GENERAL SCIENCE

U. S. Unprepared for Attack

Not one of more than 250 primary A-bomb targets in U. S. prepared for enemy attack. Civil defense problems mount daily.

➤ NOT ONE of the more than 250 primary target areas in the United States is anywhere near ready for an A-bomb attack—eight months after the President announced national civil defense plans.

The people are not volunteering, the supplies are lacking, there are few shelters, industry has done little about protecting vital defense plants. Finally, Congress has cut down a $400,000,000 budget request for the Federal Civil Defense Administration to $31,000,000.

A rough estimate is that only about five to six percent of the necessary civil defense workers have volunteered. There are three reasons, according to civil defense officials. Many do not believe this country or their city will be attacked by A-bombs, many more believe that it is no use trying to do anything against an A-bomb, and, in some critical areas, civil defense organizations are not prepared to take the few who do volunteer.

Only some small towns—not in the critical target category—have recruited enough volunteers.

This attitude toward civil defense, officials say, can mean two things: 1. If an attack does come, casualties and damage will be much greater. 2. Apathy and a feeling of helplessness could produce panic which would pile casualties up even higher.

There is some preparation in the areas of civil defense which will operate through extension of already existing services—the police and fire departments and the Red Cross. However, even here, there are not nearly enough volunteers. In other areas, like rescue work, special weapons defense, radiation detection teams and warden services, there is almost no preparation at all.

The Federal Civil Defense Administration has always insisted—and the law says—that civil defense is a state and local problem and that its functions are to provide training and guidance, to standardize equipment and procedures, to provide funds for materials too expensive for local governments and to help in writing mutual assistance pacts between states and cities.

It has been criticized by many states and local civil defense directors for moving too slowly. Another criticism has been that it is merely a pamphlet-writing, speech-making outfit. The FCDA, however, has had to operate so far on a small special Presidential fund. It has secured cooperation from other government agencies and from private organizations to produce millions of copies of its pamphlets, which it considers valuable guides to what to do in case of A-bomb attack.

They point to 16,500,000 copies of "Survival Under Atomic Attack," instructions to the average citizen. Only 225,000 of these were paid for by the federal government. The rest were "promoted" by FCDA.

Some industries which already have safety problems—oil and electronics among them—have a good basis of preparation against attack, according to civil defense officials. However, the federal agency has not even heard from other vital industries—machine tools, ball bearings, to name only two. Generally, industry is as badly prepared as are the nation's cities.

Civic organizations, generally, have responded to appeals for help from FCDA. Two thousand representatives of organizations came to Washington for a two-day pep rally early in May. The groups are now making plans to work in civil defense and to recruit volunteers. But they also are up against the general apathy and helpless feeling.

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PHYSICS

It's Still the H?-bomb

➤ SCIENTISTS "in the know" presumably have some hopeful information on atomic fusion of the heavier kinds of hydrogen, called deuterium and tritium, necessary for the H-bomb. If we knew what they know, it would be possible to tell whether it is more or less probable that the hydrogen bomb can be built successfully.

For the Atomic Energy Commission statement that "experiments contributing to thermonuclear weapons research" may be calculated to confuse the Kremlin as well as uncleared Americans.

We can guess that in the recent Eniwetok experiments some of the isotopes of hydrogen were wrapped around, as it were, a plutonium A-bomb. The immense heat of the atomic explosion should, according to theory, fuse together the deuterium and tritium so that some of their mass is converted to energy in the transmutation, somewhat as hydrogen is believed to turn into helium in the immense heats of the sun and stars.

To discover whether the light elements participate in the reaction, the hydrogen-enriched bomb would be compared with an ordinary plutonium bomb of the same size.

A prime problem is to maintain the immense temperature of the triggering A-bomb explosion for the longest possible time. It takes time for the hydrogen reactions to take place and if the extreme ignition temperature of the fission of the plutonium can be prolonged for a very small fraction of a second, the effect should be much greater.

The chances are that much of the research on the H-bomb explosion is concerned with this prolongation of the explosion. This is also important in the non-hydrogen A-bomb, because if the explosion is too fast the material will fly apart before most of it reacts or fissions.

Of course, we have no assurance that the experiments were successful, since a failure could contribute, even though it be negatively, to developing the hydrogen bomb.

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BACTERIOLOGY

Sweet-Sounding Chemical Kills Disease-Causing Fungi

➤ A CHEMICAL with the sweet-sounding name ethyl vanillate will kill or stop the growth of all but two of the serious disease-causing fungi, Dr. David L. McVickar of

SPECIAL INSTRUMENTS—A cerebral palsied child receives dental treatment with special instruments at the Pediatric Cerebral Palsy Clinic of Columbia University's Presbyterian Medical Center. The seamstress thimble protects, yet permits freedom for the dentist's finger.

Vanderbilt University School of Medicine reported to the Society of American Bacteriologists meeting in Chicago.

Fungi which attack the entire body, not just the skin, are fatal in a high percentage of cases, he pointed out. So far, the search for substances active against these fungi has met with little success.

These serious fungus diseases include actinomycosis, or lumpy jaw, which attacks man as well as cattle; histoplasmosis; blastomycosis; and coccidioidomycosis, or Valley fever. The lungs and other internal organs are affected, and the diseases are sometimes mistaken for tuberculosis or for cancer.

Ethyl vanillate is a new substance with the chemical name, ethyl 3-methoxy-4-hydroxy-benzoate. It is a by-product of wood pulp manufacture, is quite inexpensive and is nontoxic to humans at concentrations of 30 to 40 mg per cent in the blood.

The only disease-producing fungi not stopped by this chemical are *Cryptococcus neoformans,* cause of European blastomycosis, and *Candida albicans,* cause of moniliasis.

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ENGINEERING

Snows Give Power

➤ STREAMS FROM spring melting snows on Austria's highest mountain peak drop more than three-quarters of a mile to give light and power to homes in Vienna, 250 miles away.

Thirty to 40 feet of snow has been piling up during the winter on the Grossglockner, a mountain rising to more than two miles above sea level in the Austrian province of Salzburg. Now it is melting to icy water which is caught in two artificial lakes high on the mountain.

From these lakes the water drops through tunnels to the power station in the valley far below. There is a vertical drop of 4,080 feet at one point from the higher lake, Mosserboden, to the lowest power house. This long drop of a great volume of water develops the highest pressure per square inch of any station of its size, according to engineers of the project.

Kaprun, as this ECA-sponsored undertaking is called, is one of the largest hydroelectric power projects in Europe. When completely finished, it will produce 600 million kilowatt hours of energy per year, 10% of Austria's total power production. Part of the huge project will be completed by 1952, and, if all goes well, the whole project will be finished in 1955.

The Kaprun plant, with two generating units, began producing power in 1944. At first it was available only for use in the Salzburg province. Over a year ago, connections with Vienna were completed and now much-needed power flows into the nation's capital.

The possibility of making use of the Grossglockner's melting snows was first considered by a German engineering firm more than 20 years ago. The firm gave up its attempt to construct a power project after finding that canals built high on the mountain to channel water froze during the winter.

The Nazis resurrected the project shortly after war broke out. They solved the weather problem by carrying the water through tunnels that kept it above freezing temperature. The two artificial lakes freeze only on the surface, so power production is unhampered by temperature changes.

The Nazis used 3,000 slave laborers when they began to build Kaprun. They spent the equivalent of $25,000,000 and the lives of many of the workers.

Today again 3,000 workers toil at Kaprun, but they are well paid, fed and clothed. They receive a higher than average wage, to compensate for the hard mountain labor. Machines also must conform to mountain conditions. The type of swaying cableway used to transport tourists up high mountains is used at Kaprun for carrying men and materials up the Grossglockner, through terrain where even American bulldozers cannot build roads.

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AGRICULTURE

Fire Seeds Into Ground

➤ USING THE escalator principle is the best way yet found to fire peanut and certain other seeds into the ground with correct spacing at modern tractor speeds.

Peanut plants must be exactly spaced, either three or five inches apart, depending on the kind. To do this, J. G. Futral of the Georgia Agricultural Experiment Station, Experiment, and R. L. Allen of Georgia Institute of Technology's engineering experiment station, Atlanta, hit on the idea of adapting the escalator.

Up a slope of 45 degrees, they ran a thick belt with holes sized to carry just one peanut, picked up from the hopper or pocket of a planter. Toward the top of the slope, this belt is covered with another, soft rubber one to hold the seeds in place while the belts go over a roller and turn downward to the top of a short delivery tube.

Here the two belts turn sharply around rollers, away from each other, shooting the seed through the tube and into the ground. A four-row planter has been built.

Practical working speeds will depend not on the ability of the planter to pop the seed uniformly in the rows, but on how fast the operator is able to drive with reasonable ease, the two scientists explain. In sheer planter capacity, the new four-row unit is equal to about ten horse-drawn, two-row planters.

Already proved for performance with peanuts and soybeans, the high-speed accuracy may soon be extended to other crops with seeds of size and form suitable for the equipment. Using pelleted seeds, any crop for which accurate spacing is important could be planted by this method.

Details of the operations are reported in the journal, AGRICULTURAL ENGINEERING (April). The National Peanut Council and the U. S. Tillage Machinery Laboratory at Auburn, Ala., cooperated in the early stages of the work.

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AERONAUTICS

Exhaust Blast from Another Plane Starts Jet Engine

See Front Cover

➤ JET ENGINES in planes at advanced stations in Korea where external power is not available are being started by the exhaust blast from an operating plane standing in front of it, a General Electric service engineer on duty with a fighter group in that country has revealed.

Jet aircraft usually rely upon field power units for starting, rather than their own electrical system, because of the large amount of power required. Several types of self-contained starting units are under development but none are in extensive use. A storage-battery type is not satisfactory if used to start the engine itself because of the size and weight of the unit that would be required.

The blast method in use in Korea, as shown on the front cover of this week's SCIENCE NEWS LETTER and described by T. J. McIntyre, G.E. engineer, requires that the plane with the operating engine be placed so that its exhaust tailpipe is directly aligned with the intake of the plane whose engine is to be started. It must be far enough ahead to protect the pilot and airframe from the high-temperature blast. This exhaust blast is sufficient to start rotation of the engine in the plane behind.

Tests in Korea were made with the North American F-86 fighters, which are equipped with General Electric J-47 turbojet engines. In the initial test, the pilot wore an oxygen mask for protection, but this precaution was found unnecessary. Neither plane nor engine suffers any damage from the excessive heat or the blast effect of the discharge, Mr. McIntyre stated.

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