

PHYSICS

Madame Curie Pioneered In Field Now Very Fertile

Her Dream of a Moderately Priced Source of Radioactivity Seems Now to Be Realized By Physicists

MADAME Marie Curie, Nobel Prize winner, co-discoverer of radium and the most famous woman scientist the world has yet known, died a martyr to her career of research, but her work at the Institute of Radium in Paris will go forward.

Madame Curie has been recognized for the last two years as the one woman "brain trust" behind the researches of her daughter Irene Curie and her son-in-law F. Joliot which last January showed the world how to create artificial radioactivity and transmute the elements.

Radioactivity is the natural process by which the heavier elements like uranium, polonium and radium spontaneously break up, or disintegrate. In the process the atoms of the radioactive elements throw out pieces of themselves and also release penetrating gamma radiation so useful in the treatment of many forms of cancer.

Irene Curie-Joliot and F. Joliot were the first scientists to bring about such a breaking-up process artificially in the laboratory. Madame Marie Curie, with her years of experience in the field of natural radioactivity, was a constant adviser in the research.

Madame Curie saw, like every scientist in the field, a means of obtaining a moderate-priced, easy-to-make source of gamma radiation if artificial radioactivity could be achieved. Her death came just as that humanitarian ambition is being realized, for already workers at the California Institute of Technology, Prof. C. C. Lauritsen and his colleagues, have produced radiation by artificial radioactivity which is more penetrating than any coming from the naturally radioactive elements.

Now Working Eagerly

Feverishly scientists in every major laboratory over the face of the earth are working on the problem of artificial radioactivity. Forty-four of the elements, out of the 92 known to man, which were formerly thought to be stable have

been bombarded with protons, deuterons and neutrons and made to undergo artificial radioactivity. Protons are the nuclei of hydrogen atoms while deuterons are the nuclei of the new-found "heavy" hydrogen. Neutrons are the non-electrical particles probably composed of a proton and a negative electron in close combination.

Newest of the discoveries in the field of artificial radioactivity is the creation of a super-heavy element Number 93 by Prof. Enrico Fermi, brilliant Italian scientist. Fermi made this substance, never before known to the world, by shooting neutrons at the heavy element uranium, the "mother" substance of radium. The neutrons stuck in the nucleus of the uranium atoms and increased their weight to form the laboratory element. The work was inspired, like all similar experiments since January, 1934, by the research of the Curie-Joliot and hence, Madame Marie Curie.

Danger Not Known

When Madame Curie and her husband originally discovered radium in 1898 the danger of working with the ray-producing element was not recognized. Gamma radiation is widely and beneficially used for the treatment of many forms of cancer but only under strict and time-tried precautionary measures. In the early days workers with radium did not work behind lead screens, wear lead-lined aprons and lead-protected gloves as they do now.

By the time Madame Curie and her husband received the Nobel Prize in physics for 1903, however, it was learned that gamma radiation if uncontrolled would penetrate the bodies of the scientists and break up the cells of the blood with anemia resulting. For nearly thirty years Madame Curie has been fighting this affliction with blood transfusions and protective measures against the rays but finally, at 66, she succumbed to the ignorance of the danger she was facing when radium was first known.



MADAME MARIE CURIE

In hospitals today where radium is used it is stored in lead-lined safes. The safes are used because it is precious and worth nearly \$50,000 for a gram, less than one four-hundredth part of an ounce. The lead shielding is employed to protect the workers in the hospital.

When cancer tumors are treated radium is put in a heavily shielded lead "pack." This is wheeled about and the cell-destroying gamma radiation allowed to come only from a tiny opening. The beam of rays is shot at the site of the tumor while the neighboring parts of the body of the patient are covered with a lead shield. Only the tissue over the tumor and the tumor itself are radiated.

Work With Great Caution

Workers, where they have to handle radium, do so with long tongs and work from behind thick lead shields. Every radium technician is skillfully trained now-a-days with dummy equipment before being allowed to handle the substance in reality. As an extra precaution workers are relieved from duty every month or two for a week of rest. Constant tests are made of their blood to catch any signs of anemia or other afflictions in the earliest possible stage. With such precautions laboratory technicians and scientists can now work for a lifetime without encountering the difficulties of Madame Curie in the early days of discovery in the field.

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