

Also in this semiannual report Miller reported on another remeasurement of nine Elgin State Hospital patients. These new measurements were compared with those made in 1951 and 1953. Four of these patients were found to have body burdens higher than those reported in 1951, and three of these were higher than those reported in 1953. Miller felt that patient movement during the 1959 measurements could have produced erroneous values for these four subjects, because the average loss in the remaining five was as predicted by the Norris retention function. These results illustrated the difficulties of using these unique cases with known radium insults.

This semiannual report of the RPY Division for the second half of 1959 was the last one for several years to contain reports of new radium cases. Subsequent issues reported radiochemical and bone studies and cooperative studies on radium-related problems with other laboratories, but they contained no mention of studies of new radium cases.

The freeze on the reporting of studies of new radium cases ultimately ended after Miller transferred on January 1, 1964, to Argonne's Health Division, under Finkel, with the subsequent retention of the radium case files in that division. Miller continued to make all of the whole-body radium measurements in Building 203, although later in 1964 the iron room he used was moved from the A-Wing basement to a new location in the C-Wing basement.

Miller refused to report on the search for and measurement of new radium cases in the RPY semiannual reports, because he believed that these studies should be reported only by the Health Division. Nevertheless, radium in humans continued to occupy the attention of other staff members. In 1961 detailed descriptions of autoradiographic evidence of leaching and translocation of radium within bone stored in formalin in museum jars appeared in the semiannual report. Here, for the first time, was mentioned an awareness that the rate of intake of radium, in $\mu\text{Ci}/\text{wk}$, could be determined by comparison of hot-spot intensities with those found in the Elgin cases. Since the latter received a known rate of 10 $\mu\text{Ci}/\text{wk}$, the rate of intake of a dial painter or other subject could be obtained from the ratio of the hot spots as determined by autoradiography. Lacking, however, was knowledge of the discrimination against radium by the gut. The hot-spot ratio reflected the ratio in the blood of two subjects, but the relation between ingested radium and systemic radium was yet to be determined. As indicated previously in the review of the work at MIT by Evans, this discrimination was measured in a classic experiment in 1967 and found to be about 5:1; that is, only 20% of the ingested radium reached the circulating fluids.