

Longitude.—During the three nights the "Countess" remained at Alofi I endeavoured to get star sights for longitude, Captain Worsley having kindly lent his chronometers and offered to assist in recording, but, unfortunately, each night turned out to be cloudy, and I only succeeded in getting one set of rounds to Jupiter. On working this out it gives $169^{\circ} 55' 15''$ W., while for the same position, bringing up the Admiralty determination from the south point of the island, would be about $169^{\circ} 51'$. Captain Worsley tells me that the mean results of his observations for longitude at Alofi Bay during several trips from Auckland is $169^{\circ} 58'$. I am therefore of opinion that the Admiralty value is too much to the eastward, especially as the chart shows the island as eight miles wide along the southern coast, whereas in reality it is only five miles. However, further observations are required to definitely settle the point.

Azimuth.—During the first week I was engaged on the survey there was a considerable amount of rain, and I was not able to get any good observations for azimuth, so I started on the magnetic meridian and then carried on limb bearings. I read the two faces of the instrument for both the bearing and the included angle at each traverse point, and was thus enabled to get the mean of four readings at each angle. As soon as the weather cleared I took both solar and stellar observations at the initial station, and found the mean variation from the magnetic to be $10^{\circ} 22'$. In the same way I checked the bearings at intervals of every few miles round the island, and got excellent closes, with the exception of the traverse between Hokupu and Liku, which I found a few minutes out. As was to be expected in an island entirely of coral formation, the readings of the needle were very steady; testing it on all parts of the traverse gave practically the same variation.

Chainage.—The main traverse round the island, a distance of thirty-five miles, comes into 2.8 links per mile. This is not quite up to the average close in New Zealand, but when it is taken into account that I started with quite untrained men, that I was working against time throughout, and had no chance of rechainning any of the line, I think the results should be considered fairly satisfactory. Of course, I read the band end of the chain all the time myself, but with new hands it was difficult to get the plumb-bobs held quite steadily.

Width of Roads.—The general width of the roads as formed is from 12 ft. to 20 ft., in most places bordered with cocoanut-palms or other trees. As they wind about very much, I did not attempt to put in any side pegs except through the Village of Alofi. I simply adopted the longest traverse-lines I could get without having to do much cutting. Mr. Maxwell has made great improvements in the roads since he has been in Niue, and it is now possible to drive right round and across the island, though some deviations are still required where the road rises from the first to the second terrace. In traversing from Alofi I worked both north and south around to Lakepa, and put in temporary marks at mile intervals. Mr. Maxwell intends to replace them with permanent milestones, which will be useful for any one travelling.

Coast-line.—Wherever it was possible I have taken offsets to the coast-line from the road traverse. Where the distance precluded this being done, I ran prismatic-compass traverses from the road down to the principal points, and then sketched the coast-line in with cross-bearings and estimated distances. This may not give the edge of the land exactly, but it will come within a narrow margin of error. From the rugged nature of the coast and the dense vegetation, to make an exact traverse would alone occupy many months, while the method employed will be close enough for all practical purposes.

Total Area of Island.—The area works out to 64,028 acres, or, in round figures, 100 square miles. This agrees very well with the estimate based on the Admiralty chart, though the shape of the island is considerably different, being wider in the middle and very much narrower at the southern end than shown on the chart.

Area under Cultivation.—A person casually strolling about the roads of the island would be inclined to get an exaggerated idea of the area under cultivation and the extent of the plantations, as these latter border the roads and extend for a considerable width about the settlements; but, when it is taken into consideration that the palms form a mere fringe along the roads in most places, and that in others there are none at all, a better estimate may be formed. By averaging the width of the plantations along the roads and tracks that I know of, I come to the conclusion that at the very outside not more than 20 per cent. of the total area has been planted with cocoanut-trees or otherwise brought under cultivation, and I should not be surprised if it turned out to be a good deal less. If another 15 per cent. is knocked off for places too rocky to do anything with—though the bananas and palms seem to thrive in Niue if they can find the least crevice to send a root down through the rocks—it will be seen that there are vast areas (speaking in an island sense) still available for being brought in. If the young men could be induced to develop their own island, instead of going to labour plantations on Malden and elsewhere (I am told there are about five hundred so absent), the export of copra could easily be quadrupled in a few years. Besides, for many other reasons, it is bad for the island that such a large proportion of its able-bodied men should be absent.

Forests.—As previously stated, the land in its natural state is mostly covered with forest; this includes ebony and many other hard woods. I saw numbers of trees with a diameter up to 4 ft., and tall trunks clear of branches. Altogether there must be a good many millions of feet of timber suitable for milling purposes on the island, but with difficulties of transit it is doubtful if its removal could be made to pay.

Caves.—There are many extensive caves in Niue, one at Lakepa, I was told, having passages which could be measured by the mile. I was so pushed for time, however, that I was unable to inspect it, but one that I visited at Vaiopepe is extremely beautiful. It is situated about 200 yards from the sea on the northern coast, and is formed of a number of galleries and terraces, one below the other. Stalagmites and stalactites are in great profusion, and group themselves into all kinds of fantastic shapes. Here a draped figure, as it were, sitting on a stool of repentance, there