

## THE WAY IT USED TO BE

BY GRIFFITH MORGAN

In this new millennium, weather data flow at rates and in quantities unheard of in the past. The forecaster sees them magically appear as tables or in fully analyzed form, on computer screens, often in gorgeous colors.

The analyses may be various, all available at the touch of a key or the click of a mouse. Forecast maps, produced by an array of computer models, may be called up for the forecaster's examination.

As wonderful as this cornucopia from the airwaves and cables may be, older practitioners of the weather-guessing game cannot help but look back with fondness on the "way it used to be." Before too long, there will be few or none of us who can describe those older days.

In the latter half of the decade of the 1950s, I was a United States Air Force (USAF) weather-officer forecaster at Wheelus Field in Tripoli, Libya, America's largest overseas airbase. The headquarters of the 29th Weather Squadron, which administered USAF weather activities over the entire Southern European/Mediterranean area, was located on the base. The squadron commander was Lt. Col. Ernest Fawbush, who was famous—along with then-Major Robert Miller—for development of severe-weather forecasting techniques; it was always interesting when the colonel came to the weather station.

The Wheelus weather station supported the weather needs (local forecast, severe weather warnings, general purpose forecasts) of the base, tactical fighter units, military transport flights (multiengine propeller aircraft), and adventitious arrivals and departures. The forecast task was mainly aviation forecasting, but the weather office also had a function as a severe weather warning center for the Mediterranean area. It operated its own weather observing station, a radiosonde station, a forecasting and analysis center, and a pilot-briefing interface in the base operations center.

Data input to this important station was through an unreliable E-W radio-facsimile link from Nouasseur, Morocco, a radio-teletype link from an airbase in Germany, and radio transmissions of the World Meteorological Organization (WMO) world network. These latter were received in a room containing a half-dozen positions with radio receivers, earphones, and typewriters, manned by excellent local civilians,

both Italian and Arab. Weather reports arrived in Morse code and were directly typed onto paper rolls by the operators. Individual numeric characters arrived in the earphones at uniform intervals—a steady 15 wpm, if I remember correctly—so the sound of the room was a steady *click-click*. Every few minutes, the radio operators tore the rolls from the machines and delivered them to the analysis room. The operators had access to schedules from a WMO manual of times and frequencies for receiving specific "sequences" of data. Data from airbases in the area arrived via radio teletype.

Data were plotted on huge base maps, approximately 4 feet by 3 feet, covering an enormous area, from Kamchatka westward across Russia and Europe to eastern North America, and from Norway south to Central Africa.

Airmen plotted the data on these maps in India ink, with dip pens, and a spilled bottle of ink was not a rarity. The plotters were a staff of enlisted airmen, who also performed weather observing functions and were considered the most highly educated enlisted personnel in the USAF. Each plotter had access to a small bottle of bleach and a blotter for correcting eventual errors and spills.

Maps were prepared for the entire area, for the surface, every 6 hours, and for the upper-air (850, 700, 500, 300, and 200 mb) every 12 hours.

The art of manual analysis—the drawing of beautiful, curved isobars and isotherms and locating surface fronts—has fallen into disuse. It was the pride and hallmark of all forecasters in the "old days." Analysis began, by officers and sergeant forecasters, as the maps were still being plotted. The analyst often had to erase portions of his analysis in order to adapt to late-arriving data plots, and of course, had to keep out of the way of the plotters. The tools of this trade were black pencils, colored pencils, and Pink Pearl erasers carried in what would today be called a "nerd pack." Isolines, according to USAF practice, had to be closed and labeled or drawn to the edge of the map and labeled. While it was a practice I personally found a waste of time, the chief forecaster disagreed strongly with me on this and I was jealous of the English forecasters at Idris Airport, who didn't have to follow this practice.

The analysis process, which ran almost continuously, was my real joy. It involved drawing isolines, rushing to the radio room for more data, more drawing, and more back-and-forth for more data. The same data might come from different sources (frequencies) and these might transmit at different times. The forecaster could ask that data from one source be deferred and data from an area of higher interest be taken earlier. Through this hands-on process, the forecaster examined virtually every bit of data—including the local sounding, to spot eventual errors—which arrived in the center and made the forecast shift a total-immersion experience of the weather situation. Most present-day forecasters are mainly occupied with interpreting forecast model outputs and do not engage in such analysis.

The full synoptic model—including pressure, pressure tendency, cloud cover and type, precipitation, weather type, and past weather phenomena—was used to plot data on the maps. The chief observer monitored the plotters for accuracy and plotting speed, both very high. Temperatures and wind speeds arrived from different countries in diverse units and the plotters had to perform conversions from memory. Surface data came from land stations of the synoptic network and from ships at sea, both stationary and navigating.

The first step in surface analysis was to trace the last several positions of surface fronts and pressure centers on the new map, with the aid of a light table. This was to aid in looking for the new position of those features and was the basis for our principal forecasting technique: extrapolation. No numerical forecast models were available at that time. The barotropic model was only being discussed, and a brief trial was made of the Fjortoft graphical 500-mb forecast method, but it was abandoned almost immediately as too complicated and time-consuming. Thus, the analyses and their interpretation were of paramount importance in forecasting.

The official USAF position was that our forecasts were 85% accurate. It would be difficult to evaluate our performance, but my impression was that we did not achieve that level in any consistent way. This was made up for by attention to following and advising flights and by issuing amended forecasts. Local weather forecasting was fairly easy to do. Flying weather was generally good, with few exceptions. The principal situations of concern were fog, which was relatively rare, and blowing dust during ghibli episodes, also not frequent but long-lasting when

they occurred. Temperatures during ghibli events could be fierce. On my first stop in Libya, on my way to my first overseas assignment, at Aviano, Italy (where I was broken in to the art of daily shift analysis and forecasting by an old timer, Sgt. Thompson), the temperature reached 127°F. During such events, homes were closed and shuttered, but the fine dust sifted in through nearly invisible openings around windows and doors. Precipitation was a rare event, to be celebrated.

On one memorable shift change, information was received from the control tower describing locusts at Idris airport, the English-operated airfield south of Wheelus. Locusts are known in Africa to travel in huge, sky-darkening swarms, so the outgoing forecaster, John Frizzola, and I excitedly bent to the task of preparing a warning for low visibility due to insects, a first in USAF history. At the last minute we muted our excitement and decided to call the English forecaster. We were completely deflated when to our questions he said “yes, there must be several hundred of them.” History would have to wait for our contribution.

Flight forecasts for other airport destinations relied heavily on TAFORs, coded forecasts prepared by the destination weather office and received via radio teletype. Of course, the responsibility for the forecast lay with the departure-point forecaster, who entered it on the weather portion of the flight-clearance form. A forecast for a suitable alternate destination was also written on the form. Outgoing flights were entered in a log, and if the weather at the destination or alternate changed negatively the flight had to be informed of that. Local flying required a forecast for Wheelus itself and for an alternate. Alternates for Wheelus were usually either Idris airport, or one of two bases on Malta, Luqa, or Halfar, which were known to conveniently have opposite weather conditions; if one had bad weather the other tended to have good. On request, flight cross-sections (distance–altitude depictions of weather for a flight) were prepared for the pilots.

Some aircraft departing Wheelus required special attention to surface temperatures in order to permit the pilots to calculate their take-off roll. This could create a certain amount of tension when, due to high temperatures, the take-off roll estimate was greater than the safe limit and the flights couldn't depart.

The forecaster had to be versed in an array of codes: the synoptic code (SYNOP); radiosonde code (TEMP); analysis codes, the TAFOR (local forecast to be disseminated via radio to the world network); route forecast codes (ROFOR); and AERO code for

data from military airbases, which often arrived as groups of letters when the shift or shift-lock character that was required on the teletype keyboard to access numbers failed to arrive, so the forecaster needed to be able to automatically interpret the letters as numbers. PIREP messages gave information from aircraft in flight, including cloudiness, turbulence, temperature, wind, altitude and the D value (the difference between pressure altitude, from the altimeter, and actual altitude, determined with a radio altimeter). These latter were important for analysis of upper-air maps over ocean and desert areas. Equally useful were debriefings of crews of incoming flights. Flight crews were required to come to the weather station to discuss weather encountered during their flight. Most flights arriving from the west came from Lajes Field, on the island of Terceira, in the Azores, sometimes with a stopover in Morocco. Flights from either place had to fly over the Mediterranean, due to the political situation in Algeria and Tunisia at that time. To the south and east, most flights were directed to and from Dahran, Saudi Arabia, over desert via the Sudan because Egypt was also off limits. On those routes, almost no weather data were available for most of the distance. There, reports from aircraft in flight were essential. Many flights came and went to and from Europe and Turkey, across the Mediterranean.

Forecasters were encouraged to take “route-check” flights over routes for which they frequently made forecasts. In reality, there was seldom time to do these, and in my own experience I made two: one to Benina, south of Benghazi across the Gulf of Sirte, and one to Rome and back, mainly to call my wife-to-be, back in Aviano.

All activities in the station were in 8-hour shifts. The forecasters’ shifts overlapped so the incoming forecaster could be briefed by the outgoing one. This at times led to earnest discussions on interpretation of the analyses—all very friendly, of course.

The rotating shift schedule was in some respects hard to live with: two days on one shift, two days off, and two days on the next shift in the rotation, and so on. However, the off days allowed time to swim on Libya’s coast, which is an unending beach, and to explore the Roman antiquities, such as the ruins at Sabratha. The city of Tripoli itself was very beautiful in the 1950s, with its port, mosques, walled Old City, and cafes and restaurants.

When I was transferred to England AFB in Alexandria, Louisiana, in 1958, the forecasting activity was much the same, with the addition of following hour-by-hour weather in airways code, instead of AERO. The area to be analyzed was also smaller and the flights shorter. All data arrived via teletype and facsimile. During this time I was sent for a period of temporary duty at Lajes Field, in the Azores, and there the job was similar to my experience in Libya, but with a greater emphasis on analysis over the Atlantic.

These memories of how things were done a long time ago are not aimed at recommending a return to those ways; one would never want to sacrifice the power and ease of our modern capacities to the more romantic methods of the past. However, the old ways gave a level of experience in the forecasting and analysis problem that can’t be repeated.

One can only ask, what will the future look like?