

were still striated, but that apparently there had been an arrest in the progress of symptoms, and often a marked amelioration of former conditions.

The symptoms suffered by those who succumbed were the customary symptoms of cancer, the course run by the disease was the customary course of cancer, hence it is not to be wondered at that many operators have reported the development of epithelioma on the sites of X-ray dermatoses, and also noted the peculiar tendency to hyperkeratosis, similar to the senile keratosis, and like it with a marked tendency to epitheliomatous degeneration.

Much has been written upon this very interesting subject, especial credit being due to Freund, the father of Roentgen therapy, for his laborious research which has been so well set forth in his "Radio-therapy," a work which has proved a veritable gold mine for many an author since.

Pusey and Caldwell, in their "Roentgen Rays in Therapeutics and Diagnosis," also present a lot of statistics, citing amongst others E. A. Codman, and giving a table collated by him, showing injury from an exposure of 0.08 of a minute at one inch distance, while in another instance it took 240 minutes at one inch distance. Another table by Codman shows that while in some instances signs or symptoms were noticed within twenty-four hours, in several cases none were noticed until after four weeks or more had interposed. The same authors cite Kienbock as stating that the mucous membranes react most rapidly to the ray.

Among many others who have collected statistics bearing upon these questions is Kassabian, himself a sufferer for some time from the results of excessive exposure to the X-rays. In his work, "Electro-Therapeutics and Roentgen Rays," he has much of interest, and gives us a partial list of those who have paid the penalty of excessive zeal and lack of precaution in studying and utilizing the action of the rays.

But there is a brighter side to the story, for the occurrence of dermatitis and epilation incident to the use of the X-rays in diagnosis led to their employment in therapy, although the price paid in dead, maimed and disfigured practitioners seems a pretty high figure for the discovery, valuable as it has proved.

Much theorizing has been done as to the actual physiological effects of the X-rays. In his work on "Radiant Heat and Light," William Benham Snow reiterates a theory which he set forth in an earlier work on "Static Electricity," of "One effect in particular, which accounts for all, the contraction of cell protoplasm. . . . Whether the action is the influence upon the end plate of the neurons or upon the individual cells, it would be difficult to assert; but the latter is most probable."

In the same work Snow summarizes the results of the action