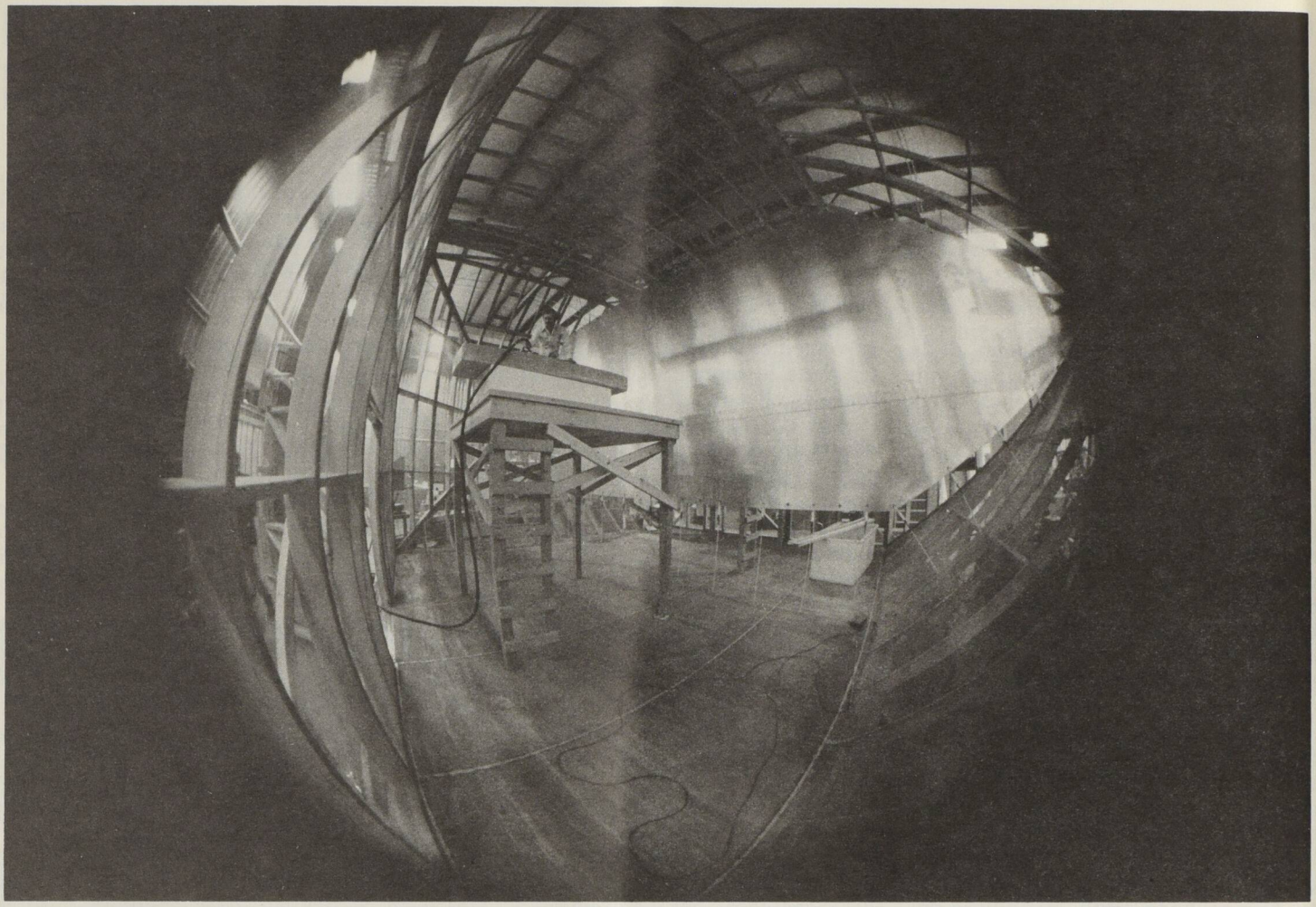

Bruce Kane, NRC/CNRC

**A dummy is being filled with saline solution to simulate the absorbing characteristics of the human body. The dummy is irradiated at a number of frequencies in the range 1 - 30 MHz to measure its absorption characteristics.**

**Un mannequin rempli d'une solution saline pour simuler et étudier les caractéristiques d'absorption du corps humain est irradié avec des fréquences allant de 1 à 30 MHz.**

ation" doesn't come from radioactive particles which can escape to contaminate the environment; rather, it is produced by generators, and vanishes when the instruments are shut down.

To assist in the establishment of realistic safety standards, the National Research Council, under Dr. Assenheim, and the Department of Defence, under Dr. A. B. Cairnie, are collaborating in a program of research aimed at a better understanding of the biological effects of electromagnetic radiation. Harry Assenheim explains: "We must first know how radiation at different frequencies interacts with humans and then try to distinguish effects which may prove harmful. Our research falls into two broad areas. In one, we are making very accurate measurements of the amount of radiation absorbed by the body at different frequencies. To do this we use a series of "phantoms" — models built to simulate the characteristics of humans. The second area of our research involves work on the harmful effects of radiation both with high dose-rates for short times and low dose-rates over long periods. And for this we use laboratory animals."

Although the research is in its early stages the team is already investigating particular effects which may prove to be harmful. Certain areas and organs of the body preferentially absorb radiation, giving rise to "hot spots". For example, exposure to strong radiation can cause heating of the eyes, and, as a long-term effect, the formation of cataracts. The gonads are also extremely sensitive to radiation, and damage to the reproductive organs will receive particular attention together with possible genetic changes.

While effects of very low levels of radiation on the body have been reported, it is not always clear if this presents a health hazard. "It is often difficult to draw the line as to what level of radiation can be defined as harmful," Assenheim says. "As a simple analogy, think of a person sunbathing on a hot day. One of the first effects of the sun's rays would be to produce a sun-tan; this is a biological effect, but hardly undesirable. Longer exposure results in a sunburn which is harmful and further exposure would lead to sunstroke and possibly death. It's difficult to draw the line between these stages and state clearly at what point the process becomes harmful, particularly as it varies from person to person and depends on an individuals' health."

Over the coming years, the research team will carry out careful investigations on a variety of biological interactions with microwaves. Using test animals irradiated at low dose-rates over long periods and high dose-rates over short intervals as well as "phantom targets" simulating humans, the group will investigate heating effects, changes in the blood-brain barrier, damage to the testes and possible changes in the central nervous system.

The result of this team-work will be a contribution to the knowledge of the effects and hazards of microwave radiation on humans. The availability of such data is a necessity to governments seeking to introduce realistic safety standards for electromagnetic radiation. □

**David Peat**