Chapter 7

Claudius Regaud

(1870–1940)

"Prolongation of time ... without increase of the dose ... favors the efficacy of the irradiation." (1922)[511]

Claudius François Regaud was born in Lyon, France, on 30 January 1870, the son of Anne-Marie Decrand and Félix Regaud (–1892), a government official. In rapid succession Claudius was joined by three younger brothers: Françisque (1871–1928), Romain (1873–), and Louis Guillaume (1875–1879). On their father's side they were the grandsons of Adelaide de Granat and André Regaud. Members of both families were stonecutters. The family spent their summers in their mother's Couzon-au-Mont-d'Or. Claudius developed a passion for his father's beautiful Savoy and its mountains.

As a child, Claudius first attended a "maternal" school, then the Lycée de Lyon as a boarder. He was a good student and excelled in Latin and English. At twelve, he was transferred to the private Institut des Chartreux, where the Abbé Fullard was his excellent teacher of chemistry and physics, and where he learned to play the piano. In 1886 he graduated with the degree of *Bachellier*. Regaud registered at the Faculty of Law of the University of Lyon, obeying his father's wishes, but also enrolled at the Faculty of Sciences. His one year of law proved unsatisfactory, perhaps because of his greater attention to the science courses.

In 1888 he entered the School of Medicine of the University of Lyon. At twenty-one, Regaud became an intern (Fig. 7-1). He engaged in cytological studies of cancerous ascites and, in 1896, received the Academy of Medicine's Portal Prize for a monograph on the lymphatic system. He showed that the formation of new blood vessels in malignant tumors was not accompanied by an equal proliferation of lymphatics, but rather with their progressive obliteration. In 1897, he successfully defended his doctor's thesis, *Sur les vaisseaux lymphatiques du testicule*.[507]

In 1898, Regaud married Marie Croizet, from the region of la Bresse, an accomplished pianist. As an undergraduate, he had already become *Chef de Travaux Pratiques*. He held this position until 1901 when he became *Professeur Agregé* (Histology) of the Faculty of Medicine of Lyon. There were few subjects in histology and embryology he failed to study. He was a dedicated teacher whose courses inspired many a young scientist. Regaud's technique for the staining of mitochondria has stood the test of time. In 1901, he made a critical study of spermatogenesis in mammals and made a detailed histologic presentation of the histology and physiology of the seminal tubules.[508] This work was to bring him praise for its didactic qualities.

In October 1903 Heinrich E. Albers-Schönberg (1865–1921),[B] of Hamburg, observed that the irradiation of the testes of rabbits and guinea pigs rendered these animals sterile, although they continued to copulate.[8] The same facts were observed by Frieben and by Seldin.[B249,568] In December 1904, Jean Bergonié (1857–1925),[B] Professor of Biophysics and Medical Electrology of the University, and Louis Tribondeau, Professor of Histology at the Naval School of Health in Bordeaux, began studies on the effects of irradiation of the testis.[79] "We had the luck," wrote Bergonié and Tribondeau, "of documenting ourselves thoroughly by reading but one work ... *un excellent mise-au-point* ... augmented by personal studies ... permitting the neophyte to find himself at ease in the confused scene of spermatogenesis." For this purpose, they used white rats on which Regaud had made available a wealth of information and developed careful histologic techniques. They verified the azoospermia resulting from irradiation after a latent period of three weeks. Histologic studies revealed atrophied

Fig. 7-1. Claudius Regaud, Intern of the Hospitals of Lyon. (Courtesy of Dr. Jean Regaud.)

seminal tubules in which only Sertoli cells were seen. Seemingly unaffected mature sperm cells remained for months in the epididymus.[80,81] They pointed out that these effects resulted from rather weak irradiations, similar to those used in radiographic exposure. The effects sometimes were temporary. Cases of human oligospermia and sterility were observed by Brown and Osgood, of New York City in 1905, in eighteen men who had engaged in work with roentgen rays.[91]

In 1905, with the assistance of T. Nogier and Barjon, Regaud began experimental irradiations using the electro-medical facilities of Professor Bondet's clinic in Lyon. Because of his experience in the field, he decided to observe the effects of irradiation of the testis. In July 1906, Regaud and Blanc reported their results and their enlightened interpretation: the mitotic phase is the point of lesser resistance of the cell. The irradiation causes changes in the generations of cells which succeed one another, stratified from the periphery to the center of the seminal tubules, from the spermatogonia through the spermatocytes, to the spermatids and spermatozoids. But the intensity of the effects take place on the spermatogonia, and decreases as the cells are more and more removed from the source and become more and more differentiated. The spermatozoids appear unaffected by the irradiation. Thus, the radiosensitivity of the cell is greater the more undifferentiated (or embryonic) it is. The extreme sensitivity of the spermatogonia leads to eventual sterilization just as a reservoir, deprived of its supply but continuing to be drained, is eventually depleted. Regaud and Blanc concluded: "It is scarcely necessary to point at the importance of our observation from the point of view of the effects of radiations on normal as well as pathologic tissues and particularly on malignant tumors."[518]

Bergonié and Tribondeau verified the stratified effects they previously had failed to interpret and, in December 1906, proceeded to express the facts observed by Regaud and Blanc in the form of a law: "The effects of irradiation on the cells are more intense the greater their reproductive activity, the longer their mitotic phases, and the less their morphology and functions are established." ("Les rayons X agissent avec d'autant plus d'intensité sur les cellules que l'activité reproductrice de ces cellules est plus grande, que leur devenir kariokynetique est plus long, que leur morphologie et leur functions sont moins définitivement fixées."[86]) The "law" of Bergonié and Tribondeau synthesized rather well the observed facts within the seminal tubules and it applied, though not to the same extent, to other stratified tissues of progressively differentiated generations of cells, such as those of the epidermis. But it was far from allowing a prediction of radiosensitivity of other tissues, or a comparison of the response to irradiation of various tissues. Not even the mitotic activity of a given tissue translates a proportional radiosensitivity in the absence of progressive differentiation. In spite of its shortcomings, the "law" of Bergonié and Tribondeau made history: it has been repeated and taught for decades, much beyond its significance, often obscuring the true identity of radiosensitivity.

Regaud pursued his radiophysiologic interests with characteristic dedication and thoroughness. With Nogier he discovered that filtering facilitated a more homogeneous irradiation and a more "selective" destruction of the most vulnerable cells.[526] Since they had already worked with rats, rabbits, guinea pigs, cats, and dogs, they now experimented with rams.[443] The bulkier testis of the ram permitted a more homogeneous interstitial irradiation while minimizing the effects of trauma. They verified that it was possible to produce permanent sterilization of the testis without damage to the scrotum, by means of three irradiations fifteen days apart.[527] This work established the biologic basis of fractionation. In work with Henri Dominici (1867–1926), Regaud became convinced that there was no difference in the biologic effects of roentgen and gamma rays, but was attracted by the possibilities of long continuous irradiation (protraction) by means of radium.[510] Nogier and Regaud published the results of irradiation of one hundred

malignant tumors; they found no morphologic explanation for the diminishing proportional effects of successive irradiations and concluded, as suggested by Delbet, that it resulted from "radio-immunization."[444,513] Regaud and Nogier also described the effects of irradiation of the skin and the histologic substratum of the moist radioepidermitis (*radioepidermité exsudative*).[525] One of Regaud's most devoted students asked him for a subject of research to be carried out under his guidance: thus Antoine Lacassagne completed his doctor's thesis with a definitive study, untarnished by age, on the effects of irradiation of the ovary.[366]

At the close of the century, Regaud had followed the courses on immunology and techniques of microbiology offered at the Pasteur Institute of Paris. The organizer of these lectures and demonstrations was Pasteur's close collaborator, Dr. Emile Roux (1853–1933). Regaud's serious dedication to scientific disciplines made a lasting impression on Roux who later became Director of the Pasteur Institute. In 1912, a generous bequest to the Institute led Roux to the realization of a most worthy project: to provide Marie Curie, who had just received a second Nobel Prize, with an adequate laboratory. Acting in unison with the Chancellor of the University of Paris, Roux proceeded to create the Institut du Radium. Twin pavilions were built. The Pavilion Curie, entrusted to Marie Curie and her collaborators, was a dependency of the Faculté des Sciences of the University. The Pavilion Pasteur (Fig. 7-2), under the administration of the Pasteur Institute, was to be devoted to radiophysiologic and radiotherapeutic studies. Roux asked Regaud to assume the directorship of the latter with the title of Professor of the Pasteur Institute. It was not easy for the shy and independent scientist of Lyon to abandon the security of his friends and supporters for work as an unknown among strangers, but he accepted the challenge.[373] Lacassagne followed him within a few months. Regaud pursued his investigations in close collaboration with Debierne. They developed hollow platinum needles to be loaded with capillary radium emanation glass tubes.[131] They also evolved an early rigorous radiation dosimetry measured in "millicuries destroyed." They had just begun their work at the Radium Institute of Paris when, at the end of June 1914, a Hapsburg prince was murdered on Hapsburg soil by a Hapsburg national: the event led Germany, within a month, to declare war on France and to invade her territory. In September, the government of France moved to Bordeaux.

Regaud served as chief of a military evacuation hospital at Gerardmer, near Baccarat. Henri Coutard, who had done research with radium, was there in charge of the radiologic services. Recalled to Paris to work in the reorganization of the health services,

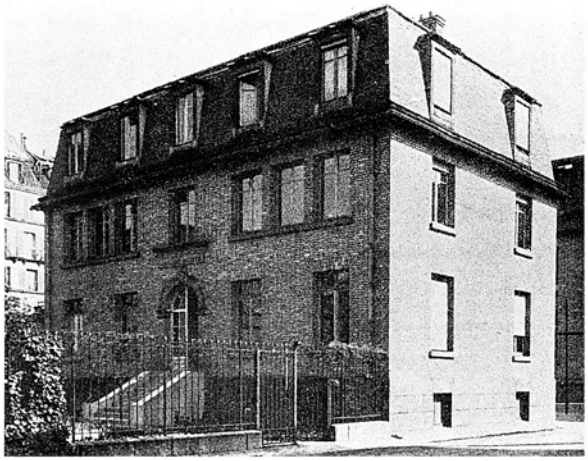


Fig. 7-2. Pasteur Pavilion of the Radium Institute of Paris.

Regaud introduced a system of surgical teams and ambulances to serve the front lines and proposed the creation of a large treatment center to double as a place for the instruction and training of army physicians. Lieutenant-Colonel Regaud was appointed director of this center, of unprecedented size and sophistication of equipment, at Bouleuse, near Reims. A constellation of the brightest names in French medicine joined his staff: a veritable *faculté aux armées* which was dubbed "l'Université de Bouleuse". In May 1918, Colonel Bailey K. Ashford, M.C., U.S.A. (1873–1934), visited Bouleuse and was escorted by Regaud for a close look at the front lines in the sector of Chemin des Dames. Ashford was impressed by the sturdy, blue-eyed, bearded French patriot and admired his determination and courage (Fig. 7-3). Ashford later related the ambulance ride, in full view and range of the enemy, which he and Regaud daringly agreed to take for their return at dusk.[12] Within a few weeks of Ashford's visit, the model center was destroyed in a German thrust across l'Aisne River, to Château-Thierry, on territory that twenty centuries earlier had seen Caesar's legions stage their attack on the Belgae.

Shortly after the Armistice, working to regain lost time, Regaud gave himself to the task of renewing the scientific activities of the institution which he liked to call the "Curie Institute," although the name then had no official status. He gathered his collaborators from the ranks of the army. Lacassagne resumed his position as faithful aid in charge of the experimental laboratories. Henri Coutard took charge of roentgenology (diagnostic, therapeutic, and experimental) in the basement of the Pasteur Pavilion. Regaud and Lacassagne bicycled to various hospitals where they perfected techniques of radium applica-

Fig. 7-3. Major Regaud and his family during WWI. From left to right: Jean, Marie-Henriette, Félix, and Marguerite, behind Major and Mrs. Regaud.

tion. In these trials the techniques of brachytherapy were developed for the treatment of cancer of the skin and lower lip and for the implants of radium needles in cancer of the tongue *(radiumpuncture)*.[501]

They had an immediate need for hospital and surgical facilities. The Pasteur Institute provided them with a six-bed ward at 213 rue Vaugirard. There Georges Richard (1893–1962),[B] Jean Pierquin (1887–1958),[B] and Juliette Baud (1893–1979)[B] became their faithful collaborators. They contributed to the gradual development of techniques of radiumtherapy. There was a great demand for attention to private patients, and an additional service was developed in 1922 at 33 rue Chantin. There Octave Monod (1877–1934)[B] took charge of radiumtherapy. Jean-Louis Roux-Berger (1880–1957) was in charge of surgery, and developed an original technique of radical neck dissection. Albert Hautant, in charge of otolaryngology, developed a technique of hemilaryngectomy. Georges Wolfromm was the urologist.

There were great numbers of patients not eligible for cure by means of surgery. Already in 1913, H. Cheron and H. Rubens-Duval (1876–1926) had shown encouraging results of radiumtherapy in 158 patients. The first efforts consisted in the vaginal packing of radium sources against the cervix. Regaud and Lacassagne also tried interstitial implantation of radon needles and *la methode americaine* of implanting radon seeds.[501] But gradually they developed the classical method of intrauterine sources in tandem and two cylindrical corks in each lateral fornix kept 15 centimeters apart by a metal spring, plus one or two additional sources between them and directly against the cervix (Fig. 7-4). The standard procedure adopted for this intracavitary brachytherapy lasted 100 to 120 hours and the dose, at the source, was of approximately 6,000 mg/hours. Radium element sources were gradually adopted instead of radon as more radium became available. Walter Frerich (1883–1968) and B. Krönig of Germany had shown the value of adjunctive roentgentherapy.[249a,363a] Although with only one unit at their service, Coutard and Richard initiated the treatment of the more advanced cases with external pelvic roentgentherapy.

Most of their work was done *gratis*, but funds were needed for facilities and salaries of ancillary personnel. Under the auspices of the University of Paris and of the Pasteur Institute, Regaud created the Fondation Curie, the financial arm of the institution.[529] Generous contributions from Baron Henri de

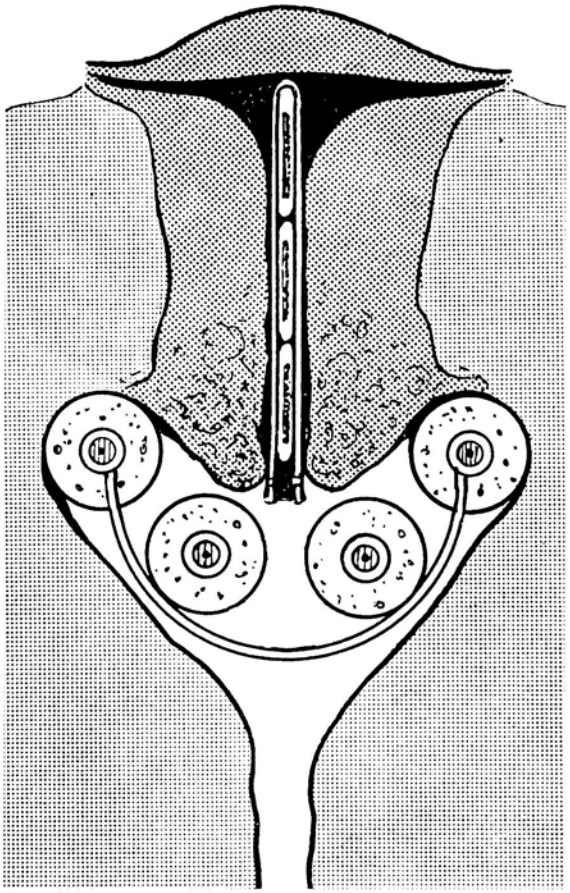


Fig. 7-4. Regaud's system of intracavitary irradiation for carcioma of the cervix.

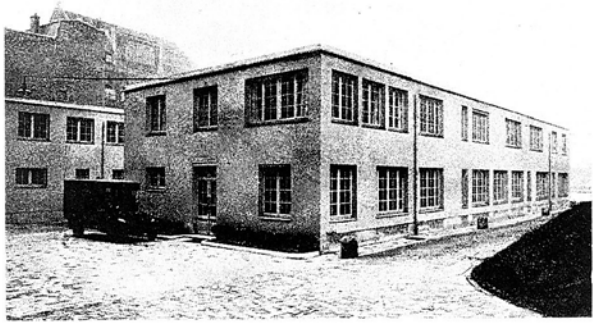


Fig. 7-5. First clinical facilities of the Radium Institute. The structure in front was dedicated to the outpatient clinics, administration, and laboratories; the one in back was devoted to the department of roentgentherapy and to radiodiagnostic facilities.

Rothschild and from the brothers André and Christian Lazard permitted the construction of two stucco pavilions, one for the clinical and histopathologic laboratories and out-patient clinic, and another for Coutard's expanded department of radiology with a radiodiagnostic unit and seven units for roentgentherapy (1923) (Fig. 7-5).

Regaud found a powerful ally in Antoine Béclère who supported the educational and research efforts of the Radium Institute. The venerable pioneer, who had lectured on radiology before the close of the century, organized an integrated course of several months of lectures offered in conjunction with the Faculty of Medicine. The demands of foreign trainees were met by full-time positions of *stagiers* with a minimum tenure of six months. One of the early *stagiers* studied and solved the problem of molding material for surface applications of radium. The developed product was named "Colombia Paste" in honor of the country of origin of Alfonso Esguerra-Gómez, of Bogotá (Fig. 7-6). Among the early *stagiers* were Maurice Lenz (1890–1974)[B] of New York, Ion Jovin of Bucharest, Brian Windeyer of London, as well as others trained in a truly multidisciplinary atmosphere, who became their countries' own pioneers of radiotherapy of cancer.

With such a variety of absorbing obligations as director, Regaud nevertheless pursued his interest in radiobiology. Gradually, he evolved his concept of the biologic resemblance of the mammal's seminal epithelium, in continuous spermatogenesis, and the unbridled growth of malignant tumors. The resemblance was accentuated by their similar response to irradiations resulting from the inequality in radiosensitivity of the various cells present: "The germinal tissue of the testes of mammals constitutes a precision test of the biologic effects of radiations."[510] He had found that it was difficult, if not impossible, to sterilize the testes of the experimental animal through a single irradiation even when the dose administered was capable of producing irreparable damage to the integuments of the scrotum. Similarly, the complete destruction of neoplastic cells by a single irradiation required doses of radiations rarely compatible with the preservation of normal surrounding tissues.

He had already confirmed the unquestionable greater selective effects of fractionated irradiation.[521,522] Now he also became concerned with protraction. In a period when the prevailing notion of radiotherapy of cancer was the intensive delivery of a single large dose in the shortest time, he put forth his experimental conclusions calling for a smaller total dose protracted in a continuous application of six to fifteen days. "The elongation of time of irradiation, without increase in the size of the dose, enhances the effects. Under the circumstances of our experiment, it seems more important to increase the time rather than the dose."[511] His techniques of curietherapy, em-

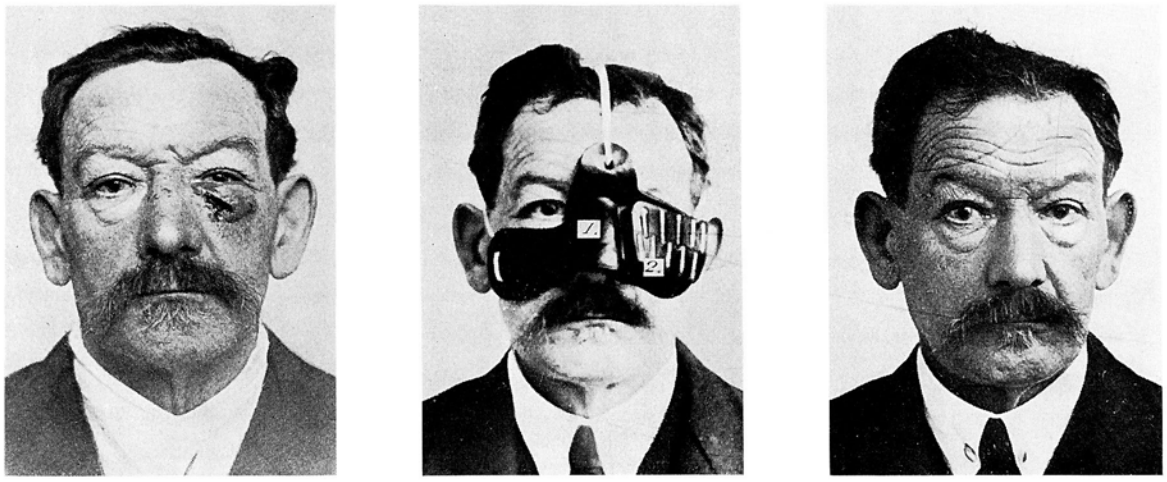
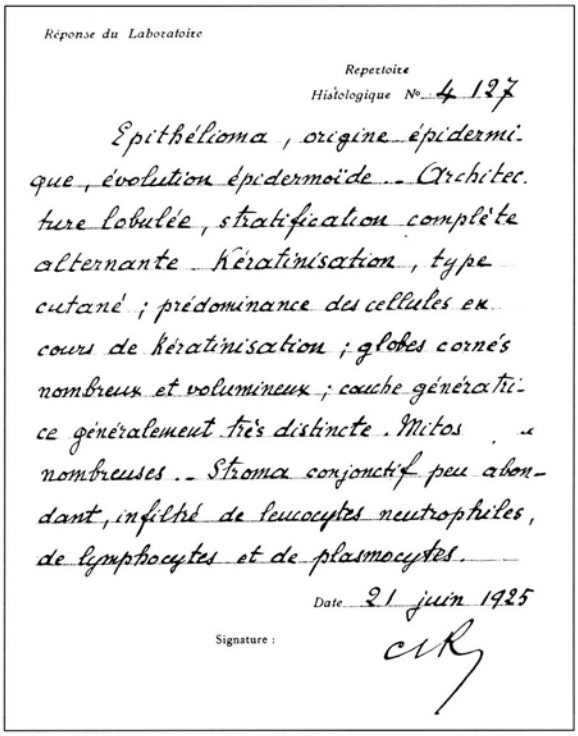


Fig. 7-6. Patient being treated for various manifestations of cancer of the skin with radium needles on a brachytherapy arrangement with Colombia Paste.

ployed to this day, were made to conform with this concept. He confirmed, in cancer patients, that local healing was easier to obtain.[509] "The alternating rhythm of cellular reproduction provides an explanation of the efficacy of prolonged irradiations: the prolongation compensates for the lesser intensity without increasing the total dose."[512] He differentiated between the indiscriminate cytocaustic effect of large doses and the selective destruction of cells by an irradiation that was adequate to exploit the conditions of cellular reproduction and greater vulnerability of cells in mitosis.

In Chicago, in June 1934, Regaud was the honored guest of the American Radium Society. At a time when the tendency everywhere was towards short intensive treatments, Regaud pleaded for the use of selective, rather than caustic, radiation effects. He made known his preference for continuous (non-fractionated) curietherapy of six to ten days, allowing a total of up to twenty days in the treatment of squamous-cell carcinomas. In the presence of a select gathering, James Ewing hailed Regaud's work as the most important development in the epoch-making rise of radiotherapy of cancer: "I find myself quite enthused and electrified," said Ewing, "by the very scientific and fundamental discussion which Doctor Regaud has given us."[190]

Regaud's interest in cancer and his keenness as a histologist led him willingly to share the duties of his successive associates in histopathology (Fig. 7-7), to each of whom Pierre Masson[B] was an early consultant. Jolly made early observations on the role of blood supply in radiosensitivity.[343] Berger made the original description of the olfactory esthesioneurepitheliomas. Gricouroff, Marie Curie's protegé, developed into an international authority on the histopathology of tumors. Faced with clinical evidence of their different behavior and radiocurability, Regaud described and designated a group of tumors arising in the upper air passages as lymphoepitheliomas. These tumors have been considered variously as malignant lymphomas or undifferentiated carcinomas; still they constitute a special group of tumors quite unlike malignant lymphomas and undifferentiated carcinomas.[533]



Réponse du Laboratoire

Repertoire Histologique N° 4 127

Epithélioma, origine épidermique, évolution épidermoïde. Architecture lobulée, stratification complète alternante. Kératinisation, type cutané; prédominance des cellules en cours de kératinisation; globes cornés nombreux et volumineux; couche génératrice généralement très distincte. Mitos nombreuses. Stroma conjonctif peu abondant, infiltré de leucocytes neutrophiles, de lymphocytes et de plasmocytes.

Date 21 juin 1925

Signature : CR

Fig. 7-7. Holographic histopathologic report by Regaud.

Regaud, as well as other workers in the various divisions of the institute, published their works in various languages in numerous countries. He integrated these contributions into a single publication, *Radiophysiologie et Radiothérapie,* as the *Archives of the Institut du Radium,* which was published by University Press of Paris. The publication appeared in the form of irregular fascicles which were gathered in three volumes from 1927 through 1938.[524]

Regaud's views on clinical cancer education and his concepts of the organization of cancer centers contributed to the world-wide growth of his reputation: "The young physician has only partial, superficial views on the subject of cancer, vastly inadequate," he said, "for the capital role he is called to fulfill .... The remedy of this situation is in the hands of the Faculties of Medicine."[516] Over sixty years have passed since this statement was made and it is even more true today than it was then. "Correct treatment, as well as early diagnosis, are capital factors in the fight against cancer." In lectures which he was asked to give in Montréal, New York, Bogotá, Lima, Santiago, Buenos Aires, Montevideo, Beirut, Cairo, Warsaw, Liverpool, Kharkow, and countless other places, he emphasized his message: "There cannot be serious organization of the treatment of cancer without concentration of resources and coordination of skills." Whereas some institutions allowed themselves to become exclusively radiotherapeutic and others, which were primarily surgical, used radiotherapy only as an adjuvant, Regaud decried the exclusive use of radiotherapy and emphasized the need for a true multidisciplinary approach: "The treatment of cancer has become a matter of teamwork that cannot be carried out adequately except in special centers .... This team requires a leader with authority; he should know well the various treatment methods but without letting his judgment be imprisoned by the use of any one of them."[515]

In the 1920s, governments and medical organizations, responding to the public needs and clamor, yielded easily to the temptation of creating a network of cancer centers for which there was little chance of sufficient equipment and a woeful absence of trained personnel.[514] "Surgeons and radiotherapists who undertake to treat curable cancer assume an exceptionally heavy responsibility because the unique stakes that they play with are the lives of their patients. If these thoughts constantly haunted, as they should, the spirits of those who occupy themselves with the treatment of cancer, the effort of organization should aim at the quality and power of the institutions and not at their number."[373] Regaud's argument was to be repeated, off and on, from time to time and from country to country.

A genial laboratory investigator who also was a keen clinician, Regaud credited his mentor, Professor Jules Renaut, for insisting on the practice of both disciplines. Regaud was also an effective lecturer, a capable administrator, and a dedicated family man. For years, he bicycled home for lunch until, after a minor accident, he was urged to use the chauffeured limousine of the Foundation. An affectionate husband and father, he spent evenings and weekends in the company of his devoted wife, for whom there was nothing outside her family, and his daughters and sons.[529] In good weather, they would explore together the picturesque sites of the Parisian surroundings. He insisted on refunding the Foundation, on a mileage basis, the use of the conveyance. An ardent alpinist in his own youth, he resumed mountain climbing in order to safely acquaint his children with his lost valley, La Morienne, in Savoy. "The mountain," his youngest son, Dr. Jean Regaud, wrote, "is a school of perseverance, of courage, a preparation without parallel for the hard realities of life, a release from the everyday suffocation."[529b] In his travels abroad, he was often accompanied by one of his daughters, Marguerite or Marie Henriette, who dutifully took charge of his social obligations and of the necessary diplomatic arrangements (Fig. 7-8).

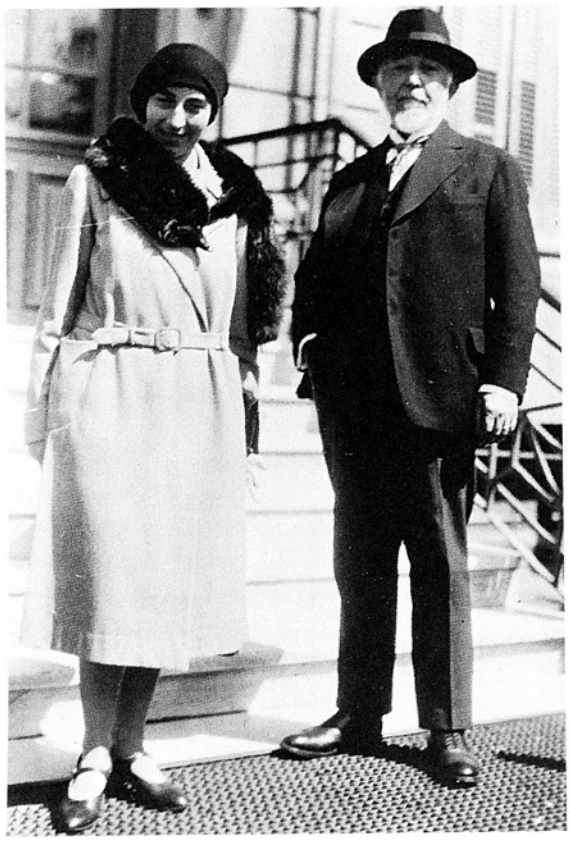


Fig. 7-8. Regaud and daughter in Buenos Aires.

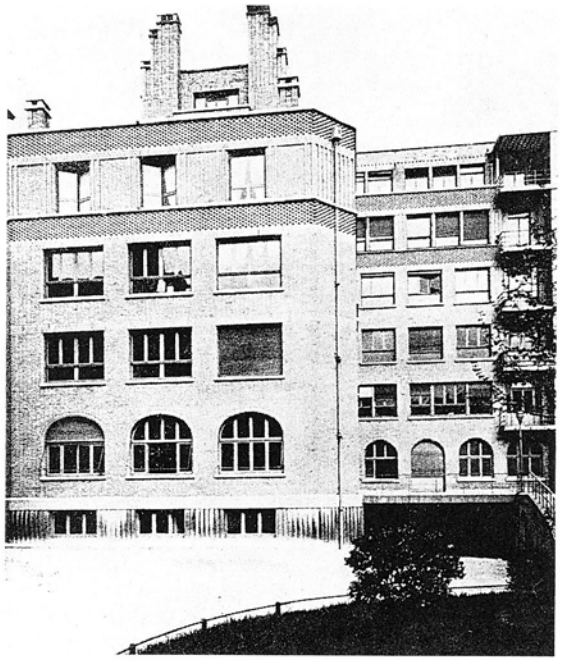


Fig. 7-9. The Claudius Regaud Pavilion of the Curie Institute.

In 1932, a philanthropist who insisted on anonymity donated a five-story building on ground adjacent to the Institute (Fig. 7-9). It accommodated Gricouroff's histopathological laboratories as well as research laboratories and the library of the institution. François Baclesse (1897–1962),[B] a native of Luxembourg and a thoroughly trained radiodiagnostician, became Coutard's first assistant and had taken charge of the radiodiagnostic service. He had new facilities for fluoroscopy and radiography in the new building.

Regaud had long entertained the thought that gamma rays were more selective in their differential effects than X rays. In 1933, he obtained a loan of fourteen grams of radium and decided to devote a whole floor of the new structure to a trial of telecurietherapy. For proper comparison he wanted to treat patients with the same doses and fractionation that had proved so successful to Coutard. Regaud asked the author to help him initiate this project. I agreed to do so in the evenings after my work in roentgentherapy. I ate dinner and slept in the premises, and placed patients under the teletherapy until well after midnight (Fig. 7-10). Doctor Jacques Lavedan, the institution's hematologist checked my blood at short intervals. He soon found that my circulating lymphocytes had all but disappeared. Young Francis Perrin discovered that some of the radium sources, supposedly sealed, were leaking radon. The service was closed, and I went to recover in the sun at the Costa

Fig. 7-10. Patient receiving telecurietherapy for a tumor of the chest. Note the hand lever to change the direction of the beam.

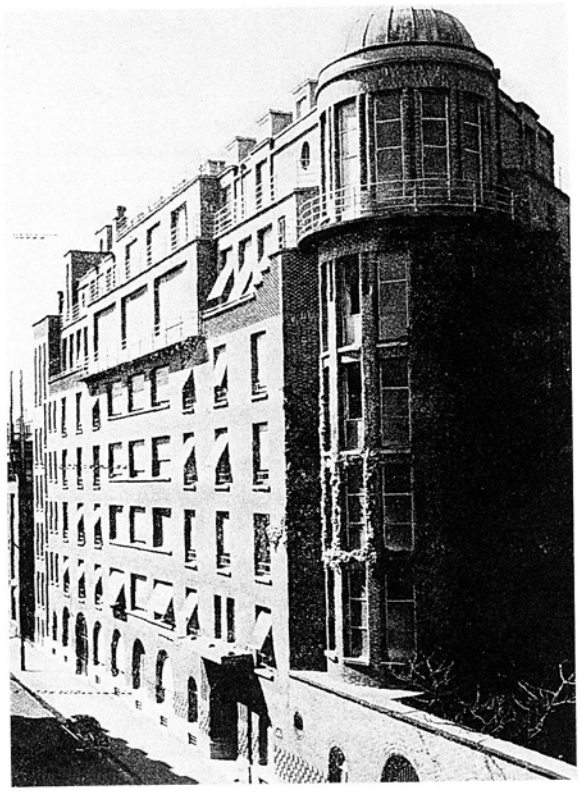


Fig. 7-11. Hôpital Curie, rue l'Hommond.

Brava. When the project was resumed, there was a new and better protected teletherapy unit, and Jean Reverdy took my place as direct assistant in the project.

In 1934, a most significant event took place at the Radium Institute. Irene Curie and her husband Frédèric Joliot, working in the basement of the Curie Pavilion, discovered artificial radioactivity and opened the doors to nuclear medicine, work that brought them the Nobel Prize.[505] In the summer of that same year Marie Sklodowska Curie died as a result of her long exposure to radiations.[494]

In 1936, another important structure was added to the Institute's complex: the Hôpital Curie (Fig. 7-11). Situated on the rue l'Hommond, behind the ancient Maronite Church, the hospital contained excellent surgical facilities and also had an entrance on the rue d'Ulm across the street from the Radium Institute.

Early in 1937, Regaud's ill health sent him to a prolonged rest and, subsequently, caused him to resign his position (Fig. 7-12). He retired to the home of his maternal ancestors in Couzon-au-Mont-d'Or where he chose to live in virtual isolation. World War II and its consequences were added to his burden: his oldest son, Félix, father of five of his grandchildren, was killed early in the war. On 28 December 1940, Regaud expired.

An exceptionally versatile scientist, Regaud was comfortable in the laboratory as well as in the hospital wards and clinics. He also had great ability as an administrator. His awe-inspiring presence hid a charming, almost childish sensitivity. Obliged to exercise authority, he did it thoughtfully, with a great deal of consideration for the feelings of others. The contributions he made in the first part of this century set the basis for the practice of protracted-fractional radiotherapy and became the most important factors in the development of radiotherapy as a medical specialty.[375,494] In 1991, on the rue d'Ulm, the doors were opened on a new hospital and on the elaborate research center of Regaud's dreams. His successors have named it the Hôpital Claudius Regaud in his honor (Fig. 7-13).

Fig. 7-12. Professor Claudius Regaud.

Fig. 7-13. The new Claudius Regaud Hospital.