the form of hourly reports of local weather as observed at official observing sites across the country. These reports, which include temperature, humidity, cloud cover, precipitation and wind speed and direction, are of particular importance to those concerned with activities such as aviation, flood forecasting, shipping, snow removal and recreation. Daily values of temperature extremes and precipitation are also available.

Expected weather information is provided in the form of general long-range and short-range forecasts for most parts of Canada, with specific forecasts for aerodromes, inland water systems, fruit and vegetable growing areas and large urban centres. The routine forecast program is supplemented by a weather warning service that alerts the general public to hazardous conditions such as strong winds, heavy rain or snowfalls, severe cold or heat. Forecasts for the general public are distributed by relay to radio and TV stations and to the press by commercial channels. Forecasts are issued by 11 main weather offices and 56 secondary weather offices, which are supplied with sufficient information to enable them to meet local inquiries. A professional meteorologist is on staff at a number of secondary offices to provide a consultative service. Weather services are also available from Canadian Forces weather offices at Department of National Defence bases across the country.

The preparation of historical and statistical weather information involves the processing and storage of observed weather data to provide a historical record of the Canadian climate. Data are analyzed, quality-controlled and published in a variety of forms applicable to the special requirements of agriculture, forestry, water resources and other areas of activity. Special analytical projects requiring computer analysis of archived data are undertaken to provide advice to industry, science and government. Advisory services are available at most weather offices so that the inquirer receives the information in the form best suited to his needs.

A constant effort is made to exploit advances in meteorological science and technology in order to improve forecasting techniques and day-to-day meteorological services. Current programs and activities in research and development are discussed in Chapter 9.

Weather observing stations. Several networks of weather observing stations provide the information for the forecasts and advisory service and for the climatological and technical services referred to above. In December 1972, official meteorological observations were taken and recorded at 2,512 weather reporting stations in Canada. Stations range from 289 first order reporting stations, mainly at aerodromes, where hourly observations of all aspects of the weather are recorded, to the 2,223 co-operative observing stations where volunteer observers make daily observations of rainfall, snowfall and temperature. Although there are vast areas of the country where the weather observing stations are several hundred miles apart, the weather in the settled parts of the country is recorded hourly at first order reporting stations every 100 miles or so and daily at co-operative climatological stations about 25 miles apart.

Some 240 first order weather stations make complete weather observations every six hours and code them in a number form agreed upon by the World Meteorological Organization for international exchange. All six-hourly reports prepared in this number code are relayed almost instantaneously by the meteorological communications network to all weather offices across the country and are dispatched at high speed to other countries requiring Canadian observations. At the end of the month, all weather observing stations send their official observation report forms to a regional collection office, from which they are sent to headquarters for final quality-control, processing and publication. These data become part of the climatological archives and serve as a permanent record of Canadian weather.

Twice daily, at 35 locations throughout the country, upper air observations are made from ground level to altitudes up to 100,000 feet. Pressure, temperature and humidity measurements are made automatically by radiosonde instruments carried aloft by balloons and this information is relayed by a system of radio signals to ground receiving stations. The wind directions and speeds aloft are determined by measuring the drift of the balloon and attached radiosonde instruments using radar or radio direction equipment. The upper air observations are distributed rapidly to weather offices, and at the end of the month summary report forms are sent to headquarters where the data are quality-controlled, processed, published and stored.

Meteorological communications. The meteorological communications system provides the flow of information essential to a reliable weather information service. Since weather