

carcinomas) was the reason for the introduction and elaboration of certain precautionary and sanitary measures intended for the protection of the individuals coming in occupational contact with these injurious physical agents. Scientific bodies from many countries cooperated in drawing up rules and regulations to be observed by the personnel of roentgen- and radium-laboratories of all types, to govern the construction, installation and operation of roentgen-equipment as well as the production and handling of radioactive substances. These recommendations have been elaborated and modified from time to time [Advisory Committee on X-ray and Radium Protection, U.S.A. (Taylor); Safety Committee, American Roentgen-Ray Society; British X-ray and Radium Protection Committee (composed of Royal Society of Medicine; Roentgen Society; British Association for the Advancement of Radiology and Physiotherapy; Institute of Physics; Radium Institute; National Physical Laboratory); Deutsche Röntgengesellschaft; etc. (Riegele; Brandt and Lange; Laborde and Leclercq; etc.)].

These three conditions must be fulfilled to accomplish complete protection of operators of roentgen-apparatus (Riedel): (1) The emission of roentgen-rays laterally and backward from the beam must be prevented; (2) the secondary and scattered-rays must be made innocuous; (3) the rays which have penetrated the body of the patient must be arrested before they contact the operating and examining individuals. The first condition is practically fulfilled since the introduction of self-protected tubes. The fulfillment of the second condition has proved to be more difficult and little has been accomplished so far in this respect. The third condition has been fulfilled only partially by interposing a special type of protective lead glass screen between the patient and the examining person during the performance of fluoroscopic examinations.

The escape of penetrating roentgen-rays from the roentgen-room into adjoining quarters entailing a hazard for individuals living or working there can be prevented effectively by lining the walls, floors, ceiling, and doors with lead sheets of proper thickness (depending upon the hardness of the rays produced). Care must be taken to overlap the edges of the sheets so as to stop any leakage through crevices. Adequate protection can be obtained also by the use of bricks containing Portland cement (one part), barium flour (2 parts) and barium sulfate (one part), which must be properly grooved and tongued to prevent leakage at the joints.

The evidence available indicates that satisfactory working conditions require that a person in normal health should not be exposed to a dose exceeding about one roentgen of roentgen-rays or gamma-rays per week, or in one year of 300 working days a dose of not more than 60 r. Medical examinations of roentgen-personnel, giving special emphasis to the condition of the blood, should be made at intervals of not less than six months. The annual vacation period should be no less than four weeks.