

Washington Digest

Radar Magical Beam That Bounces Back on Contact

Lightning Calculator Estimates Distances Upon Deflection of Electrons; Study Of Apparatus Still in Infancy.

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(In a previous article Mr. Baukhage told some of the little known facts in the history and development of radar and recorded many of its possible peacetime uses. In this article he explains what makes radar tick and how it performed some of its marvelous feats in this war.)

"Impact," a publication of the office of the assistant chief of air staff, intelligence branch, for the first time lifting the veil which has covered descriptions of radar, says succinctly: "A radar set is nothing more than a machine for sending electrons out into space in a steady stream in a desired direction. These electrons travel with the speed of light in a straight line until their energy is dissipated, or unless they bump into something."

That bump is important. If a stream of electrons is shot into the air like a searchlight and a plane flies across the stream, the electrons which hit the plane bounce back. They bounce right back to a screen in the radar scope and are revealed in the form of a "blip" of light, just as an echo bounding back on your eardrum is reflected in the form of a sound.

The principle of the real echo is used in "sonic" location of obstacles—ships use it to locate shoals, for instance. And, recently, it has been demonstrated that bats use the same principle in avoiding obstacles (which they can't see since they are blind) by uttering a tiny "beep," the pitch of which is probably too high for the human ear to catch. Their beep bounces back in time to warn them to duck.

But radar's electronic "blip" is better than a sonic "beep." One reason is that an electron moves with the speed of light which is faster than sound.

'Echo' Caught On Radar Receiver

Perhaps at this point we ought to recall to your minds what an electron is. A short definition of an electron is "the most elementary charge of negative electricity." Electrons plus protons (the positive charge) are what atoms are made of and atoms are what molecules are made of and you and I and the universe and all it contains are, as we learned in high school, nothing but various groups of molecules.

Ordinarily electrons pursue the even, if rapid, tenor of their ways well within the bounds of their own atoms. But radar has changed all that. It has made it possible to project those electrons out into space and then, if they hit something and bounce back, to catch the "echo" on the "scope" of the radar set in the form of a "blip" or blob of light.

We can't go into detail as to how this operation takes place, but we can tell you in a general way. The scope of the radar set is round. It is like a map. North at the top, south at the bottom; east to the right and west to the left. So that you will know where you are a little light appears on the screen just where your set is located on the "map" you are looking at. By moving the instrument, you can keep yourself in the middle. If you see another spot of light on the screen up where 12 o'clock would be on your watch dial, you know there is a plane (or other object) north of you. If it should be a plane and it were coming toward you (which the instrument would reveal) and it finally appeared right on top of the light that showed your location, you'd know that there was going to be a collision.

Radar can "see" a ship 30 miles away—and see it in the dark, through a wall of cloud or mist, which no human sight could penetrate.

Different substances give stronger or weaker "echoes" on your screen, water little or none. Land more, built-up areas more than fields. Rocks more than softer surfaces.

In addition to locating an object in relation to the observer (the location of the radar set), the distance from the object can be calculated by the length of time it takes for the electrons to reach the object and bounce back. The elevation (angle of height from observer) and the deflection (how far to the right or left) are calculated just as a sur-

veyor makes these calculations by observation from two known points. And you don't have to be an engineer to do it either—it is done automatically by a lightning calculator.

I have stood in awe before these calculating machines, which can "think" more accurately and a thousand times faster than I could figure, and watched how they direct the aim of the turret, waist and tail guns on a B-29.

As I said in last week's article, the enemy has radar, too. The Germans were working on it with investigation and experiment which paralleled ours and those of the British. In the early days of the war the Germans had receiving sets on high hills along the coast of France. The electron beam, like that of television, moves in a straight line and since the surface of the earth is curved, this curve gets in the way if the image and receiving set are too far apart. Therefore, land sets are placed as high in the air as possible.

We knew that the Germans had some kind of an electronic device and they knew we had one. One of the early commando raids, which the papers said was successful in destroying a German "radio station," really destroyed the radar installation.

Poke Out Japs' Eyes

One of the reasons why Iwo Jima and Okinawa were so important, besides the fact that they make excellent naval and air bases, is because the Japs had their radar detection stations on these islands and were able to detect the presence of our bombers and intercept their flight. You will also recall that a number of little adjacent islands that hardly seemed of any importance were seized by our troops. In all probability it was because they had radar installations which could detect and give warning of planes leaving the larger island for Japan. As we put out her "eyes" one after another, Japan becomes more impotent. There have been many cases, you may have noticed, where the Japs, on land or on small ships, have been taken by surprise. I have no information on this subject, but in some cases it may have been due to the fact that they lacked radar equipment. It is believed that what radar knowledge Japan has come from the Germans.

Of course, there is one phase of radar detection which in the past has sometimes prevented use of data concerning the detection of a plane or ship. That is the fact that until the object is very close it cannot be identified. It is merely a "blip" of light. Therefore, it is impossible to tell friend and enemy apart. Some sort of identification has been developed, details of which are still, I believe, "top secret."

An example of how this worked to the disadvantage of the British was in the engagement in which HMS Hood was lost. On May 21, 1941, the Hood was lying in the strait between Iceland and Greenland when suddenly out of nowhere she was hit by a salvo from the 15-inch guns of the powerful Bismarck. The Bismarck had accurately located the Hood with radar equipment, the first reported successful use of radar in such a naval operation in the war. It is said that the Hood had likewise detected the presence of a ship at the spot where the Bismarck was, but knowing that a number of friendly warships were in the vicinity, did not dare to take the chance of attacking first.

Many improvements have been made in radar which are not as yet ready for the public eye and all those familiar with the subject say the study is only in its infancy. Scientific achievement seems limitless and the one virtue of war is that it spurs inventive genius to great strides of progress.

When peace comes radar will likewise open new vistas of which the layman hardly dreams.

Harry Truman didn't want to be vice president. James Byrnes didn't ask to be made secretary of state. Neither wanted to mix into international affairs—but they found themselves on the same boat en route to Germany.

Superforts All Over Japan



Three B-29 superfortresses are seen in flight over Fujiyama, Japan, during recent strike against the enemy. The famous Fujiyama volcano forms a colorful backdrop for the big bombers. Some "authorities" claim that the entire island can be wrecked by unloading tons of bombs into the mouth of Fujiyama and other Japanese active volcanoes.

Fishes in His Private Pool



It is not every boy that has his own private fishing pool. This young farm boy baits hook hopefully and prepares to fish in the family pond. Private waters like these can be used the year around, and hundreds of inland farm kids who never had a chance to fish are growing up into a larger generation of sportsmen. The government has encouraged building of private ponds. Some states, such as Missouri, offer special inducements for farm ponds, not only stocking with fish but supplying at cost shade trees and water plants for the ponds. Even in postwar, the addition of fish to the farm diet will be welcomed.

Bringing Them Back Home Again



With thousands of U. S. troops scheduled to fly home from Europe each month, the most effective all-air rescue system ever devised in safeguarding the men has been put into effect. (1) The waters are well protected, while from the Azores to the U. S. many ships are on guard.

Fixes Grave for Dog Mascot



Pfc. Joseph Samson of Detroit, Mich., fixes the grave of his pet dog, "Sgt. Chippo," who died in the "line of duty" after participating in four Southwest Pacific campaigns. Men of Samson's outfit, a signal detachment with the 1st cavalry division, built the grave on Luzon. The dog smiling at the headstone is allegedly one of Chippo's pups.

Christmas in July



Recruiting of 65,000 additional workers for railroads, needed urgently to carry out the army's redeployment program, gets under way in Chicago with Cpl. Edward Soletke, 6th service command M.P., decked out as Santa Claus in this Christmas in July crisis.

Man of War



One of the busiest men in the administration, Under Secretary of War Robert P. Patterson, relaxes, whenever he can get away from Washington, by running his farm at Cold Spring, N. Y.

Postman and His Pal



"Butch," who belongs to Joe Hammer, 13, a patient in Johns Hopkins hospital, Baltimore, has not missed a day in meeting his postman pal, Arthur Pritchard. He makes the daily rounds with the mailman, grabbing his trouser leg to urge more speed.

Back From Prison



Col. Hubert C. Zemke, 31, as he arrived in New York City. The air ace, credited with 38 1/2 Nazi planes before being shot down and taken prisoner, was released from Stettin.



TRUMAN COMMITTEE CARRIES ON

Senators Kilgore of West Virginia (Dem.) and Brewster of Maine (Rep.) had an interesting experience while probing conditions in Germany for the Mead committee, formerly the Truman committee. Calling at the headquarters of Lt. Gen. Alexander M. Patch, they were received courteously by the general himself, who talked with them for ten minutes, then went off to keep an appointment.

The two senators then proceeded with their usual investigation. Settling down in one of the U. S. military offices, they called in witnesses, and cross-examined them with a stenographer taking down everything that was said.

This continued for nearly three hours. Unlike most visitors, Senators Kilgore and Brewster seemed intent on really finding out what was happening in that part of occupied Germany. Finally, Gen. Arthur White, chief of staff to General Patch, appeared nervously in the background.

"Gentlemen," he said, "ahem . . . this procedure . . . it's a little unusual. I'm not sure that we can permit you to continue."

"It's the same procedure we've always followed," replied Senator Brewster.

"Yes," continued Kilgore, "it's the same procedure followed by this committee under former Chairman Truman."

"You probably recall him," added Brewster, "he's now President of the United States."

Next day General Patch himself invited the two senators to dine with him at the villa which he had taken over from a German princess.

JUDICIAL EXIT

There was a day when everyone in and around the Roosevelt administration wanted to be a judge. This ambition was largely precipitated by the Supreme court fight and the fact that the courts in those days had put several obstructive decisions squarely across the path of the New Deal.

But now it is just the opposite. There is a growing exit from the courts. Judge Schwellenbach has just resigned from the bench to be secretary of labor. Judge Sherman Minton is itching to get off the circuit court of appeals in Chicago. And there will soon be four vacancies on the court of appeals of the District of Columbia, considered one of the most important courts in the country.

Judges Vinson and Thurman Arnold have already made two vacancies on this court. Two other vacancies will occur when Chief Justice Duncan Groner and Judge Justin Miller resign.

It may keep the White House busy looking for good men to take their places.

ITALIAN UNDERGROUND

It is not often that anyone can get a first hand report on the results of psychological warfare direct from his own family in an enemy country. However, Ugo Carusi, director of immigration and naturalization, has had that experience.

Carusi came to this country as a small boy from the marble quarries of northern Italy, went to work in the marble quarries of Vermont, and got to know Harlan F. Stone, who brought him to the justice department when Stone became attorney general under Coolidge.

And during the war, Carusi has been broadcasting to the Italian people urging them to surrender. With the end of the war, Carusi has received letters from his relatives in Italy telling how his broadcasts helped inspire the battle against the Nazis.

"Ugo," wrote a cousin, "you can really be proud of your relatives here in Italy. From the oldest down to that little, charming young lady (Carusi's 10-year-old niece) you were always so happy to hold in your lap while in Carrara, they have proven themselves to be great patriots."

"One of your cousins, the brother of Enrico, was the colonel who led a Partigiani band in the capture of Carrara from the Germans last November. From that time on, the Partigiani controlled all the public offices in the town. The caves with which you are familiar were used to good advantage by the Partigiani, and the Nazis refrained from re-entering the city."

WAR NOTES

Despite the heavy bombing of the Schweinfurt ball-bearing plant, inside sources reveal that it is in reasonably good condition and within one month could be producing 50 per cent of its wartime schedule. . . . The Nazis had removed a lot of Schweinfurt's intricate machinery before the air raids, and hidden it. The manager of the plant told U. S. officials that within three or four months he could be turning out 30 per cent more ball-bearings than during the war.

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BRIEFS . . . by Baukhage

Japs are making kitchen knives from American incendiary bomb cases. They ought to be ready to set up housekeeping soon since we have begun throwing everything at them but the kitchen stove.

One of Hitler's favorite tunes was "Who's Afraid of the Big Bad Wolf." That was before he got a bear by the tail.

An American flier back from a Jap prison camp says the Japs, realizing they are beaten, are treating our prisoners better. Nothing like a good licking to bring out one's virtues.

The new DDT insecticide perfected by the army kills everything but human beings. Another secret weapon against Japan.