

northward from these Antarctic depressions. Along this front other depressions form.

*What is a front?* The term "front" is a metaphor. A front is a battle-line, where two opposing forces meet. The opponents in this case are the warm and cold air, which struggle for balance.

According to the *Polar Front theory*, which is accepted as a working hypothesis by practically all meteorologists, depressions originate along the front which separates a warm air mass from a cold air mass. In other words *depressions originate along the front which separates warm winds, such as our northerlies, from cold winds, such as our southerlies.* In Fig. 7 the warm northerly wind behind one anticyclone can be seen blowing alongside the cold southerly wind ahead of the next following anticyclone, like two trains moving in opposite directions.

As we can see from newspaper maps, military fronts sway backwards and forwards and develop "bulges" where there is a weak place. Just as a military front develops a "bulge" so a weather front may develop a "wave" (see Fig. 8) when a tongue of warm air penetrates into the cold air. This tongue of warm air is the *warm sector* of a depression.

Figure 9 shows the grouping of the isobars round the centre and the clockwise wind circulation. The figures are the last two figures of the pressure, expressed in millibars. The depression consists of three parts: (1) the warm front; (2) the warm sector; (3) the cold front and southerly wind.

Depressions move polewards along the front.

Figure 10 shows a warm-sector type of depression passing over New Zealand.

(1) With the approach of the *warm front* a thin sheet of high white cloud

(cirro-stratus) develops. Gradually the cloud thickens and lowers and becomes a depressing sheet of grey. More or less steady rain develops over an area one hundred and fifty miles to three hundred miles wide. Along that portion of the front known as "warm," the warm air is climbing up as a gently-sloping surface of cold air. The gradualness of the rise accounts for the overcast sky and widespread rain. In Fig. 10 note the wide belt of rain along the warm front, in contrast to the narrow belt along the cold front.

(2) As the warm front moves on, the northerly winds characteristic of the *warm sector* prevail. If the wind is fairly humid there is likely to be mist and drizzle or rain on the windward side of hills and clear skies and warm sunshine on the leeward side. This lasts for perhaps half a day; longer if the place is on the outskirts of the warm sector.

(3) Then come the *cold front* and *southerly wind*. Along the part of the front known as "cold," the cold air is pushing under the warm air and wedging it up abruptly. Masses of towering cumulus cloud form, sometimes darkening to cumulo-nimbus. There is heavy rain over an area about twenty miles to sixty miles wide. If the slope of a cold front is very steep, the warm air may be forced up with some violence, causing squally conditions and even hail and thunder (characteristic of violent upward currents) along a belt about twenty miles to sixty miles wide for hundreds of miles along the front. Less-vigorous cold fronts may be accompanied by only a few showers. Temperatures become cold. (See Fig. 11.)

(4) As the cold, dense air flows in from the south, the barometer rises. Scattered showers of the convectational type may be experienced as the lower



FIG 6



FIG 7



FIG 8

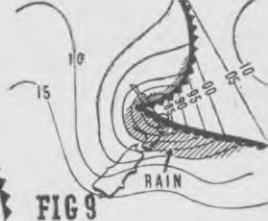


FIG 9