RADIO

Radar's Future

When the war is over, it may be used to cut down railroad accidents, and even your automobile may be equipped with a unit.

➤ IF YOU have ever shouted in the direction of a cliff, then measured the time it takes the echo to return to determine how far you are from the cliff, you have used a means similar to radar to check distance. However, radar uses ultra-high frequency radio waves, while the echo is made up of sound waves.

Many important Allied victories would have been virtually impossible without radar. In anti-aircraft defense, radar is used to detect the approach of raiding planes at great distances through darkness and fog. Installed on fighter planes, radar enables pilots to spot enemy planes in bad weather, and to get range for attack. It helped lick the U-boat menace by spotting submarines when they came to the surface at night to recharge their batteries. In spite of fog, smoke, or night's blackness, radar can spot the enemy more than 100 miles away. The day-after-day bombardment of Germany's arsenals and supply lines that preceded the invasion would not have been possible without radar.

When the war is over, radar will not drop out of the picture. Today we have only reached the bare beginning of radar development. Many peacetime applications are already known, others only need time for research to bring them into practical form.

When the war is over radar may be used to cut down railroad accidents. Radar units mounted in the engine cab of a locomotive would enable the engineer to detect oncoming trains on the same track, or trouble ahead, so that he could slow the train down in time. He would use the invisible eye of radar to give him visibility in storms, fog or on moonless nights.

Ships equipped with radar can sail into a harbor during a heavy fog and come into dock without colliding with other ships. At sea, radar will detect other ships, icebergs, floating wrecks, and other hazards.

In the air, radar will give pilots of commercial airliners an accurate picture of their altitude at all times. It will also detect objects such as high tension wires, radio antennae, tall buildings, mountains and other planes even though they are not visible, so that the pilot can steer clear of them. It will permit a plane to land in a dense fog, without other assistance.

Even your automobile may have a radar unit that will make driving safe in fog, storms, or snow. With a radar beam shooting out in front of your car you would know of the position of obstructions, other cars and trucks even though you cannot see them.

Until recently, it was taboo even to mention the word "radar," which means radio detecting and ranging: *ra* (radio) *d* (directioning) *a* (and) *a* (ranging). The letters r-a-d-a-r spell the same forward and backward. This spelling of the word gives a clue to what it is, a radio echo.

Twenty-two years ago, Dr. A. H. Taylor and Leo C. Young of the Naval Research Laboratory discovered that certain radio waves bounced back from steel, like the echo from a cliff. This was the beginning of radar for America as we know it today. Other pioneers rapidly picked up the idea and intensive research is still in progress. These men were Maj. Gen. Roger B. Colton, U. S. Army, Dr. John H. Dellinger, of the National Bureau of Standards, and Robert M. Page, of Naval Research Laboratory. Although these men were long on faith in radar, they were short on funds to carry on research.

As World War II came nearer to being a reality, radio manufacturers gave their cooperation in perfecting military radar, and in getting it into mass production. Today, military and naval men agree that we might have lost the war 10 years before it began, if these pioneers had not persevered in radar research.

The Axis got its first taste of radar from the United States on the night of Nov. 14, 1942. Out in the Southwest Pacific, off Guadalcanal, it was storming, and one of our warships was hunting for Jap men-o'-war. Like a searchlight beam, the radar beam probed the enshrouding turbulent darkness, until a reflected signal was received, registering the presence of an enemy vessel more than eight miles away.

Our big battleship raised her guns, and sent powerful high explosives thundering

DRESSED FOR WINTER—American soldiers in western Europe have devised a variety of winter coverings for their jeeps, as shown in this OWI photograph. This jeep has a plastic top constructed entirely of salvaged material, complete with windshield wipers, a spotlight and a windshield defroster.

into the storm towards the spot where they knew the Jap ship lay. The second salvo landed squarely on the enemy man-o'-war, 14,000 yards distant. This experience vividly demonstrated radar's effectiveness, and soon afterwards compact radar units were being installed in airplanes, as well as on land and aboard ships.

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ENGINEERING

Research Needed

Technical progress in the construction industry has been relatively slow in the past, and extensive research is now needed.

➤ TECHNICAL progress in the construction industry as a whole has been relatively slow in the past, and extensive technical research is now necessary if the industry is to be stabilized. Highway construction, and to a lesser extent heavy bridge and dam construction, have become thoroughly mechanized, but progress in other fields has lagged. This is the opinion of the National Planning Association, a voluntary association certified under the laws of the District of Columbia, in a report entitled "Stabilizing the Construction Industry."

The report, prepared by Miles L. Colean, states: "The costs resulting from the traditional handicraft methods still characteristic of most building operations have prevented the industry from fully exploiting its potential markets and at the same time have caused it to overbuild for the limited part of the market it has been able to reach."

"Another industrial problem comes from the slowness or failure of builders to shift from types of construction for which the demand may be currently satisfied to those where demand may still be latently effective," the report continues.

Some contractors have demonstrated considerable flexibility in shifting from one type of construction to another, but most find it difficult to shift profitably to unfamiliar types of structures and retire temporarily when the market for their usual products declines or disappears.

Research activities are engaged in by many large manufacturers of construction in the use of more economical method of their scientific work is concerned with the development of their own products.

"Only to a minor degree is research directed to the development of well-balanced end products and experimentation in the use of more economical methods," Mr. Colean declares.

To conduct the needed technical research, the report recommends that "assistance from the federal government should be considered." A precedent for this type of activity on the part of the government has already been set in agriculture, mining, aviation, and in highway construction. The National Bureau of Standards and the U. S. Forest Products Laboratory already have facilities capable of expansion, the report states, and the government could expand and coordinate work now proceeding in a piecemeal and unrelated way.

The primary aim of the government activities recommended by Mr. Colean "would be to advance the productivity of the construction industry (with resultant lower costs per unit of volume), increase the total physical volume, and, most important, encourage expansion of types of construction now restricted because of high cost."

The program, also, would help building organizations reorient their production as made advisable by variations in demand.

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ENGINEERING

New 7-Cylinder Engine Develops 700 Horsepower

➤ A NEW seven-cylinder air-cooled radial engine that develops 700 horsepower on inexpensive low-octane fuel has been announced by G. W. Vaughan, president of the Curtiss-Wright Corporation.

Known as the Cyclone 7, the new engine will permit airplane manufacturers to design short-range cargo planes and military trainer planes around a 700 horsepower installation. The new engine is similar to the nine-cylinder Curtiss engine which powers more than 80% of the nation's airlines. Close resemblance between the two makes it possible to interchange many parts, thus reducing maintenance problems.

The combustion chamber is designed for gasoline of an octane rating much lower than that of planes in the air today. Horsepower output would be correspondingly greater if higher-octane fuels were used.

The new engine is provided with a two-speed supercharger drive. The higher supercharger ratio is adequate for the development of maximum engine power at high-altitude airports. The lower supercharger ratio supplies extra power for high performance at airports situated at low altitudes.

To improve lubrication within the engine, oil jets have been provided in the crankcase to direct a continuous flow of oil into each cylinder barrel.

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