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? WHY THE WEATHER ? Mailed February 7, 1934

AIR-MASS ANALYSIS

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The terms "polar front" and "air-mass" are becoming common in the newspapers. What do they mean?

According to the "polar front hypothesis," the general interchange of air between high and low latitudes takes the form of two main air streams; one of cold, dry "polar" air, coming from the polar regions, the other of warm, moist "tropical" (or "equatorial") air, coming from the torrid zone. Both streams are strongly deflected by the earth's rotation until they tend to flow side by side in opposite directions around the globe. The boundary between them is the polar front, along which are supposed to develop the barometric depressions, or cyclones, that keep the weather continually changing in the temperate zone, and these cyclones are bounded by so-called "warm fronts" and "cold fronts."

An air-mass is defined as a portion of the atmosphere, usually many thousands or hundreds of thousands of square miles in extent, that is approximately uniform horizontally in its meteorological properties; especially with respect to temperature and moisture. The mass acquires its distinctive properties from an underlying surface of land or water -- such as ice-covered polar waters, snow-covered northern lands in winter, warm, dry northern lands in summer, the subtropical ocean, etc. -- and it tends to preserve these properties, especially at levels above the earth's surface, when it travels over other portions of the globe.

The polar and tropical streams above mentioned are distinct air-masses, and these are subdivided to include such types as "continental polar," "continental tropical," "maritime polar," "maritime tropical," etc. Different air-masses, when not easily recognized on the weather map, can, it is said, be identified with the aid of upper-air soundings by balloon or airplane. Air-masses of various types are supposed to interact in characteristic ways along fronts and also to develop characteristic conditions of cloudiness, rainfall, visibility, etc., within their several areas. The identification and charting of air-masses, as an aid to weather forecasting, constitutes "air-mass analysis."

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