

THE TORLESSE RANGE lies one hour west of Christchurch by car. It is a barrier of ancient seafloor sediments uplifted to higher than 2000 metres by the same forces that raised the mountains of the main divide and the Kaikoura Ranges. The range lay in the path of the first transalpine travellers, who knew it by the name of Otarama, and who sought sustenance and solace from its valleys and peaks. It commanded the respect of Charles Torlesse, the first European to climb its slopes, who gazed at the "romantic and chaotic mass of mountains to the westward" from the mountain that now bears his name, and who named Starvation Gully when hunger forced him to choose between eating his donkey or his dog. (Both were spared by the arrival of an unfortunate weka!). Now the main transalpine highway winds over Porters Pass and through Starvation Gully at the southern end of the range and the Midland railway line follows the precipitous gorge of the Waimakariri River to the north.

Ancient Screees

To travellers on these routes the Torlesse Range may appear barren and desolate, a pile of broken rock devoid of vegetation. The finely-bedded sedimentary rocks of the range are greywackes and argillites which have been folded and twisted during uplift. When weathered by the extremes of a mountain climate, they shatter to fine fragments and form the screees that run from mountain top to valley floor. If exposed to heavy rainstorms these screees would move rapidly to feed the rivers running onto the plains.

The screees are surprisingly stable. They move only gradually, and then usually only at the surface, except in rare and catastrophic storm events. Sediment yields of the rivers draining the Torlesse Range are only a fraction of the yields of West Coast rivers which drain completely forested catchments. This is because rates of uplift and annual rainfall are significantly reduced east of the main alpine fault and in the lee of the predominant westerly winds. Dating of screees by measuring weathering rinds on rock surfaces indicate that often these rocks have hardly moved for hundreds of years.

"I was amazed at how stable the scree slope was," commented one keen participant at Forest and Bird's 1990 high country Easter gathering. "I didn't expect to be able to stay standing!" A scree only forms where the angle of the slope lies between 30 and 35 degrees; where a source of shattered rock fragments is present; and where the annual rainfall is low. Greywacke screees are found only on the east of the South Island in Canterbury and Marlborough, contributing to the bare appearance of the foothills ranges. The more specialised plants and animals that have colonised these screees are restricted to areas where the annual rainfall does not exceed 2500 mm.

Curious penwiper plants (*Notothlaspi rosulatum*) form rosettes above the rock fragments, black scree cotula (*Leptinella atrata*) and Haast's scree buttercup (*Ranunculus haastii*) appear in spring, flowering quickly in the short, harsh alpine summer. Disguised by its dull colouring and inconspicuous flowers, the fleshy lobelia (*Lobelia roughii*) nestles among the stones and the bright greens or reds of the leafy scree willowherbs

(*Epilobium pycnostachyum*) provide contrast to the dull grey or black of the rocky slope. All are scree obligates, growing only on these greywacke screees, where summer temperatures can soar to 50 degrees in the midday sun and plummet to below zero at night.

These plants are able to survive, and even flourish, in such extreme conditions. They have evolved to tolerate the desiccating climate, the short harsh growing season, and movement of the scree surface. Beneath the scree surface lies a thin hard crust which, with the overlying stones, protects the soil below from water loss and helps stabilise the surface layer. Even in the hottest weather the soil remains moist, so scree plants have evolved complex and extensive root systems to exploit this water. Succulent leaves, fine hairs and cushion growth forms are other adaptations to an extreme climate. Most scree plants are summer-green herbs. They die away to a taproot or rhizome in winter and re-emerge in spring after snow melt. When the scree moves they survive by either having tough stems, buds protected by whorls of leaves, or small leaves connected delicately to the stem and root system which break easily and are quickly replaced when conditions stabilise. They are also inconspicuous, no doubt to help escape the hungry eyes of the ubiquitous alpine grasshoppers.

Sharing the screees with the grasshoppers and specialised plants are wetas, cockroaches, lizards, and butterflies. Sheltered beneath the stones a weta (*Deinacrida connectens*) scavenges for plant and animal fragments, the female reaching more than 6 cm long, mouse-sized and dwarfing the male. Lower down is the scree cockroach (*Celatoblatta montana*) which is confined to

Former Reserves Board member Peter Johns has peered closely at many specimens to describe the differences that separate the cockroach species and he talks enthusiastically of a zone centred on Lake Coleridge and the southern Torlesse which is the geographic centre for the invertebrate fauna of the drier eastern foothills.

Conspicuous Animals

It is the more conspicuous animals such as the inquisitive alpine parrot, the kea, that visitors are likely to notice. Peter Newton in his classic high country book *Wayleggo* describes locating kea nests from the unusual whistles of nesting birds. Musterers have recorded kea nests in the Kowai Valley at the southern end of the Torlesse Range. Despite years of pressure from hunters, the now fully protected kea is still present. Phil Beckett, who worked voluntarily for Forest and Bird on the Torlesse proposal, tells of the time he was surrounded by a group of 14 kea in Torlesse Stream. Many of our more common birds inhabit the forests, shrublands and grasslands; pipits roam the open ridges and falcons patrol the valleys.

It is not only the scree plants and insects which make the Torlesse Range a special place. The high frost shattered ridges are home to the hard cushion plants such as the vegetable sheep (*Raoulia eximia* and *R. mammillaris*) and *Phyllachne colensoi*. South Island edelweiss (*Leucogenes grandiceps*) and furry *Haastia* species have established a foothold in the shelter of rock crevices and a range of alpine daisies (*Celmisia* spp.) occupy the more stable sites. Where snow cover insulates the ground from winter temperature extremes an alpine grassland of



These dry beech forests in the north-east of the Torlesse Range are all that remain of extensive stands which once clothed its northern flanks. The Department of Conservation's PNA survey scientists have earmarked these special arid forests for protection. Photo: Mike Harding

these dry eastern ranges and the common weta (*Hemideina maori*). Another undescribed cockroach (*Celatoblatta* sp.) lives in areas of very dry rock and scree within the forest. Skinks scuttle amongst the scree stones or crevices of the rock bluffs sheltering from the baking daytime sun and emerge to soak warmth from the rocks in the cool of the evening.

The smaller inhabitants are less well known but have not escaped serious study.

slim snow tussock (*Chionochloa macra*), and on wetter sites, mid-ribbed snow tussock (*C. pallens*) and snow patch grass (*C. oreophila*) are present. Many of our alpine plants were first collected from the Torlesse area and Foggy Peak is still a popular destination for botanical field trips.

Below the high alpine tops the original vegetation of the Torlesse Range has been altered by burning and grazing. Fires swept the area hundreds of years ago and fire was