

CORRESPONDENCE.

DIAMONDS IN SOUTH AFRICA.

SIR,—At Alexander Bay, Cape Colony, where the Orange River flows into the South Atlantic Ocean, diamonds have been found in such profusion as to cast all previous discoveries into the shade. Like all river stones, they excel in quality those found in the mines or “pipes”. The obvious inference is that the diamonds have been transported by the Orange River, especially as it has long been known that its affluent, the Vaal River, contains gravels rich in diamonds, that have been worked during the past sixty years. Although the diamond resists great pressure, a light percussive tap with a hard substance suffices to fracture it. That diamonds should travel together with pebbles over the rocky bed of a river without being shattered may be due to the surrounding water forming a protective cushion. But why are the diamonds concentrated in such abundance at this site?

A glance at the map of South Africa shows that the northern line of watershed includes a good slice of the Kalahari, it then passes through Lichtenburg in the Transvaal, follows the Witte Water Rand past Johannesburg, and on to Lake Chrissie on the Drakensberg. The eastern line follows the Drakensberg to where the Stormberg branches off. The southern boundary follows the Stormberg, Bamboes Berg, and their continuation to Victoria West, Cape Colony, thence along the Nieuwveldt Range to Kroms Berg, and to the head of the Tanqua River. The western boundary forms an irregular line from the head of the Tanqua River to near the mouth of the Orange River. From the whole of this vast area the water drains into the main channel of the Orange River, and flows westerly to Alexander Bay.

All the South African diamond mines are in “pipes” of extinct volcanoes, or the channels up which molten and fragmentary rocks travelled to reach the craters, when the volcanoes were in action; there these materials were poured out in lava streams, or hurled out as ash and agglomerate over the surface of the country. Diamonds are distributed through the material filling some of these “pipes” and they must have been plentifully scattered in the volcanic ejectamenta from them. Besides the “pipes” known to bear diamonds and worked, many must exist that have not been discovered.

Such “pipes” are remarkably productive. For example, the Kimberley “pipe” was $12\frac{1}{2}$ acres in area at the surface, diminishing to 7 acres at a depth of 500 feet. From a depth of about 2,000 feet the yield cannot be far short of one hundred millions worth of diamonds.

It is reasonable to conclude that within the river watershed many equally rich "pipes" existed, and that much surface volcanic material was also rich in diamonds.

Wherever worked, these "pipes" are truncated by denuding forces, and their present surface is far below the craters of the once active volcanoes.

The "pipes" are later than the sills and dykes of dolerite, that ramify through the Karroo beds, for they cut through them. At the close of the deposition of the topmost beds of the lacustrine series—the Cave Sandstone—intense volcanic action took place, which piled up two or three thousand feet of volcanic rocks on the top of the Drakensberg. Whether the volcanoes that poured out and hurled out diamonds when the "pipes" were in action were of this date, or later, is uncertain.

Over the whole of South Africa there is abundant and conspicuous evidence of denudation, on a scale that implies the removal of hundreds and even thousands of feet of rock, from above the present surface of the country. A view of the Malutis as they branch from the Drakensberg, or a view southward, from the crest of the Stormberg Range, brings out vividly what has been removed.

When the Cave Sandstone was laid down, it probably extended over the whole area of the lake, as it then existed. To-day but a fragment remains. The difference in level of that fragment (over 6,000 feet above sea-level at the Stormberg) and the present surface of the Karroo series at any site, is a fair measure of what has been denuded, amounting to a vast number of cubic miles of rock, that have been ground to sand and silt, and removed by flowing water for the most part.

With the sandstones, the shales, the dolerite sills, etc., the diamond-bearing surface volcanic rocks and the "pipes" were also worn down, and removed by flowing water. The river conveyed the sand and silt to the sea. Diamonds dispersed through the surface volcanic rocks, and though the "pipes", however, were not ground up, but survived intact, owing to their hardness. Unlike gold and other metallic substances, they were easily removed by water, and transported by that medium. They found their way into runnels and tributaries of the Orange River, eventually reaching the sea at its mouth. Owing to their sp. gr. being somewhat higher than quartz and felspar, a certain amount of concentration took place.

The sea appears to have exercised a selective action on the diamonds, and perhaps owing to their form the waves have cast them up on shore again. Along the west coast of South Africa the set of the current is northward. Small diamonds appear to have been carried by the current for a considerable distance, along the shores of Namaqualand. Both sand and diamonds were blown from the beach inland to form sand-dunes.

Given the vast area drained by this river, the presence over this area of numerous diamond-bearing "pipes" and ejectamenta from

them, the stupendous denudation that has taken place over this area, from the time the mountains of volcanic matter were piled up on the top of the Drakensberg, to the present day, and that the imperishable diamonds in the material removed by denudation have eventually reached and travelled down the main channel of the Orange River, and been concentrated where it enters the sea ; their abundance at Alexander Bay is accounted for.

In December, 1871, the writer spent a day at Alexander Bay and noticed the pink garnet sand on the beach, but did not see the diamonds.

In 1872 he travelled through Bushmanland and touched on the course of the Orange River at various points. Below Aughrabies Falls, or the Great Falls, the river flows for 3 or 4 miles through a great gorge it has cut out in hard gneiss, 300 feet below the general level of the country. At these falls there are many potholes ; some are 12 feet or more in diameter, and proportionately deep, and have been ground out by the swirling waters and the pebbles. As a small pothole at Alexander Bay has produced £40,000 worth of magnificent diamonds, what may be expected when these and crevices in the rocky bed of the river are exploited ? Unless great floods have swept the channel clean. This river flows over a rocky floor for hundreds of miles, in fact, from Hope Town to the sea.

Besides Orange River, it is known as the Gariep, the Groot River, etc., but it deserves to be called the River of Diamonds.

E. J. DUNN.

“ ROSENEATH, ”
KEW, VICTORIA,
AUSTRALIA.

The Editor regrets that by an oversight the price of Messrs. Murby's patterns for making geological block models was stated in the May number as 4s. per set ; this should have been 1s. 6d.
