kohekohe and titoki on the drier sites.

The hill country east above the Drury Fault had probably been altered by Maori fires around the habitations and tracks. Enough forest remains today to suggest that kauri once dominated on sandstone and greywacke, and taraire on the volcanics.

On the south side of the Manukau the Pleistocene terraces of the Karaka district had kauri gum in the soils but settlers found the land a waste of manuka and tauhinu. What seem to be forest remnants on today's topographical maps may be old plantings of eucalypts or Ligustrum lucidum.

Dense forest covered the basaltic hill country from Bombay to Pukekohe and Waiuku. Taraire and other broadleaved species dominated with some rimu, northern rata and occasional kauri (e.g. at Ravensthorpe). Most of today's remnants have abundant second-growth totara, the species most resistant to cattle grazing.

At the foot of the Bombay Hills there stand three giant puriri, worthy shelterers of Bishop Selwyn, flourishing despite vandal fires and a sacrilegious settler's topping.

The Awhitu Peninsula is composed of young only moderately fertile sandstones. Much kauri was logged from here but broadleaved species, particularly tarire, were probably at least as common, with pohutukawa dominating the exposed western slopes. According to S. Percy Smith, surveying there after the Maori Wars, the eastern side of the Peninsula was mostly (manuka?) scrub. The characteristic second-growth tree of this district is kanuka.

PLANTS OF THE NORTHERN OFFSHORE ISLANDS

A. E. Wright

Of the more than 600 islands lying off the New Zealand coastline, the greatest concentration lie between North Cape and East Cape. These northern offshore islands constitute one of New Zealand's major natural features. Their importance centres on their function as a refuge for plants and animals under threat on the mainland, and for their own endemic flora and fauna.

The present vegetation and individual plant species of the northern offshore islands are a result of many different factors such as the period of their isolation, distance from the mainland, climatic variation, and modification of the environment by humans - both pre-historic and historic. Human modifications include burning and clearing, earthworks, and the introduction of feral animals - e.g. rats, rabbits, goats, pigs - and plants - e.g. pampas grasses, gorse, and blackberry.

Thus the flora and fauna that is protected on the offshore islands today is not an unmodified remnant of the primaeval biota as is commonly thought. Although elements that have not survived elsewhere are present, the majority of island ecosystems have been grossly modified.

At the peak of the last glaciation (18-20 000 years ago) sea level was about 110 metres below present, and only the Three Kings and Poor Knights groups remained as islands separate from the mainland. In fact, the Three Kings area has probably been separate for at least 2 million years, and the Poor Knights for something less than one million years. Between 18 000 and 6 500 years ago sea level was rising at a rate of around 10 metres per thousand years. By 12 000 years before present the Hen and Chickens, the Barriers, Cuvier and the Aldermen were also islands, and by 7 000 years ago the majority of the northern offshore islands were separated from the mainland. Sealevel has remained almost static for the last 6 500 years.

Isolation leads to the development of endemic plants and animals - the greater the isolation, the more independent becomes the course of evolution. Thus, the more isolated a habitat is from the rest of the world, and the longer this isolation has persisted, the richer the habitat is in forms peculiar to it. These forms are known as endemics.

Turning to northern New Zealand, we find that the Three Kings have been geographically isolated by seawaters the longest (2 million years), and are also the most distant from the mainland (65 kilometres). As you might expect, they also harbour the greatest number of endemic plants - at least 10 species. The Poor Knights are the next most isolated group (1 million years), and are only 25 kilometres from the mainland. Consequently there is less endemism at the full species level (c.3 species), but there are a number of undescribed varieties or subspecies which only occur there. The Poor Knights are somewhat of a halfway house between the Three Kings and the remaining northern islands, which have neither been isolated long enough, nor far enough from the mainland to evolve significantly different plants.

It is possible that some of the offshore island endemics may be little changed relics of the pre-glacial New Zealand flora that never regained a foothold on the mainland, and that some of their smaller-leaved counterparts on the mainland may in fact be the result of independent evolution as a response to a colder climate.

By looking in more detail at 8 specific islands or island groups - the Three Kings, Stephenson Island, the Mokohinaus, northern Great Barrier Island, the Motukawao Islands off Coromandel, Whale Island and the Rurima Rocks in the Bay of Plenty, and finally the Poor Knights - many of these points were illustrated, along with some of the characteristic and more spectacular plants involved.