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News of Science

Nuclear Weapons Tests

A recent statement emanating from the National Academy of Sciences that nuclear test explosions could be increased tenfold "without causing any serious genetic danger" has resulted in the publication (*Washington Post,* 26 Oct.) of the following letter from A. H. Sturtevant of California Institute of Technology.

"I have just seen the news item in your issue of Oct. 15, headed 'Tenfold Rise in A-Tests Seen as Safe.'

"This account implies that the National Academy of Sciences Committee on the Genetic Effects of Radiation concluded that a tenfold increase in fallout would not be serious.

"As a member of that committee I wish to state that the report of the committee reaches no such conclusion, and that I, for one, would have been unwilling to sign a report that could reasonably have been so interpreted.

"Further, since the committee reported, Commissioner Libby has indicated (Oct. 12) that the danger from radioactive strontium in fallout is greater than the information available to the committee led us to suppose. For this reason, our conclusions about the danger from fallout need revision upward."

In recent weeks other statements by scientists about the testing of hydrogen bombs have appeared in the press:

Bentley Glass of Johns Hopkins University, who like Sturtevant was a member of the NAS Committee on the Genetic Effects of Radiation, cautioned that uncontrolled testing of nuclear weapons could become a genetic threat through competitive snowballing. Glass proposed an international agreement on the number of nuclear explosions allowed to each nation, as a needed safeguard for the protection of the human race (*Washington Post,* 17 Oct.).

In supporting the proposal to discontinue large nuclear tests, ten scientists at California Institute of Technology said: "It appears to us that this might be a useful way to get the negotiations [on nuclear arms restrictions] out of the deadlock stage by taking a step that would not endanger our security" (Associated Press, 14 Oct.).

Later (Associated Press, 21 Oct.), 73 scientists at Argonne National Laboratory added their signatures to the C.I.T. declaration.

In contrast, five others said: "As citizens, we wish to express our approval of the test program as handled to date" (*New York Times,* 22 Oct.).

Lee A. DuBridge, president of C.I.T., followed his colleagues' endorsement of a test ban with the observation that from "my own official Government contacts, I have become convinced [that] large-scale tests are an important part of our weapons-research program. . . . Discontinuance [of such tests] should . . . not precede enforceable international agreements" (Associated Press, 15 Oct.).

Thirty-seven faculty members of the City College of New York, including 14 scientists, "warmly endorsed" the test ban proposal (*New York Times,* 19 Oct.).

Describing the outlook as "alarming," 24 scientists at Washington University in St. Louis commented that the nation's atomic policy has been made "in a vacuum of public information." They urged "intensive scientific study and public discussion" (Associated Press, 18 Oct.).

However, Arthur H. Compton, also of Washington University, and one of the principal figures in the development of the A-bomb, has stated that continued H-bomb tests are necessary "to maintain our freedom" (*Christian Science Monitor,* 25 Oct.).

Eleven members of the physics department at Columbia University, including Nobel laureate Polykarp Kusch, added their support to the proposed ban on tests and urged the President to join in the "clarification of public thinking on this crucial issue" (*New York Times,* 17 Oct.).

Nineteen members of the Atomic Energy Commission research project at the University of Rochester Medical Center, including William F. Neuman, have described President Eisenhower's defense of further H-bomb tests as "confused" and an "oversimplification" of facts on fallout. They stated that "The National Academy of Sciences' Report does not say that the levels likely to be reached, if bomb testing continues, are safe. . . . There is good reason to fear that they may not be safe" (*Washington Post,* 26 Oct.).

Shields Warren, former AEC medical research chief, supports continued tests, as do 12 well-known scientists whose names were released in a memorandum from the chairman of the AEC to the President.

On 24 Oct., the Federation of American Scientists, a nation-wide organization of more than 2100 scientists and engineers, reiterated its earlier support for an international agreement to a ban on tests of large-scale nuclear weapons. A statement was released by the FAS executive committee, which is made up of the following members: Charles C. Price, head of the chemistry department at the University of Pennsylvania; Martin Deutsch, physics professor at Massachusetts Institute of Technology; Harry Palevsky, physicist at Brookhaven National Laboratory; Mortimer M. Elkind, biophysicist for the National Institutes of Health; John T. Edsall, professor of biochemistry at Harvard University; Donald J. Hughes, senior physicist at Brookhaven National Laboratory; and Bruno H. Zimm, research chemist for the General Electric Research Laboratory.

On 26 Oct., 200 scientists endorsed the President's "leadership and program" in a statement that was released by Roger Adams, chairman of the science branch of the Committee of the Arts and Sciences for Eisenhower (*New York Times,* 27 Oct.).

On the following day, 22 scientists, including 18 at the Worcester Foundation for Experimental Biology, Shrewsbury, Mass., issued a statement declaring that the possible danger in hydrogen bomb tests was "a real problem which must be faced and should be discussed openly." The signers of the statement included two professors at Clark University and two members of the staff of the Worcester State Hospital (Associated Press, 27 Oct.).

Controlled Burning of Combustible Materials

The National Bureau of Standards has developed a simple, rapid method for burning combustible materials under closely controlled conditions. With this procedure and equipment, the gaseous products formed when organic materials are burned in air can readily be collected and analyzed. The results give a quantitative estimate of the combustion gases produced from such organic coatings as paints, asphalts, and plastic compounds. This information is useful in selecting organic coatings with particular thermal breakdown properties for use in buildings and other structures. The method was developed by A. Schriesheim, of the bureau's floor, roof, and wall coverings laboratories, working under the sponsorship of the Air Force.

The principal combustion products of organic materials are carbon monoxide, carbon dioxide, and water. When organic materials contain other elements in addition to carbon, hydrogen, and oxygen, combustion yields other gases as well. Among these are ammonia from wool, cyanogen from silk, sulfur compounds from rubber, and chlorine compounds from chlorinated plastics. To generate, collect, and analyze combustion products, earlier investigators burned large, built-up specimens, including actual rooms and buildings. Subsequently, laboratory procedures were developed to replace such costly and time-consuming processes, but these methods were slow and of doubtful accuracy. The bureau's recently developed method of burning organic materials provides a quick and comprehensive analysis of the gases as well as close control of the ratio between air volume and specimen weight at any initial firing temperature up to 550°C.

The bureau's equipment for burning organic materials consists essentially of a combustion chamber containing a heating element for firing the specimen, and apparatus to control the amount of air in the chamber. The combustion chamber, a 2-liter pyrex flask, can be tilted so that the specimen will slide down a silica tube inside the flask into the heating element.

In use, a porcelain boat containing the specimen is placed in the silica tube as far from the platinum heating coil as possible. After the combustion chamber is evacuated through the vacuum system, a controlled amount of air is admitted to the chamber. A constant ratio of specimen weight to amount of air is maintained by adjusting the specimen weight when combustion is initiated at higher temperatures.

Current is applied to the platinum coil until the desired firing temperature is reached. The combustion chamber is inclined, the boat containing the specimen slides down the silica tube into the hot platinum coil, and the material begins burning. After the temperature has been held constant for the appropriate time, the current is turned off and the apparatus cools to room temperature. The combustion gases are now available for analysis in a mass spectrometer.

In a series of investigations performed with this equipment, the results showed that for every material examined the greatest variety of gases was produced at the highest initial firing temperature (550°C). At this temperature, cracking and decomposition occurred and small molecular fragments such as methane and hydrogen were formed from many of the specimens. Chlorinated plastics liberated chlorinated compounds at the higher temperatures, while at the lowest firing temperature the only chlorinated material produced was hydrogen chloride. In every case the amount of hydrogen chloride increased with increasing temperature.

Several plywood assemblies, both painted and unpainted, and a polyvinyl chloride coating were fired in quantities sufficient to consume all the oxygen in the combustion chamber if they had been left to burn entirely to carbon dioxide and water. These materials produced the largest concentration of combustion gases, and caused the greatest decrease in the oxygen concentration. This low oxygen concentration is typical not only of the closed system used here but also of large, open, ventilated systems such as burning rooms and buildings.

Anterior Pituitary Hormones Available

The Endocrinology Study Section of the National Institutes of Health, Bethesda 14, Md., has announced a plan for supplying anterior pituitary hormones, other than ACTH, to qualified investigators in the medical sciences. Five of the NIH institutes are jointly providing the funds for the purchase or production of large uniform lots of the hormones, purified to meet exacting specifications, both for potency and for low limits of contamination with other activities.

The first lots of bovine growth hormone and of ovine prolactin have been approved by the study section and are ready for distribution. The growth hormone and prolactin are packaged as sterile, lyophilized powders in vials of 50 milligrams and 25 milligrams, respectively. Data on the estimated potency and degree of contamination and instructions for dissolving the materials will be issued with each package.

A pilot plant at Emory University is being set up under the direction of Stanley Ellis and Alfred E. Wilhelmi for the production of follicle-stimulating, luteinizing, and thyrotrophic hormones. These materials will not be ready for some months.

Details of the program are being looked after by a subcommittee of present and past members of the study section: Warren O. Nelson, Roy Hertz, Robert W. Bates, and Alfred E. Wil-