A line of telegraph can be carried along the posts without any great increase of expenditure.

Besides all these unusual recommendations, the boxes are so constructed as to enable them to be locked at the point of departure, so as to prevent the introduction of any foreign substances of a deleterious kind while *in transitu*, and by a simple self-acting contrivance, the load will be shot out on its arrival at the battery, and a self-acting weighing machine will be attached to the last post, by which the weight of the load can be correctly read off.

Last, but not least, of the proposed advantages:—A grip has been contrived by Mr. Herrich to grasp the wire at any moment, to prevent accident by the sudden fracture of the line; should a fracture occur, the natural inclination of the line would be stopped by the grip revolving upon the roller on which the wire travels, and holds it firmly jammed.

With these advantages, and the additional fact that it is believed the line can be constructed at an average cost of £800 per mile, it must be evident that the mining community would reap advantages from adopting this scheme, which would infuse new life into its proceedings, and would resuscitate many moribund companies which are being wound up, simply in consequence of their inability to obtain carriage at a reasonable cost.

The principle may be utilized for uniting any distant part of the country, instead of a railway, say between Riverhead and Helensville, a distance of sixteen miles, which could be constructed at a moderate calculation, including motor power, for about £10,000; the cost of a railway line of 3 ft. 6 in. gauge would be £50,000, not including rolling stock.

Art. LXIV.—*On the Currents, Temperature, and Saltness of the Ocean.*

By W. B. Bray.

(abstract.)

[*Read before the Philosophical Institute of Canterbury, May* 4, 1870.]

The author of this paper after describing at length the principles which have been established respecting the distribution of ocean currents in the Northern Hemisphere, where they have been most fully studied, proceeds with the discussion of the currents in the southern seas:—

The Southern Hemisphere, in its geographical circumstances, contrasts so remarkably with the Northern, that very material differences may be expected in the currents themselves; yet the general principles are the same, in that the effect of intense polar cold produces a descending cold current, which flows along the bed of the ocean towards the equator, and draws a corresponding supply of warmer water to the pole, and the action of that warm current on the ice produces a superficial current of cold, but fresher, water from the polar ice.

In the north, the great continents approach within 15 or 20 degrees of the pole, enclosing a vast ocean of unknown depth, which receives the rivers that drain one-fourth part of those continents, and which form the belt of ice intervening between the coast and the open ocean.

In the south, on the contrary, only Cape Horn comes within 24 degrees of the pole, about as distant as Ireland from the north, while the other continents of Africa and Australia are nearly as far from the south pole as the north coast of Africa is from the north pole.

A wide belt of ocean intervenes between the south capes of these continents and the polar ice, which encloses the Antarctic continent so closely that the coast has been only partially traced through a distance of 1500 miles, and its form and extent is still a matter of conjecture.

The peculiarly lofty barrier of Antarctic ice could not be formed by the freezing of ocean waters, but by the streams of water flowing from the sunny slopes of the elevated continent during the short summer, and forming plains of ice, resembling the plains of gravel and alluvial soil left by the rivers in warmer latitudes. During the height of summer, these streams may pour down the icy cliffs, but in February, the thermometer being at 14° at noon, these streams had formed the gigantic icicles seen by Sir J. Ross.

From the great height and inaccessible nature of this barrier, we can gain no positive knowledge of this hidden continent. But if any future Antarctic expedition were provided with a balloon of moderate size, and 200 or 300 fathoms of silk cord, some one might ascend from a boat to such an elevation as to have a clear view over these frozen plains to the mountains beyond, which are concealed from the view of those on shipboard.

The intense cold of the Antarctic winter, acting on the surface of the deep sea around this continent, will produce descending currents of cold water, which will form under-currents receding from the pole in the deepest portions of the ocean bed. In one place Sir J. Ross sounded 4000 fathoms, and found no bottom; and the Austrian expedition, in the "Novara," sounded 6170 fathoms, or 7 miles, without finding bottom.

But when this deep current meets with the obstruction of an island, or south cape of a continent, it must ascend to the surface.

The south side of the Crozets is generally hidden by thick fog, from this cold uprising water condensing the moisture in the atmosphere.

On the S.W. coast of Africa, Sir J. Ross found a cold current setting north, extending 60 or 70 miles from the coast.

The cold current also rises on the east coast of Patagonia, where it forms a northerly current inshore.

This cold current, rising at the south end of New Zealand, is probably the cause of the sea being only 51° or 52° at midsummer, when about Banks' Peninsula it is 58° to 60°.*

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* For Temperature of Sea round New Zealand, see Report by Dr. Hector, *App. to Journ. H. of R.*, 1869, D. 2, p. 22.—Ed.

The deeper warm current is shown by the observations of Sir J. Ross, who found that while the surface water was 28° or 30°, at 400 to 600 fathoms the water was nearly 40°.

This deep and warmer current impinging on the barrier ice, undermines it, and by dissolving the ice, becomes fresher and lighter, and, rising to the surface, forms a superficial current which recedes from the pole, carrying with it the icebergs formed by fragments of the great barrier. Some of these are stated to be 600 feet high, in which case there must have been 4000 or 5000 feet below the water. Such enormous bergs might be formed by the fall of portions of the barrier, half a mile or three quarters of a mile long, which would float with the heaviest end down. These bergs are stated by Wilkes to advance 70 or 80 miles northward in one season. The cold and fresher current as it recedes from the pole must extend over a wider circle, and therefore diminish in depth. Icebergs floating partly in the upper current and partly in the lower, will be carried to such a distance, that the pressure of the two currents shall balance each other; then, their further progress being arrested, they will form that close pack of icebergs and floe ice, through which Sir J. Ross had to bore his way, while south of this pack he found a clear open sea, free of ice.

Art. LXV.—*Notes on the Conduction of Electricity.* By James Duigan.

(Abstract.)

[*Read before the Wellington Philosophical Society, July* 16, 1870.]

The object of this paper is to controvert a view stated in a paper entitled "The earth of New Zealand a bad Conductor of Electricity, as compared with that of other countries, by F. E. Wright," in *Transactions of the New Zealand Institute*, Vol. ii., pp. 226–227. The transmission of electrical currents along the telegraph wires, in some cases after they have become detached from the insulators, and lie on the ground, attributed by Mr. Wright to a peculiarity in the New Zealand soil or rock formation, is explained by the fact of the New Zealand telegraphs being worked on what is technically known as the "open circuit" system, one of the conditions of such system being, that it never occurs to have more than one battery sending its current of electricity along the line at the same time, whereas in Australia the lines are, or at least were, until very recently, worked on the converse of the "open circuit," viz., the "closed circuit," one of the conditions of this latter system being that there are a plurality of batteries always sending their currents along the whole length of the line, in their respective circuits, and which by so doing prevent a current passing beyond an earth-fault, thus closing the communication between all stations situated on opposite sides of the fault.

After explaining at length the nature of the two methods of working the telegraph, the author concludes by expressing his opinion that the term