and to all appearance eminently suitable for a town supply. A short distance to the north, in Section 168 or 169 is another spring equal in size to Hughie's Creek, so that the supply from the latter source could easily be supplemented if required.

Though I did not have the time or means required for gauging Hughie's Creek, and therefore the estimate of 40 cubic feet per minute as its flow is merely a guess, there need be no doubt but that it will easily fulfil the needs of Kaikoura Township, which according to the census of 1911 contained only 408 inhabitants. Probably the maximum number of people to be supplied at the present time does not exceed six or seven hundred. The past two years have been among the driest ever experienced in Marlborough, and yet, as I was told, the flow of water in Hughie's Creek has not diminished in the least. My inspection of the creek confirmed this statement, for there was not the slightest indication of any lowering of the water-level.

The water of Hughie's and other springs on the Kaikoura Plain is derived mainly from the slopes of Mount Fyffe. It creeps through the gravels forming the various stream-fans until, probably through the influence of some clayey layer more or less impervious to water, it is forced to the surface. Quite possibly the bulk of the water forming each spring follows a fairly definite channel or course in the gravels in the early part as well as the later part of its career. There appears to be no danger of the springs being contaminated by surface drainage, but samples of the water, if it is to be used for a town supply, ought to be taken at different seasons of the year and subjected to analysis.

Hughie's Creek (excluding Lyell Creek, which is liable to contamination) is the nearest visible source of water-supply to the Township of Kaikoura. Possessing an ample and constant flow, the stream by reason of its origin in a spring is free from floods, and the only drawbacks that can be urged against its use are that the expense of bringing in the water will be somewhat great for the present small population, and that the pressure will hardly be sufficient to supply the hospital and other buildings on the higher levels, nor will it be adequate for fire-prevention purposes. Hence some pumping will have to be done, and ultimately a reservoir made to supply the high levels. For such a reservoir the hills of the Kaikoura Peninsula offer various suitable sites.

III. Possibility of Artesian Water on Kaikoura Plain.

The Kaikoura Plain has been formed by the coalescing of the delta-fans of the Kowhai and Hapuku rivers, with the addition of material transported by the small streams draining the seaward slopes of Mount Fyffe. Near the mountains it has a considerable slope, probably 100 ft. to the mile, but towards the sea its grade is 30 ft. or less to the mile. Theoretically the plain will be built up of numerous lenticular layers of gravel and finer debris, the coarser material predominating near the mountains and the finer towards the coast. Since remnants of ancient beaches on Kaikoura Peninsula and elsewhere along the coast prove considerable land-elevation in comparatively recent times, it follows that most of the debris transported by the streams was deposited by them in the sea, and hence is deltaic in character. The uppermost layers of the higher part towards the foot of the mountains were deposited on land, and are most correctly regarded as fan deposits.

A very large amount of water undoubtedly finds its way through the gravels and sands of the Kaikoura Plain to the sea, and the question to be considered is whether any of this water can be easily made available for a supply to Kaikoura Township. The conditions are similar to those of the Canterbury Plains and several other localities in New Zealand where artesian water is obtained. The analogy of Kaikoura with Christchurch is rendered curiously close by the presence of peninsulas—Banks and Kaikoura—both of which are formed of hard rocks, and were at one time islands. There appears to be no reason why bores for artesian water in the neighbourhood of Kaikoura should not be successful, provided sites some distance from the hills of the peninsula are selected, so as to avoid the danger of striking solid rock before a good water-bearing layer is tapped. It is also advisable, in the first place, to avoid boring near the shore-line in case brackish water only should be obtained. Experience, however, may ultimately show that fresh water extends right to the coast. Whether the water obtained by boring will rise well above the surface or fail to reach it cannot be predicted beforehand. Much depends upon the distribution of layers of clay or other comparatively impervious material in the neighbourhood of the bores. The most probable case is that the water will reach the surface, but without any great pressure behind it. In that event more or less pumping will be necessary.

Artesian Structure.—Even in some comparatively modern text-books the theory of artesian wells is treated in such a way that the reader will gather the impression that a basin structure is required. There are, however, at least half a dozen types of artesian structure, and of these the basin, as originally defined, is not the most important. It is a fact that in many situations, although the water of a porous stratum may have a means of escape, yet it will rise in a bore sunk to the porous stratum because the friction in the channels of escape provides considerable head available for forcing the water up the bore. Hence it is quite reasonable to expect that the underground water of the Kaikoura Plain can be successfully tapped by bores.

Conclusion.

Although my opinion need not be accepted as in any way authoritative, yet its expression may be of use in a discussion regarding the Kaikoura water-supply. Of the various possible schemes that of obtaining the town supply from Hughie's Creek seems on present information to be the best. As compared with the Luke's Creek or Waimangarara Stream proposals it has the advantage of being less expensive, but the disadvantage of not being purely gravitational. The installation of a pumping plant and the construction of a small reservoir on the Kaikoura Peninsula would make the Hughie's Creek scheme equal in every respect to any of the gravitation