NEW ZEALAND ATLAS

EDITED BY IAN WARDS

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Note: In the section headed 'Water Balance', '760 millimetres' should read '76 millimetres'.

MAPS

area can be contained within an approximate ellipse, with a centre at 10° S latitude and 165° W longitude and with a minor axis inclined at about 17½° to the meridian of the origin. Mr L. P. Lee found that a conformal projection of this area could be devised from a transformation of the stereographic, as already demonstrated by O. M. Miller. The scale coefficient ranges from 0.721 at the centre to 1.279 at the boundary, considerably less than in any projection so far used for the Pacific. Air routes are those being used in July 1973 to the principal airports of the main island groups and all countries bordering the Pacific. Major routes to Europe and the Middle East are also shown. Generally, the shortest route with the least number of stops has been shown.

The base map is a modern outline from the New Zealand Map Service, Series 1. The information of the early Polynesian settlement of the Pacific and their voyage path to New Zealand was supplied by the author based on her reading of most recent sources. The voyage path of **Abel Janszoon Tasman** was plotted by Graham Jeune, assisted by information from Commander G. B. W. Johnson, Wellington Harbour Board, and Commander I. S. Monro, Hydrographer RNZN, from the following sources:
Tasman, Abel Janszoon, Journal of his discovery of Van Diemen's land and New Zealand in 1642 . . . photo-lithographic facsimilies of the original manuscript in the Colonial Archives at the Hague with an English translation and facsimiles of original maps to which are added life and labours of Abel Janszoon Tasman by J. E. Heeres and observations made with the compass on Tasman's voyage by W. van Bemmelen, Amsterdam, 1898, *Abel Janszoon Tasman & the Discovery of New Zealand,* Department of Internal Affairs, Wellington, MCMXLII; *The voyages of Abel Janszoon Tasman,* Andrew Sharp, Oxford [1968]; photostat of F. J. Visscher's chart from the Huydecoper MS in the Mitchell Library, Sydney (Turnbull Library Map Collection); photostat from Tasman's chart, State Archives, The Hague (Turnbull Library Map Collection).
The voyage path of **James Cook** is compiled from:
'A chart of Newzeland . . . by Lieutt. J. Cook . . .' Reproduced from the original chart in the British Museum, The Friends of the Turnbull Library, 1969; *The Journals of Captain James Cook on His Voyages of Discovery: The Voyage of the Endeavour 1768–1771,* Vol. 1, with folio of charts, edited by J. C. Beaglehole; the point of entry into New Zealand waters, 6/7 Oct 1769, and the voyage path to the south-west of the South Island, were amended from information by Commander G. B. W. Johnson.
The voyage path of **De Surville** was compiled from:
'Plan de la Baye de Lauriston . . . 1769' and 'Carte de la Nouvelle Zelande . . . 1769', both photocopies from MSS in the Bibliothèque Nationale, Paris (Turnbull Library Map Collection).
Place names and spelling;
The place names and chart information of Tasman's voyage (green) have been translated.
The places named by Cook (red) are a selection of places from Cook's chart of his first voyage.
The Maori place names (brown), from material supplied by the author, have been given modern spellings/translations for ease of identification.

The base map is from the New Zealand Map Service, Series 1. The main areas of Maori settlement are shown from information supplied by K. Gorbey, Director of the Waikato Art Museum, and with particular reference to the South Island and the Taupo area by D. R. Simmons of the Auckland Institute and Museum, collated by the editor. The special settlements are shown from information supplied by the editor and the more recent immigration from information from the Department of Statistics.

Prepared from information supplied by the Department of Statistics on a base map from the New Zealand Map Service, Series 1. The area of any one screened (light red) circle is centred on and proportional to the population it represents, and is completely independent of any other screened circle and/or solid (dark red) symbols that fall within it. All population within gazetted Urban Statistical Divisions has been shown as urban, which will account for the apparent lack of rural population around larger cities.
Some of the cities and boroughs in the Auckland vicinity have been grouped within four main areas represented by individual screened circles:

Northshore	Auckland West	Auckland Central	Auckland South
Takapuna (city)	Henderson (borough)	Auckland City	Papatoetoe (city)
Devonport (borough)	Glen Eden (borough)	Newmarket (borough)	Otahuhu (borough)
Northcote (borough)	New Lynn (borough)	Mt Albert ,,	
Birkenhead (borough)		Mt Eden ,,	
		Mt Roskill ,,	
		One Tree Hill ,,	
		Onehunga ,,	
		Ellerslie ,,	
		Mt Wellington ,,	

Other screened circles in the vicinity of Auckland are centred on:

East Coast Bays (borough)	Te Atatu (county subdivision)	Titirangi (county town)	Manukau (city)
Glenfield (county town)	Kelston (county town)	Howick (borough)	Papakura (borough)
Groupings in the Wellington vicinity are:			
Wellington (city)	Upper Hutt (city)	Tawa (borough)	Wainuiomata (county borough)
Lower Hutt (city)	Porirua (city)	Petone (borough)	Heretaunga-Pinehaven (county town)
Groupings in the Christchurch vicinity are:			
Christchurch (city)	Riccarton (borough)	Hornby (county borough)	
Waimairi (county)	Sockburn (county borough)		
Groupings in the Dunedin vicinity are:			
Dunedin (city)	St Kilda (borough)	Green Island (borough)	

Unless the date is shown on the face of the map, the information on local authorities and statistical areas is dated to November 1974; on Education Board boundaries and electricity distribution to February 1973. All boundaries are as shown in the *Atlas of New Zealand Regional Statistics,* Town and Country Planning Branch, Ministry of Works, Wellington 1968, with later amendments by the relevant authority to the date shown.

This map was drawn by J. Petro, then Cartographic Branch, Department of Lands and Survey, in 1963–64 on a base from the New Zealand Map Service, Series 1. It was subsequently revised by the Cartographic Branch.

From information supplied by the Geophysics Division, Department of Scientific and Industrial Research.

This map is based on Lawrence, P., 1967: New Zealand Region; Bathymetry, 1: 6 000 000, N.Z. Oceanogr. Inst. Chart, Miscellaneous Series, 15.

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The map is on a Lambert conformal (or orthomorphic) conic projection with two standard parallels, these being at 0° and 45° S. The meridians are straight lines and the parallels arcs of concentric circles.
The scale at any point is independent of direction; between the standard parallels it is a little smaller, and outside the standard parallels a little greater than the nominal scale of the map.
The variation from the nominal scale of 1 : 25 000 000 ranges from −8 per cent at latitude 22° 30′ S to +11 per cent at latitude 12° N and 55° S.

This map was designed in the Cartographic Branch, Department of Lands and Survey. For a base, a cardboard model was made by L. P. Lee, which was then photographed by National Publicity Studios (who also prepared the sea vignette). The drawing was then done by D. W. Lawrence from a selected perspective. Type sizes reflect tourist density.

ILLUSTRATIONS

ILLUSTRATIONS

hill country throughout New Zealand. Indigenous forest covers the far ridges, while in the middle distance cleared and grassed ridges are reverting to secondary growth on the shaded slopes. There are exotic trees and improved pastures on the valley floor.

CHRISTCHURCH — *V. C. Browne*

p 245 The international airport at Harewood is in the foreground, with the business district beyond Hagley Park in the centre. Sumner lies to the top left, with Lyttelton Harbour beyond the Port Hills at the top right.

DUNEDIN — *NZ Aerial Mapping/J. H. Johns*

p 245 The city lies at the head of Otago Harbour with Macandrew Bay in the foreground and Ravensbourne middle right.

MT COOK, *left*, AND MT TASMAN — *NZ Aerial Mapping*

pp 246–247 with the Ball, Hochstetter and Tasman glaciers. Ascents of Mt Cook often begin after a climb up the Haast ridge to the right of the Hochstetter Icefall, which drops from the Grand Plateau at the foot of Mt Tasman. Climbers then cross the Plateau, skirt Mt Tasman to climb first the Linda glacier between the two massifs and finally the high Northern Peak.

BENMORE, THE EARTH DAM AND POWER STATION — *NZ Aerial Mapping/J. H. Johns*

p 248 with the great stretch of artificial lake.

THE UPPER TAIERI RIVER — *NZ Aerial Mapping/J. H. Johns*

p 249 flows through tussock grassland. The range and basin topography of Central Otago is illustrated by the block of the Rock and Pillar Range, *right*, and the down-faulted Styx basin.

THE OBELISK ON THE OLD MAN RANGE, OTAGO — *NZ Aerial Mapping/J. H. Johns*

pp 250–251 Subalpine vegetation and stark schist tors characterise the higher ranges of Central Otago.

THE ALPINE FAULT AND THE WEST COAST BETWEEN JACKSON HEAD AND THE GREY RIVER — *National Aeronautics and Space Administration (US)*

p 252 This photograph was taken from an Earth Resources Technology Satellite at a height of about 500 miles. The colours are false and show contrast only. The darker brown areas indicate podocarp forest on ridge slopes, while the lighter red areas show pasture, farm land or perhaps freshly planted exotic forest. The dark areas of inland water, for example Lake Brunner, show clear water, and contrast with the light green of the moraine of the upper arm of Lake Tekapo and other shingle or sediment saturated water. Similarly, the green of the river beds indicates the shingle areas of a braided river rather than water, shown as a dark thread. Light brown areas near Tekapo show dried out tussock or other grassland pasture. The large areas of white are cloud, but areas of snow on the tops also show white. In the sea, the light green along the shoreline shows shingle and sediment, and the dark area, clear sea water.

MILFORD SOUND — *NZ Aerial Mapping/J. H. Johns*

p 253 The valley lies between the Wick, *left*, and Darran mountains. Mitre Peak is on the left of the Sound. In the foreground is the Gulliver River which leads through to the Cleddeau, along which the highway continues to Milford. It is an area of classic land-forms resulting from valley glaciation.

THE LAMMERLAWS — *NZ Aerial Mapping/J. H. Johns*

pp 254–255 This subalpine, tussock-covered Otago upland shows a dissection pattern caused by small streams cutting into an uplifted landscape.

SIX ANTARCTIC VIEWS — First five: *Antarctic Division DSIR*; last: *R. H. Wheeler*

p 256 The south fork of the upper Wright Valley; the summit camp, Mt Erebus Expedition 1967–68; descending the traverse on Axel Heiberg Glacier; Emperor penguins, Cape Crozier; the Wright Valley; Victoria Glacier, Upper Victoria Valley.

These pictures are of the more diverse, western side of the Ross Dependency. Those on the left of the page and on the bottom right are scenes from the eastern flank of the Trans-Antarctic Mountains that 'obstruct' the ice cap. The upper and centre right photographs are of Ross Island, some 60 kilometres from the mainland coast.

The Axel Heiberg glacier is tiny compared with the Byrd, Nimrod or Beardmore glaciers. The flat, featureless Ross Ice Shelf is seen as the horizon in the top right of this picture. In the photograph to the right, the Ross Ice Shelf again appears, this time in its distal section at Cape Crozier at the eastern extremity of Ross Island. Adult Emperor penguins of the local colony are escorting their maturing chicks at the foot of a block calved from the 'Barrier', the terminal cliff of the Shelf and the birth place of the characteristic flat-topped Antarctic icebergs.

The ice-free landscapes, *top and bottom left and bottom right*, are exceptional features of Antarctica, with a climate and situation that do not sustain ice-filled valleys. These Dry Valleys are not merely scenic and accessible but are prized geological 'windows' in the almost unbroken shroud of the ice of the continent. Both the Wright Valley photographs show rare and scientifically informative exposures of rock, here consisting of alternate layers of warm-coloured tan sandstone and contrasting black dolerite which long ago was injected horizontally whilst molten between the sandstone strata. In this unvegetated oasis, the tan provides visual relief to the surrounding eternity of the whites and blues of sky, ice and snow. In the blue of the middle distance of the upper Wright Valley can be detected both the rock contrast and the consequent benching (hill, *middle left*). The floor of the valley in both Wright Valley photographs is littered with morainal debris, largely resistant dolerite, which is often wind sculptured by sand abrasion and bears a lustrous polish. The photograph, *bottom right*, of another Dry Valley, the Upper Victoria, shows a stagnant glacier in the upper reaches and the now empty main valley beyond is occupied by a proglacial lake, ponded by overdeeping by ice and recessional moraine. This 'lake' is solid ice, but some, as in the Wright Valley, are still liquid due to a high degree of salinity and are a subject of much scientific speculation. The stationary Upper Victoria glacier, like many other retreating or stationary tributary glaciers of the Dry Valleys, is spectacularly cliff-sided from radiation melting caused by reflection of the sun from the bare rock valley sides. The three New Zealanders are passing through *penitentes*, melt sculptured litter from huge slabs of ice that have 'calved' from the glacier's lateral wall. The lamination, *top right*, in the top of the glacier is the ice of a 'perched' tributary glacier which joined the main glacier some four kilometres further up the valley.

The photograph, *top right*, of Mt Erebus, higher than Mt Cook by thirty metres, shows another unusual feature of Antarctica—its only active volcano. In this photograph, the slopes of Erebus are unusually heavily clad in snow, and the normal contrast of black volcanic rock and snow slopes is masked. The almost constant, gentle, white plume of smoke and ash is also temporarily absent. The photograph shows the life style of the New Zealand field parties in Antarctica. Here is the traditional double-skinned pyramid tent of Scott's day still in use, albeit now of more durable synthetic materials. Sleds too are still used but are pulled by a motor toboggan, the mechanical if less reliable substitute for the husky dog. These toboggan tracks make a contrast to the dog-sled trails in the foreground of the Axel Heiberg photograph of only a few years earlier.

GAZETTEERS