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b. ROENTGEN-RAYS AND RADIOACTIVE SUBSTANCES

I. TECHNOLOGICAL AND HISTORICAL NOTES

The discovery of the existence of highly penetrating rays, emitted by certain types of chemicals or artificially produced in vacuum tubes through which an electric current is conducted, was made shortly before the turn of the century. In 1895, Wilhelm Conrad Röntgen reported that invisible, highly penetrating, electro-magnetic rays (x-rays or roentgen-rays) were emitted from a solid substance, when it arrests in a highly exhausted vacuum glass tube (Crookes's tube) the electronic rays given off by the cathode while an electric current is passed through the tube. This discovery gave rise to the development of the roentgen-tube.

In the original tubes used by Röntgen, the x-rays were emitted from those parts of the glass walls of the tube where the cathode rays were arrested, and therefore caused a more or less diffuse radiation. The presently used and more perfected tubes have a curved cathode built so as to release directed and focused rays which strike upon a specially constructed target placed at an angle to the cathode rays. The target consists of a metal possessing a high melting point (tungsten), because a great amount of heat is generated when the cathode rays are converted into x-rays, which are reflected as a directed beam from the narrow focus of the target. The higher the voltage of the electric current used in the production of the cathode rays, the shorter and the more penetrating are the x-rays that they generate. The early roentgen-tubes used a rather low voltage and produced a soft type of x-rays. In more recent years, with the increasing improvement in the quality of roentgen-tubes, high volt-