

NUCLEAR PHYSICS

H-Bomb Devastation

A string of hydrogen bomb explosions in the Pacific could kill all life in the U. S. Until everything is done to live peaceably with Russia, it is wrong to develop the H-bomb.

► A STRING of hydrogen bomb explosions off the Pacific coast could kill every living thing in the United States with radioactivity. Similarly, a string of H-bombs along the line of the iron curtain could kill every living thing 3000 miles into Russia.

This is the warning of Dr. Harrison Brown, associate professor in the Institute for Nuclear Studies at the University of Chicago and wartime A-bomb scientist.

Writing in the Phi Beta Kappa's AMERICAN SCHOLAR (Summer 1950), Dr. Brown said that the H-bomb may well be too big to be used merely for its explosive power and blast effect.

"If the bomb works at all," he said, "there may well be no upper limit (or at least a very high limit) to the size of the nuclear explosion that may be created. One might well ask, of what use is a bomb which will destroy an area greater than, say, 500 square miles by its blast effect?"

"The answer is that one would not use such a weapon to destroy by blast effect," he went on. "Instead, one would utilize the radioactivity that could be produced by such an explosion and permit the westerly winds to carry it over the enemy territory."

The radioactivity of a hydrogen bomb could be greatly increased by adding material that would become radioactive to the other ingredients of the weapon.

Dr. Brown visualized a series of hydrogen bomb explosions carried out along a north-south line through Prague. The radioactivity produced by the explosions would be carried eastward by the prevailing westerly winds. "All life would be destroyed," he said, "within a strip 1,500 miles wide, extending from Leningrad to Odessa, and 3,000 miles deep, extending from Prague to the Ural Mountains.

"By the time the radioactivity passed the Urals (approximately three days), the intensity would be lower and the destruction would be less. By the time the Pacific had been crossed and the west coast of America reached, the radioactivity would not be dangerous."

Admitting that many human beings might survive such an attack by protecting themselves, Dr. Brown pointed out that animals and vegetation, without protection, within the area would be destroyed.

"Such an attack," he said, "would produce a scorched earth of an extent unprecedented in history."

Russia could use the same tactics on the United States. Hydrogen bomb explosions could be set off on a north-south line in the Pacific approximately 1,000 miles west of California.

"The radioactive dust," Dr. Brown said, "would reach California in about a day, and New York in four or five days, killing most life as it traversed the continent."

As for the more conventional uranium-plutonium bombs—so-called A bombs—it is later than we think, according to Dr. Brown.

"We can expect," he said, "that the Soviet production of bombs is being pushed forward today with all possible rapidity. Indeed, it is quite possible that by the summer of 1951 Russia may have a sufficient number of bombs of the present type to enable her to destroy completely the major cities of Western Europe, should she feel compelled to do so."

Tightening "security" will not delay Rus-

sian production of the A-bomb and development of an H-bomb.

"There can be little question that the revelations of men such as May and Fuchs aided the Russian atomic development program to some extent. But we must not fool ourselves. It is probable that the Russians, solely by asking the proper questions of nature, would have developed the bomb anyway."

Dr. Brown doubted the wisdom of President Truman's decision to go ahead with the H-bomb, in view of the enormous potentialities of the new weapon for eradicating life and what the scientist called "the many constructive alternatives" to the bomb.

In concluding his article, Dr. Brown asked whether our government has done all that can be done to determine whether or not an agreement with Russia is possible.

"Until we make a concerted effort to determine whether or not an agreement is possible," he declared, "we have no moral right to proceed with the development of this new weapon."

Science News Letter, June 17, 1950

PSYCHOLOGY

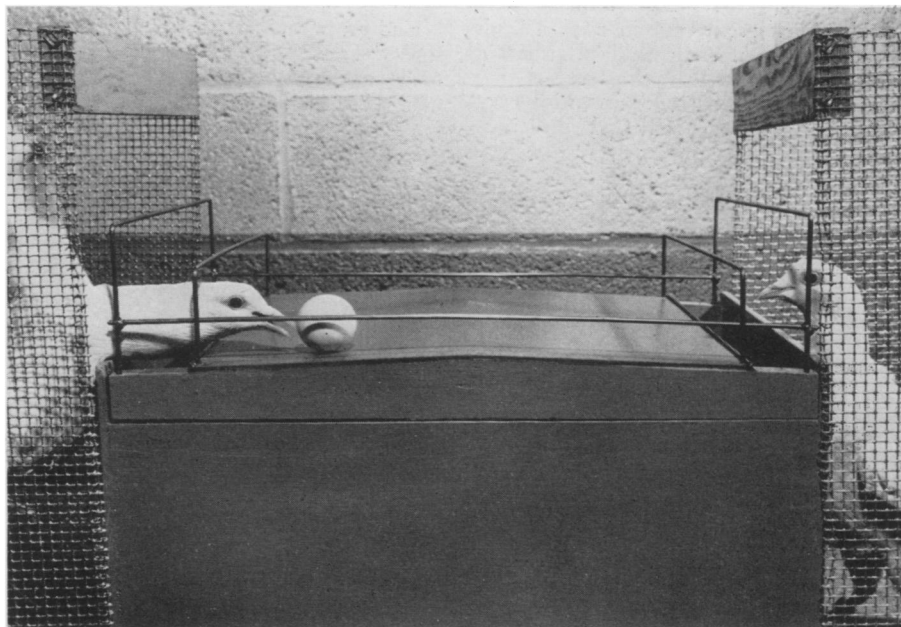
Pigeons Play Ping-Pong

► PIGEONS at Harvard University in Cambridge, Mass., play ping-pong and peck out tunes on the piano.

The birds are not training for a vaudeville act—they are serving as laboratory ani-

mals in studies directed by Dr. B. F. Skinner. The Harvard psychologists are exploring the relative importance of reward and punishment in learning.

The table on which the birds play ping-



PIGEON PING PONG—The sports-loving pigeons engage in a lively game of ping pong. A hit is made as player A (left) bats the ball with his beak while player B watches his opponent attentively.

pong is about two feet square and slopes from the middle toward each of the opposing birds. It has no net. A ball is placed in play in the middle of the table.

As the ball rolls toward one of the birds, he bats it with his beak and tries to send it past his opponent. The other bird tries to send it back. Rallies sometimes go to three or four shots. When one bird misses, the ball rolls into a trough in front of him and his opponent receives a reward of food.

Pigeons can be taught to cooperate with each other as well as to compete. In one experiment, pigeons in separate cages with glass partition between must simultaneously peck at matching buttons to release a reward of food. When the birds work together, both eat. If they fail to cooperate, neither is fed. Result: They work together successfully.

A difficult solo task is learning to play a little piano of seven keys. The pigeons were

taught to peck out simple tunes such as "Take Me Out to the Ball Game," by rewarding them when they strike the keys in the right sequence.

Prof. Skinner is the psychologist who several years ago surprised his colleagues by teaching a rat to play a marble game to get food. He says he likes pigeons better than rats as laboratory animals. They live longer and are less susceptible to disease. The lifetime of a pigeon is as long as 15 years, whereas rats live only two or three years. And pigeons have a reaction time comparable to that of humans. They also have good color vision.

The pigeons have been taught to respond to lights of different colors. When a blue light shines, the bird will peck at a sign which reads "BLUE". When the light is yellow, green or red, he will peck at the sign marked with the appropriate color.

Science News Letter, June 17, 1950

CHEMISTRY-AGRICULTURE

Sugar from Palm Trees

► A NEW use for sulfanilamide reported by an Indian scientific institute in Kanpur, India, may make the world's palm trees a future source of sugar.

It was found that the sulfa drug can prevent the sweet juices of the date, coconut, sago and brab palms from fermenting after collection from the trees.

Fresh palm juice contains 10% to 14% sucrose. Sugar cane contains 11% to 16%. The palm juice, therefore, conceivably could be a useful source of sugar. The hitch is that the juices ferment very quickly. Their present use in tropical lands is restricted to making toddy (fermented juice) or liquor.

To keep the juices from fermenting even while they are being collected, the usual

practice is to add lime juice to the pots. The lime does not preserve the fresh juice; it merely slows down fermentation.

Sulfanilamide, researchers at the Indian Institute of Sugar Technology learned, can preserve the juice in fresh condition from five to 20 days. No more than .008 of an ounce per gallon of juice is required.

This finding, say the scientists, could be a valuable contribution to the food store of the world. They believe sugar made from the millions of palm trees in tropical lands is now practical.

Under present-day techniques of refining sugar, even the tiny amount of the drug used as a preservative would be left behind when the final pure sugar is produced.

Science News Letter, June 17, 1950

RADIO

Saturday, June 24, 3:15-3:30 p.m.

"Adventures in Science" with Mr. Watson Davis, Director of Science Service, over Columbia Broadcasting System.

Dr. Oswald Hedley, United States Health Commissioner for the Department of State, will discuss "Making Greece Healthy".

Sugar, the sweetener, is used in tanning operations to make chromic acid salts compatible with hide substances.

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