CENTENARY OF BIRTH OF LOUIS PASTEUR, SCIENTIST

Life and Achievements and Recognition Which He Received Before Death.

(By Dr. Victor C. Vaughan)

On December 27, 1822, there was born in the village of Dole in the Jura a child destined to play an important role in the progress of scientific medicine. If greatness be measured by the extent of the good done to one's fellowmen, the name of Louis Pasteur deserves to stand high not only among his contemporaries but among those of all ages.

His origin was from a humble class. This is not in connection but in conformity with the law of heredity. The history of the Pasteur family has been traced to the middle of the seventeenth century. The great-great grandfather was a serf and neither he nor his wife could write their names as it is shown by the records of their marriage. The great grandfather of Louis Pasteur was born a serf but purchased his freedom and both he and his wife signed their names to the marriage certificate. Of his grandfather there is but little known; he died in early manhood. His father served in the Napoleonic Wars in the famous Third Regiment, renowned for the bravery and intelligence of its individual members. Jean Joseph Pasteur, Louis's father, at the time of the demobilization of the grand army, had won the rank of sergeant-mapor and wore the cross of the Legion of Honor. This short sketch of the history of the family along the male line shows that good blood often flows in the veins of the lowly.

At the age of sixteen Louis was sent to Paris and arrangement made whereby he was to fit himself for admission by study in a preparatory school located in that city. However, as has happened to many others, the sixteen-year-old boy found himself the victim of a severe attack of nostalgia in the great city and so longed for his old home and his father's tannery that he gave up his stay in Paris and finished his preparatory work in a provincial institution.

At the age of twenty he passed the examination for admission to the Normale, but with no great brilliancy, the paper being marked mediocre. In the laboratories of the normal school he came under the instruction of some of the greatest French scientists of the time. This was especially true in chemistry, at that time under the direction of Dumas. He continued for a few years after graduation as a laboratory assistant in the normal school, and it was during this time that he demonstrated his intelligence and skill in the solution of a perplexing problem in physics.

Later he taught for one year at Dijon where he had no facilities for experimental research. Then he was transferred to Strassburg where it appears that within a few weeks after his arrival he fell in love with, proposed and was accepted by a daughter of M. Laurent, rector of the university. The letter to his future father-in-law on this occasion is an example of the unswerving honesty which characterized both the personal and scientific activities of Louis Pasteur. In this letter he spoke plainly of his humble origin, stated that he had only health and courage in bank, that he intended to devote his life to scientific work and had no prospects of being able to secure luxuries for his family.

Tartaric Acid

At Strassburg Pasteur continued his research on right and left-handed tartaric acid. In pursuing these studies he made at his own expense, visits to practically all the laboratories of Continental Europe in which tartaric acid was obtained in quantity. The brilliant solution of the right-handed and left-handed tartaric acid puzzle which had so long perplexed great chemists and physicists like Biot, Mitscherlich and others brought the young chemist to the knowledge of his contemporaries in that line of work. But since the problem has only indirect connection with the great work of Pesteur's life, we will not go into detail concerning it.

In 1854, Pasteur, then only thirty-two years of age, was made dean of new Faculty of Science at Lille. He remained in that position for only a short time. During his stay at Lille Pesteur became interested in fermentation as manifest in the manufacture of wine, vinegar and beer. He reasoned that if infectious disease are due to fermentation, there must be a specific fermentation for each disease, and concluding that this reduced the proposition to an absurdity he cast it aside. The great authority on fermentation at the time when Pasteur began his work on this subject was the professor of chemistry at the University of Munich, Justus Liebig, who stood as the autocrat of chemical and physical science. Liebig believed that fermentation was entirely due to a process of oxidation, that it was a chemical procedure and depending in no way upon life. He recognized the fact that the inoculation of a fermentable substance with even a tiny bit of fermenting substance caused by fermentation to proceed in the whole, and that by transplanting from time to time, the process might be extended indefinitely. But he did not believe that fermentation was due to living organisms. Indeed, the demonstration of micro-organisms and the discovery that yeast is a living, growing, multiplying cell was not made known until the thirties of the nineteenth century.

The earliest theory concerning the causation of infectious disease, and one which still has a strong hold upon the belief of mankind, teaches that it is an infection imposed on man by some supernatural power. Some have attributed disease to evil spirits, while others have regarded it as a dispensation of their gods. There is no book of the middle ages down to the eighteenth century discussing an epidemic which does not attribute it, in part at least, to the wrath of God. Even those who were inclined to give rational explanations for epidemics did not dare to leave out the possibility, indeed, the probability, that the wrath of God was the most important element in causation. Luther wrote that pestilence and disease are naught else than the devil's work. Our own Cotton Mather described disease as "flagellum dei pro peccatis mundi." Another doctrine as to the cause of disease taught that all the joys and ills of man are determined by the position of the heavenly bodies. There are those that believe firmly that pestilences are caused by the spots on the sun or by the juxtaposition of certain planets. Our own great lexicographer, Noah Webster, wrote a two-volume book to prove that epidemics are due to earthquakes and other terrestial disturbances.

Fermentation Studies

During the sixties the wine industry of France suffered severely because in some places the wine became too acid; in others it became unpleasant to the taste; while in still other localities it became ropy or oily. Pasteur had studied alcoholic fermentation until he had determined that yeast is the only ferment essential for the conversion of sugar into alcohol, and when he examined these abnormal or diseased wines he found in all ceses that they contained some other ferments than yeast. For the most part these adventitious and undesirable ferments appeared as bacteria. After a study of diseased wines Pasteur was able to tell with certainty the changes which had taken place in a given vintage by a microscopic examination of the sediment. It was therefore plain that if one could prevent the growth of these foreign bacteria deterioration of the wine would not occur.

Pasteur's work had gone further than the study of alcoholic solutions and the conversion of alcohol into acetic acid; he had shown that the souring of milk is due to a ferment now known as the lactic acid bacillus.

Micra-Organisms

Pasteur had by this time shown that all the fermentations which he had studied were due to specific organisms. He was able to grow each of these in what we now know as pure cultures, to sow the seed and to reap the harvest with the same certainty that the farmer scatters his wheat and his barley. It was now essential that the question of spontaneous generation should be settled with scientific finality. Do these ferments come into existence spontaneously without ancestors and without inheritances? If this is the case, there is no possibility of scientifically controlling fermentations, whether they be in vinegar casks or in the animal body. Does smallpox or scarlet fever or diphtheria develop in a community de novo or as the result of the anger of some supernatural being, or does each disease arise from a natural cause? It will be impossible in the time at my disposal to enter into the procedure by which Pasteur for all time settled the question of spontaneous generation and demonstrated that microscopic as well as macroscopic life is continuous, that the dictum of Harvey, "omne vivum ex vivo," is true, that the tubercule bacillus can boast unbroken ancestry through a longer time than any son of woman, and quite likely that the pus germs which cause a boil on the back of your neck are lineal descendants of those which fed upon the body of Job. Suffice it to say that the work of Pasteur aided at that time by that of Tyndall and confirmed by thousands of experiments made now each day in the various laboratories of the world, have settled all these points. Pasteur had been growing in the belief that each infectious disease has its own specific germ micro-organism and to this, and to this only, the disease is due and through this, and this only, is the disease distributed from man to man, from community to community, and even, in the case of pandemic, throughout the world.

Called upon to investigate an outbreak of chicken cholera, Pasteur was soon able to demonstrate that this disease, highly fatal among fowls, is due to a bacterium. Here was opportunity to test an idea which had lang been in his mind; would it be possible to so attenuate the virulence of the chicken cholera bacillus that it might be used as a vaccine. He transplanted the cultures of this organism day after day through more than a hundred generations was just as fatal as inoculation with the first generation.

Treatment of Anthrax

For centuries anthrax has been a most destructive disease among animals especially among sheep and cattle throughout Europe. As early as 1837 a micro-organism had been found in the blood of animals dying from the disease. This bacterium had been studied and its causative relation to the disease demonstrated by Davaine and others. Pasteur inaugurated a line of experiments in order to determine whether the anthrax bacillus could be attenuated and made to serve the purpose of a vaccine. He succeeded in accomplishing this in two ways. First, by growing the organism in the presence of an antiseptic such as carbolic acid strong enough to inhibit and modify its growth but not strong enough to kill the organism. Another method of attenuation consisted in growing the cultures at a temperature of 42 degrees Centigrade, somewhat higher than that of the animal body. He found that when this was done through several generations the organism is so atenuated that it produces only a mild disease from which they soon recover and after which they are wholly immune to virulent culture. Probably the world has never seen so theatrical a demonstration of a scientific experiment as that made by Pasteur and his assistants on vaccination for anthrax at Melun. Having been convinced by experiments upon laboratory animals that he had a certain vaccine for anthrax and being continuously annoyed by criticism, he offered to make a public demonstration. A flock of sheep and a herd of cows were placed at his disposal and on a certain day there assembled at this farm a hundred or more, not only those interested in the work scientifically but those led by curiosity. Healthy sheep and healthy cows were vaccinated. At an appointed date later the assembly again gathered at this place and all the sheep and the cows were innoculated with virulent cultures. Two days later the assembly called again and while every unvaccinated animal was dead or dying there was no mortality among the vaccinated.

The Rabies Treatment

Passing over certain minor studies in immunity conducted by Pasteur and his collaborators such as vaccination for rouget or swine erysipelas, we come to the crowning work of this great life. I refer to his researches and his great achievements in the prevention of rabies after the bite of a rabid animal. There are graphic deschiptions of rabies both in men and in animals written long before our era and during all the intervening centurles it has been known by those most competent to speak that this disease is transmitted from animal to animal and from animal to man by the bite or scratch of an infected animal. It is true that through all this time there were some who believed that the disease may originate spontaneously in animals and especially in dogs. A popular superstition attributes this disease to the effect of heat, to the partial or complete deprivation of water or to the position of the stars. It had been demonstrated before Pasteur began his work that the virus of the disease is contained in the saliva of rabid animals. Further it had been shown that inoculation of a healthy animal with a bit of the brain or cord of a rabid animal induces the disease. Pasteur and his co-workers had not proceeded far in their investigation before they felt that inoculation with rabid saliva was too uncertain and variable in its effect. They decided to use the spinal cord in their inoculations. The next thing to do was to make this preparation of definite strength. This they accomplished by repeated inoculations subdurally of rabbits. Finally they obtained a fixed preparation, that is one of definite strength. Then they found that by drying the infected cord they gradually attenuated its virus. The infected cord suspended in a jar, the atmosphere of which was kept dry by the absorption of meisture by means of potassium hydroxide or other drying agent for fourteen days, is wholly without effect when injected into animals. Then it was found that a dog or rabbit inoculated with a fixed virus did not develop the disease if it was treated successively by inoculation of cords of gradually ascending virus. It was as if one should be told on the first of January that on the first of July he would be compelled to submit to an injection of a fatal dose of morphine. With this knowledge such a man could go to work and receive day after day gradually increased doses and when the first of July comes around he could bear without fatal effect the dose administered to him.

Pasteur and his students had demonstrated by experiment after experiment on animals the protective value of their procedure, but they were not quite ready to try it on human beings, when a little Alsatian boy, Joseph Meister, who had received fourteen wounds inflicted by a rabid dog, was brought to Pasteur's laboratory for treatment. Vallery-Radot, Pasteur's intimate historian, has described graphically the anxiety of Pasteur when this boy was submitted to the anti-rabic treatment. He was watched day after day until the time for the development of the disease was long past. It is not to be wondered at that Pasteur formed a fatherly attachment for this little boy which continued throughout his life. Neither is it strange that when the great contribution from Alsace for the building of the Pasteur Institution came in, signed by a long list of contributors, the name which struck and held the eye of Pasteur was that of his first patient, Joseph Meister. The treatment for rabies developed by Pasteur has demonstrated its great value, and Pasteur Institutes, the principle purpose of which is this treatment, are today in operation in nearly every part of the civilized world.

Recognized During Life

Pasteur was fortunate in thee recognition which he received during his life. Every possible scientific honor of real worth was conferred upon him. He was voted a member of very important academy and society. After his silkworm work he was given by the French Government an annuity of twelve thousand francs. After the demonstration of the anti-rabbic work this annuity was increased to twenty-five thousand francs. He lived to see the Paris Pasteur Institute built by contributions which came from widely separated parts of the world, from emperors and kings as well as from the poor. On the occasion of his seventieth birthday, in 1892 he received an ovation which probably no other scientific man has received.

In another and a little more important and extraordinary way Pasteur was fortunate. Personally, he was dearly beloved. Probabl yin the whole history of science no other man has had such devoted disciples. Many of the younger men absolutely effaced themselves in the service of their master. This certainly can be said of Roux, Chamberland, Duclaux and others. His disciples bestowed upon him a degree of reverence which would scarcely be exaggerated if termed adoration.

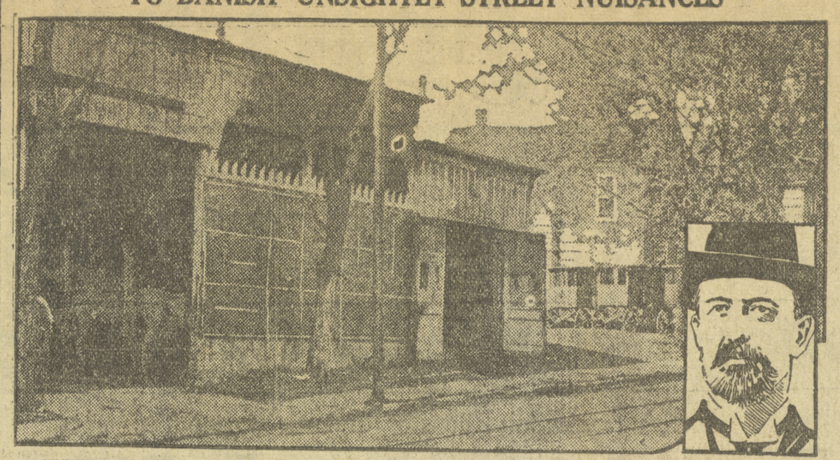
Great as were the researches of Pasteur they were greater still in the possibilities which they have opened up. Pasteur discovered the path which leads up the mountain of human achievement. He pointed out the way by means of which the race might wholly free itself from the infectious diseases. He led the world high up this mountain path, preaching as he did, "Let peace be among you. Let science load you. Under these conditions you may be able to reach the mountain peaks of human perfection." Under his guidance the world travelled far. In every land where his teachings were followed mortality and morbidity rates fell, the average life was prolonged, greater freedom from illness was secured, higher intellect developed. Under guidance we reached the hills where we were able to look down upon the pestilential marshes which we had left.

False Teachers

Having reached the limit permitted man to live he laid himself down to rest. The world built him a splendid mausoleum. For a few years after his death the race continued its progress with the best among nations in science in the lead, then came the great world cataclysm. The path being followed by the race toward the higher plateau has been broken. Across this path there are now chasms difficult to span. False teachers are urging the multitude to descend to the valley from which they came. They point out that the descent is easy, "descensus averno facile est." Many are following these false teachers, indeed, the descending crowds number not only hundreds and thousands but millions. Russia, the country that gave the world a Mendeleff in chemistry, a Metchnikoff in biology, has already as a nation reached the marshes that lie below the hills. Asiatic cholera confined to the mouth of the Ganges before the war has for the past six years implanted itself along the Volga and its tributaries and from January 1 to August 17, 1922, there were officially reported in Russia 55,000 cases of Asiatic cholera. In 1921 there were millions of cases of typhus and relapsing fever and in the same year for the first time in the history of the world malaria reached the Arctic circle and was in evidence at Archangel. As a scientist, I fear that the near future of the race is by no means certain. False prophets were never more numerous and credulity among the masses was never more evident.

It is fitting that we should do honor to the memory of that man who has done so much for the benefit of his race but the highest honor and the greatest homage that we can bestow upon him or manifest toward his spirit is to follow his teachings.

TO BANISH UNSIGHTLY STREET NUISANCES



A STREET IN KANSAS CITY AFTER THE "ANTI-UGLIES" WON THEIR FIRST VICTORY. INSET, JOSEPH MEINRATH, LEADER OF THE ORGANIZATION.

NINE MEN KILLED

Rome, Dec. 28—Nine men were killed when a fort near Trent blew up during the night. The disaster was caused by the accidental explosion of a shell when it set off the ammunition. The debris from the demolished fort was scattered for miles around.

FIND 6 SKELETONS

St. Thomas, Ont., Dec. 28—Six human skeletons, believed to be of Indians slain in battle a century ago, were unearthed yesterday by Harry Berry, of Bayham Township, when searching for a skunk in a woods about two miles east of Vienna.

$10,000 Violin

Miss Matilda Fultz of Middleport, O., is shown here admiring the Stradivarius which its owner, John B. Downing Jr., has just insured for $10,000. Downing's father "The Fiddlin Pilot," immortalized by Mark Twain, gave it to him.

CLOSE SATURDAY

The entries for the school boy competition will close at the Y.M.C.I. on Saturday of this week, but the date for the event has not yet been set. A number of entries were received yesterday and the West Side is now in the lead in that respect, Albert and LaTour schools being tied for first place. Alexandra school, Indiantown, comes next, and there are a few entries from the Winter street, St. Vincent's, King George and King Edward schools.

DIED

CAPLES—At his late residence, 22 Richmond street, on December 28, Richard F., son of the late Patrick and Annie Caples, formerly of this city.
Funeral from his late residence at 8.45 o'clock tomorrow morning, to the Cathedral for high mass of requiem. (Boston and Maine papers please copy).

Obituary

Miss Bessie M. Watson

Apohaqui, Dec. 28. — A shadow of sorrow darkened the otherwise festive season in this place and vicinity when it became known that Miss Bessie M. Watson had died yesterday at "Fox Hill" the home of her brother-in-law, Hastings M. Flewelling. Miss Watson's death was caused by septic pneumonia, the ultimate cause of her passing, having developed from an apparently trivial sore on a finger. The estimable young woman was a daughter of Mr. and Mrs. Charles N. Watson of Carpenter, Queens Co.

Besides her parents, two sisters, the Misses Phoebe and Maud Watsen survive.

Mrs. J. J. Hayes

Apohaqui, Dec. 28.—A sudden death occurred at Head of Millstream on Tuesday night, when Mrs. John James Hayes died at her home there.

Mrs. Hayes had been ill only since Friday last, and on that day had driven to Sussex. She contracted a heavy cold from which pneumonia developed. Mrs. Hayes was Miss Margt. Mason of Millstream. She was 45 years old and is survived by her husband, six daughters and one son. The daughters are: Mrs. George Soper, Mrs. Mabel Cooper, Mrs. Otis Mason and the Misses Audrey, Muriel and Florence. Spurgeon Hayes is the son.

Bereavement has visited the home twice within a month as two weeks ago, her mother, Mrs. Charlotte Mason passed away. Mrs. Hayes will be buried tomorrow afternoon.

Claude Morrison

Apohaqui, Dec. 28.—The death of Master Claude Morrison, aged seven years, occurred at the epidemic hospital on Tuesday, death being from scarlet fever. Both parents and a brother of the child are at present in the hospital with the same disease and a sister has just recovered.

Mrs. James Coneen

Moncton, Dec. 28.—The death of Mrs. James Coneen, aged 73 years, occurred at Painsec Junction on Wednesday. She leaves one son, Albert E. and four daughters, Mrs. Daniel Trites Shediac Road; Mrs. Fred W. Powell, Sunny Brae; Mrs. Albert A. Powell, Georgetown, and Mrs. Thomas King, of Painsec Junction.

Alexander Robertson

The death occurred at Chicago on Dec. 15 of Alexander Robertson, who went to Halifax from the Old Country many years ago, and was on the staff of the Bank of Nova Scotia. He was inspector for a few years. Twenty-five years ago he went to Chicago as manager of the branch of the Bank of Nova Scotia there, J. H. Stevenson, of the main St. John office, being on the staff for a time. Later he accepted a position as vice-president of the Continental National Bank in that city, which position he held until his death.

Richard Caples

The death occurred last evening, after a lingering illness of Richard Caples, a highly respected citizen and business man of St. John. He had been in business in this city for over forty years. He leaves to mourn his wife, three daughters, May and Vera at home, Florence of Montreal and one son Richard of Regina. Mr. Caples is also survived by one sister, Mrs. King of Portland, Me. and one brother, Robert of this city. The funeral will take place tomorrow morning from his late residence, 22 Richmond street to the Cathedral for High Mass of Requiem.

DRIVEN FROM HOMES

Erie, Pa., Dec. 28—Seven families were driven from their homes by a fire which destroyed the Aris Theatre building, Sixteenth and Peach streets, and is now destroying the three-story Zuck building adjoining.

MAYOR FISHER IS OUTVOTED

Council Decides Not to Drop Power Company Negotiations.

The offer of Messrs Sanford and Harrison, acting on behalf of the first and second preferred shareholders of the New Brunswick Power Company, the resolutions passed by the Civic Power Commission, tenders for castings, and superannuation of civic employees, were matters discussed by the city council in committee yesterday.

The offer of Messrs. Sanford and Harrison was taken from the table on the motion of Commissioner Frink. A resolution that the solicitors be asked to submit a list of all the holders of the stock, showing the price at which it was acquired, after which the council would consider the matter of further negotiations for the purchase of the property, was moved by Commissioner Frink. Mayor Fisher objected to any further negotiation as the price was higher than that mentioned in his platform and moved the offer be rejected.

On the vote being taken the amendment was defeated, only the mayor voting for it and the original motion carried.

The resolutions of the Civic Power Commission, covering the engagement of Barry Wilson as engineer, the New Brunswick Power Commission as consulting engineers, the appointment of an accountant-secretary and a vote of $10,000 for engineering and incidentals, as published yesterday morning, were approved by the Council.

Tenders for castings for the water and sewerage department were opened and referred to Commissioner Wigmore for a report, as follows:—

R. N. Robertson—Valves, 36-inch $1,180 and $910 each; 24-inch, $450 and $425 each, plus sales tax.

St. John Iron Works Ltd.—All cast iron fittings and valves, 6½ cents a lb.; hatch boxes, 8¼ cents a lb.

T. McAvity & Sons—Valves and castings, with bell and spigot fittings, 6¾ cents a lb.; with flange fittings, 7¾ cents a lb.; valves, 36-inch, $1,225; 24-inch, $465; hatch boxes $960.

Phoenix Foundry & Locomtive Works, Ltd.—All fittings and hatch boxes, 7¾ cents a lb.

Union Foundry & Machine Co., Ltd.—Special castings, 6 cents a lb.; hatch boxes, 7 cents a lb.

Vroom & Arnold, Ltd.—All special castings, $3,658.75.

James Robertson Co., Ltd.—Valves, 36-inch, $1,243; 24-inch, $321.52, plus sales tax.

John T. Farmer, Montreal— Hatch boxes, $3,250, plus sales tax; valves, 36-inch, $857; 24-inch, $328, plus sales tax.

General Supply Co.—Valves, $1,340; 24-inch, $397; with flanged ends, $1,869 and $418 respectively.

Commissioner Wigmore said he thought a superannuation plan for city employees should be brought forward at once and Commissioner Thornton expressed the idea that the civic employees should take the first step.