



<http://researchspace.auckland.ac.nz>

### *ResearchSpace@Auckland*

#### **Copyright Statement**

The digital copy of this thesis is protected by the Copyright Act 1994 (New Zealand).

This thesis may be consulted by you, provided you comply with the provisions of the Act and the following conditions of use:

- Any use you make of these documents or images must be for research or private study purposes only, and you may not make them available to any other person.
- Authors control the copyright of their thesis. You will recognise the author's right to be identified as the author of this thesis, and due acknowledgement will be made to the author where appropriate.
- You will obtain the author's permission before publishing any material from their thesis.

To request permissions please use the Feedback form on our webpage.

<http://researchspace.auckland.ac.nz/feedback>

#### **General copyright and disclaimer**

In addition to the above conditions, authors give their consent for the digital copy of their work to be used subject to the conditions specified on the Library Thesis Consent Form.

ROCKS OF THE WAIITEMATA GROUP

WHANGAPARAOA PENINSULA

NORTHLAND

---

A Thesis

Presented to

The University of Auckland

---

In Partial Fulfilment

of the Requirements for the Degree

Master of Science

---

by

Murray Richard Gregory

February 1966

FRONTISPIECE:

Slump folding on a large scale in normal Waitemata beds at G.R. 339920 about three quarters of a mile west of Huaroa Point.



TABLE OF CONTENTS

	PAGE
CHAPTER I. INTRODUCTION	2
Location	2
Map Coverage	2
Physiography	4
Synopsis of Geology	5
Aims of Study	5
Previous Work	6
Terminology	6
CHAPTER II. STRATIGRAPHY: AGE: STRUCTURE	13
The Stratigraphic Succession	13
Thickness of Waitemata Beds	19
Age of Waitemata Beds	19
Conclusions	27
CHAPTER III. INTRAFORMATIONAL DEFORMATION: PENECONTEMPORANEOUS SLUMPING	28
Small Scale Deformation	32
Large Scale Deformation	38
Discussion: Cause and Style of Deformation	47
Clastic (Sedimentary or Neptunian) Dykes	58
CHAPTER IV. SEDIMENTARY STRUCTURES OF THE NORMAL WAITEMATA BEDS	61
The Turbidite Rhythm	61
Variations from the Typical Turbidite Rhythm	81
The Interturbidite Sequence	87
Discussion on Cross Bedding	88
Laminites	95
Featureless Thick Sandstones	96
CHAPTER V. PETROGRAPHY OF THE NORMAL WAITEMATA BEDS	100
Rock Types	100
Detrital Mineralogy	103
Diagenesis	108
Provenance	110
Grain- Size Analysis	112

	PAGE	
CHAPTER VI	PALEOCURRENTS	115
	Basal Markings	115
	Intrastratal Structures	116
	Ripple Marks	117
	Comments Upon Current Directions Recorded from 200 Sandstone Beds	123
	Discussion	128
CHAPTER VII	TURBIDITES - LAMINITES-TRACTIVE SANDSTONES: A DISCUSSION	130
	Turbidites	130
	Laminites	135
	Tractive Sandstones	136
CHAPTER VIII	WHANGAPARAOA GRIT BEDS	139
	Introduction	139
	Primary (or Depositional) Features	145
	Petrography	160
	Fossils of the Grits	165
	Paleoecological and Paleoenvironmental Implications of These Fossils	170
	Emplacement and Provenance	172
	Large Blocks (or "Horse") of Basalt Associated with the Grits	181
CHAPTER IX	TRACE FOSSILS	186
	Introduction	186
	Systematic Description	187
	Discussion	207
CHAPTER X	PALEOGEOGRAPHY DURING WAITEMATA TIMES	212
<u>Appendix I</u>	SHORE PLATFORMS	221
<u>ACKNOWLEDGEMENTS</u>		224
<u>REFERENCES</u>		225

# Whangaparaoa Peninsula

Fig.1 LOCALITY MAP

