at the rate of only 4 feet in the century. To show, however, that the question has engaged the attention of the colonists before, I will quote from a paper read before this Institute by our worthy President in 1868, entitled "Is the Land about Auckland Rising."* Dr. Purchas said:—"He might mention a very curious circumstance in reference to the rise that occurred in the land about Auckland. He thought it afforded positive proof that the land about Auckland was rising sufficiently to be quite measureable. Messrs. Thornton and Co. got a supply of water from the harbour. They had a pipe fixed at some distance down the wharf with a rose at the bottom. They have had to alter that rose three times at intervals of three years. Mr. Firth had told him of the circumstance, and he believed that special pains had been taken with the fixing of the pipe the last time, in order that the matter might be settled. He had been assured by a settler that the harbour of Mahurangi was 2 feet less in depth than it was two years ago. If the bottom of the harbour was rising, it was a matter of vital importance to the people in the neighbourhood of the city. He had no doubt about the accuracy of the information, as was shown by the fact that the rose had to be altered three times in order to get a supply at low-water. A discussion ensued, in which Mr. Weymouth, Captain Hutton, Mr. Wark, Mr. Buckland, and Mr. Stewart, took part. Most of the speakers seemed to be of the opinion that there was not sufficient evidence to show that the land was absolutely rising."

I also quote from the "New Zealand Herald" part of a report by Captain Burgess, dated 3rd January, 1878. After referring to the changes in the character of the weather and the alterations in the harbour due to the silting-up for the last thirty years, he says,—"With reference to the above remarks, I may mention that there is but 3 feet of water at the end of the Breakwater instead of 7 feet, as reported in 1868; also, that the rocks off St. George's Bay are evidently rising." I think we may infer from the last remark, that Captain Burgess believes that the land is rising in addition to the harbour silting-up. If it is so, and that at anything like the rate that Norway is rising, the day is not so far distant when the commercial part of the city of Auckland will have to shift its quarters considerably to find depth of water for its shipping.

Art. LIX.—*Description of an Artesian Well sunk at Avonside.*

By T. A. Mollet.

[*Read before the Philosophical Institute of Canterbury, 30th December*, 1880.]

The information contained in this short paper, though of little or no importance to the ordinary observer, is of interest to the geologist, as helping

* "Trans. N.Z. Inst.," Vol. I., p. 38.

him, with other like evidence, to elucidate the formation of the Canterbury plains. This matter has been treated of by Professor von Haast in his recent work on the geology of this province, and he there points out the value of collecting all possible information to enable maps and sections to be prepared, showing the geological nature of the country.

I trust that many persons may be found willing to bring forward any communications of a similar kind, as by that means a mass of facts will be collected, which, taken together, will be of immense value. It is important that this should be effected as soon as possible, there being now no means of ascertaining what the pipes (the lower ends of which are invariably closed with an iron plug) are driven through. In former times, as is well known, the wells were bored, and thus afforded a section of the strata passed through; but the number of such wells is comparatively few, and therefore particulars regarding them (which would otherwise be irretrievably lost sooner or later) should be put on record at once.

The well to be described is situated about 15 chains south-east from the junction of the New Brighton road and Dudley Creek, and about 2 chains from the road bordering on the creek, and fronting on the property on which it is sunk. It is on lot 32 (at present occupied by Mr. Hebden) of Rural Section 231 (originally in the possession of Mr. T. L. Laine).

This well was bored for the gentleman (Mr. T. L. Laine) who, at the time, owned the property, and from him I obtained, a few years ago, the particulars (which I noted down) concerning the sinking of it. Not thinking at the time that the information would ever be of any value he had not committed it to writing, so that he gave it me from memory; but as he had taken very great interest in the matter, I have not the slightest doubt of the correctness of the measurements.

Starting from the surface, 1¼ feet of black soil was first met with, beneath which was a layer of clay 1¾ feet thick, followed by a bed of sand 12 feet deep. The next stratum of 15 feet consisted of river-worn shingle, which reposed on one of bluish sand, considered to be of sea deposit, and was only passed through after hard driving for 60 feet. Peaty soil was next encountered, beneath which was found fragments of wood, cockle shells and clay, all this occupying a depth of 2½ feet. A 1½ feet layer of shingle was the last pierced before water was reached. At this point the well was abandoned by the sinkers, who had taken six weeks to attain a depth of 94 feet. The lower end was now so much bent that it was hardly possible to clear the pipe; and the water, the supply of which was very meagre, was not of good quality.

Two months after the well-sinkers returned, and finding the pipe had sprung back to its normal condition, proceeded to drive it without difficulty. It now passed through 3 feet of sand, followed by 1 foot of peat, and 2 feet

of clay, when a plentiful supply of water was tapped, which brought up a considerable quantity of sand. Some idea of the quantity issuing from the pipe may be gathered from the fact that, though the extremity was three feet above the surface, the water was forced up in a solid mass five inches higher (pipe 2¼ inches in diameter).

The well had then reached a depth of 100 feet, but as it frequently brought up sand, and as the taste of the water was not so good as was expected, the owner, about ten years after, had it sunk another 8 feet. It was easy to drive, eight to ten blows to the inch, through a bed of shingle. Some of this, brought up by the force of the water, was of so great a size, that the burred edge of the pipe had to be cut off to allow it to pass out. The water was now entirely free from sand and much improved in taste.

It will be seen by referring to the list of strata passed through, that the well, when bored the first time, ended in a bed of shingle, with a deposit of clay above. When sunk deeper, the second time, it again passed through clay with shingle beneath, which was further penetrated in the third boring. The above agrees with the following statement made in Professor von Haast's work:* "The bottom of the water-bearing stratum consists invariably of a bed of shingle, mostly of small size, upon which a deposit of sandy clay reposes.

I might mention that when the well was left, after the third boring, 10 feet of shingle was present in the lower end of the pipe.

TABULATED LIST,

Showing the depth of the various strata, borings, etc.

Depth.	Description of Strata.	Thickness of Strata.		
		I. Boring.	II. Boring.	III. Boring.
	Black Soil	1¼ feet	..	..
1¼ feet	Clay	1¾ „	..	..
3 „	Sand	12 „	..	..
15 „	Shingle..	15 „	..	..
30 „	Blue Sand	60 „	..	..
90 „	Peaty Soil .. } Wood, Shells, and Clay }	2½ „	..	..
92½ „	Shingle	1½ „	..	..
94 „			..	..
	Sand		3 feet	..
97 „	Peat		1 „	..
98 „	Clay		2 „	..
100 „				..
	Shingle..			8 feet
108 „				

* "Geology of the Provinces of Canterbury and Westland, New Zealand." By Julius von Haast, Ph. D., F.R.S., etc., 1879.