PHYSICS

Why Atomic Testing?

Although present atomic tests are mainly directed to perfecting weapons, information from all tests have been applied to peaceful uses, according to top nuclear experts.

➤ WHY CONTINUE atomic testing? What are we getting out of it? Do the good results overshadow the bad?

These questions asked by SCIENCE SERVICE of top Government nuclear experts disclosed that the underground, underwater and atmospheric shots, 254 of which have been fired by the United States, at least 121 by the Russians and 381 total in the world, are mainly directed to perfecting weapons.

The United States is leading in the number of announced tests, the Atomic Energy Commission said. We are also ahead in information which we are gathering from these powerful blasts, they claim.

Aside from the war devices and information, which remains a deep secret within the confines of the military agencies, information from all of the tests have been applied to peaceful atomic uses.

The two peaceful U. S. blasts, Projects Gnome and Sedan, have shown experts how the atom can be chained to produce useful heat and power and how giant mounds of earth can be reduced to rubble without endangering human or plant and animal life, AEC officials stated. Nuclear blasts may some day be harnessed to produce oil or iron or to produce rare chemical isotopes which are needed in medicine. Results from several test sites have given the basic reasons for using this controlled power.

Scientists are also learning how much radiation is dangerous to life. Designed to test purely for weapons, the Nevada shots have given much valuable knowledge to botanists about how close plants could live to ground zero of a blast, and how much change can be expected in plants and animals exposed to high levels of ionic particles.

The United States high-altitude hydrogen bomb test of July 9 over Johnston Island in the Pacific Range created one of the most unusual phenomena for scientists to study in the "false" radiation belt. Expected to wipe out the natural Van Allen belt, the shot created a belt of its own. Scientists are now able to study aurora effect and the effect of radiation on electronics with greater accuracy.

Communications and electronics have also been revised because of the nuclear testing. Several satellites stopped communicating when bombarded with ions, Telstar and others did not. Experts now know what intensities will affect the delicate electronic equipment and can apply these results to future design of earth-bound equipment.

With the increasing levels of radiation being recorded world-wide, the experts were hard pressed to answer whether the good results overshadow the bad from these tests. They would, however, explain that the weapons results, which are not being released because of the national security, undoubtedly justify some of the testing.

In order to stay ahead of our opponents, they pointed out, the U. S. must test. The scientists have mixed emotions over the validity of nuclear testing, but since the Russians continue testing the Americans also do so.

The total announced tests of all nations are 381 to date, the AEC said.

One positive result which has come out of testing has been the increase in equipment and techniques used by all countries to detect explosions. These results will also tell scientists more about the formation and composition of the earth, how to locate precious mineral resources and how to design better equipment to study the earth's interior.

One question remains: Is it worth it?

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MEDICINE

Fall Flu Shots Urged To Stave Off Epidemic

➤ IF ASIAN FLU follows its two- to three-year cycle, Christmas may find the country in the throes of another epidemic threatening some 60,000 lives.

To reduce the number of fatalities and serious illnesses that occurred in the winter of 1957-58 and 1960, the U.S. Public Health Service has lowered the age limit from 65 to 45 in advising vaccination before the season begins around Dec. 15.

Some local health offices are giving vaccinations free to those 45 or older and to persons having chronic ailments. The American Medical Association has joined PHS in advising early vaccination.

Those who had flu shots last year are due for a booster shot, but those who are completely unprotected need two shots, the first one now and the second two months later.

Influenza is especially dangerous to older persons, to pregnant women and to those with chronic ailments, Dr. Luther L. Terry, PHS Surgeon General, said. He predicted that many outbreaks of Asian flu (influenza A-2) will occur in the U.S. during the 1962-63 winter season. The 1957-58 epidemic took 60,000 lives above normal expectations, and the 1960 epidemic caused an excess of more than 26,000 deaths.

Among the chronic ailments that could predispose flu patients to serious illness or death are: heart ailments, including high blood pressure and hardening of the arteries; asthma, bronchitis, pulmonary emphysema, tuberculosis, diabetes, metabolic disorders and kidney disease.

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TWISTING GYROSCOPE — The small hollow cylinder shown performs the same basic functions as the familiar spinning gyroscope silhouetted behind it.

TECHNOLOGY

Solid-State Gyroscope "Does the Twist"

➤ THE "TWIST" has reached outer space.

A new solid-state gyroscope which "does the twist" has been developed by Westinghouse research scientists, the company announced. The vibragyro—as the dancing cylinder is called—develops a lengthwise twist for the same physical reason that body twist develops in a "twister" doing the popular dance.

This is the first successful solid-state gyro and is particularly suited for use in space capsules and satellites, the scientists claim.

The new gyro looks nothing like the conventional wheel-spinning gyroscope. It is a solid thin-walled hollow cylinder (much like a short piece of pipe), pressed from ceramic powder and hanging midway between the open ends by strands.

Like a rotating-wheel gyro, however, it has the same ability to act as a reference in space, detecting any motion that tries to swing it out of position.

This property makes standard gyroscopes standard equipment for guidance in aircraft, missiles, satellites and spacecraft.

While vibrating, after being set in motion by exciting the cylinder with a small high-frequency voltage, the open ends expand and contract in opposite directions 100,000 times a second. The movement, however, is so small it cannot be detected by microscope.

With no rotating parts, this vibragyro is especially suitable for applications in weightless, ultra-high-vacuum conditions in outer space. It will likely be incorporated in spacecraft in the near future, the company predicted.

Development is now being carried on under contract with the Flight Control Laboratory, Aeronautical Systems Division, Wright-Patterson Air Force Base, Ohio.

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