far as a very unfavourable season for exploring the rougher and back parts of the country would admit of, with the result that, while the previous report may be said to be generally fairly correct in certain particulars, statements purporting to be based upon facts require to be corrected, and speculations based upon these require to be modified. The work of the present season being much impeded by unseasonable weather about the end of January, I abandoned the mountainous parts of the district altogether, and for the remainder of the season confined my examinations to the low grounds between the borders of the mountain country and the sea coast. I had thus the opportunity of examining at many places the drifts that have been or are being worked for gold, and at the same time of securing a large number of photographic views, illustrating the methods of gold-mining now being pursued on this part of the West Coast, and at the same time I obtained a large series illustrating matters of pure geology, the scenery, and physical peculiarities of the district. These, it is hoped, will be made available for the purposes of this report, as very many of them have been taken with this special object in view; but it is questionable whether press of work in the photo-lithographic department will admit of the number being reproduced which it was intended should illustrate this report.

On the 2nd November I received the following instructions:—

"Colonial Museum of New Zealand, Wellington, 1st November, 1892.

"Mr. McKay, Assistant Geologist.

"The Hon. Minister of Mines desires me to instruct you to proceed as soon as possible to explore the country about the Upper Arahura and Hokitika Rivers, with the view of discovering any auriferous or any other metalliferous deposits that occur there.

"Special instructions and maps will be provided for your guidance.

"James Hector, Director."

"*Memorandum of Instructions for Mr. McKay.*—With reference to my letter of yesterday, I now furnish the following special instructions for your guidance: You will proceed by way of Arthur's Pass, in order that you may have an opportunity of revising the section which displays the general structure of that part of the Southern Alps, as the stratigraphical position of the auriferous rocks on the west slope has yet to be decided.

"The late Sir Julius von Haast adopted the view that there is a distinct Westland formation, but did not define its relations to the older metamorphic rocks of the same district. But in the Reefton District the facts observed indicate that there has been a mineral, and particularly an auriferous impregnation of the argillite sandstones that are younger than the fossiliferous Devonian strata in the district.

From this it is probable that synclinal inclusions of upper Palæozoic formations may occur along the western flanks of Alps which have been subjected to chemical, mechanical, and metamorphic action, and which, having originally included "tufaceous" deposits of igneous matter, have now developed masses of the same hydrated magnesian rocks that characterize the mineral belt of Nelson District.

"This view is, of course, opposed to that which supposes the outcrop of a formation along the western flanks of the Alps older than the Te Anau series, and younger than the metamorphic rocks represented by the granites and mica-schists of the same district.

"It is therefore desirable that you should commence with a thorough examination of the Mount Torlesse formation in its typical locality, and especially by a careful scrutiny and collection from the strata which carry the obscure fossil plants and annelid casts which are usually quoted as characteristic of this formation, and which have also been found on the western flanks of the Alps. In passing, your attention should be given to the verification of the theory that the inclusion of the Trelissick Cretaceo-tertiary basin has been due to faulting, and probably some new and important information bearing on this point may be obtainable from the sections on the New Zealand Midland Railway line along the valley of the Waimakariri below the Cass.

"The section in the upper part of the Waimakariri, above the Bealey Ford, should also be examined, and compared with that occurring at Arthur's Pass, so that the section can be continued westward; not only to the auriferous rocks at Taipo, but also directly towards the headwaters of the Arahura and Hokitika Rivers, where your special exploration is to be made.

"After reaching the West Coast, your best course will be to explore the up-rivers into the heart of the range in a deliberate manner, establishing camps at convenient distances to enable you to make a thorough examination of the structure of the country, and above all things to avoid being cut off from communication.

"You will also, as hitherto, keep full notes of your observations in the form of a daily journal, and collect, as largely as circumstances will permit, specimens of rocks and minerals, and fossils for future reference and study.

"If the weather is suitable, it would be advisable to re-cross the Alps by Whitcombe's Pass.

"James Hector,
"Director of New Zealand Geological Survey."

On receipt of these instructions I made preparations for the trip, and on the 9th November I went to Christchurch, and thence to Springfield and Castle Hill stations, from which places I made the necessary examinations of the Mount Torlesse Range and the Trelissic Basin.

After having examined the coal seams in the lower valley of the Broken River, I went by coach to the Bealey, where I remained for two days, examining the strata in various directions; and the following coach-day I crossed Arthur's Pass to the foot of Otira Gorge, where I waited the arrival of the next coach from Springfield, meantime making such examinations as might further my work in other parts of the district to be examined.

On the 23rd November I arrived at Kumara, and, after a few days spent in necessary preparation, the exploration of the Arahura Valley was begun, and continued till the 12th December without any important discovery being made. This was owing to the prevalence of wet weather, which, especially amongst the mountains, proved exceedingly stormy and unseasonable.