

MILITARY SCIENCE

No More "Dramatic" Weapons Foreseen

► DURING the next 18 years no weapons will be developed that are as "dramatic" as those unveiled since the closing days of World War II, Dr. Harold Brown, head of research and engineering for the Defense Department, predicted.

The main reason, he said, is that man probably won't find another source of such tremendous energy as he did in the atomic nucleus.

"The A-bomb and H-bomb designs we have now can be improved," Dr. Brown told a House Appropriations subcommittee in Washington, D. C., but from high explosives to the A-bomb, the energy unleashed was increased by a factor of 1,000. "That is the last factor of 1,000 we will see, based on the knowledge that anybody now has."

Even the dreaded cobalt bomb, Dr. Brown said, would not equal the effect the atomic bomb has had on men's minds.

Asked if outer space research would produce dramatic weaponry, Dr. Brown said proposals he has heard to deliver bombs from satellites to earth seem to be "not very useful" to the military.

Launching a bomb from orbit would require a bigger booster and a more accurate guidance system than it would take for one of today's earth-launched ballistic missiles to hit the same target, he explained.

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IMMUNOLOGY

Cancer Tissue Immunity Seen for Patients

► AN EXPLANATION of the growing number of reported "spontaneous regressions" in cancer patients was offered at the American Medical Association meeting. Dead cancer tissue injected into 48 rabbits immunized the animals to that type of cancer.

This indicated the possibility of a limited vaccine that might stop the spread of the same kind of cancer in the same person. But hope for a general vaccine or shots for all types of cancer was discouraged as "a lot of bunk."

Drs. Alfred A. Strauss and Max Appel of Michael Reese Hospital, Chicago, said in Atlantic City they had shown that dead tumor tissues may have antigenic properties to stimulate resistance to further growth of cancer.

The animal experiments, still going on, were undertaken to find out how immunity to a specific tumor was brought about.

The experimenters used electrocoagulation to kill the cancer cells but emphasized that the same results could be accomplished by chemical caustics, intense heat, ionizing radiation, mechanical crushing and cutting off blood supply to the tumor.

Dr. Strauss, now 80, has used electrocoagulation for treating inoperable cancer of the rectum since 1910. By attaching electrodes, the cancerous cells are killed by

electricity. "Despite the fact that only a portion of the tumor was destroyed by electrocoagulation," Dr. Strauss said, "many of these more than 400 patients were alive years later. Frequently the tumor had gradually disappeared." This suggested that the tissue destruction might also have stimulated certain generalized constitutional factors protecting the patient against further progress of the disease.

When scar tissue was removed in some patients with no evidence of remaining cancer, the pathology laboratory examination showed well stained, intact, apparently live cancer cells embedded in the scar tissue. In some unexplained way, Dr. Strauss said, the patients appeared to have developed an immunity to their own cancers.

In the rabbit experiments, which included controls, 60 mongrel rabbits were used. Dead Brown-Pearce rabbit carcinoma was transplanted to the animals' testicles but only 12 developed tumors. The others were immune.

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GEODESY

Get Geodetic Accuracy Using Shotgun Blast

► THE NOISE of a shotgun, heard over a distance of ten miles or more, could lead to new super-accurate measurements of the earth's surface.

The accuracy of electronic distance measuring equipment depends on precise knowledge of the mean air temperature along the line to be measured, and scientists of the Coast and Geodetic Survey hope to improve the accuracy of their equipment by using sound to determine mean air temperature along the entire distance. At present direct temperature readings at three points along the line are used.

For every degree error in mean temperature there is a one part per million error in distance measurement, or about one millimeter per 1,000 meters—the width of a paper match. Although these errors seem small, they are critical for super-accurate geodetic measurements.

During recent field tests of the "sonic technique" near Frederick, Md., several rounds were fired by Spurgeon E. Smathers of the Coast and Geodetic Survey toward a point about six miles distant. On the receiving end the crew heard the blast twice, once via radio which was recorded almost instantly, and again about 30 seconds later when the sound waves reached their ears. From these observations, the scientists can determine the velocity of sound between the two points and calculate the mean temperature along this line.

Louder explosive sources will be necessary for greater distances. If this sonic technique is successful, it will become standard procedure for many geodetic field surveys.

The Geodetic Survey has been working on this problem since October 1962, in conjunction with the sound section of the National Bureau of Standards and the Army's electronic research and development activity at White Sands, N. Mex.

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IN SCIENCE

EDUCATION

Do Not Put All Eggheads In One Basket, U.S. Told

► THE U.S. GOVERNMENT should not put "all our eggheads in one basket," Dr. Philip Davidson, president of the University of Louisville (Ky.), argued, speaking for the small universities and liberal arts colleges at the American Council on Education meeting in Washington, D. C.

He charged a concentration of Federal programs in "surprisingly few" institutions.

Great centers of Federal programs have developed on the coasts and in the Midwest, he said.

The result is that 90% of all Government grants go to a mere 100 institutions; 68% of all Federal research funds are held by 25 institutions.

Although colleges and universities have benefited from the Government's programs, he said, Federal policies "have developed some imbalances and created stresses in the academic community," causing concern to many educators.

The sciences get most of the funds and most of the emphasis.

The Government furnishes less than 25% of the research money in the social sciences and only one percent of that in the humanities. This compares to financing 95% of the research funds for the physical sciences, 85% for engineering.

Emphasizing the benefits that come to universities and the Federal Government as a result of their voluntary relationship, Dr. Davidson said current discussion and policy reappraisal would "undoubtedly result in efforts to correct some of the imbalances." By taking an increasing part in Federal programs, he said, small qualified colleges and universities may be encouraged to expand their activities and "render a community and national service."

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AGRICULTURE

Research Started For Sweeter Grapefruit

► SCIENCE may make your bitter grapefruit sweeter.

Naringin and other chemicals causing bitterness in grapefruit are being studied by scientists at the University of Oklahoma Research Institute under a contract with the U.S. Department of Agriculture.

Samples of fruit picked at intervals throughout the growing season will be analyzed to study how the bitterness appears, accumulates and disappears. Scientists hope to find out if these bitter compounds decrease as the fruit ripens, or whether they are diluted or converted to less bitter or non-bitter substances.

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CE FIELDS

MEDICINE

Breath-Holding Spells Lower Oxygen in Blood

➤ WHEN AN ANGRY child turns blue after a severe spell of holding his breath, the oxygen in his blood is rapidly lowered.

Ordinarily the seizure lasts only a few seconds, a study of 20 breath-holding children has shown. However, researchers reported in the *New England Journal of Medicine*, 268:1436, 1963, that long-term effects of repeated seizures should be studied further.

In some cases the spells occurred as often as 12 times a day. Flustered parents originally told their doctors that breath-holding lasted as long as 20 minutes, but when they were instructed to time the seizures with a watch, one minute was the longest episode.

In six cases, one of the three Toronto scientists who made the study was present. He was able to test two of the children for arterial blood pressure by a needle left in the main artery of the arm. He also studied respiratory movements and amount of oxygen in the blood of the ear, took an electrocardiogram and an electroencephalogram.

The seizures were purposefully provoked by creating frustrating situations. In some cases slight pain was inflicted and in others the child was startled.

The longer the child cried the less likely was he to have a spell. But on several occasions the child did not cry at all, proceeding at once to hold his breath. Twitching was commonly observed, but convulsive movements were not seen.

The child would end the breath-holding phase with a gasp, after which the color would return promptly, but he would sometimes lie motionless in a stupor for a few minutes up to several hours. More often he immediately returned to his activities.

Psychiatrists have said breath-holding is caused by a disturbance in parent-child relationship or because both children and parents were neuropathic.

Drs. Ehor W. Gauk, Langford Kidd and John Stobo Prichard, all of the Hospital for Sick Children, Toronto, Canada, reported the study.

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PSYCHOLOGY

Snake Phobia Helped By Teaching Methods

➤ MEN WHO GET SICK at the sight of a snake, women who will not visit the reptile section of a zoo, and all those poor souls who cannot even bear to touch a snakeskin wallet have a chance to be helped with a new treatment method.

They can be taught to relax when they see snakes, instead of becoming tense. After just a few weeks of training, they may even progress to the point of picking up

a live snake without a tremble. The treatment is fairly simple and quite effective, studies with 24 men and women volunteers have demonstrated.

First a personalized list of frightening situations involving snakes is drawn up. The situations are scaled from least frightening to most terrifying.

Next the person learns to relax. When properly trained in deep muscle relaxation, he is introduced to hypnosis.

Finally, the volunteer is hypnotized and told to imagine his least frightening situation involving snakes. If he can stay relaxed, he then visualizes the next scene on his list. This goes on until he can meet even his most frightening scene without getting tense.

What was learned by the hypnotized mind will transfer over to real life situations. Tests with live, unpoisonous snakes showed changes in attitudes and behavior. All of those who went through their complete list of frightening scenes could handle a snake.

A group of untreated volunteers remained terrified.

New fears, it was found, were not acquired when the old fear was lost.

Drs. Peter J. Lang and A. David Lazovik of the University of Pittsburgh reported their studies in the *Journal of Abnormal and Social Psychology*, 66:519, 1963.

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SOCIOLOGY

Exercise Program Helps Youngsters' Schoolwork

➤ EXERCISE AND FOOD help youngsters do better school work, a District of Columbia physical fitness program has demonstrated.

Young boys who took part in the project developed interest and pride in their schoolwork as well as their physiques.

They got to school on time for their 7:30 in the morning exercise, shower and breakfast. After the program, they were ready to settle down to work. Before the project began, they rarely made it at nine but would straggle in to school during the late morning hours.

The physical fitness program was tested experimentally at the Perry and Bundy elementary schools in Washington, D. C. Bradford A. Tatum, Perry principal, said he had "high hopes" the program would be continued next fall and would also be used on a nationwide scale.

The boys, selected by Mr. Tatum and by Bundy principal Charles Carter, were problems in school. They had reading and learning difficulties and were thought of as potential drop-outs. They had nutritional problems at home.

Teachers found the boys, after some two months in the project, showed general academic improvement.

The results of weighings, exercise tests and interviews with the boys' parents and teachers are now being evaluated. It is expected they will directly relate the boys' all-round improvement to their participation in the program.

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BIOCHEMISTRY

High Blood Pressure Seen From Salt in Baby Foods

➤ BABIES could be headed for high blood pressure because of the salt put into commercial strained infant foods to make them more tasty.

Weanling rats fed strained meats and vegetables made by four leading baby food manufacturers developed high blood pressure rapidly, although none of the controls did, three researchers at Brookhaven National Laboratory, Upton, N. Y., reported in *Nature*, 198:1204, 1963. At least three of the rats were expected to die of their hypertension, which drastically shortens life expectancy.

The scientists analyzed the contents of 40 different jars of these foods, purchased in the open market, for salt content. The tests indicated that the infant was getting salt equivalent to the highest daily salt intake in adults who commonly develop hypertension.

Previous demonstrations in rats have shown that a high salt diet can cause high blood pressure that becomes "self-sustaining" even after the excess salt is removed from the diet.

"Therefore, in man," the investigators said, "it seems warranted to give serious consideration to the possibility that a high intake of sodium chloride in infancy might play an important part in the propagation of hypertension in adults."

They pointed out that cow's milk also contains salt and that the average five-month-old infant drinking a quart of milk a day will average one and a half grams, or .0525 ounces of salt.

Combined with 100 grams of baby food containing four-fifths of a gram, or .028 ounces of salt, this would bring the total daily intake of salt to 2.3 grams, which is .0805 ounces. This is equivalent to 23 grams of salt a day for a 150-pound adult.

Drs. Lewis K. Dahl, Martha Heine and Lorraine Tassinari reported the study, which was supported by the U.S. Atomic Energy Commission.

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ZOOLOGY

Orphaned Baby Seal Star of Aquarium

➤ "CISSY," an orphaned baby harbor seal, was the star performer when the Steinhart Aquarium opened at the California Academy of Sciences, Golden Gate Park. The baby seal was rescued from the ocean at Pacifica, Calif., and installed in a special tank at the aquarium.

She has seven forced feedings per day of whitefish, squid and clams, ground fine and fortified with cod-liver oil and iodized salt.

The Steinhart Aquarium to which "Cissy" has been added has the most comprehensive overall collection of fishes and other aquatic vertebrates on this continent.

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