

## Cancer Therapy

The patient shown is undergoing cancer radiation treatment in a hospital-like atmosphere—but he is not in a hospital. The treatment room is at NASA's Lewis Research Center, Cleveland, Ohio. It is a converted portion of the Center's cyclotron facility, originally designed for radiation studies related to nuclear propulsion for aircraft and spacecraft. Under an agreement between the Center and the Cleveland Clinic Foundation, the 50 million volt cyclotron is now being used to evaluate the effectiveness of "fast neutron" therapy in the treatment of cancerous tumors.

One of several alternatives to conventional x-ray radiation—the objective of which is to damage cancer cells so that they cease to grow and divide—fast neutron radiation penetrates tissue in a manner similar to x-rays but has theoretical advantages in treatment of some tumors. Still largely an investigative technique, neutron therapy is employed when a patient has a tumor that has not spread and which cannot effectively be treated by such conventional procedures as surgery, x-ray, cobalt or chemotherapy. Encouraging results at London's Hammersmith Hospital inspired similar research in the United States; the Lewis/Cleveland Clinic facility is one of four places in the U.S. where clinical trials are being conducted.

The cyclotron generates neutron radiation by bombarding a beryllium target, causing a nuclear reaction which yields fast neutron particles. Conversion of the Lewis cyclotron to medical use involved modification of the neutron beam; calibration of the instrument to provide the exact prescribed radiation dosage; construction of a properly shielded treatment room; and provision of associated facilities. Conversion and therapy costs are funded by Cleveland Clinic Foundation under a grant from the National Cancer Institute.



## Foldable Walker

Paraplegics, who number about 100,000 in the United States, depend on crutches for their mobility on level ground. But crutches are ineffective on stairways; for climbing or descending, the paraplegic needs a stable pair of rails to push against. Aluminum metal walkers are designed for use on level surfaces, hence they have little utility on stairs; and, although lightweight, they are too heavy to be carried by the paraplegic while walking on crutches. There exists a need for a walker specifically designed for stair use and made of material much lighter than aluminum.

Engineers at Langley Research Center teamed with Dr. Ernest Harrison of the Mississippi Methodist Rehabilitation Center in a community service

project involving development of a very light walker that is foldable for easy carrying. The prototype stair-walker is based on composite materials being developed by NASA for aircraft and spacecraft. The material selected was a graphite-epoxy composite which is stronger yet 50 percent lighter than aluminum. The developers made the front legs eight inches longer than the rear legs to fit the uneven surfaces of a stairway.

Dr. Cynthia Morris (shown in photos), a professor at American University, Washington, D.C. and a paraplegic, has been evaluating the composite foldable walker for more than a year. She reports that it is light enough to carry while walking on crutches, it forms a stable platform to assist her in ascending and descending stairs, and it has significantly improved her mobility and independence.

