Appendix: Additions to the species list for Lake Otamatearoa of Cameron & Aspin (2011).

(PA/SB) = addition by P. Aspin and S. Benham, 29 Feb 2012
(ABS) = addition by Auckland Botanical Society, 17 March 2012
* = exotic species

Dicotyledons
*Callitriche stagnalis** (ABS)
*Lythrum hyssopifolia** (ABS)
*Mentha pulegium** (ABS)
*Persicaria maculosa** (ABS)
*Ranunculus scleratus** (ABS)
*Utricularia gibba** (PA/SB)

Monocotyledons
*Juncus bufonius** (PA/SB)
Juncus planifolius (ABS)
*Ottelia ovalifolia** (PA/SB)
Wolffia australiana (ABS)

Kermadec Biodiscovery Expedition 2011
The Southern Kermadec Islands Group

P. J. de Lange

This account is the second part of the May 2011 Kermadec Biodiscovery Expedition whose objectives were outlined in my first of a series of articles describing the expedition's landings in the Northern Kermadec Islands group (see de Lange 2011a-d). This account, derived from my field diary, describes the landings Warren Chinn and I made on the islands of the Southern Kermadec group (Fig.1). Photos taken during the expedition were by Warren Chin (WC), Malcolm Francis (MF) or myself (PdL).

During our night journey to Macauley from Raoul Island (see de Lange 2011d) I slept so badly I was able to gauge, from the change in motor pitch of the *RV Braveheart*, when we were nearing Macauley Island. This, along with the welcome smell of breakfast wafting through our bunk room, encouraged me to get up. It was well worth it too, as above deck I was greeted by the most glorious sunrise in which Macauley was nicely framed.

Macauley Island (Plate 1A) resembles an overcooked Pavlova, the burned base of which is made of dark black tholeiitic basalt lava, while the island's pinkish grey dacitic cliffs resemble the cracked meringue of the rest of the burned Pavlova. This dacitic ignimbrite is mostly unwelded, thus freely eroded, so that in places the cliffs are broken by gullies, deep ravines and canyons. In a few places the ravines are partially choked with more recent scoria and basalt lava flows that probably originated from the Macauley Crater, part of the twin crater complex that is centred on Mt

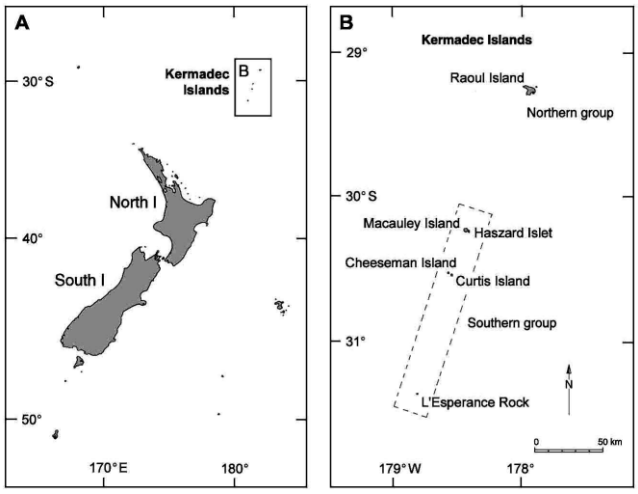

Fig. 1. Location of the southern group of the Kermadec Islands. Map modified by Josh Salter.

Haszard. To continue with the Pavlova analogy one then has only to imagine that your overcooked dessert has sagged slightly to one side (in this case the east). For the Macauley plateau is gradually sloped from the west down to Windy Point. There, east of Windy Point, separated by c.220m of very turbulent water (Boat Passage) are the two satellite islands of Macauley, Haszard and the smaller, seemingly unnamed one we jokingly called "Haszardette" (Fig. 2). Haszard is deemed unclimbable and the only landings that I know have reached the island's summit have been made by helicopter. For the sake of brevity I will not recount

the island's past history here; for this you can read the accounts given by Sykes (1977), de Lange et al. (2004) and Barkla et al. (2008). All that you really need to know is that the island once supported feral goats and that, prior to their eradication in 1970, these animals had reduced much of the island's vegetation to the world's largest *Microlaena stipoides* "bowling green".

Prior to the expedition, my Christchurch-based Department of Conservation (DOC) colleague, Terry Greene, who had visited Macauley twice, had advised

Fig. 2. Hazard and Haszardette Islands as viewed from Windy Point, Macauley Island. Note the extensive areas of die back on Haszard and Windy Point caused by a combination of salt and wind burn from the passage of Tropical Cyclone Bune. The main vegetation in the foreground is *Scaevola gracilis* and Kermadec ice plant (*Disphyma australe* subsp. *stricticaule*). Image: PdL.

me that landing by sea was going to be "epic" and that we'd be lucky to get on the island, let alone off again, without helicopter assistance. He suggested that we try and land on the northern side near Windy Point where there are two ravines known as "Quadrant" and "Access" Gullies, and which provide "easy" access to the plateau. Terry warned us to stay well away from the cliffs which were very unstable, and certainly not to risk camping beneath them. He also advised that we take plenty of water, as there is no water source on the island, which he happily described as "hot as hell during the day and bitterly cold at night". He warned us also of earthquakes which he'd experienced during his 2006 visit to the island. As a final encourager Terry stated that the *Hypolepis dicksonioides* fernland that now dominates the vegetation of Macauley was a "*&^%" to get around.

With Terry's advice in mind, and to comply with our DOC health and safety plan, we had so much gear that we had to employ two additional porters to assist us with our Macauley landing. Our porters were expedition leader Tom Trnski and expedition photographer Richard Robinson both of whom had to be briefed on landing procedures and whose clothes and footwear had to be minutely inspected to ensure that no unwanted organisms(s) got onto Macauley. Our own gear, which included enough water and food for five *enforced* days on the island, as well as tents, medical supplies, clothes and extra collecting gear, had been carefully packed back in New Zealand under strict quarantine conditions. All these measures are absolutely essential, especially as Macauley is still ant free (all of the Northern Kermadec Islands Group are crawling with ants) and potentially rodent-free, and we need to keep it that way.

Soon, all loaded up and ready, we found ourselves zipping along the northern coastline of Macauley. From a landing perspective Macauley was simply terrifying, with a coastline dominated by mostly sheer cliffs dropping straight into the sea. These were only broken in some places by a narrow margin of massive truck-sized basalt boulders, which in skipper Matt Jolly's opinion seemed to provide about the only reasonable landing point. That morning the sea swell was running rather high and crashing in great plumes of spray all along the coast. So despite the idyllic sunrise and crisp blue morning sky none of us felt that enthusiastic about landing. Still we had to at least try, so after scooting between Macauley and Haszard Island to check on options on the southern side we returned to trying a landing within the proximity of the ravines Terry had mentioned. As always we were going to undertake a bow landing. To achieve these Matt preferred places where he could "plant" (his words) the bow into a cliff or boulder face rather than risk the alternative of being stranded on a shoreline and then getting swamped by the next wave. This is all fine and dandy but when you have lots of gear to handle, slippery rocks and very big swells to contend with, it means that absolute precision and perfect coordination between skipper and landing party is essential. Luckily our past weeks training at the (by comparison) recognisably more passive landings in the Northern Kermadec Islands Group (see de Lange 2011b,c) had done us proud. Without that training I seriously doubt that we would have tried landing on Macauley in the conditions we were faced with that morning.

Matt selected a piece of boulder-strewn coastline some distance west of the main "Access Gully" ravine and all too soon we were speeding toward the designated landing area. At the landing, Warren went first to set up a safe place to store our gear and then he assisted Tom and Richard up. Once secure they all worked as a chain whilst I passed gear up from the heaving boat. Then it was my turn to leap up on to the wet, slippery rock face and hope for the best. Now began the carefully measured, slow, back-breaking task of lugging barrels over the very slippery truck-sized boulders the kilometre or so to the "Access Gully". It wasn't fun either and we had to do it quickly, because Matt was still offshore in '*Thomas*'

waiting for Tom and Richard to return. So over the boulders and around them we went, ever watchful of the next wave and taking care not to slip. Eventually we reached the entrance of the "Access Gully". I checked my watch. It was now 6 am and we had made the landing and ravine entrance all within 40 minutes. So far so good.

"Access Gully" (Fig. 3) is a huge ravine system that starts as a narrow defile on the Macauley Plateau close to Macauley Crater (the inland twin of the coastal Mt Haszard Crater). From there it cuts steeply down into the soft dacitic ejecta that forms the

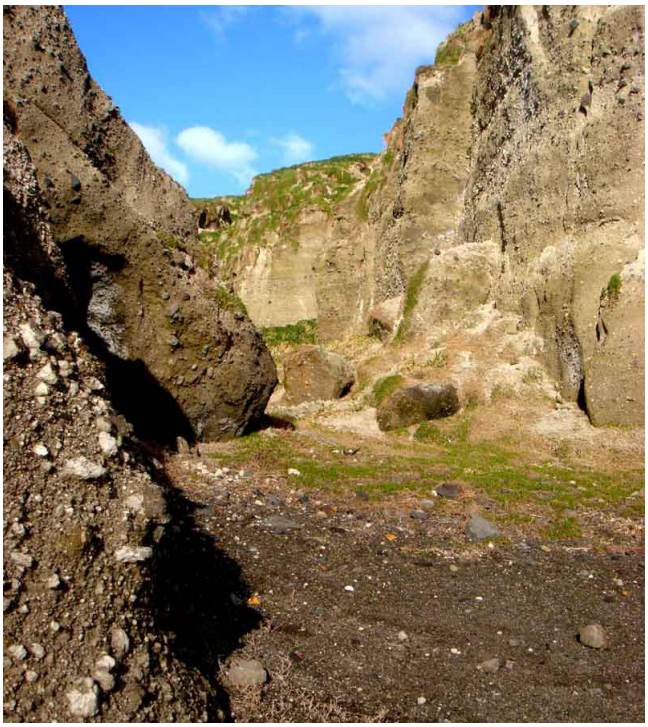

Fig. 3. Entrance to Access Gully, Macauley Island. Image: PdL.

plateau until it eventually hits the less porous basalt lava basement rock near the coast. While it provides access to the plateau, clambering up it was not easy. Over the years countless millions of seabirds had burrowed every square metre of the ground so that each step was an unknown venture in attempting to stay upright as unseen burrows collapsed beneath you. Of course each burrow collapse necessitated stopping, checking and then if required, digging out the often justifiably enraged occupant. Mercifully very few burrows were occupied and no birds were injured. However, under these conditions progress was incredibly S-L-O-W, made worse by the ravine floor being densely covered in waist high *Hypolepis* fernland. Although one is usually excited to see this fern in New Zealand, on the Kermadecs I was not. All those I'd interviewed about Macauley were emphatic; this fern was "**evil**". It not only hid burrows and razor sharp rocks, but also retained last season's fern stipes. These dried with finely honed tips that cut through your flesh as effectively as any surgeon's scalpel. Thus, within minutes of encountering the fernland all of us were bloody, sweaty, swearing, and thirsty, and thanks to a persistent morning breeze blowing down the ravine, finely covered in a film of girt. Finally, with time against us I had no choice but to send the pair *trying-not-to-appear-so-delighted-at-my-decision-to-let-them-go*, Tom and Richard, back down the ravine to depart with Matt. It was now up to Warren and me to find a way up the ravine walls and on to the plateau. By now I had already badly lacerated my right knee on a hidden, razor-sharp scoria block and, as I was bleeding copiously over just about everything, it was agreed that I'd ferry barrels up the ravine while the so far *not-so-seriously-lacerated* Warren went ahead to find a route out of the "Access Gully Hell". Eventually Warren found a good path up though a series of scoria tuff blocks and talus to the plateau level. Using this route (which we rigidly stuck to from then on to prevent collapsing yet more burrows) it still took another hour to get all the barrels from the shore up the ravine and on to a narrow ecotone between the two main vegetation types on the island, the dominant *Hypolepis* fernland and *Cyperus insularis* sedgeland. This was to be our campsite for the next two nights (Fig. 4). We selected

Fig. 4. Campsite above Access Gully, Macauley Island perched on the ecotone between *Hypolepis dicksonioides* fernland and *Cyperus insularis* sedgeland. Image: PdL.

it for two basic reasons – the good environmental reason – so as to minimise burrow damage, and the second (and being honest – the key reason) because by now we were both thoroughly fed up lugging gear, gear that we'd only have to lug back to the coast in two day's time. All said, our camp site wasn't that bad. We had great neighbours, sharing it with eight Tasman boobies (*Sula dactylatra tasmani*), and myriad white-naped petrels (*Pterodroma cervicalis*) (Plate 1B) and black winged petrels (*Pterodroma nigripennis*) whose burrows we had to try and avoid trampling, collapsing or erecting tents on. For variety we also noted a few Kermadec kakariki (*Cyanoramphus novaezelandiae cyanurus*) who scampered rat-like from amongst the fern and

Cyperus to rummage about in our food barrel when they thought we weren't looking. Macauley Island is the stronghold for white-naped petrels (which are now extinct on Raoul and scarce elsewhere in the Pacific (some people even regard them as endemic to Macauley, but a few individuals of this species are known to nest on Phillip Island in the Norfolk Island group) (Heather & Robertson 2005). Anyway, by the time we had set up camp (8.30 am) the sun was now well up and it was getting very hot, so while having a much needed drink it was time to contemplate our surroundings. Macauley certainly looked beautiful! Surrounding us was a sea of verdant green *Hypolepis* that stretched right across the plateau (Fig. 5). In only a few places was this green sward broken by smaller strips of blue-grey *Cyperus* sedgeland or the grey sinuous lines of apparently dead vegetation. No trees broke the landscape. The sky was full of sea birds, again mostly white-naped and black winged petrels.

Having no set game plan we decided we'd "amble" over to Mt Haszard and then see if we could find the Kermadec poplar (*Homalanthus polyandrus*) tree that

Fig. 5. *Hypolepis dicksonioides* fernland – now the dominant vegetation type on Macauley Island. In the distance can be seen the other main vegetation type on the island, *Cyperus insularis* sedgeland. Image: PdL.

had been found near the Macauley Crater (see Barkla et al. 2008). This tree we thought would allow Warren to set up his malaise trap to catch invertebrates. On the way we thought we'd keep an eye out for any sign of rats. The whole jaunt we naively thought would take an hour or so (Macauley is after all only 1.5 km wide) and, stupidly, we did it without wearing overalls.

We soon learned that Macauley was **horrible**. Traversing the fernland and *Cyperus* sedgeland was one thing, the collapsing burrows ("like snow plugging" said Warren) another, but it was also *really* hot and humid, so that within minutes you were covered in sweat, blood, grime and so absolutely, ridiculously, super, super thirsty. While it is indeed a privilege to visit such islands as these, and also appreciating that, with the passage of time one tends to forget the nasty bits, I don't think I will ever forget how utterly unpleasant it was traversing that plateau. Likewise the treck up to Mt Haszard seemed to take an eternity.

On the way, we found that, although crossing through the fernland and/or sedgeland provided little difference in terms of personal suffering, the areas of die back we'd seen from the campsite were marginally better (Fig. 6). They were also, botanically more interesting. Although for the most part they were covered in dead *Solanum* (probably both *S. nigrum* and *S. nodiflorum*) and *Euchiton sphaericus,* in places this was broken by a beautiful glaucous-green turf of mostly *Oxalis thompsoniae* (this mercifully held the soil together really well and so provided a reasonably safe place to walk or sit on). In these places we found

Fig. 6. Die back area. In this image can be seen a young *Sicyos mawhai* and a few patches of *Cyperus brevifolius* and *C. insularis*. Image: PdL.

occasional plants of *Pteris tremula*, swards of *Carex kermadecensis*, small vines and numerous seedlings of *Sicyos mawhai* and masses of mostly seedlings of *Gamochaete calviceps*, *G. coarctata*, *G. simplicicaulis*, *G. subfalcata*, *Conyza bonariensis*, *G. sumatrensis*, *Pseudognaphalium luteo-album*, and *Bidens pilosa* most of which I later identified from growing them on in Auckland. In some places, shrubs of Devils horsewhip (*Achyranthes velutina*) were common. There were even a few stunted ngaio (*Myoporum rapense* subsp. *kermadecense*) providing some hint of

a future forest in the making. These areas of die back, we soon found, owe their origin to underlying percolation tubes (some of which we fell through). These are formed by tunnel gully erosion stripping the soil and saprolite from underneath the root mat. I suspect that these tubes are responsible for killing the overlying vegetation and that they ultimately feed existing ravine systems, or if not, they herald the onset of new ones.

Fig. 7. The summit cliffs forming the northern wall of the Mt Haszard crater. The main vegetation covering the base of the crater is 1–3 m tall Kermadec ngaio (*Myoporum rapense* subsp. *kermadecense*). Image: PdL.

By 1.45 pm we had finally made the summit of Mt Haszard, not bad considering that we set out for it at 8.30 am! Here we patched up our numerous wounds, and ate our lunch in the warm sun, perched on the summit cliffs which swept down in a series of tiers to the dark blue sea some 200m below. Whereas most of the cliffs ringing the island are made from dacitic ignimbrite, the cliffs below Mt Haszard are part of the Haszard Crater system and are formed from much harder scoriaceous welded tholeiitic basalt tuff and tephra (Fig. 7). These, although fully exposed to the elements and very dry are much less prone to the sudden collapse typical of the rest of the island's ignimbrite cliffs. As such they support a surprising diversity of plants. The most common "honorary plants" though were lichens of which I had soon collected many. Mosses were also common, though as with The Meyers and Herald Islets the main mosses seen were *Bryum dichotomum* and *Fissidens linearis* var. *linearis*. The most common liverworts encountered here were the beautiful turquoise-coloured *Plagiochasma rupestre* and ubiquitous *Frullania pentapleura*. Small stunted plants of *Asplenium shuttleworthianum* and *Doodia squarrosa* were also common. On one portion of cliff face I found *Cheilanthes distans* a new record for the Kermadec Islands group (see Sykes & West 1996). In this area we also rediscovered *Doodia australis*, the Macauley plants differing somewhat from the most common race of this species in New Zealand by their

Fig. 8. Devils horsewhip (*Achyranthes velutina*) shrubs growing with Ipomoea cairica and a little *Cyperus insularis* on scoria talus below the first tier of cliffs near Mt Haszard, Macauley Island. Image: PdL.

long creeping rhizomes. Below this first tier of cliffs on a fine scoria talus grew a stunted ngaio shrubland *cum* forest (in places up to 5 m tall) (Fig. 7). Probably the most common ground cover within this area was *Ipomoea cairica*, followed by numerous shrubs of Devils horsewhip and the scrambling *Scaevola gracilis*. Devils horsewhip (Fig. 8) was first discovered in the Kermadecs on Macauley Island in this site by Terry Greene and his team during their first visit to the island in 2002 (de Lange et al. 2004 – wherein I conservatively treated it as *A. aspera* s.l. Later, on the advice of Bill Sykes supplemented by my own research, I corrected this name to *A. velutina* in Barkla et al. (2008)). Amongst the many differences between *A. velutina* and *A. aspera* is the fact that *A. aspera* is a weedy annual while *A. velutina* is a long-lived, woody perennial shrub). At that time of its original discovery Terry Greene and his team found only a few shrubs. Four years later Barkla et al. (2008) recorded it as having increased its range, reporting it from the original site on the seaward north-western cliffs of Mt Haszard and also from near Windy Point. During our visit, Devils horsewhip was still very common on the north-western cliffs (though in many of the sites where we saw it there, it was now at risk of being smothered by *Ipomoea*), but it had also spread into some of the die-back areas of the adjacent plateau and was now present in some

ravine heads as well as at Windy Point. At the time of our visit the distinctive whip-like inflorescences of this plant set with spiny fruits were absent, though one plant was sporting a few minute flower buds.

Aside from Devils horsewhip, growing amongst the tangles of *Ipomoea* I spotted an almost prostrate, solitary poroporo (*Solanum aviculare*). This species had been reported (though not collected) from Macauley by Thomas Cheeseman when he landed there in 1887 (Cheeseman 1888). In this area I was also rewarded by finding a solitary Kermadec nettle tree (*Pouzolzia australis*) perched at the head of a vertical slot dropping straight into the sea. The Kermadec nettle tree had been reported from the island by W.R.B. Oliver (Oliver 1910) who it seems did not collect a substantiating voucher. With such interesting finds to keep me going, I was happy to spend a few hours on these cliffs, relishing not only the finds but the fact that here at least you weren't paying in blood for every step taken. Still, the cliffs were not for the faint hearted; one had to be careful, in one place an ill-judged move cost me my prized geological hammer – owned for 27 years and an essential tool for collecting saxicolous lichens – I swore freely as I watched it plummet 200m into the sea below.

Eventually it was time to return to search for the Kermadec poplar. This tree proved remarkably elusive but eventually we spotted a dark green mass rising above the fern-land south-east of the Macauley Crater (Plate 1C), and an hour or so later we arrived at a thicket of Kermadec poplar trees, shrubs, and seedlings congregated around the now dead parent tree (Fig. 9). Much to our delight we also noted a further 12 trees scattered up to c.600m distant from this central "*Homalanthus* Bush" as we now called it (Plate 1D). Although the scattered trees had all been damaged by Tropical Cyclone Bune, they were covered in epicormic regrowth, and in fine fettle. This find, along with the local presence of ngaio shrubs growing in the die-back areas across the plateau, the presence of numerous land crab burrows, and the absence of any signs of scavenging of the freshly dead petrels that we saw from time to time, all suggest that kiore have indeed been eradicated from Macauley. While this observation remains to be confirmed, it does suggest that the observed lack of regeneration of the sole Kermadec poplar seen in 2006, was not the result of Kermadec kakariki predating all the seed of the sole tree seen (Barkla et al 2008) but that it was probably rat predation instead. This fits with my own observations of rat predation of the fruits and seeds, resulting in a complete lack of regeneration of the related *H. nutans* in the rat-infested cloud forest of Rarotonga (see de Lange 2010a). Further, based on the rate of spread of Kermadec poplar since it was rediscovered on the island in 2006, it will be interesting to see what Macauley will look like in say another twenty years. It may be that by then some of the *Hypolepis* fernland will have given way to a Kermadec poplar (and probably ngaio) shrubland and/or forest.

To our surprise, by 4.30 pm it was getting disturbingly dark, and fast too as the sun had now set behind Mt Haszard. Even with hard out "snow plugging" it still took us another hour and a half to reach our camp site, by which time it was nightfall. Also, as Terry had warned us, the wind had now got up and it was freezing cold. So wearing all the clothes we had we made a hasty hot meal and then waited it out in our sleeping bags for our 7 pm radio 'sked' with the *Braveheart*. By this time our camp site was a hive of activity as numerous white-naped and black winged petrels, and a few wedge-tailed shearwaters (*Puffinus pacificus*) fought it out around our tents. With this rowdy company it was not to be a restful night.

Fig. 9. The original and now dead Kermadec poplar (*Homalanthus polyandrus*) lying within "Homalanthus Bush". Image: PdL.

The next day we got up early and, both of us having surveyed the mess our legs and arms were in, decided that this time we'd don overalls. On this day we first explored the eastern coast, heading down "Access Gully" to the shoreline. The shoreline vegetation of Macauley, in the few places where we managed to reach it, was pretty bleak – mostly large mats of *Scaevola gracilis*, Kermadec ice plant (*Disphyma australe* subsp. *stricticaule*) and native spinach (*Tetragonia tetragonioides*). Sometimes there were patches of *Ficinia nodosa* and toward Windy

Point there was plenty of *Calystegia soldanella*. All too soon though we were forced by a huge cliff face, strong winds, and rapidly rising tide to retrace our steps back from the base of Windy Point to the entrance of "Quadrant Gully" (Fig. 10). This was initially a narrow split (1 m wide) in the cliff face which eventually broke out into a series of fern-choked amphitheatres. At the head of "Quadrant Gully" we found that you can easily climb up to the plateau and that this also provides kinder access to Windy Point than we would have experienced had we taken the more direct route across the fernland of the plateau from our campsite. It was also while climbing up "Quadrant Gully" that we experienced what we thought was a minor earthquake. The most frightening aspect of this was the fact that, at the time, we were in a very narrow part of the ravine. Earthquake aside, "Quadrant Gully" was mostly given over to *Hypolepis* fernland, though in one place a mass of shining spleenwort (*Asplenium oblongifolium*) grew in association with *A. shuttleworthianum*, and what seems to be a hybrid between both these ferns (a first for the islands as the earlier Kermadec Islands (Raoul and Meyer Islands) record originally attributed to this hybrid combination is now deemed to be *A. northlandicum* × *A. shuttleworthianum* (see Sykes & West 1996)).

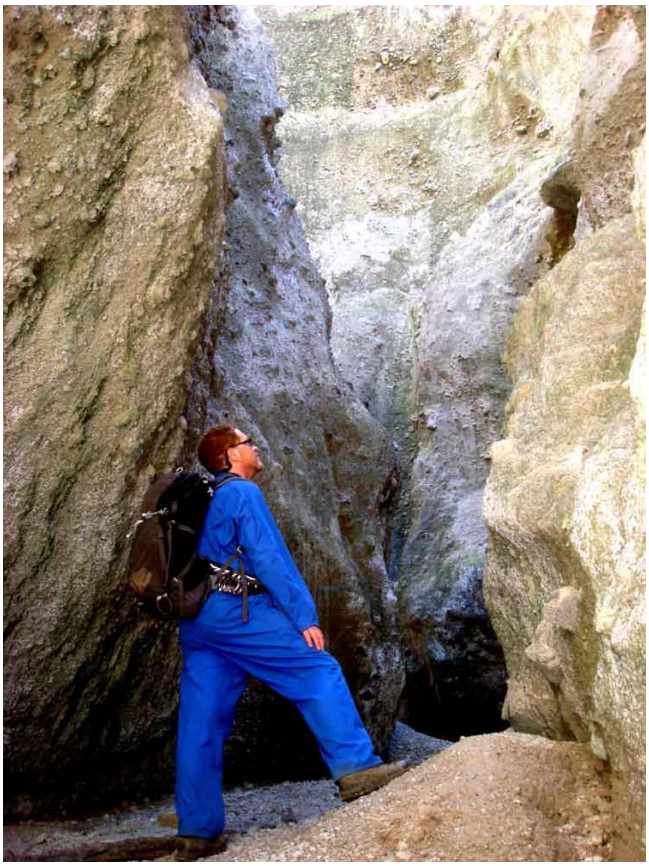

Fig. 10. The entrance to Quadrant Gully, Macauley Island. The author is admiring a boulder jammed in the narrow ravine gap, joking at the time about what would happen if we would experience an earthquake, which we did only five minutes later. Image: WC, with author's camera.

From "Quadrant Gully" we traversed Windy Point and the southern cliffs, searching in vain for any signs of *Lepidium* aff. *oleraceum* (g) (for an interim description of this unnamed entity see de Lange 2010b and de Lange et al. 2010), which had been seen in this area by John Barkla in July 2006 (see Barkla et al. 2008). Eventually we dropped into the impressive "Grand Canyon" which is the largest and deepest of the ravines on the island. It took some time to traverse this as it was botanically rather interesting, containing such unexpected treasures as the large thalloid liverwort *Dumortiera hirsuta* (which had originally been discovered on Macauley by Bill Sykes (see Campbell 1977) but not seen since), and also *Blechnum norfolkianum* (another species reported but not collected by Thomas Cheeseman during his 1887 visit, and then not seen on Macauley since). I also collected here what proved, upon cultivation back in Auckland several months later, to be *Hydrocotyle moschata* var. *moschata* – another new vascular plant record for the island. After an hour or so, we climbed up out of a tributary ravine to continue our way along the southern coastline, past "Goat Valley" and over to the "Slaughter Cliffs" where I was delighted to find a small amount of *Tetragonia implexicoma*, yet another new record for the island. Although this coastline was rather scenic and afforded us excellent views of our next destination, Curtis and Cheeseman Islands, eventually we had to turn inland for "*Homalanthus* Bush" to retrieve Warren's malaise trap. While Warren headed for "*Homalanthus* Bush" I explored Macauley Crater, seeing as I did numerous welcome swallows (*Hirundo tahitica neoxena*) zipping about the place and also a solitary spine-tailed swift (*Hirundapus caudacutus*) whooshing around in the pursuit of some hapless flying insect.

The crater was, by comparison to the rest of the island, far more horrible (Fig. 11), being covered in 1.5–2 m tall *Hypolepis* fern and virtually nothing else. However, along the base of south-western crater wall amongst some scoriaceous tuff blocks I found a small amount of *Adiantum cunninghamii* (another new record for the island). Eventually after a reasonable search of the area I went back to "*Homalanthus* Bush" to see how Warren was getting on, and while I waited for him to finish packing up his trap I collected a bracket fungus (*Ganoderma applanatum*) from the stump of the original 2006 Kermadec poplar tree (the fungus is also a first record for Macauley). Then we had to beat a hasty retreat back to our campsite, as the sun had already set behind Mt Haszard and it was getting dark and really cold again. Luckily we had our torches and we could retrace our track from the previous day. During this last stretch I found a few *Sonchus kirkii* whose inflorescences had been seriously damaged by Kermadec kakariki. These specimens, and a few seen in "Access Gully" earlier that day, were the only examples of this species I saw on the island.

Fig. 11. Author covered in sweat, dirt, *Hypolepis* spores and blood, standing on the rim of Macauley Crater with ridgeline leading to Mt Haszard visible in back ground. I took this to remind myself of how nasty getting around Macauley Island can be. Image: PdL.

Back at our campsite whilst we cooked dinner, Warren pointed out what we initially thought were three white herons (*Egretta alba*) in flight near the mouth of "Access Gully". We eventually decided that they were the white-phase of the reef heron (*Egretta sacra*), with which I am familiar from my work on the Cook Islands (where it is called "*koutuku*"), and which is the typical tropical race of this usually dark grey (in New Zealand anyway) species. At our 7 pm radio 'sked' that night we also learned that our little earthquake had been a sizeable 6.1. We really had no idea. The night passed with the usual blustery and chilly wind, interrupted by intermittent heavy down-pours and hail. Mercifully this had all cleared by 5 am when we broke camp under a beautiful, crisp, moonlit and star-studded early morning sky. Donning headlamps, we started the long slog down the "Access Gully" and it was only then that we noticed the earthquake damage that had occurred in this ravine the previous day. From what we saw, we agreed that had we dallied there the previous morning on our way to the coast, we might very well have been seriously injured or even killed. By the time we reached the coastline, the sun was now rapidly rising, bathing the normally pinkish white cliff faces pale orange (Plate 1E).

At the departure point on the boulders, we sat perched on the slippery rock nervously watching the huge swell and crashing waves. To relieve the tension, I attempted to collect some seaweed, with Warren doing point duty, but after one very nasty scare I gave it away. Soon we saw the tender '*Thomas*' coming toward us, skippered by Matt and with a crew of three (Ged Wirren, Steve Urllich and Ashley Manghley) who had come to assist us with getting off the island. Because of the conditions we advised our helpers to stay put and we'd pass our gear to them. This worked well although the whole process was painfully slow, taking over an hour and half, with Matt critically judging each swell to prevent crashing into the rocks or capsizing the boat. Eventually, we got off Macauley, thankfully without any serious injuries or mishaps. As we sped away I certainly had mixed feelings about Macauley. The island had undoubtedly been a rewarding place to visit botanically, and we'd made some significant finds, adding 23 vascular plants, 10 liverworts and 28 mosses to the known flora, but as I surveyed the numerous lacerations, abrasions and bruises that the island had carved into my legs, I had to agree with Terry Greene's assessment that Macauley is indeed "hell".

Once back on the *Braveheart* we ate a much needed breakfast as the ship upped anchor and headed for Curtis and Cheeseman Islands (Plate 1F), which we reached that afternoon (May 23rd). Here we set anchor in the Stella Passage which lies between Curtis and Cheeseman islands (Fig. 12). Despite the glorious weather, a major low pressure system east of the Kermadecs was still driving a huge easterly swell, and this made the prospect of landing on Curtis rather dubious. In any case, Tom Trnski, having seen the state of our legs and arms, had ordered Warren and me off to get medical attention from the ship's medic Broughty (Broughton) Lattey. Broughty advised a rest day, and so, with our legs sporting numerous patches of iodine war paint, Warren and I set to, processing our Macauley gatherings on the warm sunlit deck while the dive team excitedly got ready for their first dive of the day.

Fig. 12. The western side of Curtis Island as viewed from the saddle between the Northern and Southern Summits of Cheeseman. Despite our best efforts the high seas made landing on Curtis simply too dangerous. Image: WC.

Plate 1A. Macauley Island northern side looking west up toward Mt Haszard. Image: MF.

Plate 1C. Kermadec poplar (*Homalanthus polyandrus*) thicket, southeast of Macauley Crater, Macauley Island. Image: PdL.

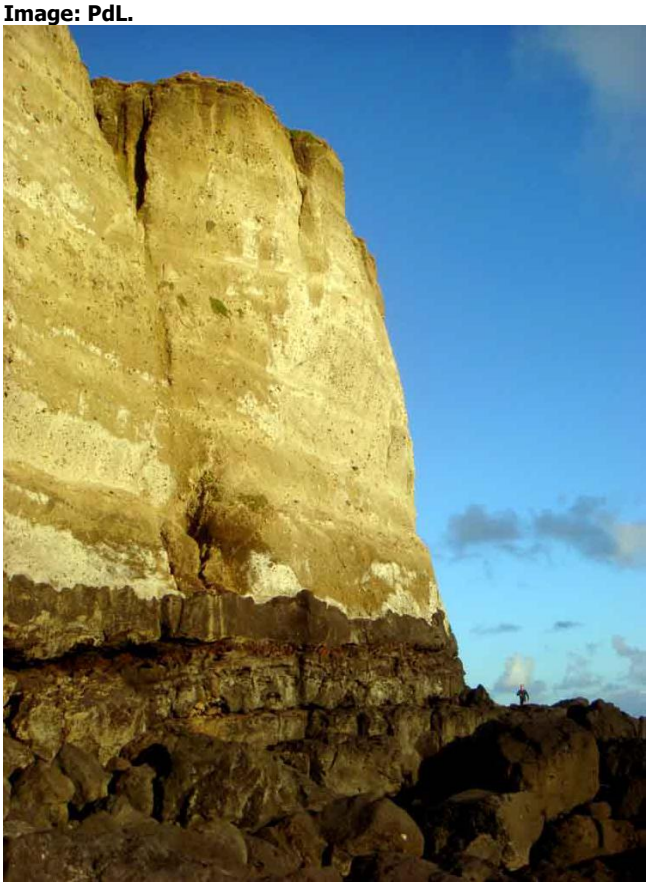

Plate 1E. Northern coastline of Macauley, at sunrise. Note Warren Chinn at the base of the cliffs. Image: PdL.

Plate 1B. White-naped petrel (*Pterodroma cervicalis*), Access Gully, Macauley Island. Image: WC on PdL's camera.

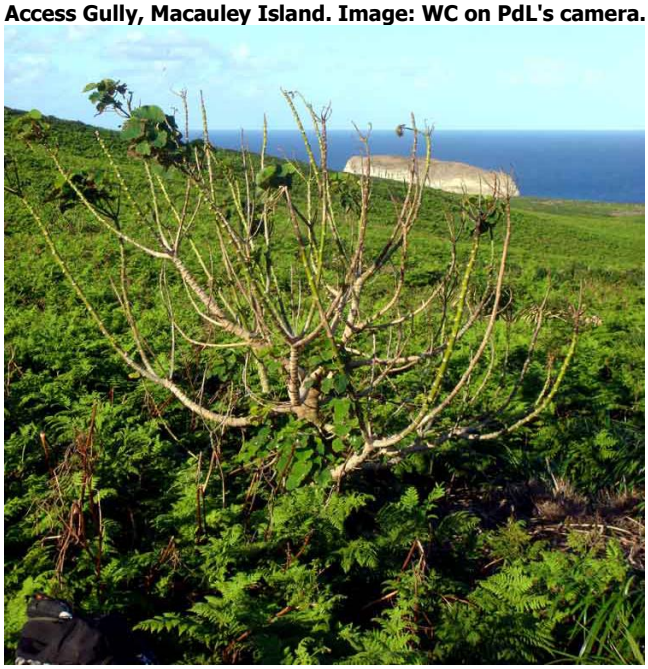

Plate 1D. Kermadec poplar (*Homalanthus polyandrus*) sapling, one of 12 seen on margin of a die back area c.600 m from the 2006 Kermadec poplar find. Image: PdL.

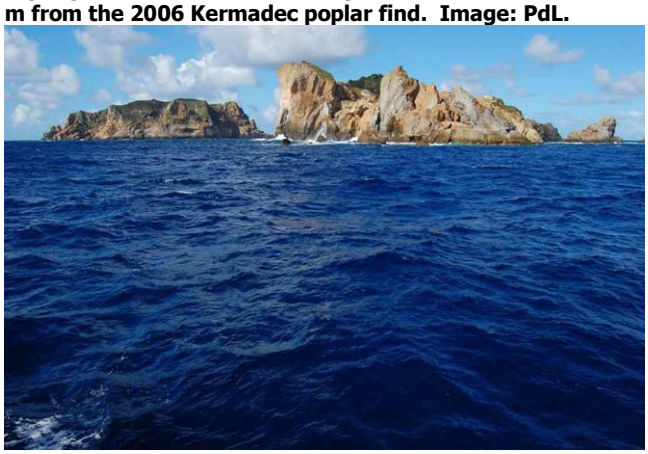

Plate 1F. Curtis (left) and Cheeseman Islands as viewed from the north-west. Image: PdL.

Plate 2A. Cheeseman Island, bottom of "*Cyperus* Gully" looking north. Image: WC.

Plate 2B. Cheeseman Island, view of southern summit taken from northern summit. Image: WC.

Plate. 2C. Sunrise over L'Esperance Rock, at 5.48 am, 26 May 2011. Image: PdL.

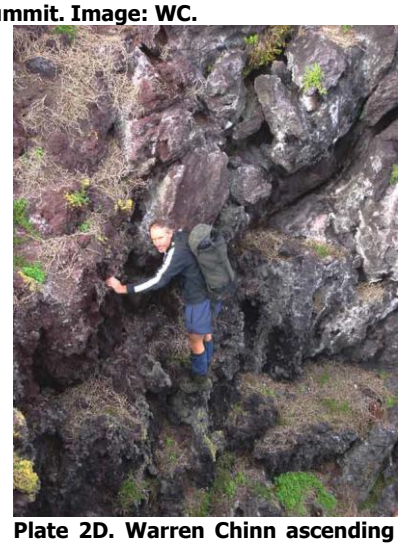

Plate 2D. Warren Chinn ascending L'Esperance Rock. Image: PdL.

Plate 2E. *Senecio lautus* subsp. *esperensis* cultivated at Oratia Native Plant Nursery, October 2011. Image: PdL.

Plate 2F. The southern summit of L'Esperance Rock (70m a.s.l.). Image: PdL.

Fairly soon it seemed, the divers had returned and they were a pretty perplexed bunch too, for they found that when they entered the water, all they saw were numerous fish swimming about completely bare volcanic rocks that dropped steeply into the depths below. There were no seaweeds, corals or sponges, and molluscs were scarce. Clinton Duffy likened diving around Cheeseman Island to diving through a drowned city of sky scrapers.

That evening, Gary Melville, a keen Ornithological Society of New Zealand member, and I sat in the wheel house, bird field guide in hand (Heather & Robertson 2005), watching the grey ternlets (*Procelsterna cerulean albivitta*) and the occasional, slightly larger and darker common noddy (*Anous stolidus*) coming in to roost on a series of ledges near the entrance to the crater on Curtis Island. On dusk we also saw plenty of little shearwaters (*Puffinus assimilis kermadecensis*), a few wedge-tailed shearwaters, some black-winged petrels, Tasman boobies and one rather odd-looking, moderately large black-headed petrel with a distinctive white breast, belly and long pointed under tail (whose extremities were broadly pigmented dark brown-black), while the wings were held dead straight at right angles to the body. This bird was easily distinguished from the other petrels seen on the trip so far by the uniformly brown under wings divided about the middle by a narrow longitudinal white line that extended along the wings above the pale brown primaries. We decided that this bird could only be a Tahitian petrel (*Pseudobulweria rostrata*), a decision reached using not only the field guide we had, but also by consulting a series of excellent pictures of Pacific Petrels held in the *Braveheart* library. These had been gifted to Nigel Jolly by an international ornithological team the *Braveheart* crew had taken around the South Pacific Islands a few years back. Back in New Zealand many months later, our identification was confirmed by DOC Seabird scientist Graeme Taylor who (*pers. comm.*) noted that these petrels are found in all the main islands to the north, east and west of the Kermadecs, and that they are known to occur in the northern waters of New Zealand during May, so it seemed it was not that surprising to see them in the Kermadecs.

The next morning bright and early, Warren and I set off for Cheeseman Island. We had wanted to try Curtis first but the surge was still too high and Matt Jolly judged the landing simply too dangerous. Alas in my rush to organise our gear, I stupidly left my camera behind, a fact I only realised as we came in for our first attempt at landing on Cheeseman (and there was no time to go back and get it either!).
Cheeseman and Curtis Islands were formally contiguous but, through erosion, earthquakes and possibly volcanic activity, they are now the two islands we see today, separated by the shallow (c. 20 m deep) Stella Passage. The western side of Cheeseman is precipitous and pretty much unclimbable without specialist equipment. Nevertheless, Terry Greene, who had briefly visited the island by helicopter in July 2002, thought that a landing on the eastern side was feasible, and so we had already scouted this out by boat on 11 May during our passage up to Raoul. It seemed OK, easy even. We soon found that this was indeed the only place that you could safely land, and that even then it was "marginal".

Fig. 13. Looking south-east over "Cyperus Gully", Cheeseman Island, from the northern summit. Note the jagged rock outcrops on the RHS - it was through these rocks that we had to scramble up from the sea. Image: WC.

Once up past the now all-too-familiar slippery rocks, Warren and I began to climb through a truly bizarre moonscape of hydrothermally altered rocks and fossil sinter field (Fig. 13). We noted that the rock of this part of the island gleamed as if it had been scrubbed clean, and it took quite some climbing before we finally started finding the usual saxicolous lichens, seen much lower down on the shoreline of all of the other Kermadec islands we'd explored. Eventually we started finding "real" plants; initially a few battered *Asplenium northlandicum*, and then, rather unexpectedly, thousands of *Sonchus kirkii* seedlings—I have never seen so many of this species growing in a single stand before. Slightly higher up grew the island's dominant vascular plant, Kermadec ice plant, scattered through which was New Zealand spinach, seedling wind grass (*Lachnagrostis littoralis* subsp. *littoralis*), allseed (*Polycarpon tetraphyllum*) and *Parietaria debilis*. Finally we reached a deep fault-bounded gully (Plate 2A) at the base of which was a jumble of boulders, and also several large, stagnant, brackish pools of fairly recent origin, to judge from the drowned, *in situ* specimens of *Ficinia nodosa* and *Cyperus insularis* (Fig. 14). The rest of this gully was dominated by *Cyperus*, so, as it had no obvious name, in a blinding flash of originality we elected to call it "*Cyperus* Gully". It was also here that we started finding occasional flowering shrubs of *Solanum nodiflorum*.

One oddity about Cheeseman that really struck us was that it was also completely silent — no birds

Fig. 14. Cheeseman Island, brackish pool at base of "Cyperus Gully". Image: WC.

shrieked at us or flew overhead, or squawked abuse at us from the burrows that we passed by. Indeed it took quite some war whooping before a solitary black-winged petrel squeaked an answer to me. It was this peculiar absence of nesting birds, the pools of brackish water, and large expanses of clean, unweathered rock surfaces, together with the general ill thrift of Kermadec ice plant, that suggested that Cheeseman too had been thoroughly pummelled by Tropical Cyclone Bune. Not long after that we also began to notice a foul smell, and on investigation, I found that many petrel burrows near the base of the gully head contained dead, rotting birds. I can only surmise that during the height of Tropical Cyclone Bune, torrential rain and/or storm-generated surges were cast up much of the western side of Cheeseman (which gently slopes down to the sea). These surges probably drowned the majority of the nesting birds in this area and washed the vegetation off the lower rocks into the sea. Indeed later on that day, the dive team found confirmation of this when they found intact *Cyperus insularis* plants sitting on rocks at 20 m depth directly off the eastern cliffs of Cheeseman Island. It was also agreed by the divers that the storm surges may also have stripped the submerged rocks of their usual coral, sponge and algal growth, so accounting for the bizarre barren moonscape they had encountered below water. Eventually, higher up Cheeseman, we saw a few more birds, mainly welcome swallows and a few black-winged petrels that flew by, but also one pair of Tasman boobies, a few Kermadec petrels and a solitary red-tailed tropic bird (*Phaethon rubicunda*) roosting under a ledge.

Much of the upper portion of Cheeseman comprises a complex labyrinth of razor-sharp fossil sinter rock, amongst which are vast, monotonous expanses of Kermadec ice plant. Finally, near the saddle between Northern and Southern summits, I found what I at first took to be a Kermadec ngaio before realising that this was an example of the unnamed *Lepidium* endemic to the southern Kermadec islands group. This *Lepidium* (*L.* aff. *oleraceum* (g)), allied to *L. oleraceum*, differs from that species by its taller stature, more deeply toothed leaves and finely hairy pedicels. Aside from that plant, I saw no more *Lepidium* until I had scaled the Southern Summit (Plate 2B) where, on a series of ledges just below the western side of this summit, eight shrubs and an estimated 1000 seedlings grew in a heavily petrel-burrowed area. In the same general area I also found a few taupata (*Coprosma repens*). Taupata is very uncommon in the Kermadecs (see comments by Sykes 1977), such that I had even harboured grave doubts that it ever really grew there until, that is, I found it on Dayrell in the Herald Islets. A distinctive *Ramalina* lichen growing on the jagged sinter of the Southern Summit also caught my eye. This I recognised as *R. microspora*, a tropical lichen I had collected in 2010 from Rarotonga (see Blanchon & de Lange 2011) and which has only just been confirmed as present in the New Zealand Botanical Region (Blanchon et al. 2012).

After thoroughly exploring the Southern Summit, we turned and headed over to the Northern Summit. The vegetation in this area was much bleaker, comprising mostly wind- and salt-burned Kermadec ice plant, tufts of *Cotula australis* and allseed. Near the actual summit, I was also rather disturbed to find a large crack through which we could hear the sea and from which a fine mist spewed from time to time. It soon became evident that this large crack ran through the entire Northern Summit and cut down through the rock face and into the sea some 50 or so metres below. I strongly suspect that one day, probably sooner than later, a large part of Cheeseman Island is going to drop off into the nearby channel.

Heading down from the Northern Summit we finally became bluffed and had to turn back and head down "*Cyperus* Gully". On the northern wall of the gully, I found a few large specimens of *Einadia trigonos* subsp. *trigonos*, a plant which had hitherto only been seen on the island as small seedlings, and here also, sheltered by a small overhang, grew a few plants of *Asplenium shuttleworthianum*—making Cheeseman Island the official world southern limit for the

species— and a few small tufts of *Christella dentata* (seemingly the unnamed form known in New Zealand as *C.* aff. *dentata* "thermal", and common on Raoul Island in the main crater). However, some of the species that had been collected from Cheeseman by Terry Greene in 2002, such as, for example, beggar's ticks (*Bidens pilosa*) and *Ipomoea cairica*, eluded us. Perhaps they too were casualties of Tropical Cyclone Bune.

Back at the *Braveheart* Matt and I spent some time scoping the western side of Curtis with binoculars to try to find a safe place to land on the morrow. It was not looking promising.

The next morning the swell had not abated, and so Matt, crew member Carl Rogers, Warren and I, nestled in '*Thomas*', spent a very frustrating hour being bashed about in the washing machine conditions of the surge while agonising over a "safe" place to land on Curtis. Sadly, several options that we'd thought possible, when viewed from the bridge of the *Braveheart* the previous evening, were too risky. Zipping around the coast, all the landings we saw, whilst initially very promising, ran into sheer or overhanging cliffs we simply could not scale. So finally, it was agreed that landing on Curtis was simply too dangerous and we gave it up. Although frustrated and disappointed, we all agreed that we had made the right call, so Warren and I returned to the *Braveheart* where we continued curating the rest of our collections. That afternoon, as a welcome diversion from our work, Warren and I assisted Clinton Duffy, Gary Melville and Matt Jolly with setting a long line 4 km west of Cheeseman Island. This was set at a depth of c.500m. During that time, the rest of the party took the tenders and dived off the western coast of Cheeseman, and when finished, they waited in the tenders for our return.

After we set the line Clint took to fishing off the back of the ship while we waited an hour or so to see what the long line would bring in. During that time Clint caught a few spiny dogfish (*Squallus griffithi*), and some other highly coloured weird fish with big eyes whose name now escapes me. Clint was fishing down to c.480 m depth, and I confess that I really had no idea how hard it is to reel in a big fish from that depth of water (I found out later that evening when I had a go at reeling in 500 m of line with an unknown fish or fishes attached to it, and all I can say is that it fair near killed me, and that I lost the lot at 20 m depth!). Eventually it was agreed to bring in the long line and, after what seemed ages, we suddenly came up trumps with an assortment of strange-looking fish, a few more spiny dogfish, and to Clint's immense delight three Kermadec spiny dogfish (*Squallus raoulensis*), a species he had named a few years ago from a few specimens collected off Raoul Island in 2004 (Duffy & Last 2007).

As the sun was now setting, we retrieved the rest of the dive team and crew from off the coast of Cheeseman. The dive team was by now freezing cold and extremely pleased to see us. However, when they heard all about the fish, they insisted we go back and have another crack, and so we did, catching, as it got darker and darker, an ever stranger array of big-eyed freakish fishes that got the marine people very excited indeed. Finally at about 11 pm, after yet another excellent meal of Gary's signature homemade bread, Matt set sail for our last port of call, L'Esperance Rock.

The night cruise south from Cheeseman to L'Esperance Rock was relatively uneventful. Again I was woken by the change in motor pitch announcing that we were close to L'Esperance. So while Gary Melville bustled about, sorting out another decent breakfast, I shot upstairs to see the rock that I had so wanted to land on ever since I had first read about it as a 12-year old (Plate 2C).

At the start of the expedition, we had already sailed past L'Esperance (de Lange 2011a), at the time in the teeth of a howling gale, and it had looked rather tall, black and menacing – positively unclimbable! Now as I looked at it, with the sun slowly rising behind it, I was struck by how much smaller it looked, and, well, considering the other islands we'd traversed, it seemed, rather "small toys".

Back below deck, following a Gary "special" for breakfast (bacon, sausages, eggs, baked beans, spaghetti and homemade bread served as toasted doorsteps), Warren and I carefully sorted out the gear we'd need for L'Esperance. Later as we mooched around on the deck waiting for '*Thomas*' to be launched, we both observed a very big shark slowly cruise by, a sighting which seemed predictable considering that everywhere else we'd try to land there were sharks. However, this one seemed bigger than all the rest so Clint Duffy was roused from the depths. On viewing the shark he initially thought that it was the expedition's first mako (*Isurus oxyrinchus*) sighting, but on further consideration he finally decided it was a larger than usual (for the Kermadecs) Galapagos shark (*Carcharhinus galapagensis*). Either way, it heightened our resolve not to fall in the water at this landing.

Finally we were nestled in '*Thomas*' and setting off with Matt and Broughty to try our luck on the south-western side of L'Esperance. As always, looks can be deceiving, and as we sped off we soon realised that our friend the "surge" was running as high as ever, and this our final Kermadec landing was going to be "interesting". Matt eventually selected a suitable spot and we shot in. This time Broughty decided he'd land first to assist us, as, he explained, the water was "truly narly". Broughty was barefooted, and I couldn't help privately laughing when he landed so very

Fig. 15. *Asplenium northlandicum*, the only fern seen on L'Esperance Rock, grew in most crevices and overhangs and was the dominant vascular plant of the vegetation of the western crater. Image: PdL.

Fig. 16. Seedling and the first plant of *Senecio lautus* subsp. *esperensis* seen on the ascent of L'Esperance Rock. Image: PdL.

confidently on the rock and proceeded to slip and slide all over the place. At last I felt vindicated, as, on all our other landings, when we'd pointed out how slippery it was, we'd been greeted with blunt scepticism by Broughty. However nice that feeling of vindication was, it was fleeting, as it was now my turn to land, and unlike Broughty I had a pack and an expensive pair of, frankly, utterly useless "*all conditions – firm grip – never slip* Salomon Boots", which had let me down on every other Kermadec landing on this expedition so far. So rather than risk falling in I elected to belly flop onto the rock and crawl up on my hands and knees, which, while decidedly inelegant, worked a treat. Warren was soon up as well, and now being in a "safe place" we were left to ourselves.

L'Esperance Rock is said to be comprised of "andesitic lava and intrusions" (Latter et al. 1992) but I tend to agree with Brothers' and Hawke's (1981) earlier field mapping and sample-based petrological assessment, which decided that the rock is mostly composed of subaerially deposited feldspar-rich basaltic andesites and basaltic scoria. There has also been some dispute about the height of L'Esperance Rock, with both Brothers and Hawke (1981) and Latter et al. (1992) giving this as 70m a.s.l., and everyone else giving it as c.45-46m (see Sykes 1977 and references therein). However, via Steve Gentry (*in. litt.*) I have an email from Andrew Ferrel (who works for LINZ) which shows that the geologists have it right and L'Esperance is indeed 70m a.s.l. This quibble aside, L'Esperance is, once above the slippery rocks and surge zone, very easy to climb (Plate 2D). The rock is solid, full of hand holds and, as it transpires, where we landed is probably the safest route to take up to the main saddle and summit.

Within minutes Warren and I were well up the rock and already finding our first vascular plant, a fern *Asplenium northlandicum* (Fig. 15) and soon after a single seedling of the rocks sole endemic, *Senecio lautus* subsp. *esperensis* (Fig. 16). This *Senecio* was first described as a variety of *S. lautus* by Bill Sykes (see Sykes 1971, as *S. lautus* subsp. *lautus* var. *esperensis*) and later (in de Lange et al. 2010) I elevated it to what I considered then to be a more appropriate rank for allopatric races of species: subspecies rank. On account of the small area this plant occupies (< 1 ha) it has been listed as "Threatened/Nationally Critical" (de Lange et al. 2009). Although obviously a narrow-range endemic, past accounts of this daisy's abundance on L'Esperance also varied, some considering it common and not worthy of conservation listing, whilst others believed it to be threatened by an emergency fuel dump kept on the island's summit saddle. To sort this out I had, over the last twenty years, tried to get the DOC to make a landing on L'Esperance. This all sounds easy but in fact it's not. You see, the problem of access to the rock is the real issue, because, not

only is it well outside the most direct route to Raoul Island taken by boats servicing the DOC staff there, but as we had already seen, getting to the rock itself does not necessarily mean landing on it (see de Lange 2011a). Thus I had long ago quite given up finding out the status of the *Senecio*, when the 2011 Kermadec Biodiscovery Expedition suddenly became a reality and visiting the rock (conditions allowing) possible. So that May morning, sitting on L'Esperance and finally seeing the *Senecio* was for me one of those "special" moments in my life I simply had to savour, even if I was only looking at a single 30 mm tall seedling.

As part of my work plan for visiting the Kermadecs I was permitted to uplift seed, or if this was not available, plants of the *Senecio* to bring back into cultivation into New Zealand. The objective was to lodge seed of this threatened plant (see de Lange et al. 2009; de Lange et al. 2010) within the MWH Seed Bank for New Zealand's Threatened Plants (see http://www.nzpcn.org.nz/page.asp?conservation_seedbank_info accessed 14 May 2012). As I found no seeding plants I took a small number of seedlings back to New Zealand where they were cultivated at Oratia Native Plant Nursery. In October 2011 they started flowering (Plate 2E). Unfortunately we were unable to harvest seed from these plants before they contracted *phytophthora* and died. This is concerning as *phytophthora* is easily dispersed and we now know that so many of New Zealand's island endemics are highly susceptible to this 'group' of pathogens (including for example from the Kermadecs, *Senecio kermadecensis*). Despite failing to procure seed, data was collected from the plants at Oratia before they died. The data now suggests that this *Senecio* probably warrants elevation to species rank, an aspect of this plant's taxonomy I am currently working on.

Not far from this first *Senecio* we came to a narrow cleft from which one could peer down into the "western crater". I am not sure if it is really a crater in a geological sense but it's called this on the maps of L'Esperance that I have seen and it certainly looks impressive. Within the cleft, to my delight I found many more *Senecio* seedlings, and lots of young *Parietaria debilis*. Also scattered about were numerous tiny cotyledon-stage seedlings of Kermadec ice plant and tiny grass seedlings of what I figured had to be *Lachnagrostis littoralis* subsp. *littoralis*. Peering cautiously into the crater I also saw hundreds of wind-battered *Asplenium northlandicum*, whilst the walls were coloured dark yellow and orange by a spectacular array of lichens dominated by species of *Caloplaca* and *Xanthoria ligulata*. These finds aside, the birdlife of the rock was nothing special. So far all we'd seen was a flock of very tame welcome swallows.

Finally we reached the saddle. This part of L'Esperance is where the main area of vascular plants

Fig. 17. One of a number of black-winged petrel (*Pterodroma nigripennis*) carcasses found littering the saddle of L'Esperance Rock. Note the exposed breast meat and missing head. Image: PdL.

is located, as well as the site of an (illegal) emergency fuel dump. Therefore as I clambered up over the saddle lip I was very surprised to see **no** fuel dump, indeed nary a sign that it had ever existed. Furthermore, as I peered down into the eastern "crater" I couldn't see any of the spent fuel drums that I had been told were routinely biffed there by fuel users. Warren and I therefore assumed that the fuel dump had finally been removed, perhaps by the DOC as this had been recommended in the Auckland Conservancy CMS (Anon 1995). So Fuel Hut and barrel matters temporarily resolved, we turned our attention to the saddle biota. As Warren scurried off, delightedly exclaiming "Oh look! pseudoscorpions!", I began examining every square inch of the area. It soon became evident, that – *yet again* – Tropical Cyclone Bune had made rather a mess of things. The whole area had been trashed, and the formerly dominant Kermadec ice plant cover was severely reduced, with most ice plants seen 50-90% dead. Littered through the dead ice plant I was also puzzled to see many black winged petrel carcasses, all with the breast meat exposed, and most headless (Fig. 17). Later in New Zealand, the images I took of these birds were critically examined by DOC predator experts, who concluded that the most likely culprit was a raptor of some kind (rather than something more sinister like mustelids or rodents), quite probably a harrier hawk (*Circus approximans*), as

these were known to visit the Kermadecs from time to time.

Botanically the saddle was the richest area, and it didn't take long to find the other plant Sykes (1977) had recorded from the rock, *Einadia trigonos* subsp. *trigonos*. There were also millions of *Parietaria debilis* seedlings. This was the dominant species on the rock during our visit, closely followed by the *Senecio* which frequently grew within the hollows, nooks and crannies of the scoriaceous lava forming the main saddle. However, I have no doubt that, once the Kermadec ice plant has recovered from the battering it took from Cyclone Bune, it will soon displace the *Senecio* and *Parietaria* as the dominant plant. The *Einadia* was not as common, and like the ice plant was mostly seen as seedlings, though in a few places some very large plants were present. Amongst a mass of dead ice plant I was delighted to find my first new record for the rock, *Solanum nodiflorum* which was soon noted in several sites – though again mostly as seedlings. In one place near the southern summit (Plate 2F) I spotted a small amount of *Spergularia tasmanica*, and, in a deep hole another wind grass, *Lachnagrostis billardierei* subsp. *billardierei* was found – both are new records for L'Esperance. A little later, on a steep guano-splattered slope (Fig. 18) at the eastern end of the summit ridgeline amongst the pathetic mummified remains of grey ternlets, I found another new record for L'Esperance a few battered plants of Cook's scurvy grass (*Lepidium oleraceum* s.s.), distinguished from the unnamed Kermadec endemic counterpart by their smaller stature, glabrous pedicels, acute-tipped silicles and by their less deeply serrated elliptic leaves. This area was also given over to numerous dried-off stems of last season's *Senecio* whose sheer size staggered me, some stems I measured exceeding 1.2 m in length. Obviously this endemic can reach impressive dimensions in its wild habitat. I also found here a moss (*Bryum argenteum*) and a liverwort (*Frullania pentapleura*).

After several hours of careful survey, Warren and I had noted how the landing area was looking disturbingly more and more turbulent. So we decided it was time to head down. During our descent, when both of us were mentally fretting about yet another hellishly tricky, slippery rock encounter, I suddenly remembered that I had read somewhere Geoff Baylis's account of landing on West Island in the Three Kings in which he recounted being told by Major Magnus Johnson to wear only socks when landing as they give you better grip (Baylis 1995). Deciding that I had nothing to lose by trying this, I stripped down to my socks and discovered that woollen socks **do** indeed give you grip *par excellence*. Had I only remembered this before starting the trip I'd have been spared so many scary moments getting on and off islands!

All too soon we were heading back to the *RV Braveheart*, our last stop on the Kermadec Biodiscovery Expedition 2011 over. That afternoon, aside from doing a few interviews with Alison Ballance for Radio New Zealand, Warren and I curated our specimens, and then watched as the divers came in. Much to our surprise, despite the washing machine condition of the surface waters surrounding L'Esperance, the diving was, they said, the best they'd had during the whole trip, and numerous specimens had been collected.

Fig. 18. The guano-splattered rocks at the southern end of L'Esperance Rock. This area is the key nesting site for grey ternlets (*Procelsterna cerulea albivitta*) and was where a few storm battered plants of Cook's scurvy grass (*Lepidium oleraceum* s.s.) were found. The rocks also supported a range of dark pink and grey-pink crustose, saxicolous lichens that have yet to be identified. Image: PdL.

Later that evening the end of the trip was celebrated with an excellent back-deck party, where an assortment of iPod's gave us an esoteric range of music tastes. I was surprised (and pleased) to see that, aside from the inevitable Led Zeppelin and Nick Cave, and the Aussie favourite "Daddy Cool", early Pink Floyd, Jethro Tull and Gong also figured prominently. It was very nice to have a few beers and scotches to the strains of Gong's "*Flying Tea Pot*" with other people who *actually* knew and *appreciated* the song! Bliss!

Sometime later in the evening, our friend the "Low Depression" finally decided to come in for a real show. So it was back to being tossed and bashed about in our bunks as we headed for New Zealand.

Thanks to this weather system, the following morning sea sickness had laid low many of the party, and as walking the deck was decidedly risky many of us slept, read books, or tried to eat through the remnants of the team's mountain of chocolate bars. Some hardy souls like Clint Duffy actually tried fishing off the back of the ship – though with no success. Finally after what seemed like an eternity of enforced roller "coastering", at dawn on the second day from L'Esperance, I saw to the south a long line of clouds heralding Aotearoa, and then after another hour or so, I could see the highest point of Aotea (Great Barrier Island), Hirakimata, piercing the clouds. Matt, it transpired, was putting us in at Mercury Bay for the night as a precaution because of the storm that was following us.

Early the next morning I got up and watched from the wheelhouse as we cruised past the jagged rock tors and pinnacles of the Aldermans, and then Tuhua (Mayor Island), until finally the entrance to Tauranga Harbour was sighted. As we steamed in it seemed oddly appropriate that I was listening to the strains of Neil Young's "*F**king up!*" contemplating as I was, the startled faces of the occupants of the numerous weekend boats, all (over-)fishing the harbour entrance. Thank God we have marine reserves like the Kermadecs. For our children's children's future we need more.

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Obviously none of this expedition would have happened without the remarkable perseverance of Tom Trnski, our expedition leader and master politician. Tom conceived the trip and he made it happen. On that note I'd also like to thank Nigel Jolly, owner of the *RV Braveheart*, for seeing so clearly Tom's vision and then subsidising the expedition, thus making it all possible. Gull Oil too is acknowledged here for kindly donating the fuel used by the tenders. Clearly none of the trip would have happened either without the *Braveheart* team: Matt Jolly (skipper), engineer Ashley Manghley, and the crew Broughton Lattey (also ship's medic), Carl Rogers and Gary Melville (cook). I haven't enough praise for these people who never seemed fazed by anything we set them, and who managed to find ways to land me on 98% of my objectives. I thank also DOC, in particular Allan Ross, Don Newman and Kevin O'Connor, for finding the funds, and helping us with permits and insurances so that Clinton Duffy, Warren Chinn and I could go on this expedition. The following specialists have already given so much of their time in helping put names on some of my gatherings: Dr(s) Jessica Beever, John Braggins, Dan Blanchon, John Engel, Allan Fife, David Galloway, Wendy Nelson, Matt Renner and Matt von Konrat. Terry Greene, John Barkla, Carol West, Graeme Taylor and Peter McClelland, staff of the DOC offered many useful tips to help with island landings and camping, as well as sharing their specialist knowledge of the flora and fauna of the islands. Dr Colin Miskelly of Te Papa Tongarewa, Museum of New Zealand happily discounted most of my bird records for me (he accepted the spine-tailed swift), while Graeme Taylor cheerfully accepted all of them – go figure! Geoff Davidson (Oratia Native Plant Nursery) kindly took care of the *Senecio lautus* subsp. *esperensis* seedlings bought back from L'Esperance Rock. Steve Gentry, an avid follower of the Kermadec Expedition Blog Site became a regular correspondent, and has helped answer many of my more obscure questions about the islands. I'd also like to thank Malcolm Francis and Warren Chinn for allowing me to use images they took during the expedition for this article. I also thank Warren for his company in the field, discussing the fabled existence of the "Great Spaghetti Monster" and (whether I wanted to hear it or not) declaiming - at great length – his dislike of religion. I would also like to acknowledge the expedition team with whom I worked during our time away, for their interest, companionship, humour and tolerance of a botanist's needs. So thanks again to: Mandy Reid, Mark McGrouther, Steve Keeble, Malcolm Francis, Vincent Zintzen, Carl Struthers, Steve Urllich, Ged Wirren, Tom Trnski, Warren Chinn, Charles Bedford, Richie (Richard) Robinson, Alison Ballance, and Clinton Duffy. I'd also like to thank the Hotel Carlton, Melbourne for the truly awful living conditions, and uncomfortable beds experienced while staying there for the nomenclature sessions of the Botanical Congress in July 2011, an environment not conducive to good sleep true but excellent in prompting me to write this article, which was conceived originally as a series for the New Zealand Plant Conservation Network newsletter *Trilepidea*. Thanks also to Scottish Glaswegian Band MOGWAI for helping me to find my muse whilst in Melbourne. Finally, my sincere thanks to Mei Nee Lee and Josh Salter, editors of the *Auckland Botanical Society Journal*, for taking this *very* long article and working closely with me to see it through to publication.

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Paratahi Island, Karekare – revisited

Ewen K. Cameron and Mike D. Wilcox

Since the initial botanical survey in January 1991 of Paratahi Island (wrongly spelt Panatahi on the NZMS 260 Q11 map, Graeme Murdoch pers. comm.) by Cameron (1991) at Karekare Beach on Auckland's exposed west coast, the sand has been steadily building up (Figs. 1-3). The extensive sand mass at Whatipu (Williams 1977) is steadily moving northwards with the local ocean current. Possibly the origin of the sand was the Taupo eruption of about 26,500 years ago, transported down the Waikato River and now moving north up the west coast (B.W. Hayward pers. comm. *in*: Cameron 2006: p.195). In 1991 EKC had to swim out about 50 m to reach the island at low tide, on 25 October 1999 he was just able to walk onto the island for the first time during a low spring tide, and during recent months the island has been accessible by foot from nearly mid-tide downwards – a reflection of the continuing build-up of sand at Karekare. Taking advantage of the easy access we recently separately visited Paratahi Island: EKC on 14 March 2012 and MDW on 8 April 2012.

Fig. 1. Paratahi Island, Karekare, near high tide in 2006. Photo: EKC, 4 May 2006 from Comans Track.