

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 Mollmawk (*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



Photo: Royal N.Z. Air Force.

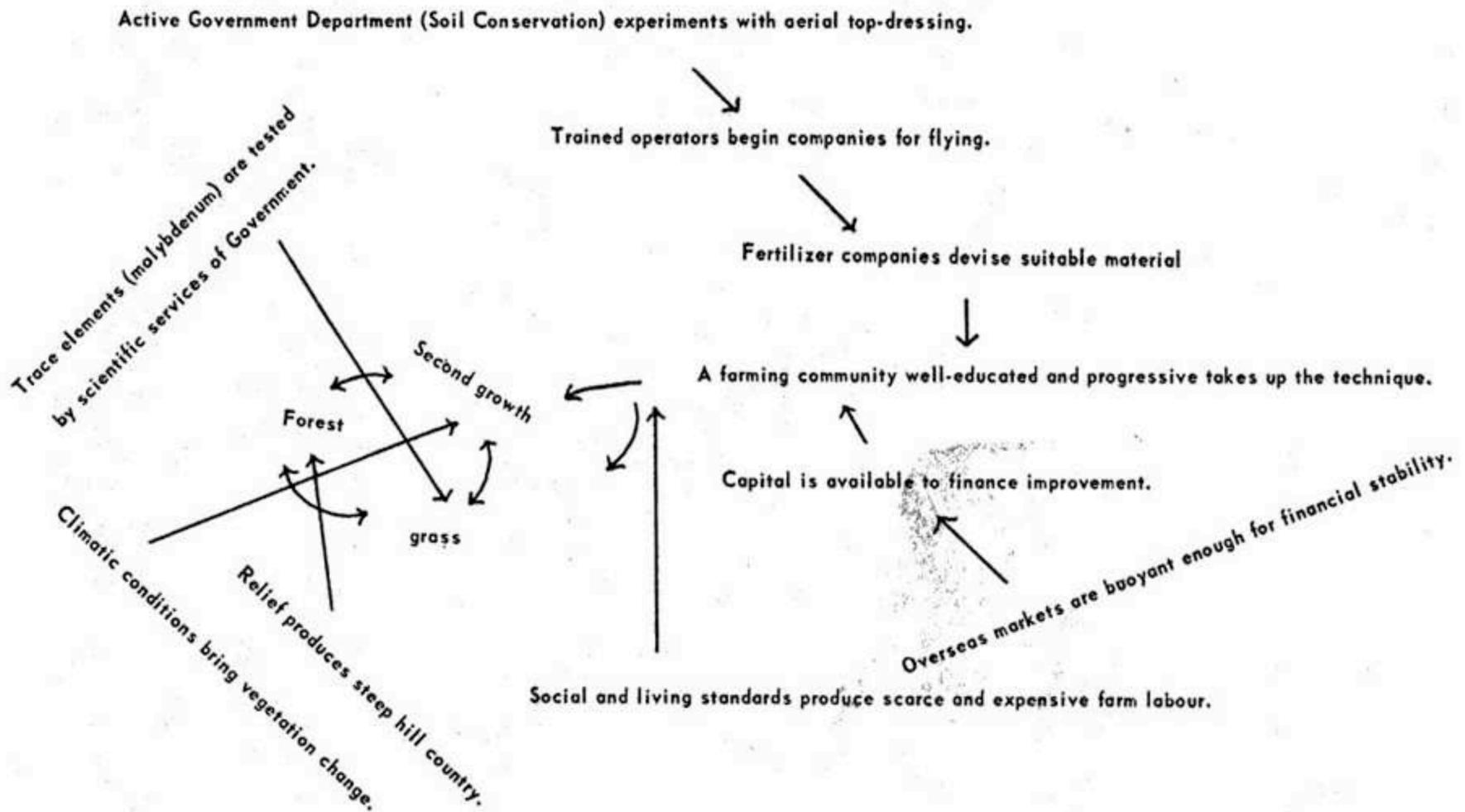
FIGURE 1.—THE HUTT VALLEY AND WELLINGTON: *The three fault-angle depressions of the Hutt system lie on the down-throw side of the north-east trending Wellington fault. The ridge-valley system (grain of the area) runs almost north, as can be seen on the eastern side of the harbour, on the Miramar Peninsula, and the depression which runs from Khandallah (by the smoke) to Porirua (the Pukerua Corridor). (1) Hutt Valley. (2) Trentham Basin. (3) Kaitoke Basin. (4) Mangaroa Valley. (5) Wainui Valley. (6) Wellington Fault. (7) Pukerua Corridor.*



FIGURE 2. — TRENTHAM BASIN LOOKING NORTH-EAST: *The Taita Gorge in the foreground is the hinge-line between the Hutt Valley and the Trentham Basin, which is now much more filled with houses than is here shown. The scarp to the left is sharpened by river cutting; the down-thrown ridges to the right show second growth with bush in the re-entrants. (1) Wellington Fault. (2) Emerald Hill. (3) Kaitoke Basin. (4) Mangaroa Valley. (5) Maori Bank. (6) Upper Hutt. (7) Trentham Race Course. (8) Peat Soils.*

Photo: Tourist and Publicity.

FIGURE 3.



Wairarapa. The track was formed in 1853 and was widened for vehicular traffic by 1859. This is still the only road crossing the ranges until near the Manawatu Gorge, and though much work is now being done widening it its steep grades can never be improved. The depression on the south-eastern side of the Wellington fault also allowed deep penetration into the Rimutakas for a railway route to the Wairarapa with steep grades, some of them 1 in 15. Fell engines and expensive running were a handicap to easy transport to the Wairarapa until this route was replaced by the new tunnel through the Rimutakas.

The three depressions differ in their characters: the Lower Hutt depression from the Taita Gorge to the harbour was covered with deep and fertile alluvial silts, with lenses of gravel and impermeable clays sloping seaward as forest beds of the delta. Thus market-gardening became early important in the Hutt Valley and developed as the demand grew of the increasing population of Wellington. Population pressure in the end, however, forced houses on to those fertile soils, and from the air the Hutt Valley is now seen as a vast housing area with only residual patches of market gardens. However valuable the soils, it seems as though the demand for housing is so strong that the land-use change is in such circumstances impossible to resist.

The variation in the bedding allowed the development of artesian supply of water, which is noted elsewhere in this discussion.

The second depression, the Trentham Basin, has not silts as deep or as fertile as those of the lower Hutt Valley, and market gardening has never been important. In the basin itself and the Mangaroa Valley dairying for city milk supply is dominant in the farms of the flats, but housing is steadily spreading. Though zoning is in force there was considerable unwise building before it became operative.

The third depression, the Kaitoke Basin, differs from the other two. It's older, higher, more dissected and is essentially rural. A few new houses are on the Mangaroa Hill to the south of the Basin, but no centre of housing exists. The railway once ran through the southern part of the basin but with the opening of the Rimutaka tunnel it has now gone.

The activities of man in this area are evidently the result of a great variety of factors. Dominant are the ways in which man wishes to use the land; ways which reflect the pattern of his culture by the animals he raises, the crops he grows, the houses he builds, and the standard of living which he demands. Land use reflects the economic factors affecting man, whether he must raise sheep for wool only when refrigeration does not exist, whether he can switch to

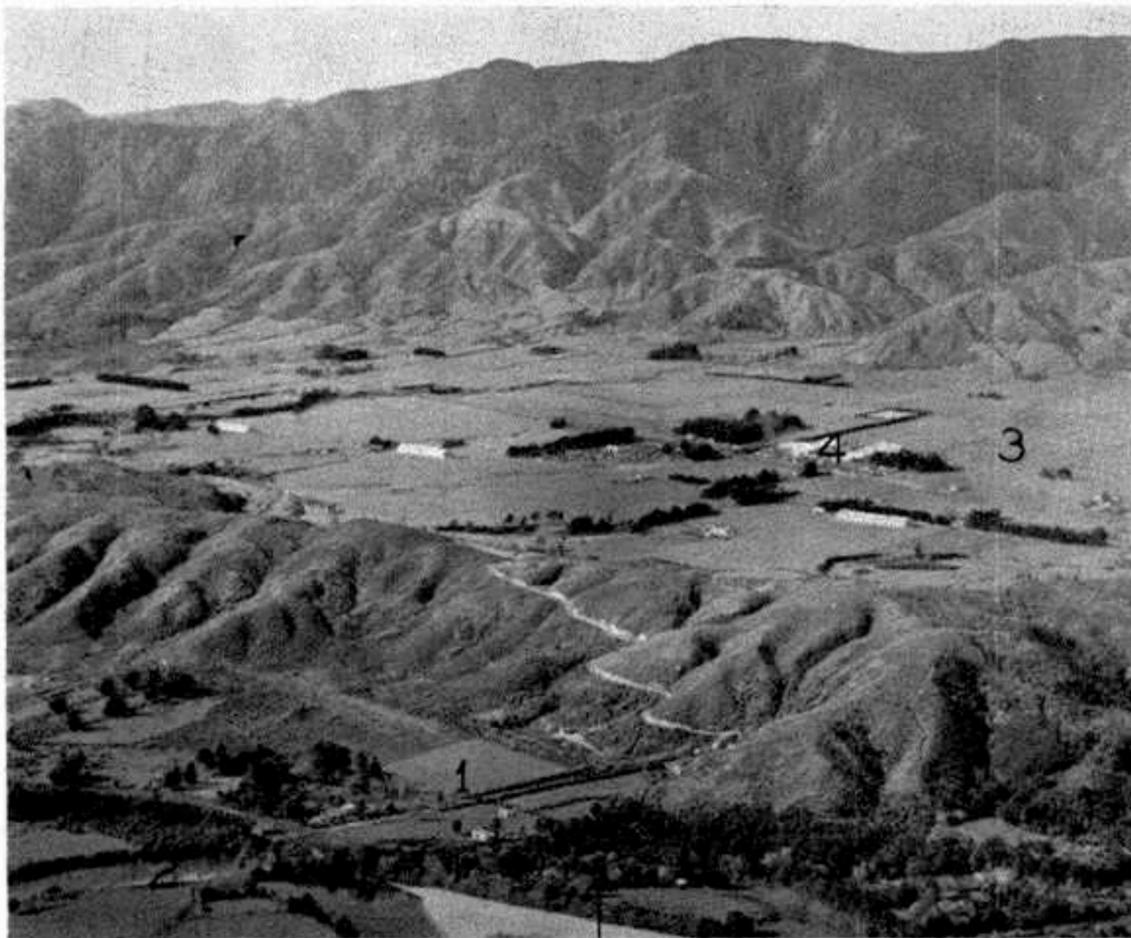


Photo: Tourist and Publicity.

FIGURE 4.—LOOKING EAST OVER THE MANGARUA VALLEY: (1) *Maori Bank Terrace*. (2) *Hutt River*. (3) *Mangarua Valley*. (4) *Air Force Stores*.

fat-lamb production or dairying when it does exist, whether he finds city milk supply more profitable as a city grows near him, or whether in the end his land is cut up for building sections as the flood of housing seeps even wider, sections whose nominal price becomes more fantastic as the standard of living rises and the value of money declines.

Other contributors to this symposium have discussed the ecological situation in the Hutt Valley as it affects the vegetation pattern. In any such situation man's activities may be paramount and these activities may be affected by a variety of factors, some economic, some cultural, some political, some educational. If in the case of the grasslands in this area something

resembling the biologists' food chain is set out, as on Fig. 3, the complexity of the problem becomes more evident.

It is clear that the work of man in modifying the ecological factors of his environment is subject to a considerable variety of influences, some of them acting at a considerable distance. The market in London may have a direct effect on the presence or absence of second-growth on the hills as finance available to the farmer varies. His capacity to use new techniques will vary with the ability of his Government investigators to devise them, and his own willingness to try them, a willingness dependent upon his own educational standards and the cultural pattern in which he lives. Man is then the dominant factor in the ecological situation.

Maps

Three detailed maps of the Hutt Valley showing respectively the geological features, and the distributions of the vegetation and of the soils, have been prepared by the contributors to this symposium. They are being published by the Department of Scientific and Industrial Re-

search, and, through the courtesy of the Directors of the Geological Survey and the Soil Bureau, have been made available for distribution as a supplement to these Proceedings. They will be supplied to all who have received this number as soon as they have been published.

Chronological Summary.

At the conclusion of the symposium some of the principal speakers combined to prepare the following table linking together the various changes which have occurred in the Hutt Valley in late geological time. This table is only tentative and will undoubtedly be revised in the near future. In the third column climatic changes should be read upwards.

INTERNATIONAL EQUIVALENT		POLLEN EVIDENCE (<i>W. F. Harris</i>)	TERRACES (<i>T. L. Grant-Taylor</i>)	SOILS (<i>H. S. Gibbs</i>)	VEGETATION <i>c.</i> 1840 (<i>A. P. Druce and I. A. E. Atkinson</i>)			
PLEISTOCENE EPOCH	RECENT	Post Glacial	Warm temperate rain forest changing to Cool temperate	Hutt	{ Waikanae Mangaroa	Podocarp/tawa forest Scrub		
	Upper	Last Glaciation		{ Trentham Pakuratahi	Heretaunga	Black beech forest		
		Last Interglacial	Temperate rain forest	Stoke				
	-----	Penultimate Glaciation		Whiteman	Judgeford	Rimu-rata/hinau/tawa forest		
		Penultimate Interglacial	Warm temperate rain forest	Belmont				
	Lower	Antepenultimate Glaciation		Emerald	Ngaio	{ Rimu-rata/hinau/tawa forest Black beech forest		
		Earlier Glacials and Interglacials	Subalpine forest type changing to Warm temperate rain forest	Normandale III			Matamau	
				Kaitoke III				
		-----		Normandale II			Kaitoke	Rimu-rata/hinau/kamahi forest
				Kaitoke II				
		Normandale I	Kaitoke	Hard beech forest				
		Kaitoke I						