

there is a water-power of any economic value under present conditions. To utilise the waters of the Whitcombe itself would entail the expenditure of an enormous sum of money quite incommensurate with the value of the power which could be derived from it; while any attempt to utilise the streams of steeper grade such as the Price, Cropp, and Vincent, would probably be defeated by the very low discharge of the rivers in the winter-time and the absence of any storage-capacity in their basins.

Progress of the Surveys.

The traverse of the Hokitika from the Whitcombe to the Mungo junction and of the Mungo itself was carried out by Mr. Allan Wilson under my direction. He displayed considerable energy in connection with the work, which he pushed on as rapidly as was possible. He carried his traverse as far east as Mungo Pass and connected it with the previous year's surveys brought up from the Wilberforce Valley on the Canterbury side of the Alps. I personally made the survey of the Whitcombe River and its tributaries, with the exception of the Cropp, which was done by Mr. Wilson. I also made several ascents of prominent peaks to complete the topography of the high country. The Vincent Stream was traversed to the Kea Pass, which is at an altitude of 4,850 ft.

Field-work in Westland was suspended early in May, and I returned to Wellington.

Office-work.

I was engaged at the office until the middle of September. During this time I was employed completing the mapping of the Westland surveys, and assisting in the preparation of the maps for publication in Bulletin No. 3 dealing with the Parapara Subdivision.

Field-work resumed.

I left Wellington on the 14th September and proceeded to Collingwood to take in hand the survey of a large area of unmapped country extending from the middle portion of the Aorere Valley to the Karamea Bight on the west coast. Work was continued in that locality until the end of the year, and a large area of topographical survey was executed. Included in this was a detailed survey of a considerable scope of country known as the Goulard Downs, which lie at an altitude ranging from 2,000 ft. to 2,500 ft. above sea-level. The area dealt with being beyond the limits of any triangulation, I had, for the purposes of the topographical work, to extend the triangulation as the topographical work proceeded.

Mr. H. Richardson, Assistant Topographer, who joined the staff in October, has also been engaged continuously upon topographical surveys under my direction, in the Karamea Division. He was located on the west coast south of the Wanganui Inlet. Besides a careful survey of the coast-line, Mr. Richardson has made detailed surveys of the main streams flowing from the Whakamarama Range to the sea-coast, the principal of these being the Anatori, the Turimawiri, the Anaweka, and Big rivers—as well as several of their larger tributaries.

Mr. A. J. Whitehorn, who was seriously ill in the early part of last season, was able to resume work again in January last. He has been engaged in making compass traverses of the Heaphy River and its important tributaries, and has done much useful work in that isolated and inaccessible region.

Work at the Franz Josef Glacier.

Early in January, under special instructions, I proceeded to South Westland to undertake a topographical survey of the Franz Josef Glacier and of the country surrounding it, as well as to determine the various movements of the glacier preparatory to a geological examination of the particular area being subsequently made. Work was continued at the Franz Josef Glacier until the middle of March, and much valuable topographical information was obtained.

A triangulation was extended to near Graham's Saddle and several useful observation-points fixed. The longitudinal movement of the glacier was carefully determined over a period of thirty-six days. A section was also made across the glacier about half a mile above the terminal face, and was extended for several hundred feet on each side of the glacier to the limits of the ice-worn rock. The results in detail of the investigations conducted at the Franz Joseph Glacier will be published later in a special paper.

The Photo-theodolite.

During the past season great use was made of the above valuable adjunct to topographical surveying. The instrument was utilised in the Karamea Division during the latter part of last year, and also in connection with the work at the Franz Josef Glacier. The photo-theodolite, as its name implies, is a theodolite and camera combined. Photographs with a field of view of 42° are taken with the instrument at fixed points at each end of a base line. All points which can be identified on both photographs can by a comparatively easy process be accurately laid down on the map.

The illustrations published with this report will give a good indication of the great utility of the instrument for the class of work for which it is being used.