

American Meteorological Culture During World War II

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This paper explores how the dominant scientific “way of knowing” weather shifted between 1920 and 1950. An empirical, geographical understanding of weather, characteristic of the US Weather Bureau in the 1920s, was largely supplanted by a quantitative and physical conception by the early 1950s. Proceeding from the assumption that knowledge is inseparable from the cultures that produce and reproduce it, this paper explores how the culture and knowledge of American meteorology was shaped by wartime experiences. The main focus is on the Meteorological Training Program, which produced 6,200 meteorological cadets for the US military between 1940 and 1945. Trained by advocates of the Bergen School, these cadets learned to understand weather in terms of physical principles and calculations. In the decades after the war, these cadets (almost exclusively healthy, previously-educated, white men), and the instructors who had taught them, dominated American meteorology. They created and staffed the new university departments, government agencies, and military organizations that directed the development of the atmospheric sciences.

The paper begins by examining the encounter between the US Weather Bureau and the Bergen School during the 1920s and 1930s. Carl-Gustaf Rossby’s 1927 dismissal and the Bureau’s resistance to air mass analysis are well known. Yet even after the installation of Francis Reichelderfer as Chief and Rossby as head of the Research Division in 1938, the Bergen school faced considerable difficulties in converting the key American meteorological institution. Horace Byers’s choice to leave the Weather Bureau for the University of Chicago in 1940 suggests these challenges.

While the Weather Bureau resisted, Bergen School entrepreneurs built alternative meteorological institutions in the 1920s and 1930s. The development of aviation, and particularly its militarization by the Army and Navy, created new meteorological needs. The handful of graduate-level university meteorology programs founded in the late 1920s and 1930s depended upon military and commercial aviation for students and research support. Projects like the Guggenheim Fund’s model airline in 1927-1929, and the military officers sent to the Caltech and MIT graduate programs in the 1930s, forged personal and institutional connections between universities and military aviation.

As war clouds gathered in the late 1930s, these connections suggested how the Army Air Force and the Navy could utilize universities to meet their quickly expanding meteorological needs. At the same time, academic leaders like Rossby saw wartime weather needs as an opportunity to demonstrate the superiority of dynamic meteorology. Weather forecasting based upon physical principles could be employed regardless of where an officer might happen to be stationed, Rossby argued, and physics could be taught to large numbers of people quickly, in contrast to the years of experience and geographical specificity necessary for Weather Bureau techniques.

By teaching a physical, quantitative understanding of weather to the thousands of weather officers needed by the military, the University Meteorological Committee, chaired by Rossby, swamped the empirical understanding that prevailed in the Weather

Bureau. While the wartime forecasting utility of dynamic meteorology is debatable, it laid the foundations for postwar developments in numerical weather prediction and computational atmospheric modeling. But simultaneously, the militarization of meteorology education excluded women and minority groups from the emerging atmospheric sciences. This exclusion has had a decades-long impact.