

● *History and Heritage*

ANTOINE LACASSAGNE

"Cancer is one of the diseases that has benefited most from experimental research which, in turn, has established its peculiar complexity on this object of study."

JUAN A. DEL REGATO, M.D., D.Sc.

Department of Radiology, VA Hospital, 13000 North 30th St., Tampa, FL 33612



Antoine Marcelin Bernard Lacassagne was born on August 29, 1884 in his parents' summer home, in the village of Villerest near Roanne (Loire) territory of ancient

Upon his return from Bayaria, Lacassagne registered at the Faculty of Sciences of Lyon for studies toward a Bachelor of Letters degree. In 1902 he served in the army

Aquitaine, France. He was the son of Jeanne Madeleine Rollet (1855-1893) and Alexander Lacassagne (1843-1924), a distinguished criminologist and professor of forensic medicine on the faculty of medicine and pharmacy of Lyon. He was the grandson of Joseph Pierre Rollet (1824-1894), a renowned syphilologist and professor of hygiene at the Faculty of Lyon. He had a sister, Jeanne (1883-1972) and a brother, Jean (1885-1960). Lacassagne also had a half-brother, Alexandre, born to his mother in her first marriage to Jean Guillermond. Alexandre Guillermond, became Professor of Botany at the Sorbonne and Member of the French Academy of Sciences. Jeanne Lacassagne married Albert Policard (1887-1972) who became Professor of Histology of the Faculty of Medicine of Lyon and also a Member of the French Academy of Sciences. Inspired by his illustrious ancestors, young Antoine was to dedicate his lifetime efforts to experimental research. He became a pioneer of radiobiology, contributed to the early development of

establishment located in the city of Vienne (sur Rhone), not far from Lyon (Fig. 3).

Having lived his formative years in the intellectual atmosphere of dedicated physicians and educators, Lacassagne decided to study medicine, not because of any strong attraction, as he explained later, but rather "out of indolence." He completed his pre-medical studies of physics, chemistry, and biology (P.C.N.) and then registered to become a medical student. Concurrently with his medical school curriculum, he prepared for the competitive exercises that qualified a limited number of externs (and later, interns) of the hospitals of Lyon; these exclusive positions assured him of a thorough clinical experience.

During the 4 years of his internship (1908-1912), Lacassagne registered also at the Faculty of Sciences and obtained master certificates in zoology, botany, and geology. These non-medical studies undoubtedly contributed to his eventual strength and originality as a medical



sisted by Elie Metchnikoff (1845–1916), Charles Louis Alphonse Laveran (1845–1922), and other distinguished colleagues; this course, with its emphasis on laboratory technology, was an enlightening experience. With the Pasteur Pavilion only partially built, Regaud, André Debièrne (1874–1949) and Lacassagne initiated an experimental study of the biologic effects of radon in lower animals. However, when the work had just taken its course, it had to be discontinued in July 1914 as the First World War broke out.²⁵

Madame Curie turned the Curie Pavilion of the Radium Institute into a school for specially trained nurse technologists to serve in a fleet of radiological ambulances. Regaud was put in charge of an evacuation hospital near Baccarat. Lacassagne was attached to the 8th Army Corps that saw action in Sarrebourg and then served on the Meuse and Champagne fronts. In response to a War Ministry call, he volunteered for service in the Orient. He was assigned to the care of Serbian soldiers suffering an epidemic of typhus in a Lazaret, isolated on an island off Corfu: he kept a remembrance of the moving, miserable condition of the Serbian defectors. He later served in Salonica and with the *Chasseurs d'Afrique*.

Meanwhile, Regaud had been recalled to Paris to help in the reorganization of the army medical services. He proposed the creation of a large medical facility near the front, and was appointed director at the village of Bouleuse near Rheims; Colonel Regaud gathered a faculty of the outstanding protagonists of French medicine and surgery.³³ Regaud requested Lacassagne's transfer, to become the bacteriologist of his surgical units. The model medical center was destroyed in one of the last enemy offensives of the war, in 1918.

Shortly after the Armistice, Regaud and Lacassagne were again at work at the Radium Institute. Thereafter, Lacassagne was Regaud's collaborator on every activity (J. Regaud, unpublished data, Dec., 1940). The original scope of their research now included the development of clinical radiotherapy techniques. Regaud's wider professional contacts, during the war, had opened new vistas and opportunities for recruitment: Henri Coutard (1876–1950) was quartered in the basement of the Pasteur Pavilion and put in charge of radiodiagnosis, roentgentherapy and experimental X ray irradiation; for these purposes, he had only one unit but used three different tubes. Regaud and Lacassagne bicycled to the great Parisian hospitals carrying their limited supply of radium needles with which they developed the early techniques of interstitial and intracavitary curietherapy: for cancer of the tongue, the technique of "radiumpuncture," and for cancer of the cervix, the tandem and colpostat.²⁷ Radium was somewhat scarce, so some of Madame Curie's radium was put in solution to collect the radon in an emanation extraction plant; it was then compressed into capillary glass tubes that were placed into hollow platinum needles. Regaud and Debièrne worked out a dosim-

etry system calculated at the source in *millicuries destroyed*.

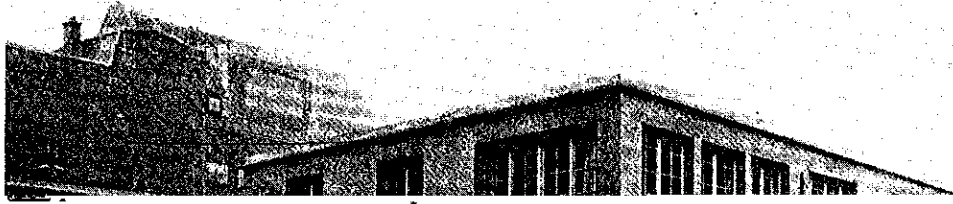
The rapidly increasing clinical activities required more help. Justin Jolly (1870–1952), a hematologist, took charge of histopathology; he also made interesting experimental observations of the role of blood supply in radiosensitivity. René Ferroux (1892–1954), a physicist trained at Grenoble, was also given space in the Pasteur Pavilion; he designed the first telecurietherapy ("radium bombs") units. Out-patient and hospitalization facilities were available at the Pasteur Institute. Jean Louis Roux-Berger (1880–1957), a dedicated surgical oncologist, took charge of these facilities. Antoine Bécèle (1888–1966), the venerable pioneer of French radiology, became an influential supporter of the clinical activities; he brought Georges Richard (1888–1961) and Mademoiselle Dr. Juliette Baud (1893–1979) as well as Jean Pierquin (1887–1956); they became enthusiastic developers and practitioners of radiumtherapy. Later, a private surgical clinic offered additional facilities, rue Chantini; Octave Monod (1870–1930), a superb diagnostician and internist was put in charge.

Because of an incredible timetable, Regaud and Lacassagne continued their experimental research, making valuable original observations; in 1922 Regaud made his timeless contribution, the greater effectiveness of fractionation.³³ Lacassagne and Monod studied the histopathologic effects of the irradiation of malignant tumors.²² With Madame Lattes and Lavedan, he analyzed the consequences of the injection of polonium in lower animals.²⁴ In doing this work, Lacassagne developed the original technique of *autohistoradiography*.²³ With Coutard, he studied the consequences of the experimental irradiation of oocytes on fecundity and subsequent pregnancies.²¹ He also wrote on radiotherapy of sarcomas.⁶

The increasing activities and personnel required administration and funds. The authorities of the university and Pasteur Institute, in accordance with Madame Curie and Regaud, decided to establish the *Fondation Curie*. The young Baron de Rothschild was its first philanthropic contributor; André and Christian Lazard were also devoted supporters. Regaud had a bicycle accident: and was forced to accept a chauffeured automobile for his transportation, provided by the trustees of the foundation.

On grounds close to the Radium Institute and accessible through rue d'Ulm, the Foundation erected two unpretentious two-storied stucco buildings. One served as the outpatient clinic with examining rooms, archives of detailed clinical records, laboratory of histopathology and administration; the other accommodated Coutard's expanded roentgentherapy service with eight units and a small addition to the laboratory research facilities (Fig. 4).

The Radium Institute of the University of Paris, what many called the Curie Institute, became a mecca for





sion, hereditary malformations, depending on the area of the cell structure hit by the rays.⁸ In the summer of that year, Madame Curie died. Lacassagne recalled his emotion when 20 years previously, he had first been presented to her.¹⁹

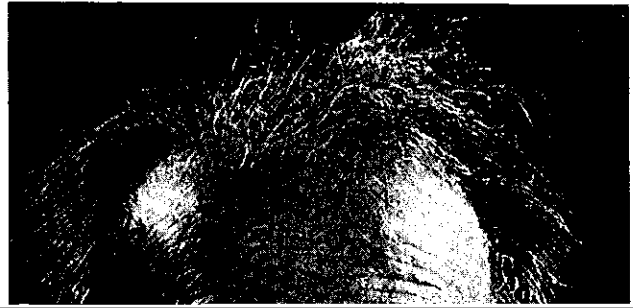
In 1936 another important facility was added, the Hospital Curie (Fig. 7). Situated behind the ancient Maronite church, with entrance on rue L'Hommond, the hospital was eventually connected with another structure, rue d'Ulm, across the street from the Institute. The long-awaited hospitalization facilities were complemented by ample operating rooms and accommodated the telecurietherapy service. The new building also offered restaurant facilities to the personnel.

In 1937 Regaud's health started to fail; upon his retirement, Lacassagne assumed the responsibilities that he had long exercised as deputy director. He aimed, however, to rescind all clinical obligations and to confine himself to his director's research. The advent of the C



Lacassagne developed a vast program of research which was, without doubt, one of the earliest examples of sub-molecular biology in the field of experimental carcinogenesis.^{13,26}

the Radium Institute and as professor of the College of France, but he was permitted to keep a small laboratory at the Curie Foundation, where he continued his work. Having worked devotedly in the ranks of the Centre Antoine Bécélère, he was elected its president in 1957. He published (1957) a study of the mechanism of death from total body irradiation,^{14,16} and he continued his work on chemical carcinogenesis.¹³ In 1957 he was elected president of the *Ligue Nationale Contre le Cancer*, and in 1960 he received his nation's recognition as *Comman-*



of his associates, a lay monk whose religion was the experimental science at the service of man.³⁵ Throughout his life, there were always ladies who adored him distantly. He was an amiable, kind man with inexhaustible sympathetic tolerance; he showed genuine interest in the views of others and patience with younger men ready to spout their opinions. He lived alone in a comfortable self-styled apartment (Porte Royale Square), within walking distance from the Institute. He lived by his own strict but well balanced rules and took pride in his culinary abilities. He went to bed early but awoke much before dawn, thus increasing the number of hours of daily work. While at home, he granted himself no holidays, but twice a year in the spring and early autumn, he took a short vacation in his *fermette*, near the place of his birth in Villerest. Returning after lectures given or congresses held in foreign lands, he brought seedlings of rare trees that he attempted to transplant to the rather infertile land of his property. Visitors of his laboratory were often surprised to find him watering plants in various places within his laboratory and the garden between the pavillions where Madame Curie shared his interest.

Lacassagne had genuine affection for his family traditions and for the Loire Valley, the region of his origins.

He was fond of history and literature and had great interest in world affairs. He was a true savant and humanist²; he seldom aired his views but was suspected of having liberal ones. He was solicited by a variety of causes, but he gave his support to only a few. In Paris the Salvation Army offered to the *clochards* of the city a bowl of potage and a bunk in a barge on the banks of the Seine. Unsuspected by most, Lacassagne attended the annual dinner meeting of the organization of which he was an Honor Member.³⁵

Monsieur Lacassagne was a passionate doubter with a mystic's respect for the unknown; the search for truth was both his philosophy and his religion. He was a gentle rebel possessed of a wild compulsion to research. An introspective slave of thought, he was subject to its subversive and anarchic influences.³²

Already 86 years of age (Fig. 10) and still impressive by his remarkable memory and intellectual verdancy, he suffered the inveterate tyranny of old age. He hurried to finish his last paper, and as he felt his physical strength relentlessly failing, he wrote brief notes of thanks to his faithful collaborators; principally out of concern for the trouble that he might have caused them, he deliberately abridged his existence on December 16, 1971.

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