further finds were made at this point. If there is no mistake about this occurrence, there must have been diamonds in this region long before the intrusion of any known mass of kimberlite.

In the Orange Free State there are a number of localities at which the diamond has been found, although Jagersfontein is the only one which has yielded this gem in important quantities. The most northerly locality in the Free State of which I have heard is at Driekopjes, in the Kroonstad district. This district is bounded on the north by the Vaal River and it lies just south of Potchefstroom district, in the Transvaal. It is to be hoped that some geologist may eventually visit all the known diamond-bearing localities in South Africa and give the world the benefit of a comparative study.

GEORGE F. BECKER.

WASHINGTON, October 31, 1897.

CURRENT NOTES ON PHYSIOGRAPHY.

THE GREAT LAKES.

GILBERT'S discussion of 'Modification of the Great Lakes by Earth Movement,' presented to the Detroit meeting of the American Association, is published in the September number of the *National Geographic Magazine* (VIII., 1897, 233–247). It is truly astonishing that in the dozen years since the tilting of the ancient lake shore lines was recognized, and in our brief half century of accurate lake levellings, quantitative results as definite as those here announced should have been reached. A change of level of 0.42 foot per 100 miles per century in a direction about S. 27° W. seems to be assured. A line at right angles to this direction, drawn through the outlet of a lake, would have no change of level. All places on the lake shore northeast of such a line, or isobase, would emerge from the lake waters; all places to the southwest would be slowly submerged. Ontario lies altogether southwest of the isobase of its outlet; and, hence, the water must be encroaching on all its shores; the estimated rise at Hamilton being six inches a century. Erie is similarly situated, and the rise at Toledo is placed at eight or nine inches per century. The outlet isobase of Huron-Michigan leaves Huron altogether on the northeast, and crosses Michigan near its middle; the water surface must, therefore, be lowered ten inches a century on the northeast side of Georgian Bay, and six inches at Mackinac; while it must rise five or six inches at Milwaukee, and nine or ten at Chicago. "Chicago has already lifted itself several feet to secure better drainage, and the time will surely come when other measures of protection are imperatively demanded." In 500 or 600 years, high stages of the lake will discharge at Chicago by the ancient outlet of glacial Lake Michigan. In 1,000 years the discharge will occur at ordinary lake stages, and after 1,500 years it will be continuous. In about 2,000 years the discharge from Lake Michigan-Huron-Erie * * * will be equally divided between the western outlet at Chicago and the eastern at Buffalo. In 2,500 years the Niagara River will have become an intermittent stream, and in 3,000 years all its water will have been diverted to the Chicago outlet, the Illinois River, the Mississippi River and the Gulf of Mexico."

THE LAVA PLATEAU OF SOUTHEASTERN WASHINGTON.

THE lava plateau of the Columbia River basin, already described by Russell (Bull. 108, U. S. G. S.) a few years ago, now receives further attention from the same author (Irrigation Papers, No. 4, U. S. G. S.). A broad flat dome, uplifted 2,000 feet over the surrounding country and well dissected, forms the Blue Mountains; so well clothed with rock waste that one is astonished to learn that they are composed of

horizontal strata of basalt. From these mountains northward towards Spokane River the surface is nearly level with a deep soil cover; but it is here and there cut by deep canyons, on whose sides the lava beds form dark cliff belts. The Snake River crosses the Blue Mountain uplift in a canyon 4,000 feet deep and fifteen miles broad. The Grande Ronde, rising in many branches in the same mountains, has excavated an intricate series of branching canyons. Here the spaces between the streams are no longer flat-topped remnants of the original plateau, but sharp-edged ridges, diversified with spires and pinnacles. This river has cut a meandering trench in the floor of a flat canyon three miles wide, indicating two partial cycles of erosion. Many special features suggest interesting physiographic problems: the gravel terraces of Snake River, that once enclosed lakes in tributary streams; the falls of the Palouse, apparently the result of recent diversion of the river to a new and shorter course to Snake River; the wandering behavior of the Walla Walla on an aggraded floor, calling for special legislation regarding its use in irrigating canals; the deep fine soil on the lava plains, here and there heaped in hills, like dunes, and everywhere producing great crops of wheat in an apparently desert region. Nothing is more remarkable than the remnants of the prelava topography, whether seen in such eminences as Steptoe butte, rising over the lavas and never buried, or revealed in Snake River canyon, where a magnificent 'shut in'* occurs as the river cuts its superposed course through a deep-buried mountain of schist. Several excellent illustrations accompany the report.

HANDBOOK OF CANADA.

A HANDBOOK OF CANADA, published for the British Association meeting at Toronto last summer by the Local Committee, contains an account of the physical features of the Dominion by G. M. Dawson, conveniently condensed for ready reference. Thus the interior plateau of the Cordilleran region, occupying an area of 100 by 500 miles between the Gold range on the east and the Canadian Coast range on the west, is described as a peneplain of Tertiary denudation, greatly modified by Miocene volcanic accumulations and by the excavation of valleys after elevation. Its true character as a table-land cannot be appreciated until rising high enough for the eye to range along its even sky lines. Unlike the forested mountains east and west, this plateau has a drier climate, and includes wide stretches of grass-covered hills and valleys, forming excellent cattle ranges. It appears to be be correlated with the basin areas of Cordilleran region within the United States.

W. B. Dawson describes the Canadian survey of tides and currents; stating, among other things, that the current in Belle Isle strait is tidal, with a flow nearly equal in each direction. The accepted theory of a constant inward cold current is thus proved to be unfounded and misleading.

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*See SCIENCE, III., 1896, 661.

CURRENT NOTES ON ANTHROPOLOGY.

THE ANCIENT MURMEX.

IN SCIENCE, April 16th, and later in No. 1, of the *Bulletin* of the Museum of the University of Pennsylvania, I announced the identification of the classical object usually called a 'bow-puller' with the *Murmex*, fastened to the fist in pugilistic contests. This identification met with general acceptance, but a few authorities of great weight, such as Sir John Evans and Professor E. S. Morse, offered against it the cogent objection that if the implement was so used, it could scarcely fail to be repre-