

# AbstractID: 4026 Title: Early History of Radiation Physics

## Early History of Radiation Physics

In 1905, Einstein's annus mirabilis, Dr. Charles Lester Leonard began his presidential address to the American Roentgen Ray Society with, "A review of what has been accomplished in the decade since Roentgen's discovery is a fitting subject for the annual address in this decimal year.... It will form a base from which we can attempt to look into the future." I wonder if Dr. Leonard would recognize the future if he could be present at this meeting, a century later, and see what it became. In the decade between the discovery of X-rays by Roentgen in 1895 and Dr. Leonard's address much had happened in the world of radiation physics. Although there were new discoveries, especially that of radioactivity, the overall emphasis was upon the application of "radiation" to clinical problems without fully understanding the nature of the "radiation" or its interaction with matter, especially tissue. When Roentgen discovered X-rays in November 1895, the news spread rapidly through the continental Europe, Great Britain and the United States and many individuals began generating and using them. This was not surprising since the basic equipment was readily available, Crooks tubes, high voltage generators, induction coils, etc, especially in academic departments and the information in newspaper accounts of Roentgen's work was detailed enough to get started. Physicists were just as likely therefore to be involved as medical doctors. Unfortunately the above equipment, except for the Crook's tube, was also being used for what became called electro-therapeutics, the treatment of disease by electricity which on the whole was considered "quackery". In the fall-out between radiology and electro-therapeutics the physicists became caught in the middle. This created problems for medical physicist that would take half a century to start addressing. No such problem existed in Great Britain allowing medical physics to develop earlier there than in the United States.

Much of the development in the period 1885 to 1905 was in the area of X-rays, although radium had been discovered by the Curies in 1898 it was very expensive, in 1906 1 gram of radium cost \$50,000, and demand far exceeded supply. However the clinical application of radium was clearly recognized and programs for its therapeutic use in the treatment of cancer had started at a number of institutions world- wide.

The major needs in 1905 were the requirement for the standardization of treatments, accurate measurement of radiation, reliable equipment and steady output, an understanding of the radiobiological effects of radiation, a basic understanding of the physics involved. In the next few years all of these questions would be extensively addressed.

## Educational Objectives

1. To appreciate the status of clinical radiation physics in 1905.
2. To realize what was and what was not known about radiation physics in 1905
3. To appreciate the problems that still had to be addressed.