Early RADAR development

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by Donald A. Helgeson

On the night of May 26, 1937, a group of very influential people were gathered in Fort Monmouth, New Jersey, for what was to be a pivotal event in the development of radar—a technology many consider key to the Allies' subsequent success in World War II.

The group, including the Secretary of War, the Army chief of staff, senators, and congressmen, had been invited by the Signal Corps laboratories to witness the capabilities of a new radar set, later known as the SCR-268.

The nighttime demonstration, designed for dramatic effect, called for a B-10 bomber, lights off, to attempt a "sneak raid" over Fort Monmouth. A radar-controlled searchlight had to detect and illuminate the airplane in time for simulated antiaircraft artillery fire. Three other searchlights, not controlled by radar, were positioned to provide support once the target was detected.

Within 20 minutes after the demonstration began, radar picked up a target at a height of 10,000 feet and a range of six miles. The pilot searchlight swung into action, pierced the sky, and quickly locked onto the target plane. The companion searchlights swung toward the plane and added their illumination, making it an easy target for antiaircraft fire. The tracking maneuver was repeated several times to the growing excitement of the VIPs in attendance.

The group, gathered that night in New Jersey 50 years ago, witnessed the first radar to track a target with precision.

The significance of what they had just seen was not lost on them. Army chief of staff, Gen. Malin Craig, acutely aware of the threat posed by the advancing German war machine, ordered production begun at once. And money for continuing radar research, which had been in short supply, suddenly became available. Congress quickly appropriated $250,000 Depression-era dollars for the Signal Corps radar project—though a year earlier, a Signal Corps request for just $40,000 for detection research had been refused.

Efforts to find a means of long-range target detection had been pursued by the War Department for years. During World War I, the Signal Corps had worked on a method of finding airplanes by homing in on the high-frequency radio emissions that emanate from spark gaps in gasoline engines. In the 1920s, there were experiments with a sound locator. Later, the Signal Corps focused on infrared detection, then microwaves.

Its work with RADAR—an acronym for radio detection and ranging—continued during the 1930s in parallel with that being conducted by the Naval Research Laboratory and RCA, each pursuing different goals. While the Army sought a plane detector and searchlight aimer, the Navy worked on a system for shipboard use, and RCA looked at collision-warning systems at microwave frequencies. The Signal Corps later joined forces with RCA on microwave research. AT&T's Bell Labs was also doing work during this same time period on detecting planes by interference with continuous radio waves.

Work on radar—a complex innovation which evolved over as much as half a century, rather than being invented—was also going on in several other countries. The British, whose work pretty much outpaced America's during the '30s, were able to develop an operational radar system to defend its coastline. By 1939, stations 25 miles apart covered most of its coast and saved that country from defeat during the Battle of Britain.

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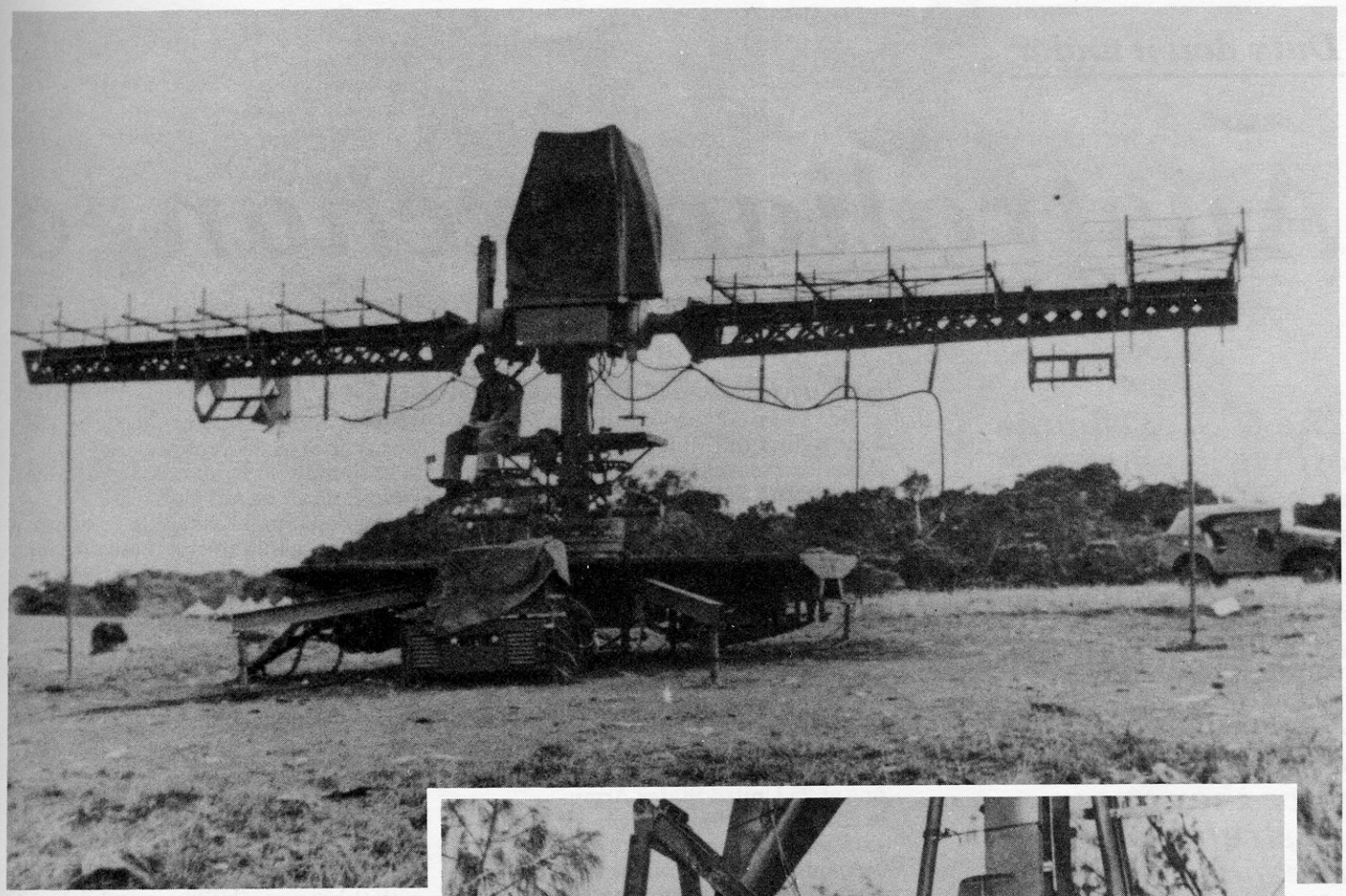

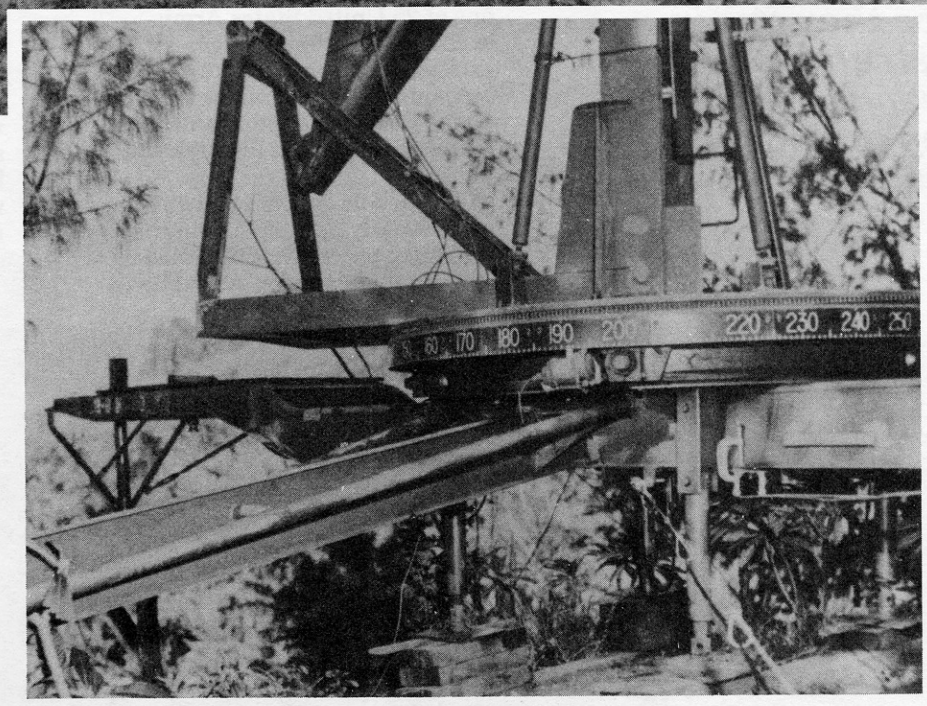

Above is an SCR-268 set up at Pacora, Panama, in April 1942. To the right is the base and azimuth scale of a slightly later model RADAR, the SCR-270, at Vanua Levu, Figi Islands.