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THE RADIOSENSITIVENESS OF CELLS AND TISSUES AND SOME MEDICAL IMPLICATIONS[1]

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CASUAL reading of contemporary medical records bearing on the action of roentgen rays and radium often gives the impression that little of such action is known, in spite of the fact that substantial or conclusive experimental data are available to indicate or to clearly establish the nature of such action. In some cases indeed the experimental indications are absolute. In other cases the experimental evidence may be inadequate, but the clinical data may be sufficient to suggest the probable effect of irradiation. It is true that many problems relating to radiotherapy are still the subject of controversy and that the large number of experiments which have been made has yielded only partial answers to many questions. Nevertheless, the facts already brought to light are sufficiently numerous to provide an imposing, although admittedly incomplete, scientific background. Unfortunately, the evidence furnished by experiments on animals and clinical observation has never been analyzed and correlated, and much of it has been lying on library shelves, buried in medical or other journals which are seldom read. Even among medical radiologists knowledge of the experimental background is not widely diffused.

The law based on the extensive investigations of Bergonié and Tribondeau (1904–1907), according to which young or immature cells are more radiosensitive than old or adult cells, has been generally recognized and has long been regarded as the essential foundation of radiotherapy. Numerous experiments have shown that direct irradiation of the pregnant uterus or of the young soon after birth causes retardation of growth of the skeleton and of various organs, including the brain. The degree of such effect varies with

[1] Abridged form, as read before the summer meeting of the American Association for the Advancement of Science, Pasadena, California, June 15 to 20, 1931.