CHEMISTRY

Fallout Worst for Children

Maximum fallout deposits will occur in 1962-65. Use of chromatography in detecting arson, new source of heavy water and improvements in silicone rubber reported.

CHILDREN now five and six years old will get larger doses than anyone else of the radioactive strontium-90 and cesium-137 already in the air as a result of nuclear weapons tests.

This is because they will be in their period of greatest growth—and consequently greatest uptake of bone- and muscle-building materials—during the time of greatest fallout.

These facts were disclosed at the American Chemical Society meeting in Cleveland, Ohio, by Dr. Wright H. Langham of the Los Alamos Scientific Laboratory. He calculated that the world average strontium-90 bone and bone marrow doses for today's children, as a result of the bomb tests to date, would be ten percent as high as those received from natural background radiation. The cesium-137 bone and bone marrow doses, he said, would be five percent of natural background.

Nuclear weapons tests, not counting the recent French explosions, have produced between 9,000,000 and 10,000,000 curies of strontium-90 and between 16,000,000 and 17,000,000 curies of cesium-137, Dr. Langham said. Of these amounts, about one-third fell to earth close to the test sites, another third has already fallen to earth all over the world, and the other third is still up in the stratosphere, constantly leaking down on earth.

Dr. Langham said the United States and Russia could not have planned the location of their test sites any better if what they actually wanted was to hit the greatest population concentrations of the world with most of the long-range fallout. Because of these locations, long-range strontium-90 and cesium-137 deposits in the area between 20 and 60 degrees north latitude from tests to date are between two and two-and-a-half times the world average.

Maximum deposit in this area will occur in 1962-1965, he said, at which time the strontium-90 level may average about 64 millicuries per square mile and the cesium-137 level about 115. It will be even higher in the U.S.—80 and 140 millicuries per square mile, respectively.

If the same pattern of tests that occurred in the last five years is repeated every five years for the next 40 years, he said, the level of biospheric contamination will reach about eight times what is predicted from weapons tests to date. There it will level off, as the replenishment from new tests will about equal the decay rate of the radioactive particles already in the air.

At the same time, three Michigan State University chemists reported that strontium-90 stays right in the leaves and fruits of food plants, while some other fallout products, such as cesium, move into the stems and roots of plants like lettuce, cabbage, tomatoes and beans.

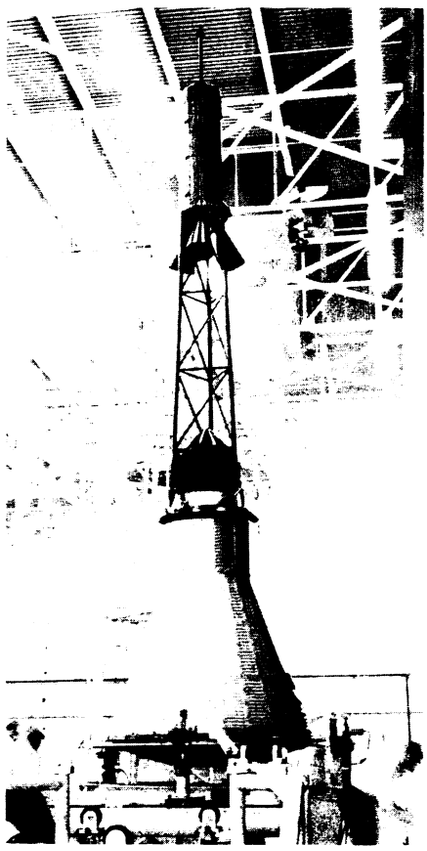
Drs. H. B. Tukey, S. J. Wittmer and M. J. Bukovac found that more radioactive fallout products are absorbed by the plants through the leaves than from the soil. Most are absorbed by plants near the nuclear explosion within the first 24 hours after the blast. However, succeeding crops of plants all over the world continue to absorb radioactive material from fallout contained in the stratosphere.

Use of Chromatography

GAS CHROMATOGRAPHY now can be used to identify materials suspected of having been used by arsonists to start fires. W. J. Cadman of the Orange County Sheriff's Office, Santa Ana, Calif., and Theron Johns of Beckman Instruments, Pasadena, Calif., reported at the meeting that materials used to accelerate a fire may sometimes be identified after separation by distillation, extraction or other methods.

However, these "accelerators" are often so altered by the loss of their more volatile constituents, the addition of outside impurities, or chemical change in the heat of the fire that these methods are no longer effective.

Gas chromatography, a method of separating gases according to their different rates of flow through narrow tubes, now provides a valuable new weapon in the fight against arson.



ESCAPE CAPSULE — Project Mercury space capsule, the first instrumented for escape system tests, has been delivered from McDonnell Aircraft Corporation, St. Louis, Mo., to the National Aeronautics and Space Administration, Wallops Island, Va. The tower on top of the capsule contains the escape system.

Natural to Heavy Water

HEAVY WATER, used as a moderator in some nuclear reactors, may be concentrated in natural water by certain detergents.

E. Griffin Shay of the Atlantic Refining Co., Philadelphia, told at the meeting that these detergents become less soluble in water at higher temperatures, and reach a point on heating at which they become turbid. This point was, he found, at a lower temperature in heavy water (deuterium oxide) than in ordinary water.

By adding special detergents to water containing deuterium oxide, then heating it, a precipitate may be obtained. The upper layer is found to be richer in deuterium oxide than was the original starting solution. Detergents causing this effect are of the non-ionic, ethylene oxide type.

Computer-Made Journal

THE FIRST COPIES of a chemical journal compiled by an electronic computer were received by the 7,000 chemists at the 137th national meeting of the American Chemical Society.

The "electronic editor" that has begun speeding the flow of chemical information to scientists throughout the world is an International Business Machines Corporation computer trained to index thousands of articles from leading chemical journals.

The end-product is a 104-page semi-monthly publication, "Chemical Titles." The computer-made journal makes it possible for the first time to print an indexed bibliography of scientific literature less than three weeks old.

Improve Silicone Rubber

SILICONE RUBBER can be improved by stretching it, then irradiating it with high energy electrons while stretched. M. Prober, G. D. Cooper and F. F. Holub of the General Electric Research Laboratory, Schenectady, N. Y., said samples of peroxide cross-linked silicone rubber treated this way had higher tensile strengths than similar samples that had not been irradiated or had been been irradiated without stretching.