PIPITS, SKYLARKS AND RAINFALL

By JILL HAMEL

ABSTRACT

A preliminary analysis of bird lists from Otago suggests that during the breeding season Pipits *(Anthus novaeseelandiae)* are absent from areas with a mean annual rainfall of under 30 inches (767mm). Skylarks *(Alauda arvensis)* seem less affected by low rainfall and are abundant even where the mean annual rainfall is as low as 13 in. (330mm). Some factors possibly influencing these correlations are discussed.

INTRODUCTION

During an Otago field day (29 November 1970) for the Ornithological Society's bird mapping scheme it was noticed that Pipits *(Anthus novaeseelandiae)* were absent from the drier inland areas around Middlemarch and Macraes Flat. These tussock ridges and valley flats did, however, support a vigorous population of Skylarks *(Alauda arvensis)* and the vegetation appeared similar to that found in Pipit areas. It seemed worthwhile even at this early stage of the mapping scheme to attempt an analysis of rainfall figures and Pipit/Skylark distribution so as to bring this point to the notice of observers doing further mapping. This analysis applies to distribution from August to mid-January only and uses data collected between August 1969 and January 1971.

ANALYSIS OF DISTRIBUTION

Skylarks were recorded in 85 of the 92 Otago squares for which adequate lists had been made by January 1971 (Table 1), but Pipits were recorded in only 34 of those squares (see Bull 1970, for method of recording).

TABLE 1 — Presence and absence of Pipits and Skylarks in squares for which adequate lists have been received.

	Pipits present	Pipits absent	Totals
Skylarks present	32	53	85
Skylarks absent	2	5	7
Totals	34	58	92

Pipits were observed in the following areas:—

(1) Around the Dunedin-Silver Peaks hills and down the coastal hills to Akatore (see Fig. 1); along the hills north and west of the Taieri Plain as far inland as Hindon and Lake Mahinerangi; around Lake Onslow and Mt Teviot at about 2000′ (609.6 m); in the Catlins area south and west of Owaka; around Queenstown and Arrowtown above about 2000′; eastern side of Lake Wakatipu north of Mt Crichton; in the lower Dart Valley and through most of the Rees Valley.

(2) Isolated squares at Timaru Creek and Lake Alexandrina (Canterbury).

(3) Sporadic occurrences in areas otherwise lacking Pipits,
Sutton — one bird, 29 Nov. 1970, and
Middlemarch — one bird, 25 Oct. 1970.

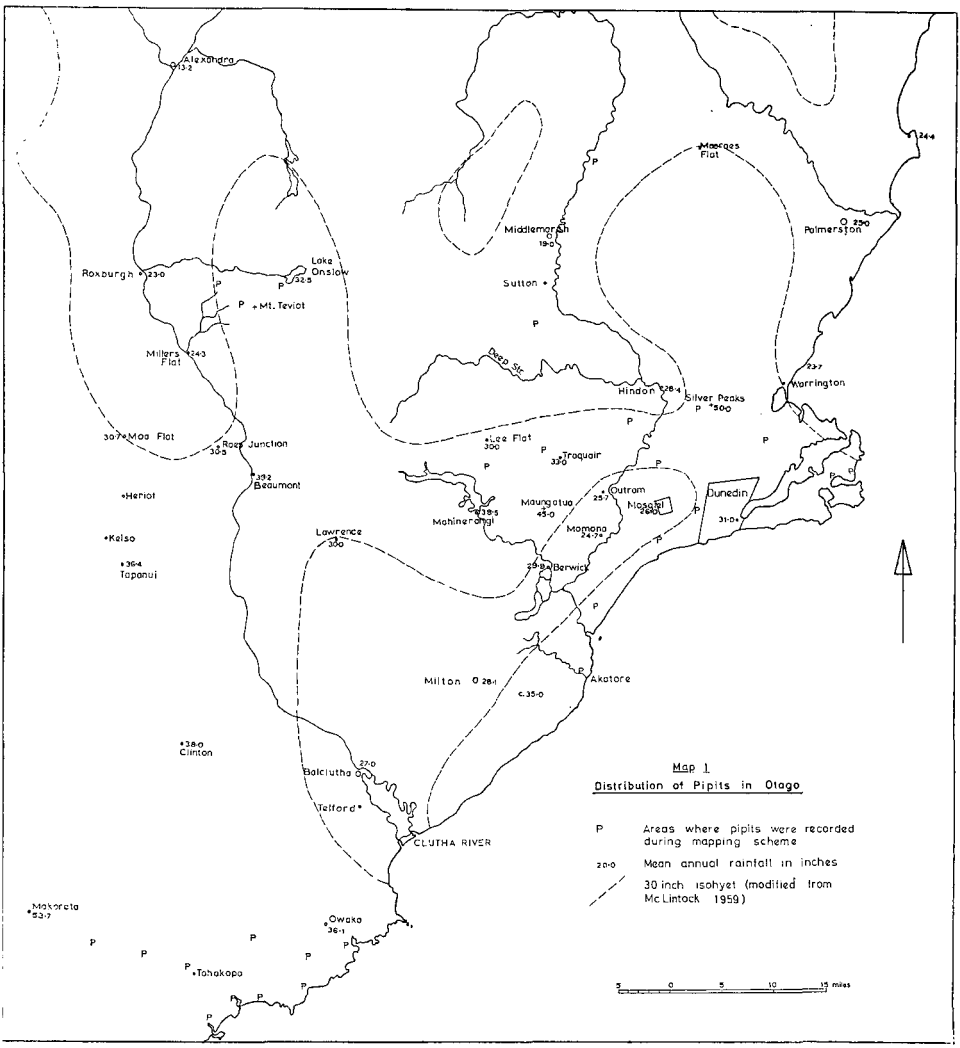

FIGURE 1 — Distribution of Pipits in Otago, showing areas where Pipits were recorded during OSNZ mapping scheme, also annual rainfall and 30 in. (762 mm) isohyet.

Pipits were *not* observed in the following areas:—

(1) North of Warrington up the coast and up the Shag Valley; around Macraes, Middlemarch and south to Deep Stream (except for two birds as above); the Taieri Plain; Milton to Balclutha and Telford; around Kelso, Heriot, Moa Flat, Ettrick and up to 800′ (244 m) a.s.l. in the Tima Burn north-east of Millers Flat; around Alexandra; around Wanaka, Albertown and Tarras.

(2) Isolated squares in the lower Clutha Catchment.

These are the only areas of Otago for which lists have been received so far.

RAINFALL

Rainfall figures were taken from the New Zealand Meteorological Service publications, McLintock (1959), Maunder (1965), Wardle and Mark (1956) and some Dunedin Soil Bureau sources. Some of these figures are means derived from 50 years and more of records but others, especially those for higher altitudes cover only a few years.

McLintock's rainfall map (Map 8) suggested that Pipits occur only in country with more than 30 in. (762 mm) mean annual rainfall. Skylarks, however, extend into the less-than-30in. zone. Lists have been made for 35 squares in the under-30 in. zone and Skylarks were recorded in 31 of those squares. Pipits occured in this zone only at the two places mentioned above, Sutton and Middlemarch.

The Meteorological Service figures for areas with Pipits range from 28.4 in. (721 mm) mean annual rainfall at Hindon to 53 in. (1346 mm) in the Rees Valley. Only Lake Alexandrina near Lake Tekapo may fall outside this range. The mean annual rainfall for Lake Tekapo is recorded as 22.2 in. (564 mm) but rainfall at this station varies greatly from year to year and may rise to 41.0 in. (1041 mm) for the year. In areas where Pipits were not recorded but there were Skylarks the mean annual rainfall ranges from 31.2 in. (335 mm) at Alexandra to 27.0 in. (686 mm) at Balclutha.

Where hills over 1000′ (304.8m) occur in low rainfall areas the rainfall may rise on the tops of the ranges to over 30 in. (762 mm) per annum. The Taieri Plain has rainfalls of 24-26 in. (610-661 mm) but the surrounding hills have rainfalls of 30-45 in (762-1143 mm). There are Pipits on the surrounding hills but not on the Taieri Plain during summer. In winter, however, Mr G. Grant at Outram reports (pers. comm.) that Pipits are numerous on his farm. Outram has a rainfall of 25.7 in (653 mm). Pipit distribution in winter may be quite different from that of summer and not correlated with the 30 in. (762 mm) isohyet.

At Millers Flat in the Clutha Valley the annual rainfall is 24.3 in (618 mm) and at 800′ (244 m) up the Tima Burn the rainfall is little more and probably rarely above 28.0 in. Mr J. Watt reports that on several visits up the Tima Burn he has seen no Pipits

at 800′ but numerous Skylarks. However, at 2200′ (670.6 m) on the range north-east of the Tima Burn and around Lake Onslow Pipits are common. The rainfall at Lake Onslow is recorded as 32.5 in. (826 mm).

DISCUSSION

Since it is unlikely that Pipits are responding directly to rainfall, intermediate factors will have to be considered. Dr P. C. Bull points out (pers. comm.) that Pipits seem to like some shrubby vegetation in their territories, and this scrub may be present only under higher rainfalls. However, at the Tima Burn (24 in. (610 mm)) it is very noticeable that the unploughed ridges and gullies on the lower slopes of the Clutha Valley carry an open scrub of manuka *(Leptospermum scoparium)* and native broom (*Carmichaelia* sp.). At 2000′ (609.6 m) above sea level where Pipits enter the habitat scrub is entirely lacking even in the gullies probably because of the very low winter temperatures of this area. The ridges and gullies are evenly covered with tall tussock *(Chionochloa rigida* and *C. rubra)*. Again at Queenstown the only known Pipit habitat in the low rolling country between Queenstown Hill and Arrowtown is on a consolidated gravel flat beside the Shotover River where the vegetation consists of low cushions of *Raoulia* spp., various small weedy species and scattered tussocks of *Festuca novaezelandiae*. The more scrubby country on the terraces and hills behind the beach carries Skylarks but no Pipits. If scrub is an important factor in Pipit territory, obviously there is some other more desirable factor which Pipits have selected in the above two areas.

Food supply may be the critical factor. It would be unwise to presume that Skylarks consume even roughly the same range of insects as Pipits, but the abundance of small passerines and Skylarks in the lower rainfall areas does suggest an ample insect supply around the size range taken by Pipits. It may be that Skylarks or other small passerines have some competitive advantage over Pipits in the low rainfall areas and it is not the simple absence or presence of a particular factor which determines Pipit distribution.

On the other hand, the controlling factor may be something as simple as the effect of low relative humidities on the hatching success of Pipits' eggs. The eggs of some species will not hatch under relative humidities below a certain level presumably because the eggs dry out. It is worth noting at this point that the closely related Richard's Pipit *(A. richardi)* of Europe is a bird of ' wet grasslands, marshy steppes and ricefield.' (Peterson *et al.* 1954: 26). If humidity in the nest is important, mean annual rainfall may not be a suitable measure to use in carrying out a more complete analysis of Pipit distribution. It may be more effective to use mean monthly rainfall figures from August to about December along with some measure of variation from year to year.

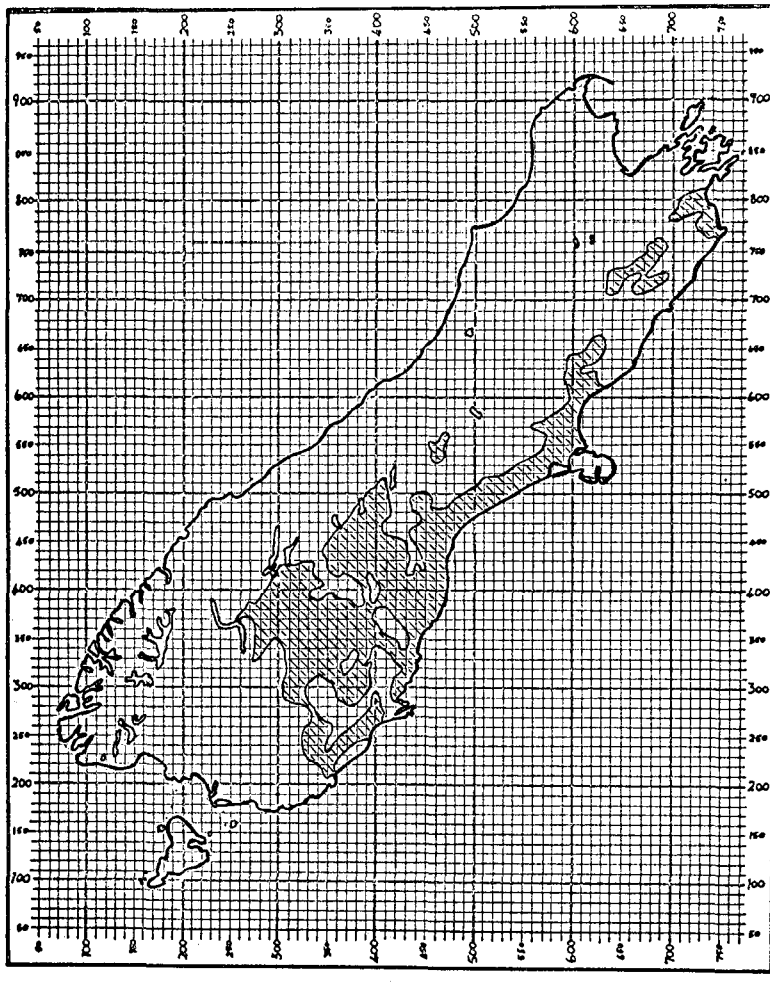

FIGURE 2 — South Island of New Zealand showing the position of the 30 in. (762 mm) isohyet in relation to the 10,000 yard grid squares. (Modified from the New Zealand Meteorological Service map of mean annual rainfall 1921-1950 (in.), issued 1961).

The 30 in. (762 mm) isohyet follows the foothills of the main ranges of the Southern Alps from Queenstown through Wanaka, Ohau and Pukaki to Tekapo with higher rainfall areas extending eastward on the tops of the eastern hill blocks of Otago and South Canterbury. The isohyet then runs roughly parallel to the east coast of central and northern Canterbury and out to the coast at Motunau (see Fig. 2). Elsewhere in New Zealand there is a small area of below 30 in. around Blenheim and another in Hawkes Bay. The temperature regime is very different in the more northerly areas and the correlation of Pipit distribution and rainfall may differ in these areas in such a way as to reveal the nature of the direct controlling factors.

CONCLUSIONS

It seems, therefore, that during the breeding season Pipits are absent from areas with a mean annual rainfall under 30 in. (762 mm). Skylarks, on the other hand, appear less affected by low rainfall and are abundant even where the mean annual rainfall is as low as 13 in. (330 mm). However, the factors influencing these apparent correlations have yet to be elucidated.

ACKNOWLEDGEMENTS

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