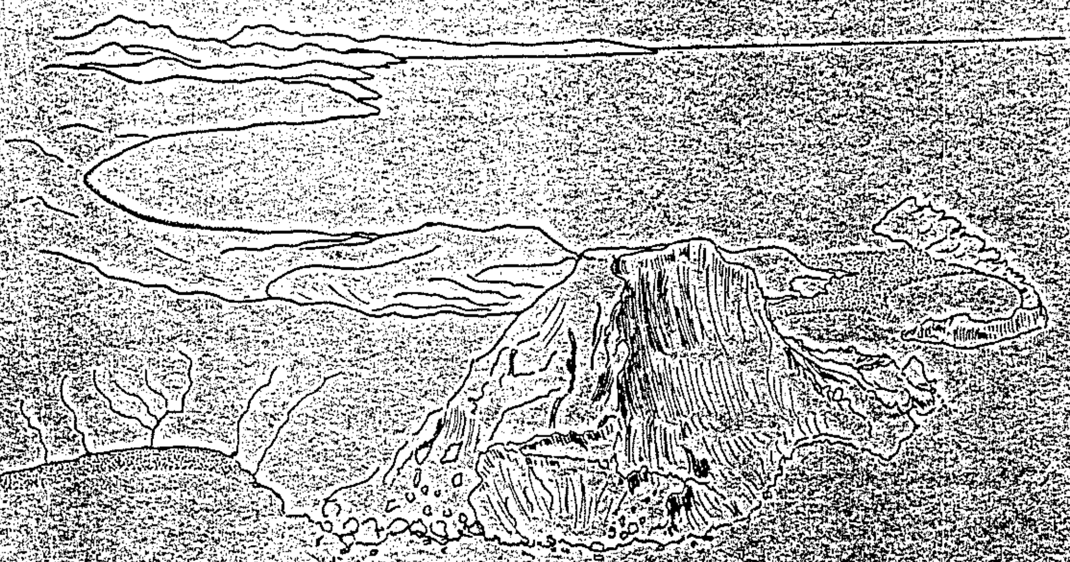
CASTLEPOINT SURVEY



— SECOND REPORT —
NOVEMBER 1965

V.U.W. BIOLOGICAL SOCIETY

Surprisingly, there is very little or no mixing of the tephra suite with the other two, siliciclastic, ones. This could indicate that most tephras are air-fall deposits, while the siliciclastic sediments were derived from a source little or not affected by ash deposition.

QFL modal analyses have been carried out to typify the Makara Basin sediments and to compare them with sediments from similar and other plate tectonic settings.

SEDIMENT GRAVITY FLOW DEPOSITION AND POST-DEPOSITIONAL LIQUEFACTION DEFORMATION OF PLEISTOCENE FLOATSTONES AND RUDSTONES IN A SUBDUCTION COMPLEX, CASTLEPOINT, NORTH ISLAND, NEW ZEALAND

VAN DER LINGEN, Gerrit J.; SMALE, David; and FIELD, Brad D., Sedimentology Laboratory, NZ Geological Survey, University of Canterbury, Christchurch, New Zealand

The Castlepoint coastal promontory is an isolated part of a tectonic high in the subduction complex of the North Island Subduction System. Two units are exposed at the promontory, the Pliocene Rangiwhakaoma Fm, and the Pleistocene Castlepoint Fm. To the west (landward side) these formations are thrust-fault-bounded by the Miocene (inner trench-slope) Whareama flysch basin.

The Rangiwhakaoma Fm consists of outer-neritic siltstones. The overlying Castlepoint Fm consists of floatstone and rudstone limestones, which were transported by sediment gravity flows (debris flows and high-density turbidity currents) from an inner-neritic to an (?)outer-neritic environment. The flow deposits contain a wide variety of clasts: pebbles and cobbles of older sedimentary strata, reworked concretions (up to two metres in diameter), macro- and micro-fossils, fossil fragments, sand, and mud. Many clasts and fossils were exposed and bored in a coastal environment before being swept to deeper water. Some larger shells carry a barnacle epifauna.

Post-depositional liquefaction of floatstone strata resulted in a variety of spectacular deformation structures: water-expulsion flow-lines in the floatstones, updoming and rupturing of rudstone beds that acted as confining layers, and large blocks of rudstone foundered into liquefied floatstone.

QUATERNARY SEDIMENTATION IN THE ST LUCIA LAGOON COMPLEX, ZULULAND, SOUTH AFRICA.

VAN HEERDEN, Ivor Ll., Marine Geoscience, National Research Institute for Oceanology, P.O. Box 320, Stellenbosch, 7600, South Africa.

Lake St Lucia is situated on the seaward margin of the Zululand Coastal Plain. Rocks underlying the coastal plain are mainly Cretaceous to Paleocene sediments which abut against late Karoo volcanics of the Lebombo Range. Post-dating these are complex Quaternary sediments representing a variety of depositional environments, including shore zone, aeolian dune, fluviatile, lagonal and palaudal, which constitute the major physiographic elements of the coastal plain.

Previous workers have mapped the extent of surface outcrops of Quaternary material and speculated on sea level fluctuations. This study combines surface mapping, geophysical data (pinger, boomer and side-scan sonar), deep cores and bottom samples and attempts to better define Quaternary sea level fluctuations and responses along this section of the Zululand Coast.

The seismic data reveals a number of channel-like features buried beneath Lake St Lucia, with channel bases in excess of 35m below present sea level. Extensions of these channels are discernable, from seismic data, on the continental shelf. Radiometric dating of cores reveals that most of the material filling the paleo-river valleys relates to the last glaciation. Rejuvenation of the lower courses of the coastal rivers appears to have commonly occurred during Pleistocene regressions.

Late Pleistocene and Holocene advance of the shoreline to its present position decreased river gradients and smaller rivers sealed. These rivers then dammed up behind a Holocene dune barrier forming Lake St Lucia which has acted as a sediment trap for the last few 1000's of years. A complex of shorelines, beach deposits, chenier ridges and dune deposits are present in the northern section of the lagoonal complex. They reflect environmental changes forced by sedimentation during the Holocene, specifically during the last 5000 years when sea level appears to have been similar to the present.

INTRODUCTION

This report incorporates the results from the second visit to Castlepoint of a group of biology and geology students under the auspices of the V.U.W. Biological Society.

It was conceived to investigate further aspects of the natural history of the Castlepoint area which we were unable to attempt on our earlier visit, due to shortage of time, and also to continue studies commenced in July, 1965. Seasonal variations were also noted, for this was an early summer visit; our previous observations had been made in mid-winter.

Again we found that the natural history of the Castlepoint area is a fascinating study; it is hoped that future visits may be made to other parts of the eastern Wairarapa coastline so that a broader picture may be obtained. The inclusion of geologists in the group proved mutually rewarding, and we hope that the Biological Society will continue this policy, so that a wider background to botanical and zoological studies may be obtained.

The social and cultural history of the area has been fully documented in a book published by the Masterton Printing Co., entitled "Early Castlepoint". Readers of this report are referred to this book for information about humans and their place in the natural history of Castlepoint.

As in July, collections were made which have been deposited with the Botany, Zoology, and Geology Departments of the University. Much of this material was referred to scientists for identification and checking, and we wish to thank them for their help and encouragement.

We are indebted to the Zoology Department, V.U.W., who provided transport and loaned us equipment; to Mr. R.G. Wear of the Zoology Department for assistance with organisation, and for acting as staff supervisor; the Geology Department and the Botany Department for assistance in the preparation of the report.

The Marine Department again made available their house at Castlepoint, and we wish to record our appreciation of their generosity.

The members of this Castlepoint party wish to record their debt to Brian Stephenson who edited the first Castlepoint report, assisted and advised those engaged in Rocky Shore Ecology, and gave much guidance and help to the undergraduate students.

As during the last visit, the help and local knowledge of the Castlepoint residents was greatly appreciated, especially we wish to thank the fishermen who made available to us their launch for plankton studies, and to Mr. Brown for giving us an unforgettable day and taking us many miles up the coast to Owhango Station in his landrover. Mr. L. Johnston of Whakataki again kindly made available his boat and outboard motor for marine studies.

Finally, in examining the results of our visits to Castlepoint in 1965, we wish to emphasize their inadequacy, and the preliminary nature of the report. All those who have visited Castlepoint in July and November wish to record their hope that visits of undergraduate and graduate students to Castlepoint and to many other places will continue, and prove as enjoyable and as scientifically rewarding as these visits have been to those who have worked at Castlepoint.

CONTENTS.

THE CASTLEPOINT SAND DUNES

At Castlepoint, there are extensive areas of drifting sand at low tide (see accompanying map). Large dunes are reported to have formed in the area in a remarkably short time. At one area to the west of the Reef, where there was no previous sand accumulation, sand dunes up to ten feet high grew in a period of nine months, according to a local resident. The tombolo joining the Reef to t he mainland has been formed in this way. In order to study future changes, posts and markers were placed in varying situations according to the prevailing winds and height above sea-level.

Trees have been planted on the sand dunes to the west of the Lagoon on County Council property. The main objective was to beautify. About three thousand trees were planted, but many were lost through damage by cattle, and a few appeared to be retarded by salt spray.

The sand itself ranges from pale yellows to dark grey colours, but on analysis the darker areas did not reveal any great concentration of ilmenite or titan omagnetite. Other minerals present were calcite (probably derived from the nearby limestone), quartz, feldspar and zircon. Small amounts of augite, hornblende, garnets and other ferromagnesian minerals were also present.

To the south of Castlepoint Township, at the end of the road and near the Lagoon, approximately thirty moa egg shell fragments were found. Facing directly south, the exposed portion of the dune, not covered by vegetation, appeared to be recently stripped by the wind. The remains of a fire were found at a depth of two inches. The presence of Maori artifacts and bones in the area does suggest a long term settlement of the area by the Maoris.

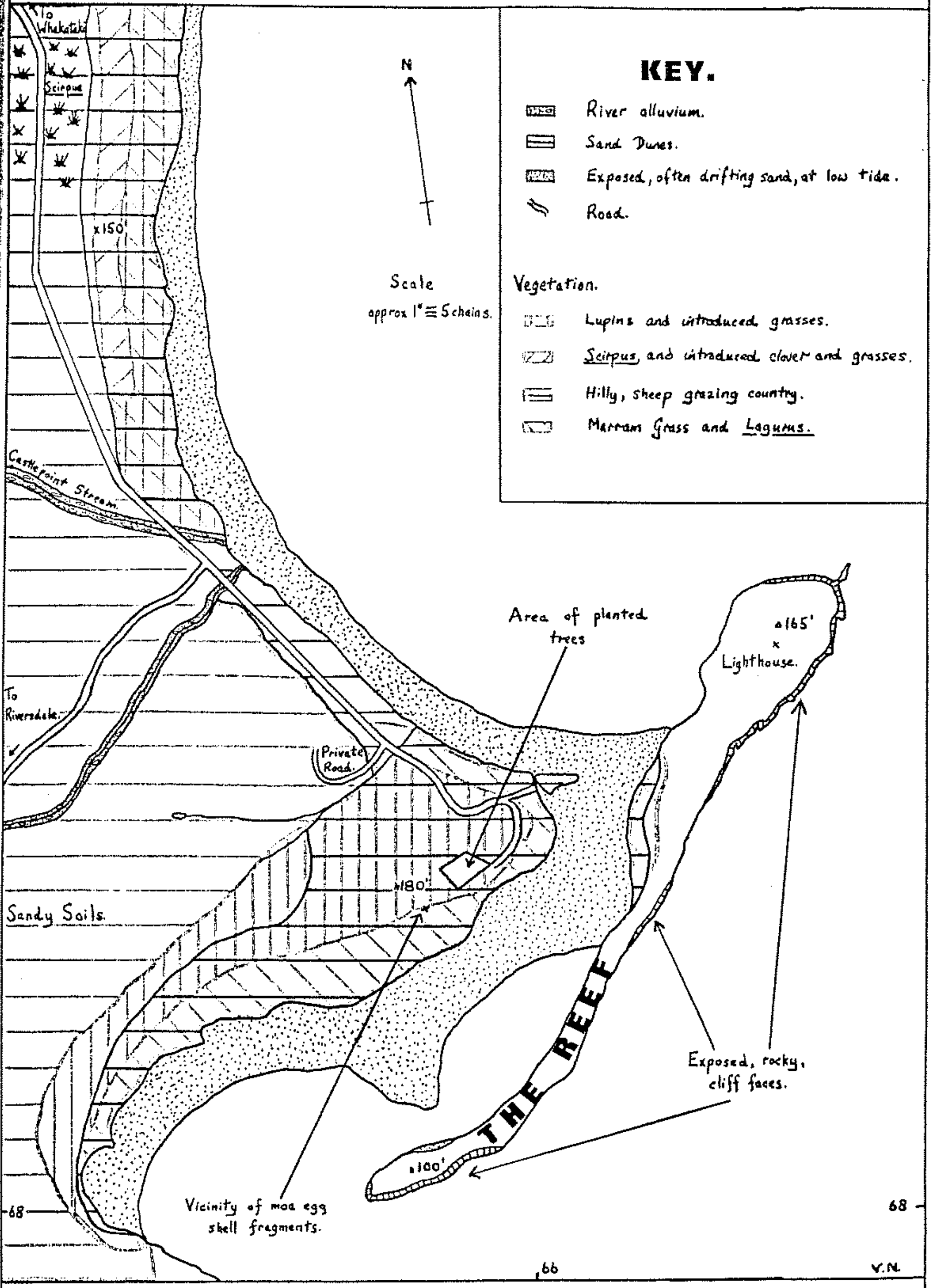
The average size of the fragments was between 1.5 cm by 2.0 cm, and the largest was 4.0 cm by 2.5 cm. The thickness of the fragments ranges from 0.8 mm to 1.1 mm. Two layers were visible in most of the specimens:

1. An outer layer from 0.8 mm to 0.5 mm thick, with a minutely pitted outer surface, the pits aligned in small depressions, giving a lineated appearance. The pits were in groups, very few occurring singly.
2. An inner layer ranging from 0.2 mm to 0.1 mm. This layer appeared to have small irregular lines, forming a network over the inner surface of the shell. These lines had become sculptured into varying reliefs.

Brodie (1950), described three types of moa egg shells from Castlepoint, based on differences in thickness. His thickest type was not found by the authors, but fragments from the two smaller types were found. No significant differences occurred within the exterior of these two classes.

Obviously, many more fragments will have to be collected and examined before any assumptions can be made on these few finds. Possible differences in egg shell exteriors could well be due to the areas of the large egg, maturity of the animal that laid it, and variations in the environment of the species. These factors would all have to be fully considered before any determination of individual species could be made from such finds.

CASTLEPOINT – SAND DUNES.



Gastropoda

x	o	Agatha georgiana (Hutton)	A.C.F.M.	
	o	Alcithoe brevis Marwick		
	o	Aeneator otagoensis n. sub. sp.		
	o	Aoteadrillia wanganuiensis (Hutton)		
	o	Argillista kingi Powell		
	o	Ataxocerithium rubustum Finlay		
	o	Austrofusus conoideus (Hutton)		
	o	Austromitra aff. ambulacra (Marwick)		
x	o	Baryspira cf. mucronata Sowerby	A.C.	1 - 110 fms
	o	Buccinulum wairapaensis Powell		
x	o	Cirsotrema zelebori (Dunker)	A.C.F.	0 - 110 fms
	o	Coluzea spiralis espinosa Finlay	A.C.	11 - 134 fms
	o	Cominella hamiltoni (Hutton)		
	o	Camitas n.sp.		
	o	Crosseola n.sp. aff. emilyae Laws		
	o	Crosseola cf. tenuisculpta Laws		
	o	Estea polysulcata Finlay		
x	o	Emarginula striatula (Q & G)		
x	o	Linopyrga cf. rugata (Hutton)	A.C.F.M.	
		Lyroseila huttoni (Suter)		
x	o	Maoricolpus roseus (Q & G)	A.C.F.M.	0 - 40 fms
		Maoricrypta radiata (Hutton)		
		Micantopex murdochi Finlay		
		Pelicaria rotunda Vella		
	o	Pellicaria media (Marwick)		
x	o	Penion aff. ormesi		
	o	Pervicacia sp.		
x	o	Poirieria zelandica (Q & G)	A.C.F.M.	10 - 110 fms
	o	Proximitra n.sp. aff. apicalis (Hutton)		
	o	Proxiuber anteastralis Powell		
	o	Splendrillia aequistriata (Hutton)		
	o	Splendrillia edita Powell		
	o	Splendrillia cristata Powell		
	o	Stiracolpus delli vellai Marwick		
	o	Stiracolpus waikopiraensis		
		Tanea planisuturalis (Marwick)		
	o	Xymenella oliveri		
x	o	Zeacolpus vitattus (Hutton)	A.C.	0 - 110 fms
	o	Zeattrophon bonnetti (Cossmann)		
x	o	Zegalerus cf. tenuis (Gray)	A.C.F.M.	low tide, shallow water
x	o	Zemitrella cf. regis Powell	A.	

o - Species collected by author in arenaceous layer.
x - Species living today.
A.- Aupourian marine province
C.- Cookian " "
F.- Forsterian " "
M.- Moriorian " "

Data for marine provinces was derived from Powell, 1962.
Depth ranges were derived from Rodley, 1961 and Dell, 1956.

The author found 35 specimens of Estea polysulcata Finlay at Castle Point, which prior to this was extremely rare. (Ponder W.F., 1965: 144)

CLIMATE

Climatic conditions changed from cool to warm while the deposition of The Reef was taking place. Below the arenaceous layer, the presence of Chlamys delicatula shows that the water was cold, as in Foveaux Strait today (Fleming, 1944: 209). In the arenaceous layer, the presence of Stiracolpus waikopiroensis, Chama huttoni, Crosseola, Zemitrella cf. regis, and Ataxocerithium robustum, indicates that the water temperature was similar to that of the Cookian or Aupourian faunal provinces today. Other species in the arenaceous layer, such as Ostrea charlotae, Aeneator otagoensis n. sub. sp. and Stiracolpus delli vellai, indicate rather cooler waters similar to that of Cookian or Forsterian faunal provinces today.

NUKUMARUAN MOLLUSCA FROM CASTLEPOINT - R.W. Ponder

At Castlepoint, an outlier of Nukumaruan coquina limestone outcrops, nearly parallel to the coast, forms The Reef. Kustanowich (1964) studied several sections of The Reef; Castle Rock, The Central Reef, and below the lighthouse. At The Central Reef Kustanowich noted three zones.

(1) Chlamys bed. Lower, strongly cemented, pebbly limestone made up of mainly barnacle fragments, with the top of the bed containing a molluscan assemblage dominated by Chlamys delicatula and Phialopecten triphooki.

(2) Arenaceous layer. Softer, less strongly cemented shell, grit, sand, mud, and mudstone and bored concretions from an Opitian land mass. This layer is weathered by spray (Ongley 1940: 34-35), leaving ledges of the harder limestone of (1) and (3) above and below. Stratal thickness is about 11 feet. For the molluscan fauna, see species list.

(3) Barnacle plate bed. A strongly cemented bed of barnacle plates, which forms the top of The Reef.

The author studied the central section of The Reef, especially the arenaceous layer. This layer was chosen because of its softness, accessibility and richness of its molluscan fauna.

Listed below are the predominant shells in an area 1 foot by 11 feet, traversing from the Chlamys bed to the barnacle bed. Pallium convexum (Q & G), Venericardia purpurata (Desh), Neothyris sp. Dosina crebra (Hutton), and Ostrea charlotae Finlay.

pelecypods	- 62%
gastropods	- 29%
brachiopods	- 9%

SPECIES LIST

Pelecypoda

x	o	Barbatia novaezealandiae (Smith)	A.C.F.M.	
	o	Chama huttoni Hector		
x		Chlamys delicatula (Hutton)	F.	
x		Chlamys gemmulata (Reeve)	C.	10 fms
	o	Cosa wanganuica Finlay		
	o	Cuna sp.		
	o	Dosina crebra (Hutton)		
		Glycymeris wairarapaensis Powell		
x	o	Glycymeris laticostata (Q and G)	A.C.F.M.	
		Kaparachlamys mariae (Hutton)		
		Lima sp.		
x	o	Limatula maoria Finlay	A.C.F.M.	0 - 120 fms
	o	Limopsis marwicki Powell		
	o	Melliteryx sp.		
x		Notocallista multistriata (Sowerby)	A.C.F.	10 - 40 fms
x	o	Notocorbula zealandica (Q and G)	A.C.F.M.	
x	o	Ostrea charlottae Finlay	C.F.M.	
x	o	Pallium convexum (Q and G)	A.C.F.M.	5 - 110 fms
		Phialopecten triphooki (Zittel)		
		Pleuromeris finlayi Powell		
	o	Pleuromeris hectori Powell		
x		Rochefortula taierienses Powell	F.	
	o	Talabrica senecta Powell		
		Tawera subsulcata (Suter)		
x	o	Venericardia purpurata (Desh)	A.C.F.M.	0 - 15 fms