PASTEUR INSTITUTE TWENTY-FIVE YEARS OLD THIS WEEK

Romance of the Life and Work of the Famous Discoverer of Cure for Hydrophobia

Diseases Such as Diphtheria, Tetanus, Puerperal Fever and Typhus Now Lose Their Terror

J. B. JUPILLE, a Paris janitor, gazes every morning at a statue to himself. It represents a young shepherd boy engaged in a mighty struggle with a maddened animal and commemorates a feat which linked the name of Jupille with one of the greatest triumphs of modern science.

The statue stands in the courtyard of the Pasteur Institute in Paris, the twenty-fifth anniversary of the foundation of which will be celebrated on Friday next. The celebration will be one of those rare occasions when a scientific jubilee takes on the character of a popular festival when the world of laymen will share with the savants the feeling of enthusiasm and admiration for new triumphs in the fight against disease.

Jupille, son of a poor farmer, was guarding his flock in a meadow in the little village of Villers-Farlay, in the shadow of the picturesque Jura Mountains, one afternoon in the summer of 1885 when he saw an enormous dog dash at a group of children playing a few yards away. Regardless of the danger and armed only with a whip, Jupille sprang between the dog and the children and grappled with the enraged animal. The children ran to a place of safety. The dog jumped at the shepherd's neck and a terrific struggle followed. The youth by a superhuman effort succeeded in throwing the animal to the ground, tied the lash of his whip around its muzzle and beat it over the head with one of his wooden shoes until it ceased struggling and died.

The shepherd was badly bitten in the struggle and his parents saw no hope of saving his life when it was established that the dog was suffering from rabies. The local physicians were powerless to aid the victim of this malady, regarded in those days with horror and dread, those afflicted being often abandoned by all around them and left to their awful fate. News of the experiments of the chemist Pasteur to discover a cure for the dread disease had, however, reached even the remote Jura Mountains, and Jupille was sent to Paris to undergo the treatment.

Pasteur's First Cure.

He arrived in Paris six days after his fight with the dog and was taken to the modest laboratofy in the rue d'Ulm, where Pasteur and his associates were carrying on their researches. In spite of the lapse of time before the treatment was used the boy was cured. Pasteur had already proved the efficacy of his treatment on the first human being to be inoculated by the new serum a little Alsatian boy, Joseph Meister, but the case of Jupille, on account of the sympathetic interest aroused by his display of courage and self-abnegation, became the sensation of the hour in Paris.

It was the subject of conversation everywhere and gave rise to animated discussion in the newspapers, the clubs, the cafes and the salons. After his complete recovery the shepherd boy became the hero of the hour. The French Academy bestowed on him a prize of $200 for his heroic conduct. Later, when the Pasteur Institute was founded, he was made concierge of the office in the rue Dutot and a statue commemorating his achievement, modelled by Truffot, was placed in the courtyard.

The feeling of exultation which the French nation experienced more than a quarter of a century ago when the name of Pasteur was blazoned throughout the world as the pioneer in an entirely new branch of the healing art will be reflected in the celebration this week not by France alone but by every civilized nation, for the glory of the founder of the science of bacteriology has spread to the far corners of the earth, carried abroad by his pupils like a swarm of bees taking to other lands the honey of French science. Pasteur institutes founded by pupils or associates of Pasteur exist almost everywhere.

Pure science is often shut up in itself, hiding its mysterious researches and discoveries from the gaze of the profane, jealously guarding its laboratories from prying eyes. Science is a benevolent goddess, but close fisted with her secrets, which she reveals only to adepts. For this reason it is only on rare occasions that the lay world takes spontaneous interest in the gatherings of savants.

World Pays Him Homage.

Pasteur was, however, without doubt one of those privileged beings whose name means just as much to the general public as to the world of science. It is not alone scientists who pay him homage. The wine growers of every land profit by his studies in acetic fermentation which put a stop to ravages due to "diseases of the grape" which from time immemorial had baffled all attempts at cure; the farmer blesses the name of the man who by his discovery of the microbes of poultry cholera and anthrax enables him to save his chickens and his flocks; people of every nation have seen some relative or friend attacked by the terrible virus of rabies, countless thousands of mothers whose children, suffering from diphtheria, have been snatched from the portals of the grave, cannot but experience a feeling of almost religious gratitude toward the tireless searcher whose discoveries have saved thousands of lives every year.

"There is no greater charm," said Pasteur in one of his addresses, "for the investigator than to make new discoveries, but his pleasure is heightened when he sees that they have a direct application to practical life." "Travailler, toujours travailler" was his motto. That spirit is the explanation of the tireless energy and faith which transformed the humble laboratory in the rue d'Ulm and the miserable wooden shed in the rue Vauquelin, where the first bacteriological studies were carried on, to the magnificent series of buildings fronting on the rue Dutot, covering altogether thirty-five acres, which is now the Institut Antirabique de Paris, generally known as the Pasteur Institute, opened on November 14, 1888.

The Life of Pasteur.

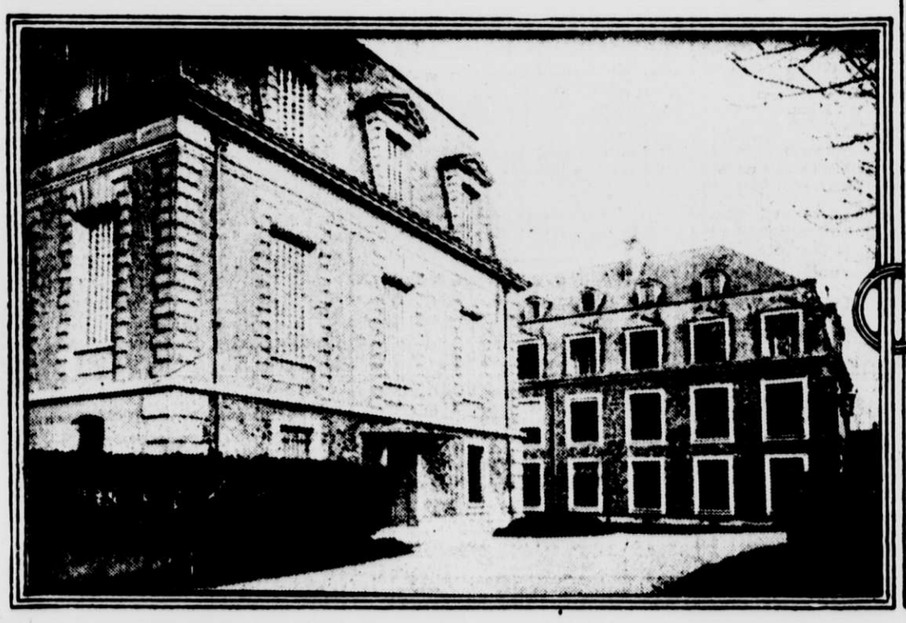
Born December 27, 1822, at Dole, Franche-Comte, where his father carried on the business of a tanner, Louis Pasteur went in 1838 to Paris to study for admission to the Ecole Normale. He did not remain long in the Quartier Latin because his health broke down and he yearned for his home in the Franche-Comte and, as he said to a friend, "for the smell of the tannery once more." He went back and attended the Royal Besancon College, where he obtained the degrees which enabled him to become a candidate for the Ecole Normale. Strange in the light of his subsequent triumphs is the fact that the examiner in the science course attached to Pasteur's diploma a note to the effect that the young student was "mediocre" in chemistry.

Portrait of Pasteur the Founder

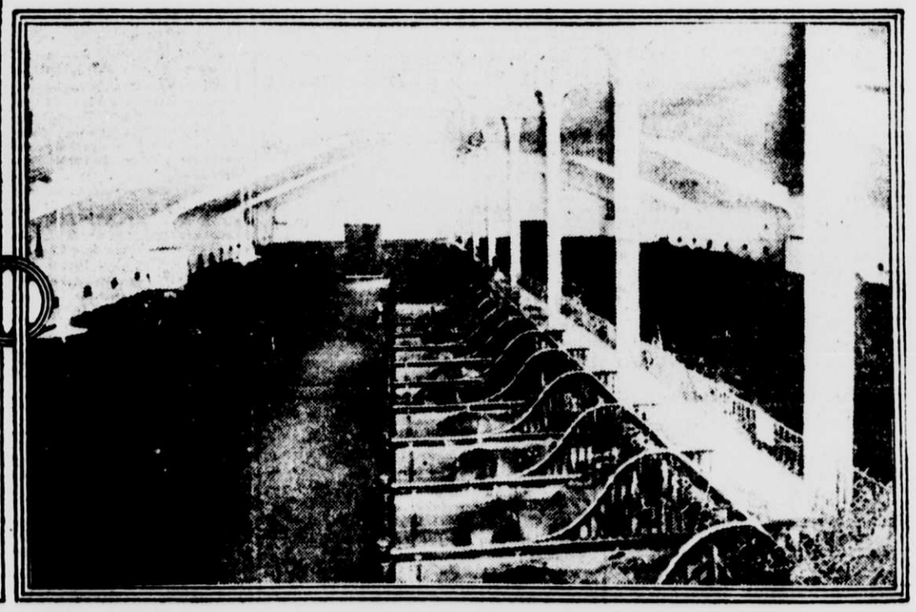
Doctor Roux.

Prof. Metchnikoff at Work.

Janitor of the Institute Standing in Front of Statue of Himself



A View of the Pasteur Institute.



The Horse Stable (Serum is Supplied by the Animals)

A few words about Pasteur's first individual researches in chemistry give the key to all his future work. While he was laboratory assistant at the Ecole Normale he heard J. A. B. Dumas deliver a lecture on chemistry at the Sorbonne. He was inbued with the idea of bringing under the domain of scientific laws phenomena of disease which had so far baffled human endeavor. He found the key to the enigma by the application to the elucidation of these complex problems, of the exact methods of chemical and physical research.

It was one of the mysteries of chemistry that compounds existed which, although known to possess an identical composition were absolutely different bodies, judging by their properties. Two tartaric acids deposited from wine lees behaved in an absolutely different manner when subjected to the rays of polarized light, one acid turning the ray to the right when it was passed through the liquid and the other having no action whatever. No explanation of this singular fact was forthcoming until the young chemist from the Franche-Comte solved the problem.

A Chemist of the First Rank.

Pasteur applied his discovery to the benefit of the wine grower and the brewer. Modern methods by which wine and beer and milk can be kept unchanged for years are due to that discovery.

Pasteur one day visited a brewery containing both sound and unsound beer. Examination under the microscope of the yeasts of both beers showed that the changes occurring during the several processes of fermentation—in the vinous, where alcohol is the chief product; in the acteous, where vinegar appears; in the lactic, where milk turned sour—are invariably due to the presence and growth of minute organisms called ferments. Exclude every trace of these organisms and no change occurs. Pasteur furthe; proved that when the interior of the grape is kept absolutely free from atmospheric germs no change takes place. If the grape is crushed and exposed to the ordinary air fermentation or putrefaction runs its course. If a crushed grape or a wounded animal is placed in conditions which preclude the presence of germs from the air the grape juice remains sweet and the wound clean.

The century old theory of spontaneous generation received its deathblow by Pasteur's demonstration. The application of the results of his researches in this department revolutionized the practice of surgery.

Pasteur, acknowledged as the head of the greatest chemical movement of the time, had not long to wait for his powers of patient research and of quick and exact observation to be put to a severe test. An epidemic of a fatal character had ruined the silk producers of France. The chemist Dumas, a native of the Alais district, where the disease was rampant, urged Pasteur to undertake its investigation. Up to that time he had never seen a silkworm and hesitated to attempt so difficult a task, but at the reiterated requests of his friend Dumas he consented, and in June, 1865, went to the south of France to study the disease on the spot. By the end of September he had discovered the means of obtaining immunity from the dreaded plague and brought back to France the prosperity of its silk trade.

When a disease germ enters the body there begins at once a contest for supremacy between the white blood cells and the invaders. Armies of white cells rush to the fray and attempt to eat up and destroy the foe. Once the bacteria get a foothold they generate poisons known as toxins. In addition to the white cells, groups of cells throughout the body after recovering from the first rude shock of the encounter with the foreign enemy begin to tolerate the presence of the toxins, then effect a change in the chemical constitution of the poisons and finally elaborate substances which antagonize the toxins and destroy their action altogether, thus lending aid to the warrior cells, which at last overcome the invading microbes. After recovery the patient has acquired a more or less permanent degree of immunity against this special form of disease.

It is the artificial formation of these antagonizing substances and their application to a patient suffering from any infectious disease that forms the basis of Pasteur's treatment. The bacteriologist can grow special organisms; that is, he can obtain a pure cultivation which has the power of bringing about a certain disease. By a process of successive and continued artificial cultures under different conditions the virus of the organism is found to become attenuated, and when this weakened virus is administered the subject is immune against further attacks.

Overcame Chicken Cholera.

The first disease investigated by Pasteur was that of chicken cholera, an epidemic which destroyed 10 per cent. of the French fowls. After the application of the preventive method the death rate was reduced to below 1 per cent. Next came his successful attempt to deal with the fatal cattle scourge known as anthrax. This also was caused by the presence of a microbe, of which Pasteur was able to obtain a culture and attenuate the virus, the application of the weakened virus rendering the animal immune. Millions of sheep and oxen all over the world have thus been treated and the rate of mortality reduced from 10 per cent. to less than 1 per cent. Prof. Huxley, speaking of these epoch making discoveries, said they represented in monetary value a sum large enough to cover the war indemnity paid by France to Germany after the Franco-Prussian war. That indemnity was "cinq milliards de francs," $1,000,000,000.

The cure of the dread disease of hydrophobia in man and rabies in animals was Pasteur's immortal discovery. Interest in the achievement lies not alone in the fact that he successfully combated one of the most mysterious and fell diseases to which man is subject, but that this was accomplished without the isolation of the special microbe causing the disease. Pasteur came to the conclusion that the virus of the disease had its seat in the nerve centres. By injecting a portion of the matter of the spinal column of a rabid dog into the body of a healthy animal he produced in the latter the symptoms of rabies. He then turned his attention to the attenuation of the virus and after long and patient effort he was able to use it with remedial effects on a dog already bitten. From that to its use on human beings was but a step.

Subscriptions for Institutes.

After the practical demonstration of the efficacy of the Pasteur cure in 1886 a public subscription was opened to enable him to build laboratories where his researches could be carried forward and a hospital where patients could be treated. The worldwide fame acquired by the scientist resulted in the subscription of $517,336 in a few months. With this money the construction of the buildings in the Rue Dutot, in the Vaugirard quarter, was begun. Subscriptions came from all parts of Europe.

In the new building, equipped with all the necessary apparatus for research work, Pasteur, in spite of the bitter attacks of his opponents, against whose anger at being shown to be in the wrong no vaccine was effective, continued his great work. Just as in former years he could be seen, between his inoculation experiments, acting as secretary to some illiterate peasant who wanted to let his relatives know how he was getting on, or consoling mothers and children whose sufferings touched his heart.

The lofty character of this apostle of science, and more than all the practical benefits of his scientific discoveries which soon were beyond cavil, brought to the institute financial aid in an ever increasing current. On the other hand, scientists who were attracted to the institute from all parts of the world could not be accommodated in the building. The institute was too small for the ever growing demands. A new subscription fund was opened, and thanks to the startling results obtained in the treatment of diphtheria by Dr. Roux, one of Pasteur's most brilliant followers, now director of the institute, which were made public in a paper read by Dr. Roux at the Medical Congress in Budapest in 1894, the sum of $200,000 was contributed.

Hundreds of wealthy women, seeing the possibility of a successful fight against diphtheria, that scourge of mothers, gave their aid and it was largely due to the efforts of such women that in the Garches domain, lent by the State, vast stables were established where a large number of horses destined to furnish the anti-diphtheric serum were kept.

Donations from Mme. Furtado-Heine, Mme. Boucicaut and Baroness de Hirsch, totalling nearly $1,000,000, enabled Pasteur to acquire the property between the Rue Dutot and the Rue de Vaugirard and build an institute of biological chemistry and a hospital with 100 beds.

Full attention could thus be given to the researches necessary for the development of physiological and pathological studies which are associated in the mind of the public with the name of Pasteur more than his other discoveries.

The Pasteur Institute as it exists today is, however, neither completed nor definitely laid out.

In all the colonies of France as well as in the departments branches of the Pasteur Institute sprang up as if by magic. His pupils are carrying on the study of tropical diseases in north Africa and in the French West Indies, in the Congo and in Indo-China.

Dr. Gibier, one of the pupils of the great discoverer, came to New York in 1889 and established the Pasteur Institute of New York in West Eleventh street. The Institute was later moved to West Ninety-seventh street and Central Park West. It is now located in West Twenty-third street near Ninth avenue and is under the direction of Dr. Rambaud, a nephew of Dr. Gibier, who lost his life in a carriage accident here. At this institute about 1,500 persons suffering or believed to be suffering from hydrophobia are seen each year and about 25,000 cases have been examined since the opening of the institute. The mortality after treatment has been reduced to .02 per cent.

In addition to the laboratory work carried on at the Pasteur Institutes, the results of much of which are still matters of the faraway future, the practical application of medical discoveries is one of the chief aims of the institutes. Diseases of such character as diphtheria, the mortality from which has been reduced from 40 per cent. to below 10 per cent.; tetanus, puerperal fever, bubonic plague, cholera, typhus, anthrax and, above all, hydrophobia and rabies are now practically all under complete control. At the parent establishment in Paris 33,777 persons suffering from the effects of dog bite have been treated since 1888. In that year the mortality after treatment was about 15 per cent. It is now almost zero.

Carrying Out Pasteur's Work.

Among the men who are carrying out this aim of their great coworker are Dr. Pierre Roux, present head of the Pasteur Institute, and Dr. Elie Metchnikoff, sub-director. Dr. Roux lives the life of a hermit in the midst of Paris. His only joy is his work and practically his entire income is devoted to the purchase of scientific instruments for the workers in the laboratories. Dr. Roux labored for years under the eyes of Pasteur and was associated in many of his discoveries. He aided Pasteur in his search for a method of attenuating the virus of rabies.

The idea of making use of serum to cure diphtheria arose about 1890 out of the researches made in connection with Prof. Metchnikoff's theory of phagocytosis, by which is meant the action of the phagocytes, or white corpuscles of the blood, in destroying the bacteria of disease. Dr. Roux confirmed in 1894 the result of the researches of the Berlin school of bacteriologists, headed by Dr. Behring, with such a mass of evidence that Prof. Virchow, the last man to be carried away by enthusiasm for a novelty, declared it was "the imperative duty of medical men to use the new remedy." Within ten years the mortality from this disease was reduced 50 per cent.

Prof. Metchnikoff, who won the Nobel prize for medical research work in 1908, is known through his "cures" for old age, but his renown does not rest on these theories, which excite for the most part only amused comment. He is the discoverer of phagocytosis, one of the triumphs of modern science, which reveals the epic battle going on between the white blood corpuscles and invading microbes. He has also made contributions of the first importance to the Institute's work on cholera and typhoid.

Dr. Leon Charles Calmette, director of the Pasteur Institute at Lille, is another of Pasteur's pupils whose names have become famous. Formerly a surgeon in the French navy he founded the Pasteur Institute at Saigon, Indo-China, and was its first director. He was sent to Oporto in 1899 to study the bubonic plague, and the serum which he discovered has been used since then with great success in the Far East and South America. He is known also for his success in dealing with snake bites and his studies in the treatment of tetanus and dysentery.

Prof. Metchnikoff's Aids.

Among the younger scientists working under the direction of Professor Metchnikoff one of the most remarkable is Dr. A. Bezredka, his principal assistant, who has made marvellous studies in typhoid immunization. He is the author of an original work on "local vaccine." It was known that after a serum injection man became more sensitive to a new injection of the same serum. If it was repeated several times the patient might die. Through the work of Dr. Bezredka this danger has been averted entirely.

Prof. Laveran, the discoverer of the microbe of malaria, began his labors in the laboratory of Prof. Metchnikoff. By his discovery of the role of the trypanosome in epidemic diseases this military surgeon has given to humanity hope of a remedy for one of its terrible scourges, sleeping sickness.

Dr. Yersin, whose anti-plague serum was extensively used in the terrible epidemic in Manchuria three years ago is another of the brilliant band who are carrying on the fight against disease on the lines laid down by Pasteur.