear of the heavy mortality from a disease so fatal as anthrax, now that it can be prevented by such a simple, safe and economic means as vaccination.

Vaccination against anthrax in domestic animals is practically imperative, not only in districts where anthrax has a constant existence, but on every live-stock farm. Everything coming on the farm is liable to introduce

the germ of the disease; and the only indication of the presence of the malady is sudden and unaccountable deaths, accompanied by heavy mortality.

Moreover, pasture at present scrupulously avoided can again be utilized, as a vaccinated herd can safely graze on contaminated soil.

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The Pasteur Anthrax Vaccine (U. S. & Canada) Company, L'd, are the sole agents in the United States and Canada for Pasteur's Anthrax Vaccine.

Pending the establishment of a laboratory in the States, the vaccine is prepared at the Paris laboratory, which is under the supervision of M. Chamberland, who shares with Pasteur the honor of discovering the Anthrax Vaccine.

Full particulars respecting the vaccine can be obtained upon application to the

**PASTEUR ANTHRAX VACCINE (U. S. & CANADA) CO., L'D.**

**369 BROADWAY,**

**NEW YORK CITY.**

Test tubes and directions for obtaining blood for transmission for bacteriological examination will be sent upon application to the Pasteur Company.

ANIMAL VACCINATION.

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HAROLD SORBY.



## **BLACK LEG.**

Black Quarter, Symptomatic Anthrax, Charbon Symptomatique, Rauschbrand, etc. are a form of Anthrax and can be prevented by Vaccination.

The Pasteur Company has just completed arrangements to supply Black Leg Vaccine. Full particulars upon application.

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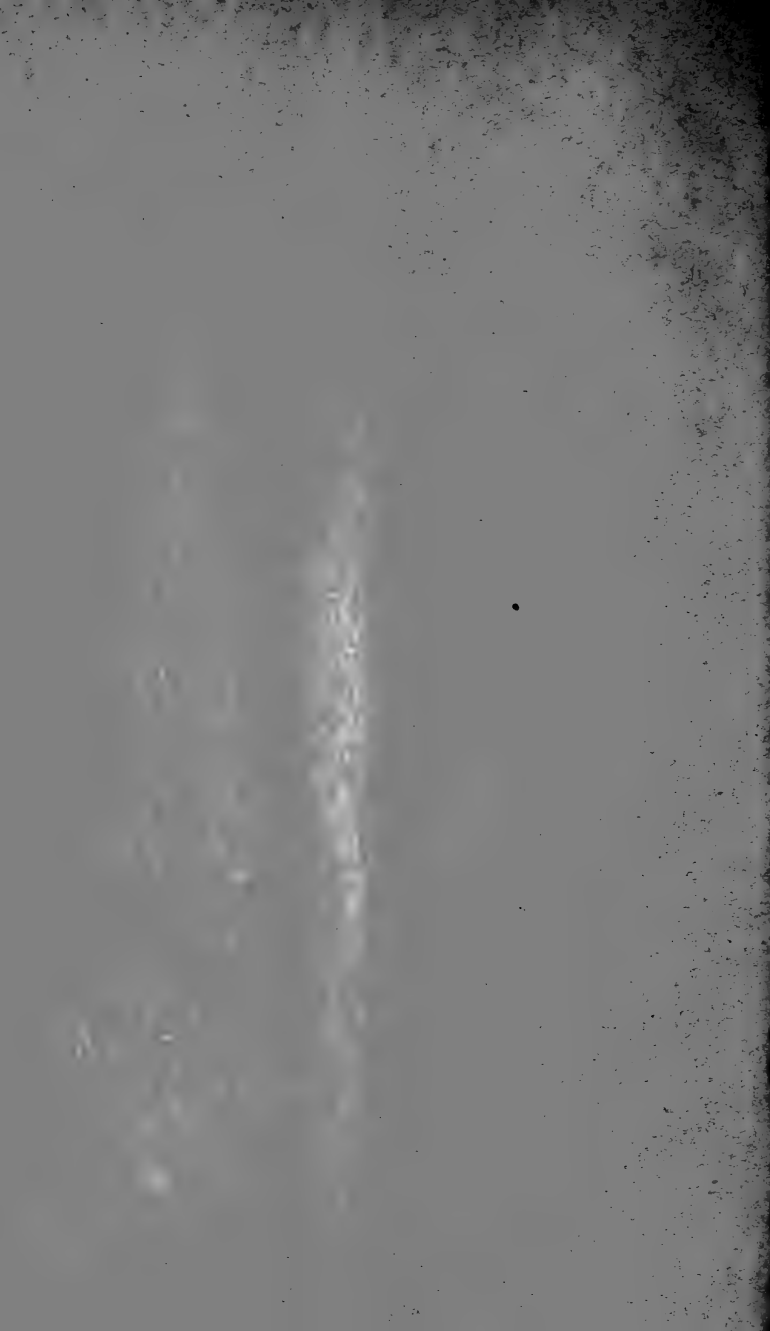
The Pasteur Company desires to make arrangements with VETERINARY SURGEONS to undertake vaccinations in all parts of the States.

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**PASTEUR ANTHRAX VACCINE (U. S. & CANADA) CO., L'D,**

**369 BROADWAY,**

**NEW YORK CITY.**





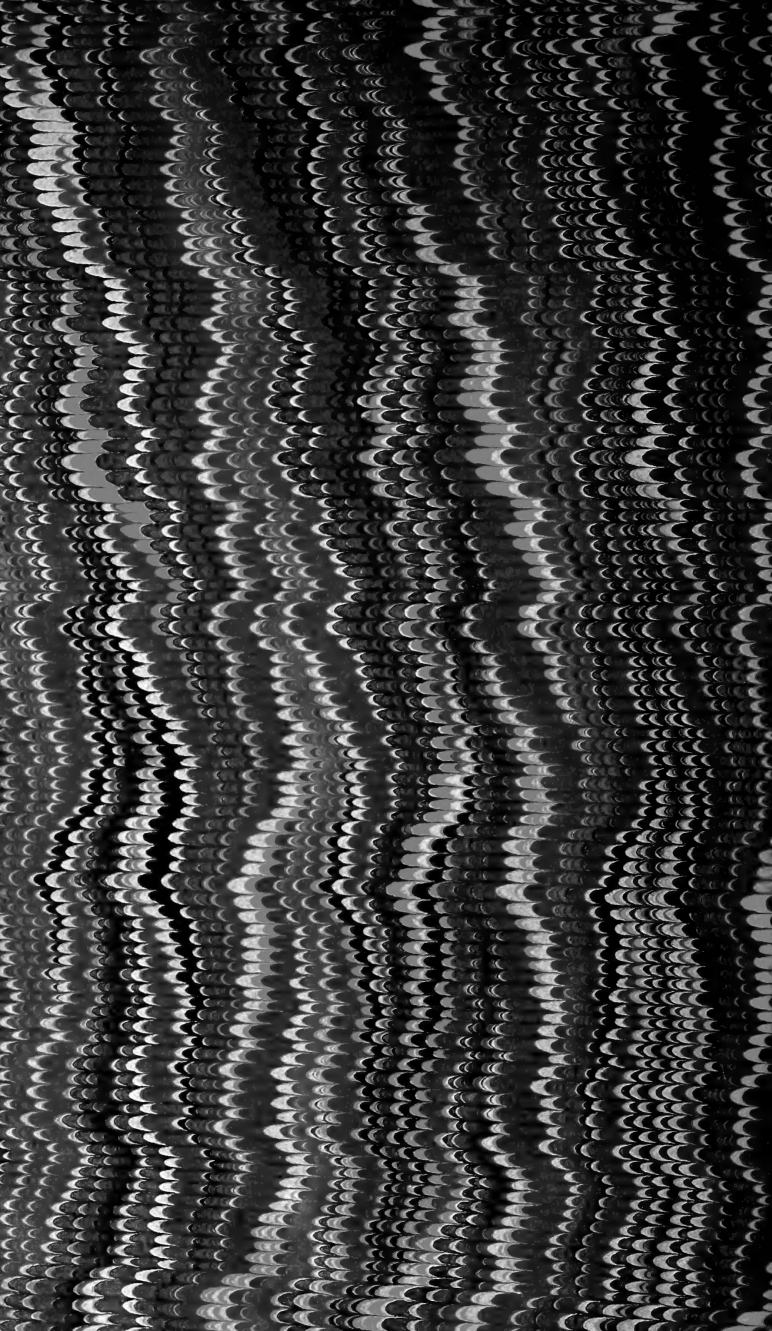


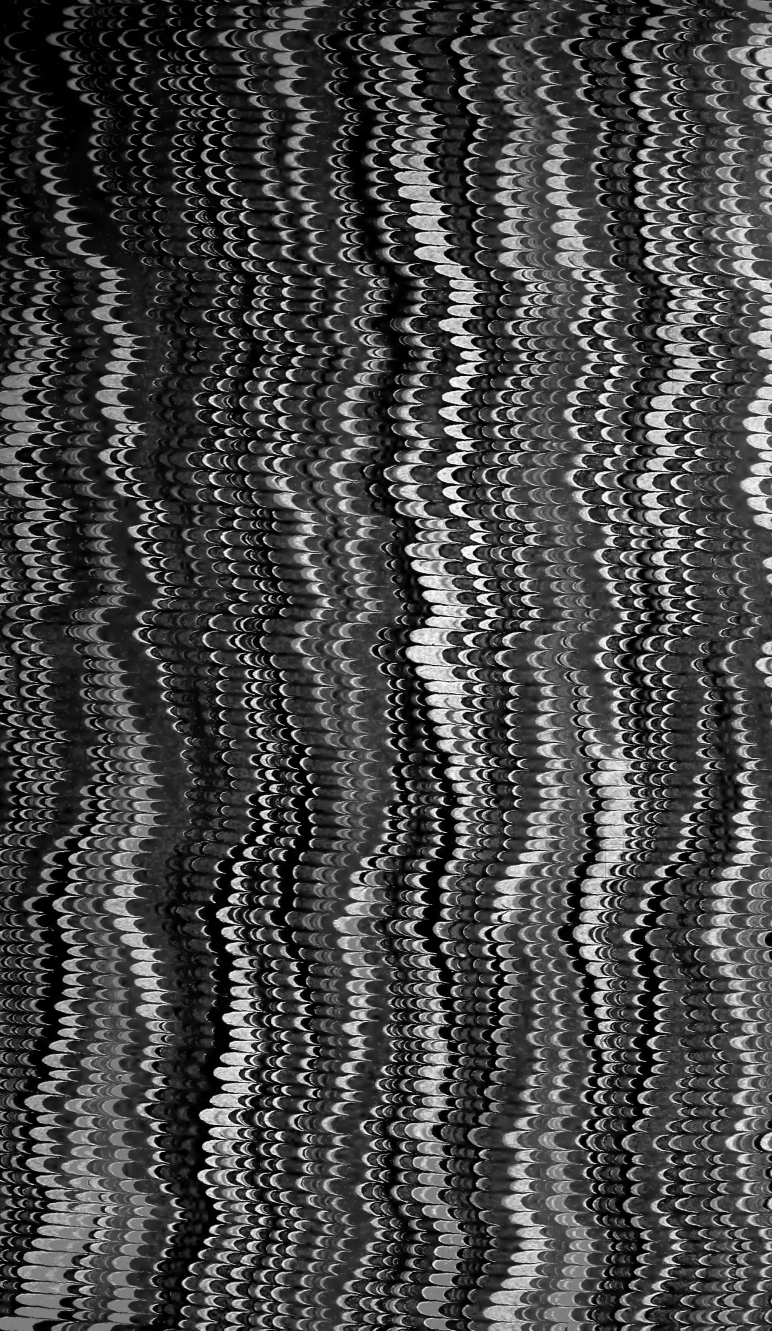












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