One method by which some members of the so-called cryptozoic fauna may have made the transition from native bush to suburban gardens may be outlined. Under isolated rotting logs in well-established pastures live quite a number of these animals which require a moist habitat. The species present include several land snails, planarians, millipedes, centipedes, ground beetles of the family Carabidae and even *Peripatus* (which is also well established under gorse scrub).

Gardens are of course only an extreme form of induced habitat and the species which have adapted themselves to gardens have been stressed to show that the total transition is possible.

Birds of the Hutt Valley

P. C. Bull

Introduction

The present paper consists of two parts: the first deals with the movements of birds from one place to another, and the second, in the form of an appendix, provides a preliminary list of the species that occur in the area.

The Hutt Valley provides good examples of several types of bird movements, but few of these have been studied in detail. The present account includes an interim report on a current study of the movements of blackbirds and thrushes in the Hutt Valley, a summary of miscellaneous observations on the movements of other species in the area, and a discussion on the significance of these movements to general ecological problems. The scientific names of species mentioned in the text are listed in the appendix.

Movements of Blackbirds and Thrushes

There are no marked seasonal changes in the distribution of blackbird and thrush populations in the Hutt Valley, and ringing has therefore been used to detect movements made by individuals. The birds are caught in modified Potter traps, and marked with aluminium rings provided by the Ornithological Society; coloured plastic rings are also used to identify individual birds without recapture. Most of the ringing has been done in Waterloo Road, but six sub-stations, all within two miles of the main station, have been operated from time to time. The study was started in July 1951, and 614 blackbirds and 164 thrushes have been ringed since then; of these, 428 blackbirds and 123 thrushes were ringed at the main station.

The movements of non-migratory species, such as blackbirds and thrushes are of two kinds. Adult birds merely move from place to place within the immediate vicinity of their breeding territories, but young birds disperse over much greater distances. The author's ringing station is surrounded by numerous small private gardens, and this makes it difficult to measure the size of territories. The few observations available, however, suggest that blackbirds' territories in this part of Lower Hutt are somewhere between the 0.4 to 0.6 acres found by Snow (1956) in Oxford (England) and the 1.5 to 2 acres reported by Gurr (1954) from Dunedin.

More satisfactory data are available on dispersal of young birds. A total of 71 ringed blackbirds and 16 thrushes have been found dead so far.* The dispersal pattern of birds ringed at Waterloo Road is shown in Fig. 1 which is based on 22 blackbirds and eight thrushes recovered more than 220 yards from the ringing station; a further 34 blackbirds and four thrushes, recovered at lesser distances, are omitted from the figure. Most of the birds were recovered within half a mile of the ringing station, but a few moved considerably greater distances. For instance, a blackbird moved from Waterloo Road to Lowry Bay (three miles) and a thrush to Moore's Valley Road, Wainuiomata (four miles). This last recovery is of particular interest since the bird had

*Grateful acknowledgement is made to D. Arthur, M. Buchler, R. K. Dell and R. H. Taylor who have ringed birds at the sub-stations and also to the many members of the public who have co-operated in returning dead birds to the Dominion Museum.

crossed a moderately high range of hills and entered another valley. Recoveries from the six sub-stations are fewer, but they indicate a dispersal pattern similar to that shown in Fig. 1; the maximum distance travelled was about two miles (two blackbirds).

There is good evidence that young birds tend to move further than adults (a young bird is defined as one less than 12 months old when last observed at the ringing station). Of 18 adult blackbirds recovered from all stations, only two (11%) had moved more than 220 yards, compared with 25 (57%) of 44 young birds. This difference is statistically significant ($P < 0.01$). The two adult birds mentioned above were recovered about 600 yards from the ringing station. Further evidence of the restricted movements of adult blackbirds is provided by trapping data. Three birds were recorded several times at the same ringing station over a period of four years, and several other birds for periods only a little shorter. Of 110 blackbirds ringed during the first 18 months of the study (when the resident population was still being marked), 23 were adult males; but of 319 birds ringed since December 1952 only three were adult males. The small number of unringed adult males trapped in recent years suggests that adult birds do not move far. Figures for males, rather than females, are quoted above because adult females are difficult to distinguish from first-winter females.

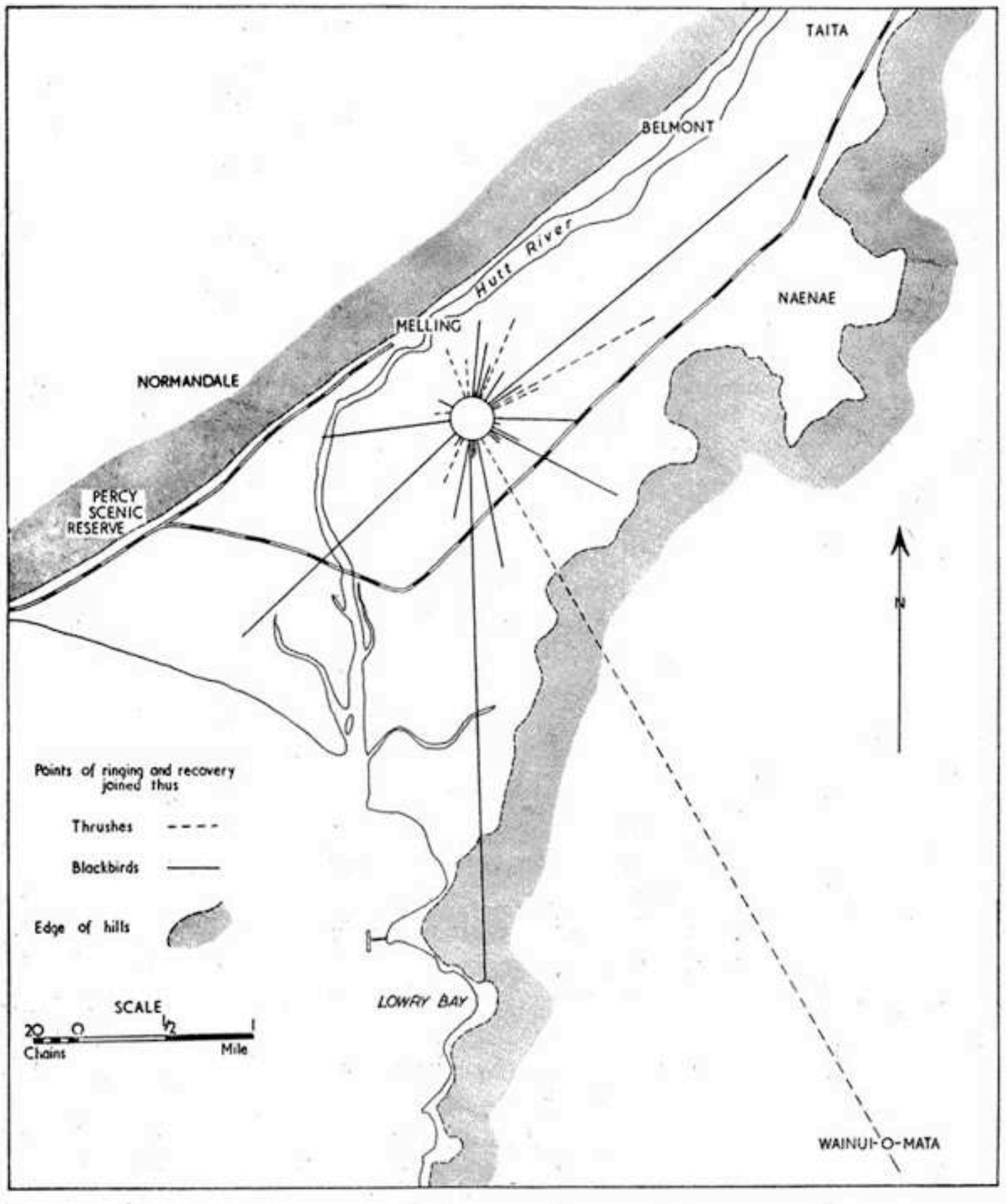

FIGURE 1.—*Dispersal of blackbirds and thrushes recovered more than 220 yards from the main ringing station. Recoveries at lesser distances (within the circle) are omitted.*

In England thrushes tend to disperse over longer distances than do blackbirds (Werth, 1947), and this may also be so in the Hutt Valley. Of 15 thrushes 9 (60%) were recovered more than 220 yards from the place of ringing, compared with only 29 (43%) of 68 blackbirds,

but this difference has no statistical significance in the small samples so far available.

The recoveries represent only 11.6% of the blackbirds ringed, and Fig. 1 therefore fails to indicate the full importance of the dispersal movements of this species. The main ringing station consists of an area of about half an acre, and an average of 60 young blackbirds are ringed on this area each year. The area is also visited by birds ringed in previous years and by young birds that pass through the area without being trapped. Clearly a large number of blackbirds visit this half acre of land in the course of a year. Most of the young birds appear in the garden during the period November to February, and numbers quickly build up and decline as various kinds of fruit become ripe and are harvested.

Movements of Other Birds

Some birds move considerable distances in the course of their daily activities. Starlings for instance, travel many miles each day between feeding grounds in th Hutt Valley and communal roosts on Somes Island and elsewhere. In winter, numerous flocks, varying in size from a dozen or so to over 100 birds, may be seen flying north over Lower Hutt in the early mornings and south again in the late afternoon. Black-backed gulls also undertake extensive but irregular movements each day, which are probably governed by such factors as the availability of food at rubbish tips, the weather and the time of high tide. Gulls frequently pass over Haywards Hill between the Hutt Valley and the west coast, and may take advantage of the extra feeding time provided by the difference in times of high water at Petone and at Pauatahanui (about four hours). A few harriers also patrol the Hutt hills daily in search of food, and Caspian terns fly up and down the Hutt river for the same purpose.

Apart from these daily movements, many species undertake seasonal movements of varying extent. The dispersal movements of young blackbirds and thrushes, already described, are paralleled by certain other species such as the New Zealand falcon. Most, if not all, the falcons seen in the lower part of the Hutt Valley are recognisably young birds that are probably dispersing from the higher country where they were reared. It is known from work carried out by Watson (1954) in Hawke's Bay that harriers may disperse over distances of more than 100 miles, and in this species these long-distance movements are not necessarily confined to young birds.

The Hutt Valley is also visited by a number of true migrants. Of these, the best known are the two cuckoos which arrive in numbers each spring and, after breeding in New Zealand, leave the country to winter in the Pacific Islands (Oliver, 1955, p. 535). Other overseas migrants such as godwit, whimbrel, arctic skua and white-winged black tern breed in the Northern Hemisphere and include New Zealand in their "winter" range, but these species are infrequent visitors to the Hutt Valley. Finally, a number of migrating petrels and shearwaters pass along the New Zealand coast on migration, and their presence in Cook Strait is often marked by the appearance of dead birds on Petone beach.

Between the random dispersal of the blackbirds and the clear-cut migrations of the cuckoos there are many other types of bird movements varying with respect to the distances involved and the proportion of the population taking part. Many of these movements involve minor changes in the area occupied in summer (breeding) and in winter. For instance, most of the adult black-backed gulls leave the valley in spring and early summer—presumably moving to the breeding colony at Baring Head; many juvenile birds remain in the valley. Red-billed gulls also leave the area during the breeding season. Numerous small flocks of yellow hammers and white-eyes enter the urban parts of the Hutt Valley every winter, but are rare or absent during the summer months, although the yellow hammers may then be found breeding on the scrub-covered hills and the white-eyes in nearby forests. Similarly fantails, grey warblers and kingfishers appear in the urban area in winter, but, except for a few that remain in larger gardens, most depart to forested or scrub-covered areas for the breeding season. Winter flocks of yellow hammers, chaffinches, goldfinches and house sparrows are common on open farmland north of Upper Hutt, and flocks of greenfinches along the beach at Petone. These flocks break up in spring and the birds then disperse more evenly over the district as a whole.

Discussion

The significance of birds in distributing seeds depends on their feeding habits and on their movements. The finches, yellow hammers and sparrows crush and digest the seeds that they eat, and, except for goldfinches which use thistle down as a nest lining, these birds do not distribute seeds although they may be important in destroying seeds of weeds or in damaging grain crops. Other birds such as blackbirds,

thrushes, starlings and white-eyes feed on fruits, and if these contain small seeds the birds may be important in distributing them since many seeds remain viable after passing through the birds. Small fruits are an important food of blackbirds, and the many wandering young birds present in late summer make this species a good distributor of seeds, including both native species (e.g. *Coprosma*) and introduced weeds (e.g. blackberry). Starlings also eat fruit to some extent, and the extensive daily movements of this species would allow seeds to be transported over considerable distances.

Some birds such as sparrows and starlings come into close relationship with man and his domestic animals and this gives opportunity for the spread of parasites and disease. While investigating an infection of the gapeworm (*Syngamus trachea*) in foreign birds in a Lower Hutt aviary, Whitten and Salisbury (1951) found the same parasite in starlings and blackbirds in the district. The literature contains numerous references to starlings carrying ectoparasites able to infest man and his domestic animals, and, according to Wilson and Matheson (1952) there is circumstantial evidence that starlings have sometimes carried foot-and-mouth disease fom Europe to England. In view of these considerations, it seems that some study should be given to the feeding and roosting habits of starlings in the vicinity of Somes Island. If appreciable numbers of starlings regularly feed on Somes Island, this could materially reduce the efficiency of the island as a quarantine station.

Birds are of only very local importance in the transfer of plant nutrients. It would be interesting to know the extent of "top-dressing" that results when a flock of several hundred gulls comes in from the sea and settles on a playing field. Near the rubbish tip at Wingate, black-backed gulls congregate quite regularly at two or three resting places, and the bulk of their droppings might be quite considerable over the course of a year. Similarly, the daily flights of starlings must result in the deposition of considerable concentrations of organic matter (collected over a wide area in the Hutt Valley) on the ground beneath the communal roost. The transport of mud by blackbirds for the building of their nests is also of some interest. Work carried out by Mr. L. C. Blakemore of the Soil Bureau, D.S.I.R., showed that the soil in blackbirds' nests made between 49% and 83% of the weight of the nest (five nests had an average weight of 250 g.). This soil was probably gathered by the bird within a hundred yards of the nest, but beyond the limits of the rooting system of the tree containing the nest.

The more important movements of birds in the Hutt Valley may be summarised as follows:

1. *Daily Movements.*—e.g. the flights of large numbers of starlings between the valley and Somes Island, and of black-backed gulls between the sea and the valley.

2. *Seasonal Movements.* — e.g. (a) The late summer dispersal of large numbers of young blackbirds and thrushes over distances of up to four miles.

   (b) The spring arrival and autumn departure of a small number of overseas migrants.

   (c) The movements of many small passerines between breeding territories in scrub and forest lands at higher altitudes and wintering grounds on the valley floor.

The abundance, fruit-eating habits, and wandering movements of young backbirds make this species important in distributing seeds and in damaging fruit crops, while starlings are of interest as potential distributors of disease since they have a close association with man and his domestic animals and make daily journeys between the Hutt Valley and Somes Island which is a quarantine station.

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APPENDIX

LIST OF THE BIRDS OF THE HUTT VALLEY

A preliminary list of the birds of the Hutt Valley, together with brief notes on distribution and abundance, is provided below. For the present purpose, "Hutt Valley" means the watershed of the Hutt River, and, apart from a few published records, the list includes only observations made during the last ten years. Except where otherwise indicated, the records are based on the author's own observations. An

attempt has been made to provide notes that are specific rather than general. The distribution of observations is rather limited, and the fact that many parts of the valley are not listed under the range of a given species must not be taken as implying that the species is absent from those places. The scientific names used are those recommended in the Ornithological Society's "Checklist of New Zealand Birds" (1953) except that subspecific names have been omitted.

BLUE PENGUIN (*Eudyptula minor*).—Common off Petone Beach; a few occupy burrows under boatsheds there. A bird ringed on Somes Island was later found breeding under a boatshed at Petone (F. C. Kinsky).

GIANT PETREL (*Macronectes giganteus*).—Seen occasionally off Petone Beach—especially when there is a strong off-shore wind. The Gear Meat Works do not attract giant petrels as the Ngauranga Works do (J. S. Watson).

FLUTTERING SHEARWATER (*Puffinus gavia*).—A flock seen close inshore off the Korokoro Stream in July 1958 (R. A. Falla).

GANNET (*Sula bassana*).—Frequently seen in small numbers off Petone Beach, one washed up dead 18/5/58.

BLACK SHAG (*Phalacrocorax carbo*).—Common in the Hutt Estuary and, in smaller numbers, along the whole length of the Hutt River; also present in Wakatikei and Akatarawa Rivers (H. L. Secker) and recorded from Whiteman's Valley.

WHITE-THROATED SHAG (*Phalacrocorax melanoleucos*).—Common in the Hutt Estuary and, in smaller numbers, far up the Hutt River (at least to confluence with Wakatikei River, H. L. Secker).

WHITE HERON (*Egretta alba*).—Rare. One seen near Melling Bridge in 1957 (R. K. Dell).

BLUE HERON (*Egretta sacra*).—A bird ringed on Somes Island on 21/12/57 was found dead on Petone Beach on 1/6/58 (F. C. Kinsky).

WHITE-FACED HERON (*Notophoyx novaehollandiae*).—A pair seen occasionally at the Hutt Estuary.

BITTERN (*Botaurus stellaris*).—One seen at mouth of Waiwhetu Stream in March, 1953 (R. A. Falla).

ROYAL SPOONBILL (*Platalea leucorodia*).—Rare. One seen in the Hutt Estuary in May 1956 (R. A. Falla).

CANADA GOOSE (*Branta canadensis*).—Single birds seen flying up the Valley on rare occasions (V. E. Hampson-Tindale).

BLACK SWAN (*Cygnus atratus*).—A small flock was often present off the mouth of the Hutt Estuary, but none seen since the area was changed by reclamation. Single birds or pairs are sometimes seen flying up the valley. One landed on the small pond at the Soil Bureau property at Taita (R. H. Taylor): another settled in Hutt River near Melling Bridge, Feb.-April, 1958 (R. K. Dell).

PARADISE DUCK (*Tadorna variegata*).—Reported in small numbers from Whiteman's Valley and Mangaroa (R. H. Taylor).

GREY DUCK (*Anas superciliosa*).—Present in small numbers along the Waiwhetu Stream and Hutt River. Several pairs breed at the Soil Bureau property at Taita. Present in Mangaroa Swamp (R. H. Taylor), and Akatarawa West River (H. L. Secker).

MALLARD (*Anas platyrhynchos*).—Small numbers occur along the Waiwhetu Stream; also recorded from Soil Bureau property at Taita (R. H. Taylor), lower part of Hutt River (K. Westerkov), Belmont (K. R. Allen), and Upper Hutt (H. L. Secker).

HARRIER (*Circus approximans*).—Frequently seen over both Western and Eastern Hutt Hills and in the upper part of the Hutt Valley. Present in Mangaroa Swamp.

NEW ZEALAND FALCON (*Falco novaeseelandiae*).—Single birds seen from time to time usually in winter, e.g. Upper Hutt (H. L. Secker); Lower Hutt September and October, 1954; Naenae June, 1958 (R. H. Taylor); Belmont (K. R. Allen); Akatarawa July, 1958; Whiteman's Valley February, 1957 (G. Caughley).

BROWN QUAIL (*Synoicus ypsilophorus*).—Now very rare or extinct in the Hutt Valley; a few were present on the hills above Haywards ten years ago (V. E. Hampson-Tindale).

PHEASANT (Phasianus colchicus).—Present in small numbers and possibly maintained by repeated liberations of new stock. Recent records at Belmont (two or three present for many years, V. E. Hampson-Tindale), Taita (F. Taylor), Upper Hutt (H. L. Secker), Kaitoke (R. H. Taylor), and Te Marua (K. Westerskov).

CALIFORNIAN QUAIL (*Lophortyx californica*).—A few present at Upper Hutt and Te Marua (H. L. Secker), at Belmont and Whiteman's Valley (V. E. Hampson-Tindale), also near Moonshine and Birchville (K. R. Allen) and at Lower Hutt and Taita.

PUKEKO (*Porphyrio porphyrio*).—A few present in Mangaroa Swamp and in the upper part of the Hutt Valley (R. H. Taylor); seen on riverbed at Belmont (K. R. Allen) and heard at night in this area (V. E. Hampson-Tindale).

BANDED DOTTEREL (*Charadrius bicinctus*).—Pairs or small flocks seen fairly regularly in winter along the Hutt River, e.g., a flock of 12 at the Hutt Estuary in May, 1956. A pair attempted to nest on Caltex property (Seaview Road) in early October, 1957 but the three eggs were covered by water after heavy rain; bird again incubating three eggs 30/9/59 (R. A. Falla).

WHIMBREL (*Numenius phaeopus*).—Rare. One recorded at Petone in October, 1949 (Fleming, in Notornis 4: 2).

BAR-TAILED GODWIT (*Limosa lapponica*).—Appear in small numbers from time to time at Petone and the Hutt Estuary, e.g., 12 in October, 1949 (Fleming, Notornis 4: 2), two on 18/11/56.

PIED STILT (*Himantopus himantopus*).—Occasionally seen at the Hutt Estuary (e.g., 12 seen in 1954 by J. S. Watson and four in May, 1956) or heard flying up the Hutt Valley at night.

ARCTIC SKUA (*Stercorarius parasiticus*).—One seen harrying terns off Petone Beach, January 1956 (R. A. Falla).

BLACK-BACKED GULL (*Larus dominicanus*).—Very common at Petone, in the Hutt Estuary and in the lower part of the Hutt Valley, e.g., near the rubbish dump at Wingate. Present on river at Upper Hutt and use course of Wakatikei River as flyway to coast

(H. L. Secker). Odd birds are seen far up the Hutt River and in Whiteman's Valley.

RED-BILLED GULL (*Larus novaehollandiae*).—Common at Petone and, especially after heavy rain, on playing fields and parks in the Hutt Valley, as far north as Taita (H. L. Secker).

BLACK-BILLED GULL (*Larus bulleri*).—Small numbers of this species, usually single birds, are sometimes seen with red-billed gulls at Petone.

BLACK-FRONTED TERN (*Chlidonias hybrida*).—Rare. One seen with white-fronted terns a quarter mile off Petone Beach on 11/4/55, and another in July, 1956 (J. S. Watson).

WHITE-WINGED BLACK TERN (*Chlidonias leucopterus*).—Very rare. One seen on the Hutt River at Belmont in January, 1957 (R. A. Falla).

CASPIAN TERN (*Hydroprogne caspia*).—Present in small numbers in the Hutt Estuary and up the Hutt River as far as Upper Hutt (H. L. Secker).

WHITE-FRONTED TERN (*Sterna striata*).—Common off Petone Beach and flocks sometimes rest on the beach, e.g., a flock of 68 in March, 1955.

NEW ZEALAND PIGEON (*Hemiphaga novaeseelandiae*).—Fairly common in bush areas throughout the Hutt Valley (e.g., Marchant Creek, Kaitoke and Akatarawa, A. R. Longhurst) and sometimes seen considerable distances from the bush, e.g., along the Western Hutt Road (e.g., Belmont, A. R. Longhurst) and at Taita. Also present in Whiteman's Valley (G. Caughley).

KAKA (*Nestor meridionalis*).—Present in small numbers in the upper forested parts of the Hutt Valley, e.g., several recent records from near Mt. Marchant (G. Caughley), Akatarawa Valley and Renata Ridge (I. A. E. Atkinson).

EASTERN ROSELLA (*Platycercus eximius*). — In 1954 Dr. Falla received several reports from the Kaitoke area of "parakeets" which from the descriptions were probably Rosellas.

YELLOW-CROWNED PARAKEET (*Cyanoramphus auriceps*).—Present in the upper forested parts of the Hutt Valley, e.g., near Mt. Marchant summer 1957 (G. Caughley) and near top of Akatarawas (A. R. Longhurst).

SHINING CUCKOO (*Chalcites lucidus*).—Frequently heard in summer in most parts of the Hutt Valley. Also present in Whiteman's Valley (G. Caughley).

LONG-TAILED CUCKOO (*Eudynamis taitensis*). — Less common than the shining cuckoo and more closely confined to bush areas (e.g., Akatarawas, A. R. Longhurst), but visits gardens in Upper Hutt (H. L. Secker). Present in Whiteman's Valley (G. Caughley).

MOREPORK (*Ninox novaeseelandiae*).—Fairly common in patches of bush in scrub-filled gullies on both sides of the Hutt Valley, and occasionally visits gardens in the Valley, breeding at Soil Bureau, Taita (R. H. Taylor). Fewer at Upper Hutt in 1958 than in 1957 (H. L. Secker). Present in Whiteman's Valley (G. Caughley), and at Mt. Maymorn (I. A. E. Atkinson).

KINGFISHER (*Halcyon sancta*). — Widely distributed — more numerous in winter. Records from Soil Bureau, Taita, Lower Hutt and Naenae (a pair resident from January to July, R. H. Taylor), frequent at Belmont (K. R. Allen), rare at Upper Hutt (H. L. Secker).

RIFLEMAN (*Acanthisitta chloris*). — Present in larger areas of bush, e.g., Kaitoke Reserve, Whiteman's Valley (G. Caughley), Akatarawas (R. A. Falla) and Marchant Creek (A. R. Longhurst) and occasionally in smaller patches of bush and scrub on the sides of the Hutt Valley (Secker, Notornis 8: 23). Not seen at Belmont January-December, 1958 (A. R. Longhurst).

SKYLARK (*Alauda arvensis*).—Present in rather small numbers on farmland in Akatarawa (H. L. Secker) and Hutt Valleys; also occurs in open spaces in built-up areas; recent records from Upper Hutt (H. L. Secker), Naenae (K. Westerskov), Petone and Belmont.

FANTAIL (*Rhipidura fuliginosa*).—Very common in areas of bush and scrub; (e.g., Kaitoke Reserve and Akatarawa, A. R. Longhurst). Also enters residential areas especially in winter, and occurs around farm homesteads where there are sufficient trees. A black fantail seen in Wakatikei Valley (I. A. E. Atkinson).

PIED TIT (*Petroica macrocephala*).—Present in Akatarawa, Kaitoke, Whiteman's Valley (G. Caughley), Wakatikei Valley (I. A. E. Atkinson), and Marchant Creek (A. R. Longhurst).

WHITEHEAD (*Mohoua ochrocephala*). Recorded from Whiteman's Valley (G. Caughley), head of Stokes Valley (D. B. Bell), Pinehaven (H. L. Secker), Akatarawas (R. A. Falla) and Soil Bureau property at Taita. Not seen during five visits to Kaitoke Reserve (A. R. Longhurst).

GREY WARBLER (*Gerygone igata*). — Very common throughout the area except in newly-developed housing areas.

SONG THRUSH (*Turdus ericetorum*). — Abundant and widespread throughout the Hutt Valley.

BLACKBIRD (*Turdus merula*).—Widespread and, in many places, even more abundant than the song thrush. Enters native bush (A. R. Longhurst) and recorded at an altitude of 2,000 ft. near Renata Forks (I .A. E. Atkinson).

HEDGE SPARROW (*Prunella modularis*). — Common throughout the district, but often overlooked.

NEW ZEALAND PIPIT (*Anthus novaeseelandiae*).—Present in small numbers along the Hutt River, on hills behind Taita, at top of Akatarawas (A. R. Longhurst), at Kaitoke Hill, and in Whiteman's Valley (G. Caughley).

BELLBIRD (*Anthornis melanura*).—Common at Kaitoke and Akatarawa, and widely distributed elsewhere in smaller numbers; occasionally visits nectar-bearing trees in residential parts of the Hutt Valley. Present in Whiteman's Valley (G. Caughley). Not seen at Belmont January-December, 1958 (A. R. Longhurst).

TUI (*Prosthemadera novaeseelandiae*).—Common in bush areas (e.g., Kaitoke, Marchant Creek and Akatarawa, A. R. Longhurst), and frequently visits nectar-bearing trees in gardens in the Valley. Appears to be resident at Soil Bureau property at Taita. Present at Belmont (A. R. Longhurst) and Whiteman's Valley (G. Caughley).

WHITE-EYE (*Zosterops lateralis*). — Very common throughout the area. Flocks enter residential areas in winter but only a few birds are seen there in summer. Present in Whiteman's Valley.

GREENFINCH (*Chloris chloris*). — Widespread during summer months—especially in vicinity of pine trees. In winter flocks of up to 50 or more are seen along the Petone Beach area.

GOLDFINCH (*Carduelis carduelis*).—Fairly common on farmland in the upper part of the Hutt Valley and smaller numbers visit built-up areas—especially in winter. Common at Belmont (K. R. Allen), present in Whiteman's Valley (G. Caughley), small numbers at Upper Hutt (H. L. Secker).

REDPOLL (*Carduelis flammea*).—Formerly fairly common on the hills of both sides of the Hutt Valley, but few seen recently at Belmont (K. R. Allen) or Upper Hutt (H. L. Secker); present on hills of Whiteman's Valley (G. Caughley). Small flocks are occasionally seen in built-up areas—especially in winter.

CHAFFINCH (*Fringilla coelebs*).—Very common throughout, enters native bush (A. R. Longhurst), flocks frequent in winter.

YELLOW HAMMER (*Emberiza citrinella*). — Common; forms flocks in winter, especially on farmland in the upper part of the valley; smaller flocks appear in parks and playing fields of residential areas.

HOUSE SPARROW (*Passer domesticus*).—Very common in built-up areas and around farmhouses. In winter flocks may be seen in paddocks—especially where hay has been fed. Present in Whiteman's Valley (G. Caughley).

STARLING (*Sturnus vulgaris*). — Common throughout built-up areas and farmland. In winter flocks may be seen each morning and evening, flying between feeding areas in the Hutt Valley and communal roosts on Somes Island or in Wellington.

INDIAN MYNA (*Acridotheres tristis*). — Dr. E. L. Marchant reports that a myna was seen regularly during the last week of September 1958, feeding with starlings on his lawn near the Lower Hutt Recreation Grounds.

ROOK (*Corvus frugilegus*).—Two were seen in Belmont area within the last two years (Mrs. K. R. Allen), and the species has also been seen at Maoribank (H. L. Secker).

WHITE-BACKED MAGPIE (*Gymnorhina hypoleuca*).—Common throughout farmland country and on playing fields and parks in residential areas. A nest found recently at Taita incorporated considerable quantities of wire.

ADDITIONAL SPECIES RECORDS (FROM DEAD OR STORM-DRIVEN BIRDS) ARE: — Wandering Albatross (*Diomedea exulans*) and White-capped Mollymawk (*Diomedea cauta*) at Petone (Cunningham in *Notornis* 2: 188), Narrow-billed Prion (*Pachyptila belcheri*) at Petone on 5/8/58 (R. A. Falla), Fairy Prion (*Pachyptila turtur*) at Melling on 16/7/56 and Sooty Shearwater (*Puffinus griseus*) at Petone on 18/5/58.

The Geographer and the Hutt Valley

D. W. McKenzie

The Hutt Valley system consists of three fault-angle depressions, the Port Nicholson-Lower Hutt depression, the Trentham Basin, and the Kaitoke Basin, lying on the south-eastern downthrow side of a major transcurrent north-east trending still active fault called in this area the Wellington Fault.

Wellington owes its very existence to the faulting which drowned the harbour and allowed the sea to penetrate the north-south system of ridges and valleys, which, as the "grain" of the country, runs diagonally across the north-east line of the fault. This harbour, the only first class one in the southern part of the North Island, was therefore the site on which settlement bound up with land-ship transport would develop. With the advantages of a drowned fault angle depression in hilly terrain Wellington and the Hutt Valley had to surmount those disadvantages which went with it—little flat land for settlement, and difficult transport.

The Hutt Valley offered the easiest land for settlement but the exposure of Petone beach to the southerlies was critical in the days of sailing ships, and harbour facilities moved to Lambton Harbour where shelter combined with deep water to give good wharfage, with which advantages the Hutt Valley has never been able to compete. With the uplift of the area in the 1855 earthquake added to a previous small rise flooding became unimportant in the Hutt Valley and the forest on the bay-head delta from Taita Gorge to the harbour was cleared and settlement begun.

The first advantage which the triple depressions of the Hutt Valley system offered was access into the Rimutakas so that a short but steep hill track could cross the ranges to the