Florence van Straten (1913-1992)

For over 30 years, a stalwart of the Navy's meteorological service was a tall, slim, reserved woman known informally as “Flossie.” Florence van Straten began that association during World War II, when the requirements for accurate weather support led to significant advances in atmospheric science. Van Straten played an important role in that effort, and continued to refine the developing science of naval meteorology after the war.

As U.S. participation in World War II began to gain momentum, it became clear that the service of women in the armed forces was critical, and in 1942 the Navy created the WAVES (Women Accepted for Voluntary Emergency Service). One of the earliest volunteers was van Straten, who was immediately assigned to the Naval Aerology Service.

Aerology is an old Navy term for meteorology. At that time, weather officers were known as “aerologists” and enlisted weather specialists were known as “aerographers,” a term still in use today for the Navy's enlisted meteorological and oceanographic specialists.

During the early years of World War II, the critical need for weather in support of fleet operations in both the Atlantic and Pacific theaters greatly stressed the small contingent of specialists in the Navy, so women were welcomed into the Aerology Service.

Van Straten, who had received a doctorate in chemistry from New York University in 1933, was included in a group of 25 women with advanced degrees sent to the Massachusetts Institute of Technology to take classes in meteorology. Ultimately about 100 women became qualified aerologists during the war. Most provided aviation forecast services at naval air stations in the U.S., but van Straten was sent to the Daniel Guggenheim Airship Institute to do research on wind gusts and develop better methods to forecast velocities.

By 1943, van Straten had been assigned to the headquarters staff, the Aerology section of the Bureau of Aeronautics, where she worked in the Operational Analysis Section. Here she compiled extensive analyses of the effects of weather on naval operations, from both historical sources and more recent naval actions. These “lessons learned” studies were published under such titles as “Weather and Naval Warfare” and “Weather and Amphibious Warfare.”

These documents provided examples of how military forces were able to use weather conditions to their advantage, but they also provided examples of engagements where the weather was ignored, to the detriment of the participants. The battle of the Coral Sea in May 1942 provided a superb example. The American fleet used the clouds and precipitation of a trailing frontal system to provide cover, slipping out to attack the exposed Japanese naval force and then disappearing again into the heavy weather. In this way they were able to sink the Japanese aircraft carrier Shoho, seriously damaged another carrier, and shoot down numerous enemy planes. But when they departed the frontal zone to operate in fair weather, they immediately lost the carrier Lexington.

For the most part, though, U.S. forces understood the value of accurate forecasts. In late 1942, the chief of naval operations wrote: “The skillful forecasting of weather conditions has been an important factor in the conduct of many campaigns in the present war. Our successes in the Solomon Islands, North Africa, Sicily, and the Aleutians were due in no small part to the competence of Navy aerological officers.”

Van Straten's academic credentials also served to make her a good liaison to the civilian meteorological research community, keeping an eye out for advances in forecasting techniques and observing technology that would assist naval aerological units.

Eventually van Straten's analytical mind turned towards more pressing needs and she moved into the aerological research and development department. Here she assessed and prioritized fleet requirements for new meteorological equipment and worked with the supply department to ensure required equipment was delivered to the most tactically significant locations. In this capacity, she was instrumental in the pioneering efforts to develop automated weather observing stations, including the floating buoy station known as the NOMAD.

“With pride or shame,” she later wrote with characteristic dry humor, “I must confess that I am responsible for the acronym: navy oceanographic meteorological automatic device.”

Another area that interested van Straten was the impact of atmospheric conditions on the accuracy of the recently developed radar technology. Operators knew almost nothing of the ability of the atmosphere to

sometimes reduce radar distances due to refraction, or to concentrate the energy into ducts that travel hundreds of miles.

“At least once during World War II,” van Straten wrote, “a U.S. Navy task force opened fire with its 16-inch guns on units of the Japanese fleet that were 400 miles away.”

In addition to her work in understanding these phenomena, van Straten began investigating the possibility of using tactical radar to identify weather systems. An early application of this was that carriers frequently identified storm centers on their radar and headed towards them to get the headwind necessary to support aircraft launches off their decks.

Van Straten also focused her attention on fog forecasting and the impact of atmospheric conditions on new infrared sensors.

After the war ended, the Navy's aerology department was significantly reduced, and many of its members took civilian positions. Like many specialty areas, though, women were discouraged from applying. The prevailing attitude was that while woman had provided valuable assistance with the war effort, their peacetime job was in the home.

Van Straten’s unique abilities and accomplishments made her an exception to the rule. She switched to the inactive reserve, ultimately rising to the rank of commander, and continued to work for the newly renamed Naval Weather Service as a civilian atmospheric physicist. From 1948 to 1962, she headed the technical requirements section, describing her position as the “application of environmental factors to military operations.” After her retirement in 1962, she continued to serve as a consultant to the Naval Weather Service until 1973.

During her post-war years, van Straten applied her keen intellect to refining upper atmospheric sensors like the radiosonde and constant altitude balloons, investigating the possibility of weather modification, and developing techniques to forecast radioactive fallout. Most importantly, she was instrumental in the introduction of computer processing to meteorology in the Navy.

Florence van Straten's contributions to naval meteorology paved the way for the thousands of women who today serve as officers, sailors and civilians in the Navy's meteorological and oceanographic community.

For additional reading, see:

Improbable Warriors: Women Scientists and the U.S. Navy in World War II by Kathleen Broome Williams, Naval Institute Press, 2001

America's Weather Warriors: 1814-1985 by Charles C. Bates and John F. Fuller, Texas A&M University Press, 1986

Weather or Not by Florence van Straten, Dodd, Mead and Co., 1966