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America's Weather Warriors, 1814-1985

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agenda or other facts that unravel the riddle.

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Bates, Charles C. and Fuller, John F. *America's Weather Warriors, 1814-1985*. College Station: Texas A&M Univ. Press, 1986. 360pp. \$29.95

Although the battlefields of war are eternally influenced by weather, history is replete with examples of weather's enforced deference to strategy and maneuvers of policy. Proper acknowledgement and exploitation of meteorological conditions, however, have altered the course of history.

Charles Bates and John Fuller have produced a well-researched chronology of America's weathermen and women over the past 170 years. Though their narrative begins in 1814, the authors' strongest contribution is contemporary, particularly, the Vietnam era. Plagued only by a plethora of weather warrior names, this well-annotated history will read best to those in the business. John Fuller's shorter *Weather and War* (27 pp.) provides an excellent compendium for anyone interested in weather's influence on combat.

The authors report a number of significant events that illustrate weather's intimate relationship with all aspects of war, from large amphibious operations, through logistical and medical problems, to

bombing accuracy and walls of suspended dust in the Persian Gulf.

One of the earliest and most distinguished contributors to our understanding of "weather" in its broadest sense was Lieutenant Matthew F. Maury, who developed charts illustrating optimal sailing tracks in the North Atlantic. Maury earned his "Pathfinder of the Seas" title in 1853 by saving an estimated \$15 million per year in sailing time for the merchant marine.

The complexity of European weather and the awesome consequences of not taking it seriously was an overriding factor in strategic planning during World War II. Ironically, with greatly improved forecasting technology via satellite, the strategic lessons of World War II and Korea were often ignored in Southeast Asia by far-distant political decision makers.

Winston Churchill, the strongest advocate of attacking what he called the "soft underbelly of Europe," was highly concerned about the weather prior to the invasion of Sicily. The "greatest amphibious operation so far attempted in history . . . all depended on the weather."

What kind of weather? What natural conditions? "Eisenhower . . . wanted as much tactical surprise as possible . . . there had to be a waxing moon because troop carriers needed some moonlight for finding assigned drop zones for the paratroops . . . the naval fleet needed total darkness to cover its approach . . . boat operators wanted

choppy water inshore to make their bobbing craft harder to hit . . . bombers needed several days of good weather in advance of the operation for preparatory air strikes against Italy and Sicily, as well as clearing skies once the beachheads were established.”

Nearly a year later, in June 1944, forecasts of a strong frontal passage with gale winds caused Eisenhower to delay Operation Overlord by 24 hours. However, across the channel the same meteorological conditions caught the German high command off guard. Following a long series of May alerts, the chief of the German weather service, Lieutenant General Richard Habermehl, advised that the projected unsettled weather of 4-6 June made conditions unfavorable for an Allied invasion. German naval experts concurred, believing that a successful amphibious landing required five consecutive days of favorable weather. Thus, the Germans issued no invasion alert for the night of 5-6 June 1944. That was the night the Allied invaders came.

Although harsh weather can be forecast, developing the capacity to perform in the environment is another matter. Operations in Korea during the onslaught of winter in 1950-1951 proved devastating for American combat forces. U.S. cold weather gear was inadequate protection against polar air from Siberia, which dropped temperatures to minus 25 degrees F., with high winds and blowing snow. “. . . M-1 rifles and Browning machine guns were unusable, the firing mechanisms of

the carbines and Browning automatic rifles frequently froze solid. To overcome that, the troops used Wild Root Cream Oil or even warm urine. Grenade pins stuck. Mortar base plates cracked. Rockets misfired because the propellant did not burn completely. Artillery pieces took longer to return to battery, slowing firing rates. Radio batteries froze, canceling communications. The valves and fuel pumps in the mechanized vehicles froze, requiring the engines to be run frequently, if not continuously. Repairs had to be postponed, for bare hands meant severe frostbite. Trenching tools could not penetrate the frozen earth. Rooter teeth welded to bulldozer blades broke off. Grenades and dynamite charges did little better, for such explosions merely broke the ground into chunks.”

Washington's policy-strategy mismatch during the Vietnam era was exacerbated by its custom of ignoring daily weather reports, or of subordinating low ceilings to high-level political decisions. Johnson and Nixon often disregarded weather forecasts while critical diplomatic maneuvering, intended to have been supported by air power, occurred during the annual northeast monsoon. Because of the time difference, Johnson preferred morning air strikes in order to report bomb damage for daily White House media announcements. Unfortunately, when the bombers arrived over their targets the morning fog and mist had yet to burn off, and hits were scarce.

When the moratorium on bombing North Vietnam was rescinded on 30 January 1966, the Joint Chiefs of Staff directed resumption of air strikes irrespective of the weather. Only 10 of 132 sorties were effective on opening day because of cloud cover. Throughout the war, targets were flagged without regard for weather input. Hence, high percentages of sorties were diverted to secondary and tertiary targets.

The heaviest air assault of the war, Linebacker II, resulted in the loss of 15 B-52s and numerous other aircraft. During the 11-day bombing campaign, which began on 18 December in the middle of the northeast monsoon, only 12 hours out of the 264 were suitable for visual bombing.

By contrast, the North Vietnamese, lacking air power, took advantage of their poor weather and darkness. The largest Vietcong offensive of the war (Tet) began during the night of 30 January 1968, at the height of the northeast monsoon.

Nonetheless, during some tactical operations, the Americans did select and use weather with precision. Prior to the liberation raid on the Son Tay

prison, meteorologist Lieutenant Colonel Keith R. Grimes found that the most suitable weather windows for launching the night raid started in late October and ran through most of November. Although unbeknownst to the planners the POWs had been moved earlier, the raid lasted five and one-half hours, killing many of the enemy. Eight days before the raid, the clouds over Son Tay had been below flight minimums, and went below minimums following the raid on 21 November, staying that way for a month. It was a textbook example on how to use weather support in a military operation.

As we have seen at Cape Canaveral, sometimes catastrophes blamed on weather can change policies—perhaps the ultimate in weather prioritization. Up through the disaster to the space shuttle *Challenger* in January 1986, launches had only used weather guidelines. But this past autumn, before the *Discovery* was allowed to lift beyond the atmosphere, mission control was strictly governed by weather “rules.”

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