

The Muddiest Rivers are Carrying to the Sea the Cream of New Zealand's Soil.

A SAMPLE FROM 55 FATHOMS, 30 MILES FROM LAND . . .

"Full many a gem of purest ray serene
The dark unfathomed caves of ocean bear . . ."

THE bottom of Cook Strait must contain many thousands of tons of precious soil—the cream of fertility—that once nourished the roots of New Zealand's primeval forest. It is easy to demonstrate that there has been a tremendous increase in the rate of deposit from the land in the past 85 years compared with the centuries previous to that. Study of the map of the State Forest Service (reproduced in this issue of "Forest and Bird") showing the areas of bush remaining, must indicate that. Wherever it rains and the water gathers and rushes over higher lands and steeper faces denuded of trees and shrubs and ferns and mosses, wherever these waters join larger issues and meet rivers that flow seawards, great soil losses occur.

The sea swallows the cream of New Zealand's soil borne to it in suspension by rivers and streams—sacrifices to the carelessness of New Zealanders.

When one sees yellow rivers and stained estuaries one may conclude that there goes fertility—some of the cream of New Zealand's soil.

Dr. P. Marshall is one man of hundreds of thousands. He keeps in touch with realities. As geologist of the Public Works Department he acts as a kind of double-entry book-keeper, auditor and inspector, of the basic public wealth—the greatest wealth, the basic wealth. He records as many as he can of the diverse transactions of nature concerned with rocks and soils and physical forces. It is a huge business this physical geography, this geology, this geological accountancy.

One of Dr. Marshall's many tasks has been to find out what lies at the bottom of the sea about New Zealand's coasts. From time to time as the Government steamer Matai cruises around New Zealand waters, a line is lowered and samples are dredged

from the bottom of the sea. The samples look quite like the contents of a child's bucket filled from the grey sea-beach. But that is not enough for Dr. Marshall.

"That comes from 55 fathoms deep, south of Cook Strait, 30 miles from land," said the geologist, pointing to a mass of grey mud in a corner of his laboratory in Wellington. It was a sample dredging.

"When you sift it out, you find this," he continued. He exhibited a tin filled with fragments of marine shells. Some were exquisitely marked and minute and delicate—a diversified collection of deep-sea relics. On the floor were piled dozens of small sieves with meshes ranging in size from half an inch to one hundredth of an inch.

The work entailed in analysing a heap of grey mud and pursuing its granular composition to the finest grade is long and wearying physically and mentally.

The very finest of the sea-bottom dredgings that pass through the smallest mesh form a small fraction of the total. Often he proceeds to classify the particles below the one-hundredth-of-an-inch size. That is done by suspension tests, placing the matter in water. Some falls to the bottom readily. Some lingers. The fine material, Dr. Marshall explained, is nothing but "land," ground to dust from rocks in ages past, absorbed by vegetation or by the chemistry of plant life, formed by decayed vegetation into humus or silt, the cream of the soil, ground to fineness by physical action, and borne to the sea-bottom by rains, and winds, and rivers.

In dozens of phials are contained the results of the sifting. Some shells are so fine that only meshes one fiftieth of an inch prevent them passing through. Most of the fine shells are of this minute kind. The information so obtained is of definite value to humanity.

The land is being washed into the sea in the eternal cycle of clouds and winds, rivers and rains. The answer surely is—

Save the bush, increase it and multiply Nature's guard against loss of top soil.