

might happen to be in the same locality, no record was kept of these imperfect surveys; and thus the mistakes made, and which will continue to be made under any system short of absolute perfection had been left to accumulate *for years*, with no guide or clue to their number or extent, except when they were brought to light by some owner of a section requiring his grant, which we find cannot be issued.

You will, I am sure, perceive that the difficulty of unravelling and correcting these mistakes is no small matter, and I cannot, while the rush of work lasts, pretend to do it in a more thorough manner than by revising urgent cases as they may arise. Mr. Wright, at Timaru, is, however, an able assistant, and during the past year has worked most energetically in clearing up the arrears of plotting in the the Southern district.

Surveys Requiring Revision.

During the past year the closures obtained between the old and the new surveys, both in the minor triangulation and the sectional work, have enabled me to form a better estimate of the extent of revision which will probably be necessary.

As previously reported to you, I found that upon attempting to re-calculate the triangulation north of Waipara, and between the Rakaia and Rangitata, west of the railway, discrepancies existed so serious, and suggesting the necessity of such extensive revisions, that I considered it better to do the whole again. This course, meeting with your approval, has therefore been adopted, the country north of the Waipara being completed under a contract to Mr. Connell, and the triangulation now being re-observed by Mr. Maitland is almost completed.

The re-observations of the former contract disclose errors ranging from 2 to 17 links per mile in the length of the sides of triangles, and in the latter contract the base line from which the work was calculated, and which, of course, was supposed to have been carefully chained, shows a discrepancy of 13 links per mile. Elsewhere the errors are from 7 to 21 links per mile, whilst the angles differ from 1 to 5½ minutes.

In another place angles supposed to have been observed could not be seen, a high hill intervening; in fact, the errors disclosed in every part of the work suggesting that the survey was not honestly done. As a triangulation it is useless.

The remainder of the Canterbury triangulation is, I believe, fairly accurate, the re-calculation and closures not showing any great discrepancies, with the exception of a few triangles in the southern portion, which, I think, can be re-observed without revising the whole work.

In the course of the present year I hope to clear up all differences of such of the old triangulation as is available for use. Anent sectional surveys on the Canterbury plains—in the Ashburton district for example—I find that a comparison of three surveyors' work under the present system, with that of the old *regime* surveys, shows that differences exist in the chained distances given on the old plans, ranging from two to 30 links per mile, in nearly every instance the old chainage being too short, showing that the surveys were done with a chain longer than the standard, the effect being—and I think it will be found a general rule on the plains—that the Crown Grantees really occupy a larger area than is shown in their titles.

In the Waitaki district the same rule obtains; the distances given on the plans being short of the true distance on the ground, from eight to 16 links per mile. The chains here used having also evidently been too long.

In the cases just quoted the angular work appears to have been well done, the largest discrepancy found being seven minutes.

In the Waipara district, so far as I have been able to compare the old with the new work, larger differences arise, but, as yet, I have insufficient check to warrant my drawing definite conclusions, further than that in rough country the effect is the reverse of that on the plains. In the district under notice the distances given on the old plans are too long, and this result might be expected to occur on hilly ground, unless the surveyor was very careful to make sufficient allowance for the difference of hypotenuse and base caused by the inclination of the ground; if this is not done the distances given on the map are greater than they really are on the ground.

I think that on the plains—except such districts as Rangiora and Ellesmere, where great discrepancies are known to exist, which, up to this time, I have had no opportunity of examining—the sectional surveys are sufficiently reliable not to need revision, save such revision naturally arising as the land is brought under the provisions of the “Land Transfer Act.”

On the Peninsula much graver errors occur, errors which a comparison of the old and new surveys shows can but be the product of gross carelessness in execution. In some instances I find errors of 187 links in 25 chains; 188 links in 46 chains; 130 links in 21 chains; and to take the last case brought under my notice, in which two sections are Crown Granted as one, in a rectangular block, 2,440 by 1,850 links, the following differences occur on the ground:—One side of the section is right, measuring 1,850 links, and one angle is as it should be, a right angle; the other sides measuring respectively 2,407 and 2,466, instead of 2,440, and 1,811 in lieu of 1,850, the angles being 1 deg. 51 min., 2 deg. 34 min. and 8 min. wrong; two of the boundary lines instead of being straight, have bends in them.

Land Transfer Surveys.

The work under this branch of the department is so rapidly increasing that the work of supervision required to be undertaken by this office is already largely augmented.

If the Land Transfer Surveys are to be, as they should be, systematically checked and properly recorded, more precautions than have hitherto been taken will have to be observed, in order to guard against the receipt of incorrect work from the licensed surveyors.

Plans on a large scale—to show clearly the subdivisions in each original section or sections held under one title or certificate—must be prepared from the Land Transfer Surveys.