

MILITARY SCIENCE

Air Defense Plans

Nation's air defense command is planning for probable night attack by "copy-cat" B-29 bombers of the Soviet Union. Radar and civilian observers will spot and track them.

By WADSWORTH LIKELY

► IF AND WHEN the Soviet Union sends its copy-cat B-29 bombers, loaded with A-bombs, against us, they will be sent at night, and they will fly hugging the ground or the oceans.

This nation's Air Defense Command is preparing for this sort of tactics.

Jet planes and radar together have made night attacks, close to the ground, necessary to the Soviet Union. We found that out in Korea. Our B-29's have largely abandoned the practice of flying in groups in the daytime against North Korean targets—the Soviet MIG's have made this the prudent course. Instead, our bombers mostly go over singly at night. Radar in their noses makes night almost like day so far as recognizing and hitting targets is concerned.

What we have learned in Korea about bombing attacks, the Russians also have probably learned. It is even more probable that the Russians will copy our tactics since their long range bombers are copies of B-29's which landed, disabled, in Siberia, during the days when we were sending them in numbers against Japan. But for the Russian insignia, you could hardly tell the difference between theirs and ours.

Just what is it that we intend to do about the possibility of attack with A-bombs by Soviet bombers?

Air Force Has Responsibility

The United States Air Force is charged with the responsibility of active defense against enemy air attack. It has set up the Air Defense Command with headquarters in Colorado Springs, Colo. Adjacent to the ADC's headquarters, is the headquarters of the Antiaircraft defenses of the nation. Presumably, managed from Colorado Springs are the defenses of the entire North American continent, integrating the Canadian defenses as well.

Many weapons are at the disposal of the top brass at Colorado Springs. First is the great radar network spread across the top of the American continent, in the frozen wastes of the Canadian north.

This country has appropriated a total of \$295,000,000 for this network of electronic eyes. Air Force Chief of Staff Hoyt Vandenberg indicated recently that the network is about completed.

Radar units send ultra-high frequency radio signals bounding out into the sky at the speed of light. If they hit an obstacle,

such as a plane—or a mountain—they bounce back. A radio receiver hears these bounced signals and, through a complicated series of electronic tubes, the difference, almost infinitesimal, between the time the signal was sent and the time it was received back is translated into the distance of the obstacle from the station, its height from the ground and the direction from the station.

Radar is miraculous, but it is a miracle with limitations. It can "see" to the moon, but it cannot see what is behind a hill. Nor can it see what is under the curvature of the earth. A radar's range, insofar as airplanes are concerned, is about 250 miles, provided the planes are high enough. A plane hugging the surface of the earth cannot be detected by a radar until it is "visible" on a straight, unencumbered, line.

That is why Soviet bombers will hug the surface. And that is one reason why we have the civilian-manned observation posts of the Aircraft Warning Service. We expect that those enemy bombers which slip through holes in the radar net, caused either by hills or the curvature of the earth, will be picked up by volunteer civilians who are expected to man the thou-

sands of observation posts set up in this country and in Canada.

There is another reason for civilian plane spotters. The radar net covers those planes it picks up only while they are within range. As an enemy plane moves down from the far north into the interior of the continent, the responsibility for tracking it, and therefore forecasting the direction in which it is traveling, will rest largely with these civilians.

Once the enemy bombers are picked up by radar in the far north and once they are being tracked by volunteer civilians, how do we bring them down before they can reach their targets?

We have planes with bullets and rockets, we have antiaircraft with conventional projectiles and with guided missiles.

On Continuous Duty

All air squadrons in the Air Defense Command are on seven-day-a-week, 24-hour duty. They are supposed to be able to take off in their fighter-interceptors within 60 seconds after they receive warning from the Aircraft Warning Service. Some of them have reached this peak of proficiency.

Our Air Defense squadrons are now mostly equipped with jet planes. Some of the National Guard squadrons called up for duty in the Korean emergency are still equipped with the "out-dated" propeller-driven P-51's.

The jet planes assigned to Air Defense fighter-interceptor squadrons are designed for all-weather, day and night defense. Radar-equipped, they can seek out the enemy bombers, with the information supplied them by ground radar and volunteer observers, in the darkest night, through the heaviest storm.

Three types are being used by the Air Defense Command, the F-86D, the F-89 and the F-94—the majority of our squadrons are equipped with the F-86 and the F-94. All are in the 600-mile-an-hour and above class, all have ceilings over 45,000 feet. The F-86 carries 24 "Mighty Mouse" rockets, the F-89 carries 16 five-inch high velocity rockets, the F-94 carries eight five-inch rockets or 24 2.75-inch "Mighty Mouse" rockets. A new electronic nose for night fighting goes with the F-94.

Air-to-air guided missiles are not yet an operational reality, although it can be counted on that many experiments are being conducted in shooting down planes with guided missiles launched from fighter-interceptor planes.

It is from the ground that the guided missiles can now soar into the sky and seek out the enemy bomber. The Antiaircraft Command is training officers and enlisted men in control and maintenance of



F-94 FIGHTER-INTERCEPTOR—
Planes such as this, with electronic noses, are ready to take off within 60 seconds after receiving notice of enemy bombers. They are manned 24 hours a day, seven days a week.

guided missiles to be used against enemy planes. How extensive are the installations is a closely held secret.

Of course, the Antiaircraft Artillery has the more conventional weapons to use against enemy bombers—huge 120 millimeter guns which can shoot their missiles 40,000 feet or higher into the air, 90 millimeter, 40 millimeter guns and .50 caliber machine guns—the latter to take care of the low-flying planes.

Preparations Improved

The AAA is under the operational control of the Air Force's Air Defense Command. Someone must decide whether planes or ground guns are to be used against enemy attackers, else our guns would be shooting into our planes.

There have been varying estimates as to how successful this active defense against enemy bombers will be. Some say that only 20% of the bombers in any attack will get through to their targets, others say we cannot prevent 80% of them from getting through. Whatever the percentage, it is true that we are far better prepared to meet them now than we were before Korea. A Senate Preparedness Subcommittee came back from Alaska recently to report that Alaska would never be another Pearl Harbor. On the edge of most cities—primary targets—are keen, alert young men, ever prepared to dash within seconds to their jet planes, ready to take to the skies. Dotted over the landscape are the AAA guns and guided missile sites. In the far north are the weird radomes—encasing in fabric, with the help of air under pressure, the electronic eyes which shall warn us of approaching danger. And backing them up is a volunteer army of civilian observers who, day or night, in bad weather and good, are ready to track the enemy on his death dealing path and to thwart his design.

Science News Letter, January 19, 1952

MEDICINE

Begin Tropic Diseases Project for Pacific

► THE PACIFIC Tropic Diseases Research Project has been established at the University of California at Los Angeles, under the direction of Dr. John F. Kessel of the U. C. L. A. Medical School, who is now in Tahiti.

It is supported by grants from Cornelius Crane, Chicago plumbing manufacturer, William A. Robinson, author of "Ten Thousand Leagues Over the Sea," who makes his home in Tahiti, and the Church of Jesus Christ of the Latter Day Saints (the Mormons).

It will continue the investigation of filariasis, study the recent outbreak of poliomyelitis in Tahiti, and engage in research on other tropical diseases such as leprosy.

Science News Letter, January 19, 1952

PLANT PATHOLOGY

Oak Wilt Hits 7 New States

Deadly forest disease discovered attacking trees in seven more states in 1951, bringing to 18 the number of states whose oak stands are threatened.

► OAK WILT, deadly forest disease threatening oak stands throughout the eastern half of the country, attacked trees in seven more states during 1951.

Newly-discovered infected areas in Kentucky, Maryland, North Carolina, Tennessee, Virginia and West Virginia bring to 18 the number of states whose oaks have been hit by this virulent fungus disease. Oak wilt in Michigan, spotted in 1951, was reported in October.

Oak wilt is a fast killer, an inoculated tree being dead a few weeks or months after infection. That it is also a spreading disease "makes a much more dangerous situation," Dr. Curtis May of the U. S. Department of Agriculture and member of the National Oak Wilt Research Committee points out.

No one yet knows exactly how the infection jumps many miles to attack healthy trees. Birds and insects may pick up the deadly spores and carry them away, forest pathologists believe, but this theory has not been proved. However the disease

spreads, it has fanned out from the Wisconsin-Minnesota area east to states bordering the Atlantic and south to Arkansas.

Finding stricken areas in seven more states considerably extends the previously known regions of infection. Although spotting the affected trees from the air is cheaper and faster, in mountainous regions surveys must be made from the ground.

Color pictures taken this past summer of Wisconsin forests show that the disease has been established there perhaps 25 to 40 years, a much longer time than in the Ozarks, for instance, where it is only 8 to 10 years old. This means, Dr. May says, that the disease is probably not native to the United States, for if it were, all oak trees here would have been killed off long ago.

Oak wilt is caused by the fungus, *Chalara quercina* Henry. The near perfect stage for the fungus is one which carries it over the period when it might otherwise die. Called perithecia, this stage has now been produced for oak wilt fungus in cultures from a single tree for the first time. It may be produced under the bark of oak trees, where insects and birds could easily pick up the sticky spores. Drs. George H. Hepting, E. Richard Toole and John S. Boyce, Jr., of the Agriculture Department's division of forest pathology in Asheville, N. C., are now studying the tree, #419, that produced the perithecial stage in culture.

Cutting the roots before infection has passed through root grafts to other trees is one method of halting oak wilt's spread. Another way to curb local transmission of the fungus is to kill with poison healthy trees within a radius of 20 to 40 feet from diseased trees.

Science News Letter, January 19, 1952



PASSAIC RIVER BRIDGE—to take advantage of high tide and low winds, two of the giant 173-ton haunch girders used to make the Passaic River Bridge were erected at night. This picture shows where the work to complete the longest girder span bridge in the U. S. stood at sunrise.

AGRICULTURE

Sugar Beet Molasses Gives Vitamin for Poultry

► MORE VITAMIN B-12 for faster growing poultry and hogs is now available on a commercial scale. It comes from fermenting sugar-containing by-products such as sugar beet molasses with bacteria.

Development work on the new process was done by the U. S. Department of Agriculture at its Western Regional Research Laboratory in Albany, Calif., in cooperation with Washington State College and the Institute of Agricultural Sciences at Pullman, Wash.

Science News Letter, January 19, 1952