In order to determine the relative absolute heights of the transect stations, a calm day was chosen on which a tide of known recorded height (obtained from harbour authorities in Auckland) covered station 1. At the time of full tide the depth below the surface of station 1 was measured with a metre rule, thus giving a known height with respect to sea level of station 1. When the tide level had dropped to station 1 the depth below the surface of station 2 was measured and so on down the transect. A profile of the transect was then plotted on graph paper and the mean tidal levels given in the local tide tables were drawn in to scale (Fig. 3).

(b) *Sampling and sieving*

The sampler consisted of a pipe of 3mm thick iron, 40cm tall and 36cm diameter, with loops for an iron bar to fit across the top. This sampler was forced into the sand by pressing down on it and at the same time rotating it slowly until it sank to the required depth. In front of the sampler a small trench was then dug, and a spade pushed beneath the sampler, cutting off the contained sand from that below. The sampler was then tipped on its side, lifted out and its core of sand slipped into the top sieve of a tier of 3 square-mesh sieves. The mesh gauge of the top sieve was 12.5mm, of the middle sieve 3.125mm, and of the bottom sieve 1.25mm. The three sieves were clamped together and worked as a unit, the sieving being carried out in sea-water inside a circular galvanised iron tub. At stations 4 and 5 a hose was used to wash the sample through the sieves, but this tended to damage the polychaetes severely and the practice was discontinued.

The animals (macro-fauna) and debris retained by each sieve were bottled in sea-water and taken to the laboratory for sorting. No attempt was made in this survey to deal with species not retained by the 1.25mm mesh sieve, as the coarse nature of the material on much of Howick Beach made the use of a finer sieve impracticable.

This sampling and sieving technique enabled one person to collect and sieve two samples during the relatively short time (1–2 hours on the lower spring tides) the stations on the lower part of the beach were exposed. The method also avoided contamination of the sample from collapse of the surrounding sand, and furthermore enabled most of the delicate polychaetes to be collected without damage.

The weight of sand prohibited the taking of a larger sample by this method. Accepted practice in ecological work of this kind has been to take samples of $0.25m^2$ (Bruce, 1932; Moore, 1940; Holme, 1949; Southward, 1953). Comparisons between the two samples taken at each station on Howick Beach show that the smaller $0.1m^2$ samples were of sufficient size to assess the quantitative distribution of the numerically common species living in the sand. They did not give reliable quantitative data on the rarer species, nor on the animals with a clumped distribution pattern (e.g., *Cominella* spp.).

(c) *Sorting*

The sievings were sorted while still fresh in a large black-bottomed dish filled with sea-water. The material retained by the fine sieve at stations 1, 2 and 3 contained a large quantity of shell fragments. Small bivalves and gastropods were difficult to sort from this and so the following flotation technique was devised and adopted. The fine sievings were treated with alcohol, and after filtering, stirred in a beaker containing ethylene dibromide. The floating material (animals and a small amount of dead shell) was skimmed off and the animals sorted out. Stirrings were repeated until three consecutive ones each failed to disclose further animals.