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● *Special Feature*

PENROSE CANCER HOSPITAL 1949–1974: A QUARTER CENTURY OF ACHIEVEMENT— A TRIBUTE TO JUAN A. DEL REGATO, M.D.

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INTRODUCTION

Few modern medical institutions have been as enriched by direct associations with the original traditions and personalities of a medical discipline as was Penrose Cancer Hospital and its staff during its most productive period. However, it is only in retrospect that the significance of this unique heritage is fully appreciated by the many trainees and others associated with the Hospital over the years to which this legacy automatically demitted. Inextricably intertwined with early achievements in the establishment of therapeutic radiology as an independent medical specialty in the United States is the fascinating history of a bygone era in the development of the Rocky Mountain West. This atmospheric lore, vividly colored with romantic events and larger-than-life personalities, became familiar to successive generations of Penrose trainees enhancing an enduring sense of fraternity among alumni to this day. It serves the purposes of this account to conjure up anew this historical context in which major contributions to the advancement of the specialty of radiation oncology were made in Colorado Springs during the quarter century beginning in 1949 guided by the extraordinary vision of our esteemed mentor, the honoree of this *Festschrift* issue of the International Journal.

DISCUSSION

Spencer Penrose, Coutard and the Penrose Tumor Clinic

Colorado Springs was founded in 1871 as a "new way of living" conceived by General William Jackson Palmer (1835–1909). By the 1890's the largess of the world's richest gold camp, Cripple Creek, on the other side of Pikes Peak, made fifty millionaires in Colorado Springs. Midas-like among these was Spencer Penrose (1867–1939), originally of Philadelphia and a consummate entrepeneur, whose after-tax income from 1909 on averaged $1,000,000 a year.[26]

Origins of the hospitals ultimately destined to commemorate Penrose' existence date back to 1890 when Glockner Hospital was established. Founded in memory of Albert Glockner of Pittsburg, the Sisters of Charity of Cincinnati soon took over control of the hospital from Glockner's widow. Situated on the north end of Cascade Avenue, one of the broad boulevards originally laid out by General Palmer, the site has never ceased to enjoy an unobstructed panorama of the "most beautiful scenery in the West."[27]

In 1932 Penrose, whose zestful lifestyle predisposed to such eventualities, was diagnosed to have cancer of the laryngopharynx. Referral was made to Henri Coutard in Paris, reflecting the worldwide recognition attracted by Coutard's sensational original reports of clinical successes with fractionated roentgentherapy of squamous carcinomas of the upper air passages.[4] Coutard,[20] one of the illustrious triumvirate of pioneer radiologists at the Foundation Curie, along with Claudius Regaud[17] and Antoine Lacassagne[13] had responsibility for radiodiagnosis and roentgentherapy. By 1928 he had recognized the radiocurability of cancer of the endolarynx and tonsil and in 1931 had presented a now classical treatise on roentgenographic evaluation of the upper air passages at Mt. Sinai Hospital in New York.[4] According to del Regato,[2] who in 1932 was a young assistant at the Curie

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(Fig. 1), Coutard accepted Penrose for treatment and administered a six week course of twice daily irradiation resulting in the apparent cure of his prominent patient.

Remaining well until 1938, Penrose suddenly developed intractable hoarseness while on a trip to Hawaii and stopped off in Philadelphia to telephone for advice from an old friend in Colorado Springs, Dr. Gerald Webb.[3] Himself a famous medical pioneer in the treatment of tuberculosis, Webb's practice had been responsible for attracting many of Colorado Springs original residents and by 1948 it was claimed that a fourth of all the new houses in the city were attributable to it. This observation was repeatedly confirmed years later in the medical history of many patients who had survived tuberculosis and were examined at the Cancer Hospital. Webb and his wife arrived in Philadelphia and were at luncheon in the Penrose hotel suite when the consulting bronchoscopist arrived to give the diagnosis of inoperable cancer of the esophagus. By one account, after a moment of stunned silence, Penrose got up and said, "Let's go to the zoo!", and they did.[3]

Coutards' opinion was again sought, but by this time had been recently recruited to the faculty of the ill-fated Chicago Tumor Institute. Protracted irradiation was again recommended and the first of three planned treatment series embarked upon until Penrose, dissatisfied with circumstances in Chicago, ordered the installation of a 400 Kvp G. E. Maximar under the supervision of E. Dale Trout (1922–1977) at El Pomar, his mountain estate outside Colorado Springs. With Coutard's agreement to relocate westward facilitated by the ability to continue to work with the most sophisticated equipment extant at that time, treatment resumed in this splendid setting after a short delay. But this time even these extraordinary efforts were not successful and Penrose succumbed to uncontrolled cancer at the end of 1939.

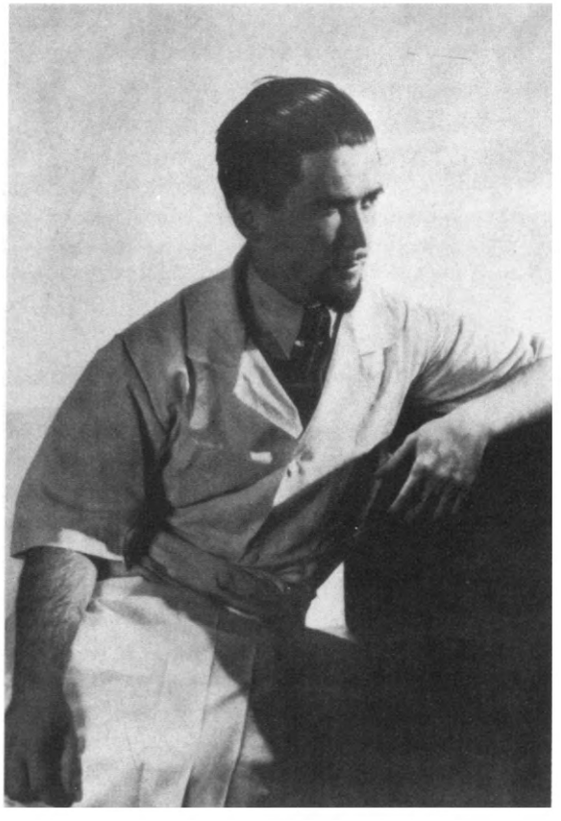

Fig. 1. Juan A. del Regato, M.D., young assistant at the Foundation Curie in 1932.

It is purported that Spencer Penrose never spoke of his illness after the fateful luncheon in Philadelphia until September 1939 when he suggested to Dr. W. P. "Dixie" McCrossin the setting up of a "cancer clinic" using the Maximar unit as one of its resources. When McCrossin pointed out the lack of available space at Glockner Hospital to accommodate the machine Penrose retorted, "then build them a pavillion". Two weeks later plans were released for the Penrose Tumor Clinic.[26] A few months after her husbands death Julie Penrose, as President of the El Pomar Foundation, announced the granting of funds for the construction of the pavillion (Fig. 2); McCrossin became the first Clinic Director. Here Coutard continued his eccentric clinical research into fractionation effects but this work was never to attract the same respectful attention as his earlier incomparable achievements. He returned to France in the fall of 1949 when his wife fell seriously ill, and died there himself within a few months of cerebral hemorrhage. Many years later residents in training at Penrose were bemused to occasionally stumble upon tangible artifacts of Coutard's last investigations. Such gadgets as gigantic ionization chambers used for measuring minute quantities of radiation or the clinic visit of a patient bearing the punctate cutaneous stigmata of sieve irradiation, "the poor man's supervoltage", developed by Coutard, always provoked lively discussion and historical reflection.

Julie Penrose and the Penrose Cancer Hospital

By 1948 Mrs. Penrose was determined to create a larger monument to her husband's memory and arrangements were made to visit the Ellis Fischel Cancer Hospital in Columbia, Missouri. Del Regato, who had previously made the Penrose' acquaintance in Paris, had for several years been radiotherapist-in-chief at Ellis Fischel and would act as host. William Moss, a resident physician at the Ellis Fischel at that time, recently recalled the unique sense of excitement and importance which surrounded the arrival of Mrs. Penrose and her small entourage late that year. Also that Mrs. Penrose' enthusiasm for the facilities and programs she observed was fortunately undiminished by a nasty fall on a patch of ice near the entrance to the hospital at the end of her visit (Moss, W.T., personal communication, May, 1987).

Shortly afterward in January, 1949, del Regato was appointed Director of Penrose Cancer Hospital, then merely a conceptual entity, and was charged with overseeing the development of an appropriate new institu-

Fig. 2. Original Penrose Tumor Clinic established at the request of Spencer Penrose by the El Pomar Foundation after his death in 1939.

tion. Although Mrs. Penrose' original preference had been to build a free-standing cancer hospital along the lines of Ellis Fischel she was ultimately persuaded by the new Director to support an innovative alternative instead.

Formation of cancer clinics had been encouraged in official policy statements by the American College of Surgeons since 1930 as the most effective means of disseminating new knowledge at the local clinical level. However, by 1949 it could be observed that this approach was limited by a dearth of adequately trained professionals in oncologic disciplines and the educational and research consequences of such clinics were minimal. Paraphrasing del Regato, "organization had proved no substitute for lack of talent."[11] On the other hand, specialty cancer hospitals with full time staffs had seldom been accepted by the American medical community except for the care of indigents. A paradoxical consequence of this stance was that in 1949 economically disadvantaged patients were frequently more likely to receive the benefits of expert care than those who could afford to pay for their treatment. Recognizing these realities,[11] the new approach proposed by del Regato was to develop a cancer hospital with a part time staff to operate in conjunction with a general hospital. A major goal of the model was to demonstrate the pragmatic advantages of blending the talent and physical resources of the two types of institutions while at the same time the benefits of multidisciplinary cancer care could be provided in an atmosphere conducive to collaborative educational and research initiatives. In short, a prototype of a community cancer hospital was created which represented a fresh philosophical and practical approach to the delivery of oncology services in a moderate size community; a model widely emulated only in recent years and now recognized as an ideal encouraged and supported by national funding agencies.

By 1959 a new Penrose Hospital was built at a cost of $10,000,000 replacing the Glockner Hospital and into which the facilities of the Penrose Cancer Hospital were also incorporated. Until her own death due to cancer in 1956, Julie Penrose remained a generous benefactress and was personally concerned with the advancement of the service, educational and research missions of the Cancer Hospital. Her charming presence as hostess at an annual reception cum homecoming on the terrace of the Broadmoor Hotel (Fig. 3) held during the Annual Cancer Seminar, a popular educational series begun in 1949 and continued for 24 more years, is a fond remembrance for many individuals. Later, as a result of the assiduous planning and surveillance of Sr. Clara Vogelpohl, for many years the devoted administrator of the Cancer Hospital, ground was broken in 1968 for a new Cancer Hospital which was consecrated in 1970 (Fig. 4). In keeping with the wishes of Mrs. Penrose the family name has been fittingly memorialized over the years by the hospitals' service to residents of the eastern slope of the Colorado Rockies and adjoining states.

Juan A. del Regato and the Penrose Cancer Hospital

Juan Angel del Regato (1909–), a native of Camaguey, Cuba, started his study of medicine at the University of Havana (1926–1930) continuing it at the University of Paris (1931–1934) with support from the Cuban League

Fig. 3. Dr. and Mrs. J. A. del Regato in the company of Mrs. Julie Penrose (center) at cocktail party of the 1951 Cancer Seminar at the Broadmoor Hotel Terrace.

of Cancer when the University of Havana was closed by a student revolt.[2,5] By spending all available spare time while still a medical student attending clinics and examinations at the Radium Institute his interest became recognized and was ultimately rewarded with a Fellowship at Fondation Curie and a position as Coutard's assistant in roentgentherapy (Fig. 1). There he was directly influenced not only by his eminent maitre but also by other seminal figures in clinical radiology including Lacassagne and Regaud. He frequently encountered Madame Curie (1867–1934) who though at the end of her career was still a presence at the Fondation, but he had no working relationship with her. Del Regato's doctoral thesis suggested by Coutard was the first published account of curative roentgentherapy of inoperable carcinomas of the maxillary sinuses and earned the Silver Medal of the Faculty of Medicine of the University of Paris.[7] He entered the United States permanently in 1937 and was immediately recruited along with two friends Franz Bushke (1902–1983) and Simeon T. Cantril (1908–1959) as junior faculty under Coutard at the Chicago Tumor Institute which was then being organized by Max Cutler (1899–1984) but which soon dispersed due to lack of financial support during a time of economic depression.

Del Regato had assumed his position at Ellis Fischel Cancer Hospital in 1943 after appointments as roentgentherapist to the Warwick Cancer Center (1939–40) in Washington, D.C. and as Research Fellow of the National Cancer Institute (1941–1942). The first of six editions of his landmark text *Cancer,*[23] initially written in collaboration with L.V. Ackerman, chief pathologist at Ellis Fischel, had appeared in 1947 (Fig. 5).

When del Regato arrived in Chicago in 1938 by his count there were only thirty-nine physicians devoted to the full time practice of radiation therapy[2] in the United States. By the end of World War II there were still not

Fig. 4. Artists rendition of the new Penrose Cancer Hospital consecrated in 1970. Original hospital which was incorporated into the new structure is seen in far right of drawing.

Fig. 5. Juan A. del Regato at work in his study at Penrose Cancer Hospital. Here was housed his extensive collection of original reprints used in the preparation of successive editions of his textbook *Cancer* and for resident teaching. Note bust of Coutard in right background.

more than fifty. Moreover, 44 of the first 72 diplomats of the American Board of Radiology which had been formed in 1932 were surgeons, gynecologists or other nonradiologists with little commitment to the field. It was not until after formal protest in 1952 that the certificate in Therapeutic Radiology ceased to be given almost as a consolation prize to candidates for the certificate in General Radiology who took the diagnostic part of the examination.[18]

Accordingly, once Mrs. Penrose was supportive of the institutional model for Penrose Cancer Hospital proposed by del Regato his efforts turned to the development of a Department of Radiotherapy purposely organized for the training of therapeutic radiologists. The mission of this program was essentially described without specific reference in remarks presented before the 19th Annual Conference of Teachers of Radiology in 1952.[8] These comments described, in effect, both a programmatic paradigm and an astute long range strategy for the establishment of the discipline of therapeutic radiology in the United States propagated by the development of dependable training centers. With the help of training grants created by the National Advisory Cancer Council and the National Cancer Institute in 1961 the Penrose program expanded such that by the mid 1960's about one third of American radiotherapists had either themselves trained in Colorado Springs or were graduates of training programs headed by former Penrose trainees. Drawing from the writings of Emerson in his introduction of the 1973 Janeway Lecturer, Milford Schulz[23,25] noted that "although Colorado Springs was not quite a wilderness, certainly the path to Dr. del Regato's door was widely known and well worn" (Fig. 6). At least twenty Penrose graduates went on to chair radiation therapy departments at academic institutions; many others have also spent their entire professional careers consistently involved in programs leading to the formation of young radiotherapists. The particular significance of the early influence of this vanquard of Penrose graduates can best be appreciated in the context of del Regato's 1972 Biannual Survey of Training in Therapeutic Radiology in the U.S.[14] which demonstrated that although between 1960 and 1970 the number of institutions training radiotherapists tripled and the number of residents in training increased sixfold by 1970 they still amounted to a total of only 180 individuals. This output in human terms was the signal achievement of the institution established by del Regato in 1949 which continued uninterruptedly until 1974 when he became Distinguished Physician of the Veterans Administration and Professor of Radiology at the University of South Florida College of Medicine, Tampa, Florida. Now Emeritus from both positions he continues to reside in that city with his wife, Inez, as their fiftieth wedding anniversary approaches, (May 1, 1989). His undiminished intellectual energies he is now able to devote to his personal kind of "golf"; a series of biographies written with characteristic scholarship and incomparable sensitivity and style which chronicle the life and times of legendary figures in radiological physics and in radiology.[13,17,19,20]

The educational program

As already indicated the most significant contribution of the Penrose Cancer Hospital to the establishment and

Fig. 6. Attendees at Alumni luncheon honoring Dr. del Regato held at Cheyenne Mountain Country Club during the annual meeting of the American Radium Society in 1973. Front row (left to right): R. Bogardus, C. Chahbazian, Dr. del Regato, A. Gutierrez, W. Reynolds. Second row: G. S. Brown, I. Arenas, D. Kersey, W. Mackey. Third row: J. Fayos, R. Lindberg, A. Grueninger, J. Schiller, A. Greenberg, C. Taggart, R. Perez-Tamayo, D. Rogers. Last row: J. Cox, J. Vaeth, J. Dolan, J. F. Wilson.

furtherance of the specialty of radiation oncology was its postgraduate training program. In remarks made in 1952, del Regato not only justified the need for the development of dependable training centers in therapeutic radiology but broadly defined the appropriate content and goals of such programs.[8,12] Paramount among the latter was to train a number of academically inclined individuals capable of working towards raising the functional level of the specialty and assuring its propagation prior to seeking its separation from other aspects of radiology. It was this philosophy put into practice, with the dedicated assistance of one of us (C.M.) as Program Director, from 1950 on, which characterized the training program at Penrose Cancer Hospital over the next quarter century.

Between 1949 and 1974, a total of 67 residents including 55 in straight Radiation Therapy and 12 in General Radiology were trained at Penrose Cancer Hospital. Generally, candidates in straight Radiation Therapy stayed in Colorado Springs for 2 years followed by a fellowship year at other institutions either in the United States or Europe. Occasionally candidates who had received initial training at other institutions spent a year at Penrose to complete residency requirements in Therapeutic Radiology. Others in General Radiology received from 3 up to 12 months training in Therapeutic Radiology. Most of these individuals came from various parts of the United States, but a substantial number also came from foreign countries including China, Spain, Greece, Puerto Rico, Venezuela, El Salvador, Mexico, Lebanon,

Chile, Israel, and Canada. Thus, most years a stimulating international flavor was characteristic of the house staff. Frequently admonished to "learn to think" residents' logic patterns and forensic skills were regularly tested and sharpened in extracurricular discussions of wide-ranging political and social issues at a lunch table presided over by "the Chief".[16,18]

It was in a structured milieu of clinical activities (Fig. 7) that the resident gained experience in general clinical oncology and with radiation therapy in particular. To train residents only in the technicalities of radiation therapy was regarded as self-limiting, providing too narrow a perspective of the overall field of oncology and a deficit not in the interest of future patients or the specialty. Accordingly, the educational program was designed to expand the cognitive bases and to refine practical skills in the following areas:

1. Clinical manifestations of neoplasms and their pathobiology.
2. The accurate diagnosis, differential diagnosis, and staging of the various forms of cancer.
3. Indications for and technical aspects of multimodal management of a broad spectrum of malignant neoplasms, including the side effects and late morbidity associated with each of the different modalities.
4. Continuous follow-up care of all patients regardless of type of treatment administered or even when therapeutic abstention was decided and including the terminal care of some patients.
5. The discipline of accurate and orderly record keeping and the maintenance of tumor registry systems.
6. Participation in clinical research through intramural as well as cooperative group studies.
7. Educational programs including didactic lectures, conferences, tumor boards, etc.

Active participation of every resident in all of these aspects of the program was emphasized. Thus, the resident learned to interview and to interact appropriately with patients and their families. Skills were refined in performing a complete physical examination including routine otolaryngological and pelvic examinations, as well as special procedures such as proctoscopy, cystoscopy, and nasopharyngeal examination with biopsies where indicated. In short, during his involvement in the educational process the resident became integral to the task force providing total care of the cancer patient. Many hours were also spent by residents conducting annual cancer screening examinations for a large population and in follow-up clinics. Residents were also provided with formal weekly lectures in radiological physics, radiobiology, and histopathology sessions. Participation in the decision making regarding patient management and in supervising the planning and delivery of the actual radiation treatment and in staffing a normally busy in-patient service rounded out the practical curriculum. Not only was familarity with standard radiotherapeutic techniques acquired but residents were also inspired by direct involvement in innovative clinical investigations;[10,15,21] experiences which many latter emulated or expanded in turn in their individual careers. Monthly Residents' Cancer Conferences were presented for critique by the staff such that all trainees became engaged in the collation and analysis of clinical data sets and participated in and gained early experience with scientific writing.[6,22,24]

From the beginning, to achieve a balanced experience, residents served 3 month rotations in anatomical pathol-

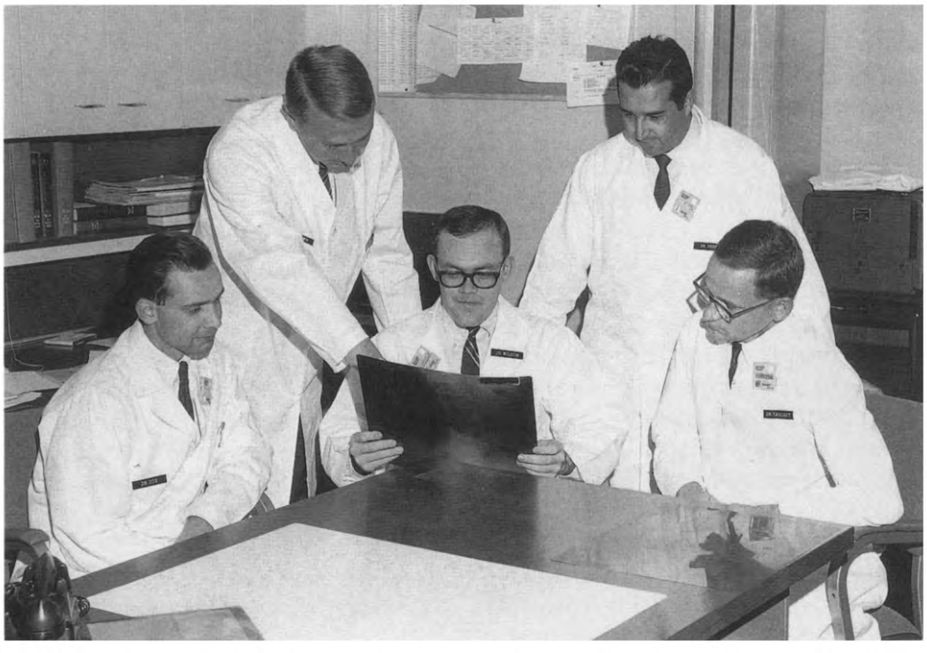

Fig. 7. Residents at work in the residents library of Penrose Cancer Hospital (1966). Left to right: J. Cox, G. S. Brown, J. F. Wilson, V. Perez, C. Taggart.

Fig. 8. Seminar participants during one of the Visiting Professorships sponsored regularly by the Cancer Hospital. Sitting l. to r.: C. Chahbazian, M. Berthong, (chief pathologist), Lauren Ackerman (Visiting Professor), J. A. del Regato, R. Perez-Tamayo. Standing l. to r.: D. Dawson (pathologist), G. S. Brown, E. Nava, V. Perez, A. Gutierrez, R. Kagan, G. Taylor.

ogy, surgical oncology, and nuclear medicine. In later years, experience with the nascent discipline of medical oncology was also interjected. Brady[1] recently reminded us of del Regato's recommendations to the Clinical Studies Panel of the National Cancer Institute in 1960[9] relative to the future thrusts of future cooperative investigations of combined modality therapy. Specifically, these new concepts included: (a) the investigation of chemotherapeutic adjuvants, (b) the investigation of agents capable of potentiating the biological effects of radiation, and (c) clinical trials of radiotherapy vs chemotherapy as surgical adjuvants. Here again, yet another example of philosophy put into practice at Penrose Cancer Hospital, was that by the mid-sixties radiation therapy residents administered chemotherapy as required within the context of the earliest cooperative group (NSABP) trials of adjuvant therapy for breast cancer.

Distinguished visiting professors invited to Colorado Springs spent up to 2 weeks lecturing and interacting with the house staff in informal discussions of various oncologic topics. Lauren Ackerman (Fig. 8), Simeon Cantril, Franz Buschke, Marvin Williams, Willett Whitmore, Simon Kramer, Julian Bloom, Bridget van der Verf-Messing, Bernard Pierquin, and Jean Dutreix were only a few among many who participated in this program. In addition to the immediate intellectual gains from contact with these dynamic experts durable interpersonal relationships were forged during these relaxed visits which later gave rise to many invaluable future professional opportunities for Penrose graduates and their own trainees.

During the last 7 or 8 years of the Penrose program with the support of a training grant from the National Cancer Institute, many students from various medical schools in the United States served electives, usually during the summer months, to gain acquaintance with the

Fig. 9. Insignia of Penrose Cancer Hospital designed by del Regato and executed by a Colorado Springs artist.

type of work described above. Stimulated by this experience several of these students ultimately pursued careers either in radiation oncology or related specialties.

The following is a chronological list of residents who trained in Therapeutic Radiology at Penrose Cancer Hospital between 1949 and 1974. Patrick A. Lynch, Orliss Wildermuth, Victor Marcial, Brian Redd, Jorghe Caballos, Jerome M. Vaeth, Patrick Cavanaugh, Francisco Comas, Joanna Keleki, Alvin Greenberg, Ruheri Perez-Tamayo, Walter Gunn, Leopold Genest, Chahin M. Chahbazian, Graciella N. Serna, Juan V. Fayos, Anthony Grueninger,* Mario Vuksanovic, Jose Campos, Ralph E. Johnson, Robert Lindberg, Carl Bogardus, Basil Considine, Weston Reynolds, Jeanne Ubinas, George W. Taylor, Douglas Carrizo, Augusto E. Gutierrez, Emanuel Nava,* Robert A. Kagan, Vinicio Perez, Alphonso Arenas,* G. Stephen Brown, J. Frank Wilson, James D. Cox, Charles H. Taggert, John F. Marshall, Antonios Mavridis, James R. Dolan, Larry E. Kun, Roger Byhardt, Santiago Sallaberry, Joaquin G. Mira, Donald Eisert, Kenneth Klein, Richard Lehfeldt, Dudley Kersey, John E. Schiller, Winona Mackey, Eitan Medini, Charles Slater, Alan Slomowitz, Drew J. Rogers.

By chronicling these events and notable contributions the authors thus pay homage to Juan A. del Regato on behalf of all those individuals who were associated with Penrose Cancer Hospital during an important era in the founding of American radiotherapy. We also wish to dedicate this account to the memory of those colleagues who shared with us the edifying experience and inspiration of participation in the programs established by our mentor and have untimely passed from our midst.

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