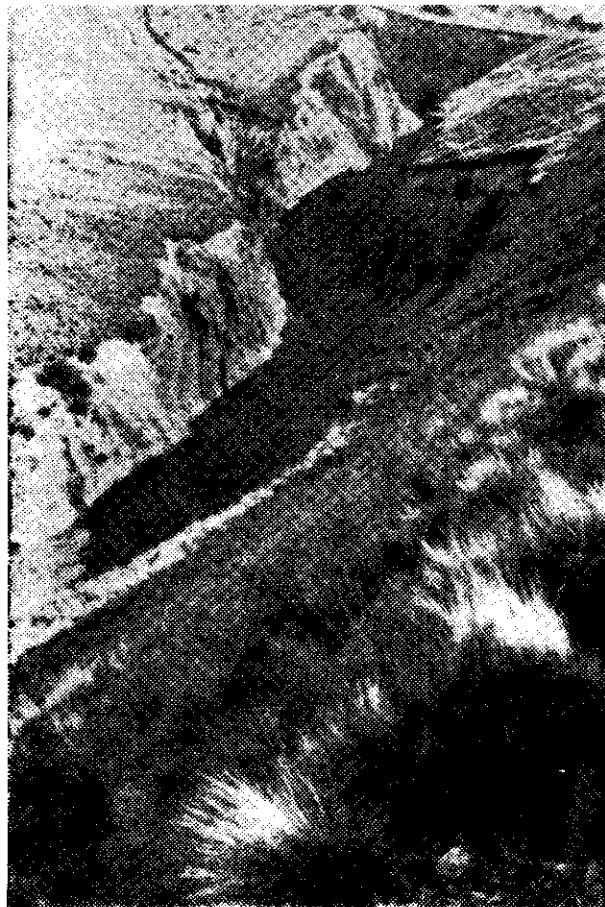


Above: In the Lindis Pass between Canterbury and Otago. Burning and grazing have removed all the tussock from the hillside.



Left: A typical gutter in South Island high country eroded during the last 40 years.

Below: High country in the North Island mountain axis. Persistent burning has exposed the surface to winds, which have eaten four to five feet into the sub-soil.



SLEEPERS AWAKE!

Geographer Sounds An Alarm

SOIL EROSION IN NEW ZEALAND: A GEOGRAPHIC RECONNAISSANCE. By KENNETH B. CUMBERLAND. Published by the Soil Conservation and Rivers Control Council.

BOOKS and booklets on erosion will soon be as numerous as the experts on the subject, and as hasty in their generalisations. But there are books and books, and this one is in a class by itself. It is an amazing book, impossible to read without a dictionary, but so earnest, so exhaustive, so convincing, and so thoroughly disturbing, that to treat it lightly would be to aid and abet all the carelessness, ignorance, and short-sighted greed that have caused it to be written.

The first thing to do in considering erosion in any country is to look at a relief map. The next is to study the covering of the land; and the next its geological foundations. With these we must consider the climate partly as a consequence and partly as a cause; and when Mr. Cumberland does that he finds himself looking at seven different Regions in New Zealand, all with different erosion histories:

1. Auckland and Coromandel Peninsulas.
2. North Island Mountain Axis.
3. Taranaki, Wellington, and Hawke's Bay Hill Country.
4. South Island Tussock High Country.
5. Central Otago and Mackenzie Inland Basins.
6. South Island Foothills and Downland.
7. Canterbury Plains.

It is impossible in our space to illustrate what is happening in each Region, but he is a complacent New Zealander who has not already begun to be uneasy. The trouble of course is that most of us have never thought of a landscape that is not eroded.

The people of New Zealand have been reared in the midst of unnecessary losses of soil and become so accustomed to their presence as to take little heed of them. They have often come to consider soil erosion as a normal, unavoidable occurrence. It has taken the experience of the United States, South Africa, and Australia to reveal to New Zealanders the seriousness and extent of the problem before their very eyes. It is only as the youthful, vigorous nation emerges from its hectic easy-going childhood to saner, steadier adolescence, that it is beginning to appreciate the more undesirable consequences of a youth at times wantonly misspent.

MR. CUMBERLAND is not a New Zealander but an Englishman, and to his fresh eyes the situation is in some respects worse than it is anywhere else in the Empire.

It seems highly probable that New Zealand, the youngest of the British Dominions, has a soil erosion problem of greater significance in its relation to the future well-being of the country than has any one of the older members of the Commonwealth. The superficial area of New Zealand is small: its history of European occupation and exploitation short. The national economy and the individual living standards of its million and three-quarter people reveal an emphatic dependence upon a restricted range of export commodities—all derived from the utilisation of the soil. And New Zealand has few other significant resources.

THAT is how the menace strikes him in general. Here are some particular aspects of it.

REGION I:

It is only from the air that one is afforded an accurate picture of the extent of the moving sand area of Region I. The eastward

migration of sand has already reached two-thirds of the way across the peninsula north of Waipapakauri. Here, though, it is invading but little used scrub and swamp land and filling scattered lakes. In other places the sand is constrained in its inland march by steep hill country adjacent to the coast. In such situations, however, it has already climbed up more than 400 feet and swept over the northern and southern flanks of the hilly obstruction. On the northern head of the Hokianga Harbour, golden-yellow sand has, within living memory, climbed over a 400 foot ridge of limestone and crept down the leeward flank to tumble over low cliffs into the harbour near Rangi Point. In its surge inland over scrubland and farmland the sand has buried and killed all vestige of vegetation. Occasionally strong winds from other than the prevalent westerly direction lift off the sand and expose gaunt and ragged surfaces of naked limestone. In certain localities the frontal advance of the golden surge is to be measured in hundreds of yards per decade. Near Rangi Point sand has, in 25 years, destroyed all trace of one farm with its homestead, buildings, fields, fences and orchard.

REGION II:

Between Willowford and Kuripapanga on the Inland Patea road, the disastrous effects of sixty years of sporadic, extensive pastoral occupation of the Kawekas is clearly and indelibly written in the landscape. On the outer, easterly slope at about 1800 feet, in a region drained dendritically by right bank headwaters of the Tutaekuri and most appropriately known as "the Blowhards," is a 2000-acre man-made desert, completely stripped of soil and subsoil to a depth of five or six feet. This deep removal of material—jointly by wind and water—is revealed by the depth of sod bank marking the sharp boundaries of the "desert" and the grassed island patches (stacks) out in its centre. The peripheral banks and central stacks reveal over six inches of chocolate-grey silt loam on a nine-inch harder (projecting) layer of darker, finer-textured material on yellowish-brown silty clay. Over a wide area much of the horizon has gone. The surface is often streaked from north-west to south-east with sand which frequently scurries over the clay. The exposed subsoil is often cracked and the drainage outlet of the "desert" is fretted with incipient gullies. Above, manuka and fern-ridden paddocks, ineffectually enclosed by dilapidated fences, climb to the crestline with its golden subsoil patches exposed by wind and water and gullied down to the greywacke bedrock.

REGION III:

As elsewhere, fire was the principal weapon used in the long, intermittent, unfinished struggle to establish pastures in place of fern (and later of manuka) in a habitat naturally productive of forest. Sheep were a subsidiary arm. "Fern crushing" is discussed briefly elsewhere. There are few parts of the region which, during this struggle, have not been swept frequently by fire and overgrazed by sheep. When even Guthrie-Smith, naturalist, author, and undeclared soil conservationist, can claim that "few sights are more engrossing, more enthralling, than the play of wind and flame" or that "a fire on a dry day in a dry season is worth a ride of a thousand miles," one suspects that the soil often suffered unnecessarily or at least inadvisedly at the hands of less enlightened station holders. To-day, outside the well-grassed districts, danthonia and browntop pastures of varying productivity occupy the greatest area supporting semi-extensive sheep rearing activities.

OR take this passage about the Esk Valley, which, instead of being eroded, was buried in 1938 under eroded material from the hills behind it:

The lower Te Ngaru Valley flat is still occupied by a spread of silt and rock with tree stumps, telegraph poles and willow trees all buried deeply in debris. The present road is newly constructed above its former site. There are abandoned houses and the landscape is generally one of decrepitude. The Tangio school is a new structure out on the silted flat. For neighbours, it has two or three erect, lone, derelict chimney stacks—remnants of former habitations washed away or silted out—and a few Maori hovels with maize and potato patches on the new brought "soil." The placid, wizened Esk is now crossed by a temporary bridge

(continued on next page)