by leaf or fruit characters from forms found within inland populations of *G. dentata,* and is therefore placed in synonomy here".

Cheeseman (1906), recognised the two species as being distinct but closely allied. *G. arenaria* is said to be stouter more glabrous, broader rounder and more fleshy leaves with stouter peduncles and larger fruit. Whereas *G. dentata* has narrow - ovate, thinner and coarsely dentate lamina.

The Auckland Regional Botanic Gardens has collections of *G. dentata* from Tongariro (AUCK 961166 - 67) and Taranaki National Parks (AUCK 961165) and simply by comparing leaf morphology, these two montane forms appear to be clearly distinct from the coastal plants.

Research

Livia Holmgren from the University of Stockholm is presently working on the systematics and biogeography of gunneras using both molecular and morphological data. *G. dentata* of both coastal and montane provenance are being studied by Livia together with the remaining NZ species.

Michael Doyle, Curator of the South Pacific Herbarium in Fiji, is also working on the genus and is aiming at a new treatment of NZ taxa by the end of 1997 (M. Doyle pers. comm., 1996).

Acknowledgements

Thanks to Livia Holmgren for the data on the symbiotic relationship. To Sri Kartawiadi for the pen and ink line drawing. Also to Peter de Lange and Ewen Cameron for encouraging me to write up my findings.

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Ihumatao Fossil Forests, Manukau Harbour

Mike Wilcox

Our group for this outing on 15 February 1997 numbered 35, and Bruce Hayward was our leader. For ease of access, comfort, a pleasant sunny morning, and a most informative guide, this field trip would be hard to beat. The objective was to see and learn about unusual fossil forests, found on the Manukau Harbour foreshore at the end of Renton Road.

Two fossil forests can be discerned at this site. The first comprises well-preserved large stumps and logs of kauris that grew here 30,000 -50,000 years ago. These can best be seen scattered about for about 100 m out on the mudflats. It is thought that the trees died from water-logging, forming a swamp, and subsequently fell over. Under the anaerobic conditions of this ancient peat swamp, the wood has remained remarkably well preserved. Pieces of kauri gum can be readily found. The black peat deposits, often compressed and up to lm deep, are readily seen at the base of the cliffs, underlying volcanic ash, and overlying a creamy-coloured rhyolitic mudstone.

The second fossil forest was buried and preserved beneath volcanic ash (tuff) from an eruption of nearby Ellett's Mountain (Maungataketake) 29,000 years ago. Remains of the

forest - of rimu, miro, hinau, kauri, and tanekaha- can be seen as stumps, branches, log fragments, and also moulds, in the cliffs.

Another interesting geological feature here is that pieces of "foreign" rocks can be found in the volcanic tuff, including Te Kuiti limestone, greywacke, jasper, and Waitemata sandstone. These are thought to have been blasted out from deep down in the Maungataketake volcano.

The Hayward family has made an intensive study of these fossil forests (Hayward & Hayward 1995), and we greatly appreciated Bruce's impressive detective powers in interpreting for us from various subtle clues, the events here of the past. Bruce takes a great interest also in the conservation of Auckland's geological treasures. As well as the steady demise of Ellett's Mountain by quarrying, there is another threat to this unique place - the eventual construction of a second runway at the Auckland Airport. Hopefully a way will be found to protect the fossil forests and to allow continued access for interested visitors.

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Native vegetation of Ihumatao Cliffs, Mangere

E.K. Cameron

In 1991 I searched around the Mangere Purification Works for any remaining native vegetation and was struck by how little remained in the general Mangere area. At that time I wrote an article on a small forest remnant by the Mangere Oxidation Pond No. 1 (Cameron 1991) and briefly visited the pohutukawa cliff forest at the end of Renton Road, Ihumatao, nearly 2km away on the edge of the Manukau Harbour. On 15 February 1997 Bot Soc visited the Ihumatao fossil forest at the end of Renton Road lead by Bruce Hayward. For an account of these fossil beds see Hayward & Hayward (1995), and for an account of our visit see Wilcox (1997).

The coastal cliffs studied are about 0.5 km long and are composed of tuff from the adjacent Maungtaketake (Ellett's Mt) which was active about 29,000 years ago (Hayward & Hayward 1995). By the concrete steps at the end of Renton Rd the cliffs are about 6 m tall, they decrease in height going east (away from the volcanic source). To the west of the steps for some 300 m they reach their maximum height of c. 8 m. Large pohutukawa, up to 8 m tall, perch on the top of these cliffs and others are rooted lower down. Kingfishers are common along the coastline with an ideal cliff to nest in. High tide reaches the bottom of the cliffs.

During the Bot Soc visit members could not resist climbing up the pohutukawa-clad cliffs to look at the living vegetation as well as the fossilised below. Bot Soc visited the same area back on 15 May 1982 and compiled a species list which includes both native (34 spp.) and naturalised vascular plants (see Bowie 1983). This current list adds 17 native species to the earlier list and confirms all but *Hebe macrocarpa* and *Juncus maritimus,* which may have been recorded in error for *H. stricta* and *Isolepis nodosa.* Herbarium vouchers have also been searched for and added to the list, three of these records were not seen by me on the cliffs.

During the February 1997 trip whole sections of the cliff had recently collapsed, with puhutukawa trees and all. Unfortunately the native vegetation hardly extends behind the cliffs and weeds are common in the area, making it unlikely that native vegetation will ever regain much of these bare cliff faces. Because so little native vegetation exists in the general area this is quite a tragedy. Concensus of opinion was that the very wet winter of 1996 was probably the cause of the large scale slumping. Although the naturalised flora is