

This report was before Messrs. Cullen and Keele when they reported in 1912, and they took a contrary view. They said—

“Although we find no evidence in support of what appears to have been a commonly accepted theory of sand-drift, and do not believe that any drift exists as alleged, the surface wind during south-easterly winds not affecting the question, yet, &c.”

When reverting to the same question in their report of 1925, Messrs. Cullen and Keele stated that by personal study they could find no evidence of sand-drift either in the form of causes which would lead them to expect the drift, or of indications of its results. After referring to the scouring out of the experimental hole dredged by the “Whakarire,” they say:—

“It is impossible to reconcile the foregoing with the existence of the sand-drift along the coast, and in our opinion it offers conclusive evidence confuting the opinions expressed as to the existence of such sand-drift. . . . A sand-drift would certainly obliterate a cutting. As the small deep cut made has not been obliterated, or even altered appreciably in ten years after its side slopes fell in, the interesting theory must be given up.”

Mr. Furkert in his report in 1924 referred to the proposed entrance channel to the Inner Harbour saying:—

“The agitation of the sea-bottom whenever there was rough weather, combined with the drift of sand up the coast, which (the breakwater notwithstanding) is still in progress, would cause a continual tilling-up of this channel.”

Messrs. R. W. and J. D. Holmes in giving evidence before the Commission took the same view of the matter as did Messrs. Cullen and Keele, and on the same grounds—namely, that they could find no positive evidence of sand-drift since the erection of the breakwater; secondly, that the deepening in the bay, and especially outside the entrance moles for the Inner Harbour, was irreconcilable with the theory of sand-drift. All engineers seem to be agreed that if this sand-drift is present it will offer a barrier to the maintenance of an entrance channel of much the same kind as would be offered by a travel of shingle.

OUR CONCLUSIONS ON THE QUESTION OF SAND-DRIFT.

We have had the benefit of being able to study and consider all these reports and also evidence bearing on this point that has not previously been assembled and put forward. This takes the form of certain soundings and contour maps covering a period of from 1855 to date.

Mr. Furkert, in giving evidence, produced as Exhibit No. 111 five plans which he had prepared showing the contours of the sandspit in the bay as they were in the years 1855, 1882, 1895, 1906, and 1927 respectively. We have had photographic reproductions of this exhibit prepared, and we show them as plans No. D1855 to D1927 in Commission's Exhibit No. 3. If these are examined it will be seen that drawn at right angles across the contour-lines is the centre-line of the proposed entrance channel to the Inner Harbour. If the 1855 map be examined it will be seen that at that date the 30 ft., 27 ft., 24 ft., and 22 ft. contours extended up to and across the centre-line to the east of the same. The 22 ft. contour extended to a distance of about 33 ft. to the east of this centre-line. The areas included in these contour-lines are shown in red hatching on plan D1855. If attention now be given to the map for the year 1882 (an interval of twenty-seven years) it will be noted that the 30 ft. and 27 ft. contours no longer exist on the centre-line, and that even the 24 ft. contour has been pushed over and is wholly on the western side of this line, whilst the 22 ft. contour, although still generally on the east side of the line, has a slight protrusion to the west, but has its maximum distance on that side of the centre-line reduced from 330 ft. to about 165 ft. On the 1855 map the width of the 22 ft. contour at the point where the centre-line cuts across it was 990 ft., but in 1882 the width is reduced to 660 ft. In the year 1927, after an interval of forty-five years since 1882, we find that the 22 ft., 24 ft., 27 ft., and 30 ft. contours have moved easterly, and a new 32 ft. contour, which did not even exist in 1855, has also appeared on the east of the centre-line, the distances to the east being respectively 22 ft., 785 ft.; 24 ft., 724 ft.; 27 ft., 620 ft.; 30 ft., 458 ft.; and 32 ft., 333 ft. It will be noticed that the new 32 ft. contour is now approximately where the 22 ft. contour was in 1855; the length along the centre-line between the south and north limits of the 22 ft. contour is now 2,722 ft. as against 990 ft. in 1855 or 660 ft. in 1882.

It will also be noticed that the north-west tongue of the spit, as indicated by the 22 ft. contour in 1855, was some 330 ft. west of the centre-line, and was in the year 1882 some 1,800 ft. west of same, and that in the year 1927 is only 1,155 ft. west of the centre-line. The elongation of this spit to the west during the period 1855-82, and the other alterations that we have described above were, no doubt, largely due to the construction of the eastern and western moles at the Inner Harbour entrance during 1876-78. To assist ourselves and readers of this report to a clear understanding of what has taken place on this spit, we have plotted cross-sections of the spit and prepared a comparative plan of these cross-sections at the three dates involved—viz., 1855, 1882, and 1927. In considering these it must be remembered that the breakwater was commenced in the year 1885. A comparison of these cross-sections shows that the area of this sandspit was very greatly increased during the period 1855-82. A plan of these cross-sections is included in Commission's Exhibit No. 3, and is marked “Plan No. E.” On each of the plans of the spit is shown the line of the centre of the entrance channel, and this is the basic line of our cross-sections. Proceeding in an easterly direction from this base-line, we have laid cross-sectional lines at intervals of 5 chains, and these are numbered from 1 to 12. Proceeding in a westerly direction from the base-line we have also laid cross-sectional lines at a distance of 5 chains apart, and they are numbered 01 to 04, inclusive.

Now, if the section between the base-line and line No. 01, 5 chains west of the centre-line, be examined, it will be seen that the material deposited between 1855 and 1882 had been almost wholly removed by 1927; not only so, but some of the original 1855 bottom which had not been covered by the 1855-82 deposits is also removed. The following three sections covering the tract within lines