The United States Weather Bureau

ALMOST 85 years ago, in the wake of storm disasters to coastal and lake shipping, Congress established a national weather service to take observations and give "advance notice of the approach and force of storms." The wrecking or sinking of nearly 2000 vessels on the Great Lakes in 1869 alone had underscored the urgency of needs for this service. Today, warning of storms continues to be the foremost duty of the U.S. Weather Bureau. With the warning service steadily improving, the loss of men and ships has declined markedly; lives lost in hurricanes in recent years have been reduced to less than two for every 100 a quarter-century ago. Military aerial reconnaissance has increased the effectiveness of hurricane tracking, and growing use of long-range search radar promises further improvements. Over the years the Bureau's warning services have been extended to blizzards, cold waves, ice storms, crop-damaging frosts, and floods; recently progress has been made in issuing timely warnings on the smallest, most elusive, and most furious storm of all—the tornado.

Another duty of the Bureau under an early directive from Congress was to gather and study weather records in order to "establish the climate." Of course, this old concept of a permanently fixed climate has long since been abandoned in favor of a dynamic climate whose long-term trends and large-scale fluctuations in weather need to be known in advance for sound national planning in agriculture, commerce, and other fields. Because no reliable methods have been discovered to extend weather outlooks beyond 30 days, the Bureau emphasizes research in this vital zone of overlap between weather and climate.

In addition to storm and flood warnings, climatological reports, 30- and 5-day weather outlooks, and daily forecasts, the Bureau provides specialized weather services to aviation, forest fire-control agencies, and horticultural interests. Most of these functions are performed through about 300 local Weather Bureau offices where regular observations are made, and weather information for the public is collected, processed, and disseminated. There are 18 general forecasting centers, 31 aviation forecasting centers, 87 river district offices, 7 river forecast centers, 43 climatological centers, and 3 weather-records processing centers. Observations at Bureau field stations are supplemented by reports from about 250 Civil Aeronautics Administration stations which collaborate with the Bureau, and from military stations, merchant ships, Coast Guard ships, and international exchanges of weather information. More than 11,000 substations in the United States, manned mostly by unpaid observers, provide valuable data for use in the climatological, river and flood, and aviation services.

To improve these various weather services and the scientific base on which they rest, a small group in the Bureau conducts research on atmospheric processes and on physical and dynamic meteorology, with emphasis on applications to weather forecasting; and it develops, tests, and improves instruments for measuring meteorological elements. Among current fields of research and development are cloud physics; atmospheric electricity; objective weather forecasting; numerical weather prediction with the aid of high-speed digital computors; solar, sky, and terrestrial radiation; severe local storm mechanisms; atmospheric pollution; radar meteorology; and automatic weather observation.

Many meteorologists believe that the science is approaching a period of rapid development through use of new facilities in sounding the atmosphere and in computing interrelationships which heretofore had to depend on extrapolation or subjective analysis. The next few years should bring a better grasp of what the digital computor and other facilities can do for meteorology; if results measure up to hopes they will inevitably bring many changes in the ways in which the Weather Bureau does its work and in the applications of meteorology to public service.

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