

ings in the bay on the first available opportunity, and this sketch is the result. The soundings show that there is an area of probably not less than a quarter of a square mile already partially sheltered, and with a depth at low water of two fathoms and upwards. Seeing that there is an ample supply of hard limestone on the spot, very fairly adapted for the construction of a breakwater, and that this bay is of perfectly easy access from the Grey Coal Fields, its future importance as a harbour will be sufficiently obvious; indeed it is the only place on the West Coast which I am acquainted with where there are both natural facilities and abundant materials for constructing a barless commercial harbour of very considerable dimensions, in direct and easy communication with very valuable coal fields. I hope during the present year to procure a careful survey of Port Curtis on a large scale.

On the whole, and making due allowance for the tempestuous character of last season, a fair amount of work has been done in a satisfactory manner, and the cost, though greater than estimated, is much less than it would have been if the surveys had been made by a staff of Admiralty surveyors; a very considerable portion of the outlay, moreover, has been on instruments and fittings of a permanent nature, so that additional work will be executed more economically. I beg to recommend that authority be granted to complete the general survey of the West Coast, and to make detailed surveys of such portions as, like Jackson's Bay and Port Curtis, will probably become of importance as the future harbours of a rising district.

15. The accompanying Appendices A. to P. show the annual expenditure of the department, the cost of the marine survey and of the lighthouse establishment (in detail), the amount of survey and other fees and light dues collected during the year; also, the amounts received as pilotage at the several ports of the Colony, and an approximation to the annual cost of all the harbour and pilot establishments in the Colony, the number of steamers surveyed during the year, an abstract of the wreck returns, &c., &c.

JAMES M. BALFOUR,
Colonial Marine Engineer.

REPORT by Mr. GEORGE AUSTIN WOODS.

(No. 2,027)

Surveying Steam Sloop "St Kilda,"

18th July, 1868.

SIR,—

Herewith I have the honor to forward a report to the close of the financial year of the progress of the Marine Survey under your control.

The work was commenced on the 15th December last at the Kaikoura Peninsula, and was continued on the East Coast until the 30th April, as detailed in my monthly reports.

An accident to the surveying steamer "St. Kilda" on the first day of work, which necessitated her immediate return to Wellington for repairs, together with her further absence on other duties,—also the wrecking of the schooner "Sea Bird," in which the survey party were taking a passage,—very considerably retarded the progress of the work. The surveys, however, carried out during that time comprise the coast and outlying dangers off Cape Campbell, the anchorages off the Flaxbourne River, and the north and south anchorages off the Kaikoura Peninsula, and the coast line adjacent, all in the Province of Marlborough; Gore Bay and Waiānua River, in the Province of Nelson; together with the examination for verification of the position of Cook's Rock.

The "St. Kilda" proceeded to the West Coast of the Middle Island in the commencement of May, and the system to be adopted for carrying on the survey from the southern boundary of the County of Westland was decided after consultation with the Chief Surveyor of the County.

As nothing had been done beyond an incomplete beach traverse, no position of the coast having been fixed astronomically by the Provincial Surveyor, the District Surveyor being aware that we required to determine the position of the principal headlands was only waiting for us to do so in order to carry down a series of geodetic lines on a line bearing from point to point connected with the coast traversed and observed points in the interior. By thus working the two services together, as Mr. Frazer, the County Surveyor, has already reported, both would be benefitted, and the progress of the Marine Survey materially facilitated, as the sea traverse must be worked by the included angles between the points we fix astronomically and the most prominent heights in the interior that can be seen from seaward, and the bearings obtained by the County surveyors from these latter positions to our Trigonometrical Stations on the coast will be a check upon our observations.

The general system being arranged, the survey was commenced on the 7th May, the inshore line of soundings run down from Abut Head to Cascade Point, the angles being taken to conspicuous points to be fixed in future. Cape Jackson having been selected for the present southern point of our base line, the chronometers were duly rated for time at this position, when it was found that a serious alteration had taken place in their rates since they left the Observatory in Melbourne, where they had been rated and reported upon by R. L. J. Ellery, Esq., F.R.A.S., the superintendent, and the need for verifying their rates with extraordinary care involved considerable delay. The hard gales and general bad weather experienced by us at this time sadly kept us back; but I have to report, notwithstanding, that the geographical position of Cape Jackson, Open Bay Islets, and Tititira Head are fixed astronomically, and that a sea traverse from Cascade Point to Ohirokua Point (Yellow Cliffs), a distance of seventy-five miles, has been practically completed, though some points require to be carefully determined before the work can be properly protracted. Numerous rocks a-wash have been discovered that are not marked in the Admiralty charts; but as a rule they are out of the ordinary course of ocean-going steamers, though dangerous to the coasting steamers. Errors in the true bearings of different points of the coast surveyed also exist. This, Dr. Hector, F.R.S., Director of the Geological Survey, had previously discovered to be the case south of Cascade Point; the errors to the northward I attribute to the fact of the Admiralty surveyors having accepted data from an ambulatory draft made by Messrs. Heaphy and Brunner, of the New Zealand Survey Department, in 1846, in their celebrated exploratory journey on the West Coast, though such a draft being prepared from compass bearings and estimated distances, if continued for some leagues on an irregular coast, must necessarily be more