

The summary of progress, neglecting triangulation, which would need to be done again, is as follows :—

| | Acres. |
|---------------------------------------|-----------|
| Section surveyed | 39,600 |
| Topographically surveyed only | 940,400 |
| Reconnaissance and unsurveyed | 2,065,760 |
| Total area of Westland | 3,045,760 |

The section surveys are sufficiently good for Land Transfer purposes, and will not need revision.

CANTERBURY.

While in Auckland and some other provinces one chief cause of the difficulties which beset the early land sales under the principle of selection before section survey was that they often had absolutely no topographical map with any pretension to accuracy as a basis to work upon; in Canterbury, on the other hand, we have the case of large areas having been triangulated and topographically mapped for purposes of land selection, with a certain show of accuracy, yet so carelessly in reality that but little good was gained; error and confusion of the usual types were introduced at the very outset, in spite of a large expenditure of money, and have never since been thoroughly eradicated.

The surveys in question were begun in 1849. A base near Christchurch, about three miles long, was measured in that year with a standard chain, and a triangulation was erected on it with a six-inch theodolite, and shortly extended to the Rakaia, a verification base near Oxford, about two miles long, having been measured meanwhile. At different times subsequently, up till 1870, other triangulations, not properly connected with this one or with one another, and each depending on one or more chained bases of its own, were carried southward to the Rangitata, and northward to the Hurunui. Though these various triangulations were mainly confined to the more level parts of the province between the mountains and the sea, a tract favourable for trigonometrical work, yet it does not appear that anything like mathematical accuracy was aimed at, or that a thorough and uniform system was pursued. Under a pressing demand for surveys, work of a rough kind was approximated as it best could be, which is tantamount to saying that errors were systematically concealed or overlooked. Everything was laid down to compass meridians; true meridian and geographical positions were altogether disregarded, except those which the Naval officers supplied. No descriptions were kept of the trigonometrical stations, several of which have since been removed and their positions on the ground lost; while of many of the observed angles no record whatever exists. Some of the work was done by contract, some by the staff. Though part of it no doubt was pretty good, a great deal was certainly very bad; the trigonometrical work in Banks Peninsula, for example, is notoriously in error to a very serious extent. This is no more than might have been expected; for, as there was no proper scrutiny or connection of parts, all depended on the trustworthiness of the surveyors. It is quite clear then that these triangulations, covering about 1,200,000 acres north of the Rangitata, are as a whole far from being accurate, and there is no pretence to the contrary. Mr. Hewlings, the present Chief Surveyor, has entered on the costly and troublesome task of revising them as he best can. Some parts stand the test well; others fail to do so; and, as it is impossible to tell before trial where the bad parts are, the whole must be gone over again, either to establish its accuracy or correct its errors, before it can be accepted as final.

In the topographical surveys nominally founded on these triangulations, a traverse was required of all natural features, such as ridges, watercourses, terraces, swamps, lakes, bush, &c., which might serve as section boundaries; main roads also had to be surveyed and marked out, and the whole mapped on the scale of eight inches to a mile, to serve as the basis for free selection, which might be made in sections of from twenty acres upwards without limit. A map of this kind, constructed with fair accuracy, should have been a sufficient safeguard against future complications. The boundaries and acreages of sections would sensibly be the same on the map and on the ground, and when the more minute section survey afterwards came to be made, any slight discrepancies could be met by corresponding corrections in the sums previously paid for license on application. But the system, though good in theory, was vitiated by the inferior quality of the maps actually produced. Not only was the triangulation in itself indifferent, but there is no evidence that the detail was systematically tied upon it. Besides this, the surveyor, who, it is to be feared, was in many cases but little skilled in his profession, was allowed to plot his own work; and, though parts were occasionally inspected, it does not appear to have been regularly subjected to field examination or other check. Thus large errors often crept into the maps, and it is easy to form an idea of the sort of trouble and confusion that might arise in consequence. If the map, for example, should make it appear that there is more land within certain limits than really exists, licenses might be issued for too many sections; and, on the section survey being afterwards made, the latest applicant would find himself mulcted of a good deal of the land he had counted on and paid for—if not altogether dispossessed—by the prior rights of those who had applied before him. Instances of this kind have actually happened in the Canterbury surveys.

¹ Including areas unconnected with circuit traverses.