

# RADAR, THE SUPERSLEUTH

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DRAWING BY KENNETH W. THOMPSON

Here's the vital story of the greatest secret weapon of the war

IN 1940, the R.A.F. pilots, outnumbered more than 10 to 1, gave the Luftwaffe its first defeat. Wherever Hitler's planes attacked, at whatever altitude and from whatever direction, "The Few" were always waiting for them. Even in the dark, they found his big black ships and destroyed so many that he had to accept defeat.

Radar saved Britain. It might have saved Pearl Harbor. The U. S. Army Signal Corps radar installation did its work dependably, as a monitor that never lies. At dawn that fateful morning of December 7, 1941, it detected, located, instantaneously reported, a large number of planes first spotted when more than half an hour away. Private Lockhard (now Lieutenant Lockhard, wearer of the D.S.M.) promptly flashed word to his lieutenant, remained on duty to see the planes in. Knowing, as probably the Japs also knew, that a large number of American planes were due, his officer suspected nothing. As a result, our Navy suffered the worst disaster in its history.

Hitler's spies are known to have tried desperately to solve the mystery of radar.

Back in 1935, when they were free to roam England at will, they could have found a clue in a quiet English lane near Daventry early one cold March morning.

A battered old truck stood parked on the frozen ground at the roadside. In the sky, an R.A.F. plane kept appearing and disappearing. In the truck were two young women laboratory assistants who could keep a secret, and a 43-year-old Scot named Robert Alexander (now Sir Robert) Watson-Watt, a descendant of the Watt who revolutionized industry with the invention of the steam engine. Several other physicists and technicians were present. All leaned over, tensely watching crude, hastily improvised electrical instruments. Then, the test over, they straightened up and excitedly discussed the marvel they had witnessed: Their instruments, crude as they were, could detect the approach of the distant plane and, like a moving finger, follow it wherever it flew.

This was the birth in Britain of radar—the greatest "secret weapon" of the war. America already had a well-developed device utilizing the same principles, but in those days, nations were not sharing their military secrets.

In 1938, Watson-Watt was put in the Air Ministry as Director of Communications Development, and in 1940, he became Scientific Adviser on Telecommunications. He headed a brilliant group. They made much of their early apparatus with their own hands. Scarcely two years after they went to work, their first radar apparatus was in night-and-day production behind the barred doors of a factory. All this while, few knew that any such apparatus had been developed, and those few never spoke of it save in a three-letter code word. It was one of the war's best-kept secrets—until July 17, 1941.

## A Coup by the Commandos

On that day, the curtain was lifted for special reasons. By that time, the Germans had captured some of the early radar apparatus and had developed a similar—though much inferior—system of radio detection. The British watched the enemy build a radar station on the Channel, at Bruneval, and when it was ready, they sent over Commandos who took it, lock, stock and barrel.

But the real reason for breaking secrecy was that Britain desperately needed radio technicians to operate and service the system. Lord Beaverbrook, Minister of State, broadcast an appeal for radio volunteers throughout the British Empire and the United States, saying in part:

"It is the radio that destroys the enemy in the darkness, that seeks him out through the clouds. It is the radio that sends the avenging fighter to the place where he will meet the lurking enemy and bring him to destruction. . . ."

How does this magic secret weapon work?

Though radar apparatus is so intricate that it can be operated only by experts, the principle on which it works is as simple as an echo.

As early as 1922, American scientists discovered that

a ship, passing between a transmitter and a receiving set, interfered with reception. Investigating further, they discovered that an object need not pass between a transmitter and a receiving set to be detected; a ship or plane would reflect, "bounce back," high-frequency radio waves striking it. It was therefore possible to have the transmitter and the receiving set at the same location. This could be on a ship, for example, and conceivably on an airplane.

Utilizing this knowledge, our research engineers contrived apparatus with which they could detect a plane in flight as early as 1930. By 1934, their apparatus could tell not only the direction of the plane but its distance. Our Navy had already installed radar on a number of warships and shore stations. Much of the basic research, however, was done by the National Bureau of Standards' radio division, under Doctor John H. Dellinger.

As now developed, radar continuously sends out short radio waves that travel with the speed of light, filling the air with them for miles up and all around. But unlike light waves, radar waves are unaffected by fog, smoke, rain or snow. Like light waves, they cannot penetrate water.

When these radar waves strike a ship or plane they "bounce"—are reflected back—and are picked up by receiving apparatus. Today, radar location stations instantaneously flash their findings to a plotting room. Here each plane or group in the area is detected, located and tracked, with altitude, speed and course. This data is entered on a huge plotting board. Officers can instantly advise their gunners or send up fighter pilots to positions where they can intercept the enemy, long before he arrives over the target.

## The Deadly, All-Seeing Eyes

Within the range of radar, no ship or plane above water and under heaven can escape detection. And when the radar waves "report" one, they provide data by which, instantly, guns and searchlights can be accurately aimed, though the targets may be above clouds and invisible.

By obviating the need of air patrols, what radar has saved in airplane wear-and-tear, gasoline, oil and general maintenance is beyond calculation.

"The magic eye" recently described in British and American newspapers as being able to locate U-boats on the surface is radar. Many of the instruments advertised in American magazines as being able to "see, hear and think" are radar instruments.

With radar to help, men on a warship can "see" many miles, day or night, regardless of weather conditions; they can "see" an enemy vessel, and with uncanny precision, send planes or fire a salvo at it—this, perhaps, without anyone on board the target vessel ever hearing gunfire or knowing where the projectiles or planes came from.

When Luftwaffe planes returned to attack London in force on Sunday night, January 17th of this year, in reprisal for R.A.F. raids on Berlin, they took a disastrous beating. Co-ordinated with searchlights and radio locaters, new anti-aircraft guns no longer sought to saturate the skies with shells, but fired to kill.

Radar saved Britain. Without it, the Air Ministry said, the Battle of Britain, one of the great decisive battles of history, must have been lost. It saved the war, possibly saved our civilization.

As rapidly as radar apparatus can be produced it is being put to work to guard our ships, shores and bases. The training of radar men and women is now the main bottleneck.

In the early days of the war, the Armed Services needed lots of radar equipment, in a hurry. Radio companies were called in to help with development and production problems. They did what at first seemed impossible in creating and turning out new equipment. Radar is useless without skilled operators, and now industry is training thousands of radio technicians, some of them women, compressing a two-year course into twelve to sixteen weeks.

First beaten by it over England, Hitler, with Italy and Japan, unfortunately now has and is widely using radar. A race for supremacy is under way, and America—the peacetime home and GHQ of radio—has thrown all her scientific resources into winning that race. ★★

Radio emanations issue continually from the radar station. As hostile aircraft approach, these emanations bounce back and are picked up, enabling our fighters to intercept them long before they reach a vital area



They were hit amidships. The shock as it ripped ship plates found Sammy with two hands to the loading, none for himself

## SHE'D DO THE SAME FOR YOU

By Betty de Sherbinin

ILLUSTRATED BY HARRY MORSE MEYERS

To Sammy, "coming back" meant coming back to her. Sammy was a good little guy, but dumb, so his shipmates had to let him down easy

GEORGE LEVAK had leave and the plane fare. He was going to Chicago. He and the rest of the gun crew knew Sammy Williams' wife was in Chicago. And George asked Sammy before he went, "If you like I'll go and see your wife . . . tell her you are all right . . ."

Sammy hesitated. "You don't have that long," he stalled. "It'll take your time."

"It's no trouble . . . You've been away over six months, she'll want to hear from you." George meant it. George was a tight guy.

Sammy didn't really want George to go. But George said, "I am going to check up for the fellows and see if she's as good-looking as her picture."

"Okay," said Sammy, "if it don't put you out . . ." He gave George the address of the Sandwiche Shoppe. "She's behind the counter," he said, "you can't miss her."

"You bet I can't," said George.

"Tell her I'm okay. Tell her there's no danger. Tell her the old Astra floats around in a circle of destroyers, that I look good and feel swell."

George said sure he would.

Sammy had a beautiful wife. He showed her picture sometimes to the rest of the gun crew, and they agreed with him. She was a knockout. It was not the kind of

picture you cut out of a magazine, not the kind of girl you find standing on the shiny page with her hands where the photographer arranged them, her smile gauged to sell something. Sammy's wife was soft and round, pretty and cute . . . all those adjectives would do. But there was something else in that picture. Sammy saw it, perhaps the others did and perhaps they didn't. It wasn't to talk about. It was something in the eyes and about the mouth, something intimate and warm, a look that bridged everything and told something of the story of loving, waiting and being a woman. Sammy never looked at the picture long enough.

It was just like Meg. Some of his mates didn't believe it. They'd look at the picture and they'd ask, "Does she really look like that?"

"Sure." He'd sound cocky.

And then they'd look at him. He knew what they were thinking. He didn't look like the kind of guy that could get a girl like that to marry him. He wasn't a big fellow; he looked more like eighteen than twenty-two. His eyes, skin and hair all shaded into neutral sandiness. Before the war had made him into a sailor he had been a stock clerk in a big department store. He'd been good at it. He was good at most things, quick, good-natured, and he prided himself that he remembered things on the job. It made up for muscle.

"Kinda young to be married," they'd say sometimes.

"Longer to be together . . ." And in his heart Sammy was always trying to believe that. He tried to put it in the letters he wrote her. He always said he was

fine . . . tried to make out that nothing could possibly happen to him. He'd say they were always convoyed and he never said how the Astra lagged, how she was just about as warlike as an old dowager with a six-shooter hanging from her stomach. He didn't want Meg to worry. And he tried to guess if she did, but he couldn't judge much from her letters.

MEG wasn't the kind of person who could make much with written words. The things she wrote never said as much as the picture did. Same words, same sequences . . . she missed him all right. The weather was cold or warm or hot. She was sending him the funnies and the sports section which she hoped would arrive in good condition. She would be glad to see him again. She loved him as ever. The words in the letter made no pattern at all.

Now and then one of the fellows would ask, "What does your wife do, with you away?"

"She works," he'd say. "She's got a job."

"Keeps her busy," the other fellow would say. He knew the thought behind that. A young man can't leave his wife for six months, twelve months, and not worry about that. It was not doubts, it was not jealousy. It sprang up like a bad dream out of his loneliness, an unreasonable vision of someone else coming to take what he had left unguarded.

George got back the night they sailed. Sammy didn't see him until mess; he pushed the next fellow out of the way and sat down beside Levak. "How'd it go?" he asked.

George didn't look so hot. "Oh, it's you," he said.

"Sure. You saw Meg, didn't you? You didn't forget?"

"Listen, kid, this is kind of embarrassing . . ." Other eyes were on them up and down the table. "This is embarrassing," George repeated. "I wasn't myself in Chicago, see. I got with some fellows I used to work with. We drank more than was good for us . . ." George reached for his coffee cup. "And I didn't want to give your wife the idea that your pals were the kind to load up . . ."

Sammy's face was uncertain. "Okay," he said, "if you couldn't make it." He looked down the table and no one was looking at him.

And it was the first time Sammy had heard of George getting fried.

"D'ye hear from her while you were in port?" George asked, his casualness—if Sammy had analyzed it—was a little faulty.

"Yeah, I got a letter." Sammy put a hand on his pocket, it was there, the same kind of letter. "She don't have much to say." Something about George made him uneasy though.

"She worked in that restaurant long?" George asked.

"Right along," he said.

There was silence after that. Eyes met across the table. Sammy, to everyone's relief, made no inquiries.

He got up and left the room as soon as he could. Eyes followed him. Joe Runion who sat at the end of the table liked to look at the optimistic side of things.

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