

research assistants are finding the mess hall a neglected student ghetto.

The heavy influx of summer tourists doesn't improve the atmosphere for scientific endeavor. When the Water Street drawbridge across the Eel Pond channel swings up to accommodate an MBL collection vessel or a sailboat, a crudely painted message appears on its underside: "Tourists Please Go Home." This pretty well spells out the attitude of many people at MBL and at Woods Hole's two other research institutions. Steinbach and others are trying to persuade the Martha's Vineyard-Nantucket steamship authority to move its terminal from Woods Hole to Hyannis.

However this turns out, MBL plans

to regain some of its lost intimacy and improve its education program by constructing a new training building and putting up an attractive new dormitory-dining hall building. These new facilities, designed for year-round use, also are expected to permit MBL to take advantage of increasingly flexible university schedules by offering courses and attracting more investigators during the academic year. The National Science Foundation, hesitant about making large grants for summer-use facilities, has encouraged MBL to go beyond its present small off-season program (of supporting a few research groups), though no one wants this done at the expense of the traditional

summer activities.

Steinbach and other MBL elders are especially solicitous of the good opinion of the federal granting agencies, for they don't know what the future holds for MBL in an era in which federal support is going increasingly to large-scale programmatic research. MBL's brand of research gets few press notices, and its lack of public visibility is one of the laboratory's chief worries. Nonetheless, MBL has much going for it. Many of the country's leading biologists, having had a close association with MBL, are always ready to vouch for the laboratory's long and continuing contribution to biology.

—LUTHER J. CARTER

## Radiation Hazards: Senate Bill Would Provide Federal Regulation

Concern over the lack of regulations governing the growing number of products that emit radiation was expressed during hearings 28 to 30 August on a bill that would protect the public against damages from radiation. Senator E. L. Bartlett (D-Alaska) conducted the hearings for the Senate Commerce Committee on his bill (S. 2067) which would authorize the Secretary of Health, Education, and Welfare to conduct research and set standards applicable to the emission of radiation from electronic products. Hearings on a House companion measure (H.R. 10790) were held on 14 August.

The recent incident involving 114,000 General Electric color television sets which produced x-rays because of defective shunt regulator tubes pointed out the lack of regulations pertaining to potentially hazardous radiation sources. General Electric detected its own problem and corrected the faulty sets. Although the G.E. sets were mentioned several times during the hearings, testimony indicated that radiation from medical and dental x-rays, microwaves, ultraviolet light, infrared, and ultrasonics may present a far greater hazard to the public than defective television sets do.

At the present time, the regulation of radiation-emitting devices is left largely to state and local governments; however, many of the devices which administer the largest quantities of radiation to the public are not regulated at all. Testimony indicated that medical and dental x-rays probably present the greatest potential health hazard of the unregulated devices mentioned during the hearings. A U.S. Public Health Service (PHS) publication indicates that Americans received 232 million medical x-rays in 1964, and 227 million dental x-rays. Witnesses asserted that a vast number of x-rays are administered by persons with insufficient training, and often patients receive 10 to 20 times the amount of radiation necessary to expose the x-ray film adequately. Not only do patients apparently receive more radiation than necessary, but single dental x-rays usually involve substantially more radiation than chest x-rays, a dentist told the committee. The PHS has stated that the average dental x-ray involves exposure to 1138 milliroentgens (mr) of radiation, whereas the average chest x-ray involves 45 mr.

Karl Morgan, director of the Health Physics Division of the Oak Ridge Na-

tional Laboratory, testified that up to 29,000 Americans may die annually as a result of radiation damage from diagnostic medical exposure. He added that he had not estimated nonlethal damage. Morgan stated that radiation fatalities could vary between 3500 and 29,000. His figures, based on extrapolations from effects at high dose rates to those at low dose rates, were obtained from human rather than animal data, wherever such information was available.

Testimony during the hearings was concerned with two types of radiation damage: somatic damage which directly affects the exposed individual, and genetic damage which affects future generations. Morgan said data indicates that "mortality from leukemia and other forms of cancer is about 40 percent higher among children exposed to diagnostic x-ray study *in utero* than among children not so exposed." He also cited a Harvard School of Public Health study which noted "that there was an increase of 10 to 30 percent of cancer primarily in leukemia and cancer of the central nervous system in children whose mothers were irradiated during pregnancy." He added that studies of mongoloid children have indicated that mothers of such children have been exposed to substantially higher amounts of radiation over a long period prior to pregnancy than the mothers of nonmongoloid children.

Witnesses testifying for the American Dental Association (ADA) argued against Morgan's testimony on deaths caused by radiation. Albert G. Richards, professor of radiology at the

University of Michigan School of Dentistry, testified that an ADA survey "showed that dentists live, on the average, 1.4 years longer than the rest of the white male population." He added that the survey also indicated that "the average age of death for dentists who died of diseases of the blood and blood-forming organs, including leukemia, was 71.2, while the parallel figure for the general population group was 68. And these were dentists working with x-ray machines at a time when they were not collimated [fitted with a device to produce a parallel stream of radiation] and when the film exposure would be in the neighborhood of 5 to 7 seconds instead of the one-tenth to three-tenths of a second as it is now."

Other witnesses, including PHS Surgeon General William H. Stewart, concurred that there is danger from abnormal exposure to radiation. Stewart stated, "An increased number of lung cancers has occurred in men who worked over long periods of time at mining uranium and pitchblende; the development of bone cancers in radium watch-dial painters is well known. An increased incidence of leukemia has been observed among many physicians who pioneered in the practice of radiology in this country and among the survivors of the atomic bombings of Hiroshima and Nagasaki. Animal studies have shown that radiation can shorten the life span."

Despite almost total agreement on the dangers of radiation, witnesses were less than unanimous in their opinions on which, if any, federal agency, should be given regulatory powers in this area. At the present time, federal regulations governing radiation are divided among the Department of Agriculture, the Department of Health, Education, and Welfare, the departments of the Interior, Transportation, and Labor, the Atomic Energy Commission (AEC), and the National Bureau of Standards. The AEC has the most extensive regulations of any federal agency over radioactive materials. It is empowered to regulate fissionable material, radioisotopes produced in nuclear reactors, and nuclear reactors.

Recommendations concerning radiation are also made by the Federal Radiation Council (FRC) which was established in 1959. Although it cannot issue or enforce regulations, the FRC may advise the President, who may in turn approve its advice and direct federal

## Civil Rights: Higher Education Comes Under Scrutiny

The Department of Health, Education, and Welfare (HEW) has announced a program designed to determine whether institutions of higher education are complying with Title VI of the Civil Rights Act. Beginning this fall, all institutions of higher education which receive or have applied for federal funds (about 5000 to 6000) must file detailed reports containing data on admissions practices, student enrollment, and the availability of services, university facilities, activities, and programs to all students. The institutions, ranging from 2-year colleges to graduate institutions, will be required by HEW to file the new reports annually, with the first one due 15 November. The forms replace the "assurance of compliance" reports that institutions were required to file in the past. Title VI states, "No person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance."

To handle and analyze the reports, HEW's Office for Civil Rights will program into computers the data received. Teams based at each of nine regional offices will receive the computerized data and visit universities to determine the accuracy of the statistics. The Office for Civil Rights was created specifically to watch for discrimination in all federally funded programs. Solomon Arbeiter, the higher-education coordinator for the office, said teams from regional offices will first visit campuses which appear, on the basis of the computerized data, to be the most out of compliance. Arbeiter emphasized, however, that HEW will continue its previous policy of working to bring institutions into compliance with Title VI rather than to sever funds. In the past, five schools have had funds cut off because they refused to file the "assurance of compliance" form. They were: the Marion Institute, Marion, Alabama; Mississippi College, Clinton, Mississippi; Bob Jones University, Greenville, South Carolina; Freewill Baptist Bible College, Nashville, Tennessee, and Anderson College, Anderson, South Carolina. Anderson later came into compliance and had funds restored. Arbeiter said that, if the teams fail to persuade schools to comply with Title VI, public hearings will be conducted by a civil service examiner for HEW. The recommendations of the examiner will be referred to a three-man tribunal, appointed by the Secretary of HEW, which will study his findings. The tribunal, in turn, will formulate a decision which will be sent to the secretary for action. If the secretary decides that funds should be severed, that recommendation will go to congressional committees. If the committees fail to act within 30 days, funds will automatically be discontinued.—K.S.

agencies to comply with its recommendations. The National Council on Radiation Protection and Measurement, a private organization operating under a federal charter, also has made a number of recommendations about radiation usage.

Most witnesses told the committee that the PHS with its National Center for Radiological Health would seem to be the most logical federal agency to carry out the provisions of Bartlett's bill. However, Russell H. Morgan, a professor in the departments of radiology and radiological science at Johns

Hopkins University, stated, "the Public Health Service has avoided involvement in the enforcement of almost all health standards for many years."

No one is in any hurry to pass the bill and all agencies and industries concerned with radiation will have another chance to present their positions when the committee resumes the hearings, probably early next year. The House Committee on Interstate and Foreign Commerce, which is handling hearings on the House companion measure, will also hold additional hearings.

—KATHLEEN SPERRY