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NEW ZEALAND METEOROLOGICAL SERVICE CIRCULAR NOTE NO.51.

WEATHER SITUATION, DECEMBER 1948, WHICH
CAUSED FLOODING OF SOME SOUTHLAND
RIVERS.

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Sudden flooding of the Southland rivers, more particularly the Oreti, occurred on Tuesday, 14th December 1948, and from a reanalysis of the weather situations of this period a series of weather maps, Figures 1 - 5, is produced which, in the main, accounts for the sequence of weather over Southland, Otago and South Westland at that time.

The weather chart (Fig.1) shows the situation at 6 p.m. Sunday night 12th December, 1948. The areas marked H are centres of anticyclones, which are seen to lie west of North Auckland and southeast of the South Island. Areas marked "L1" "L2" "L3" "L4" are depressions and the main interest lies in the depressions "L1" and "L2". The warm and cold fronts associated with these depressions are marked according to the legend on each diagram, arrows indicating the direction of movement.

It is seen from Fig. 1 that the period of rain over southern New Zealand on Sunday was produced by a warm front associated with "L1", which was moving southeast, and next morning the cold front was advancing in from the west (Fig.2). This cold front produced little rain in Southland as it passed, but some heavy showers occurred over Otago. Monday was mostly fine in Southland and Otago, but by evening a cloud sequence began, which indicated the approach of another warm front from the northwest, and it was this front which moved back on to Fiordland, Otago and Southland during Monday night. This front was associated with the more vigorous depression "L2" into which warm moist air from southeast Australia had been absorbed early that morning as it passed Tasmania, (Fig.2). The depressions "L3" and "L4" over Australia disappeared about the same time, (Figs. 2 and 3). So it was, that during the Monday night and early Tuesday, a vigorous warm front caused a period of widespread heavy rain and on Tuesday morning the 14th., the rivers were rising rapidly. The depression "L2" was a deep one, having a central pressure of about 982 millibars, or 29.00 inches, and the northwest winds following the warm front were very strong.

The warm front passed over the area on Tuesday morning (Fig.4) but the rain did not cease in the back country, for the moisture-laden air was lifted over Fiordland by the strong north-westerlies and besides causing further heavy rain west of the ranges, rain was carried over into the catchment areas of the rivers concerned. This rain continued until the passage of the cold front of "L2" on Tuesday night (Fig.5) caused a change of wind direction, which improved conditions inland, but brought coastal Southland into a cold showery southwesterly current which lasted throughout Wednesday 15th.

A map showing the distribution of rainfall for the three days December 12th to 14th inclusive 1948, with isohyets drawn for 1" 2" 5" 10" and 15" of rain is given by Fig.6.

Situations of a similar pattern but of weak or moderate intensity appear on a number of occasions throughout the year. However, in this case the increased activity of the second

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