

## SURVEY OF A SEAPEAK IN THE MOZAMBIQUE CHANNEL

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The current practice for all H.M. Surveying Ships making a passage from one port to another is to plan the passage so that, without deviating too much from the direct route, the ship shall pass through any areas which appear to be little known. A continuous record of soundings is maintained and other oceanographical observations are also obtained. In this way a considerable body of information is being built up and Admiralty charts are continually being improved by the addition of the information so obtained. Much of this information is of comparatively little interest to the surface navigator and is therefore only incorporated in the charts when new editions are being prepared or when the accumulation of information in any area justifies a large correction. Occasionally however a new and prominent submarine feature is discovered which can be of great value to the mariner in assisting him to confirm his dead reckoning when out of sight of land, and such a feature will be embodied in the chart immediately by means of a block correction.

A case in point is the discovery of a previously unknown seapeak in the Mozambique Channel by H.M.S. « Dalrymple » while on passage from Durban to Mombasa in September, 1954. Referring to the reproduction of a portion of Admiralty Chart No. 2762 as it was at that date (Figure 1) it will be seen that between the latitudes of 13° South and 15° South there is a blank area lying between two lines of soundings which run 355°-175° and which cross the parallel of 14° South in 41°18' East and 41°46' East approximately. H.M.S. « Dalrymple's » designed track was laid down to bisect this 28 mile wide blank area.

At 07:00 on the morning of the 28th September the ship was in approximate position 14°18' South, 41°30' East (i.e. about 3 miles to port of the designed track) in 1 209 fathoms of water and steering a course to make good 355°. Soundings began to shoal noticeably at about 0720, the 1 000 fathom line was crossed at 0734, and at 0752 a peak sounding of 252 fathoms was recorded. There was thus a rise in the sea bed of some 5 700 feet in a horizontal distance of just over 5 nautical miles.

It was at once decided that this feature, provisionally classed as a seahigh, merited a full investigation and the passage was broken off. While a beacon was being rigged the ship returned and, running lines about half a mile apart parallel to the original course by dead reckoning, endeavoured to obtain a preliminary picture of the top of the feature. Purely by good luck the initial turn was made in the right direction and the probable highest point was soon found. The least water recorded during this preliminary stage was 168 fathoms.

The beacon, which was fitted with two radar reflectors, was laid in 180 fathoms of water with 300 fathoms of mooring. In theory it was thus free to move anywhere within a circle of about two cables radius but in practice it always lay well out to a strong (2 knot) southerly current and maintained a very steady

position. The same sounding was recorded time after time as the ship subsequently steamed close by while sounding.

The scale selected for the investigation was 1:72 000. This was large enough to ensure that the main features of the seahigh could be accurately delineated, small enough to ensure that the whole could be plotted on a convenient sized sheet, and a very convenient scale on which to work as one « radar-mile » of 2 000 yards corresponds to one inch on paper.

After allowing half an hour for the beacon to settle, sounding was started and was continued until dusk when the ship was stopped about a couple of miles away from the beacon to enable evening star sights to be observed. By remaining well away from the beacon an accurate fix relative to it can be obtained by radar as each star is observed. This method is preferred to heaving to in the immediate vicinity of the beacon and estimating one's distance from it, as it permits the ship to remain on a constant heading throughout. Morning stars were similarly observed the next morning, and sights of the sun and Venus were observed while sounding the following day. All the position lines thus obtained were used to derive the position of the beacon which was accepted as  $14^{\circ} 10'.7$  South,  $41^{\circ} 28'.7$  East.

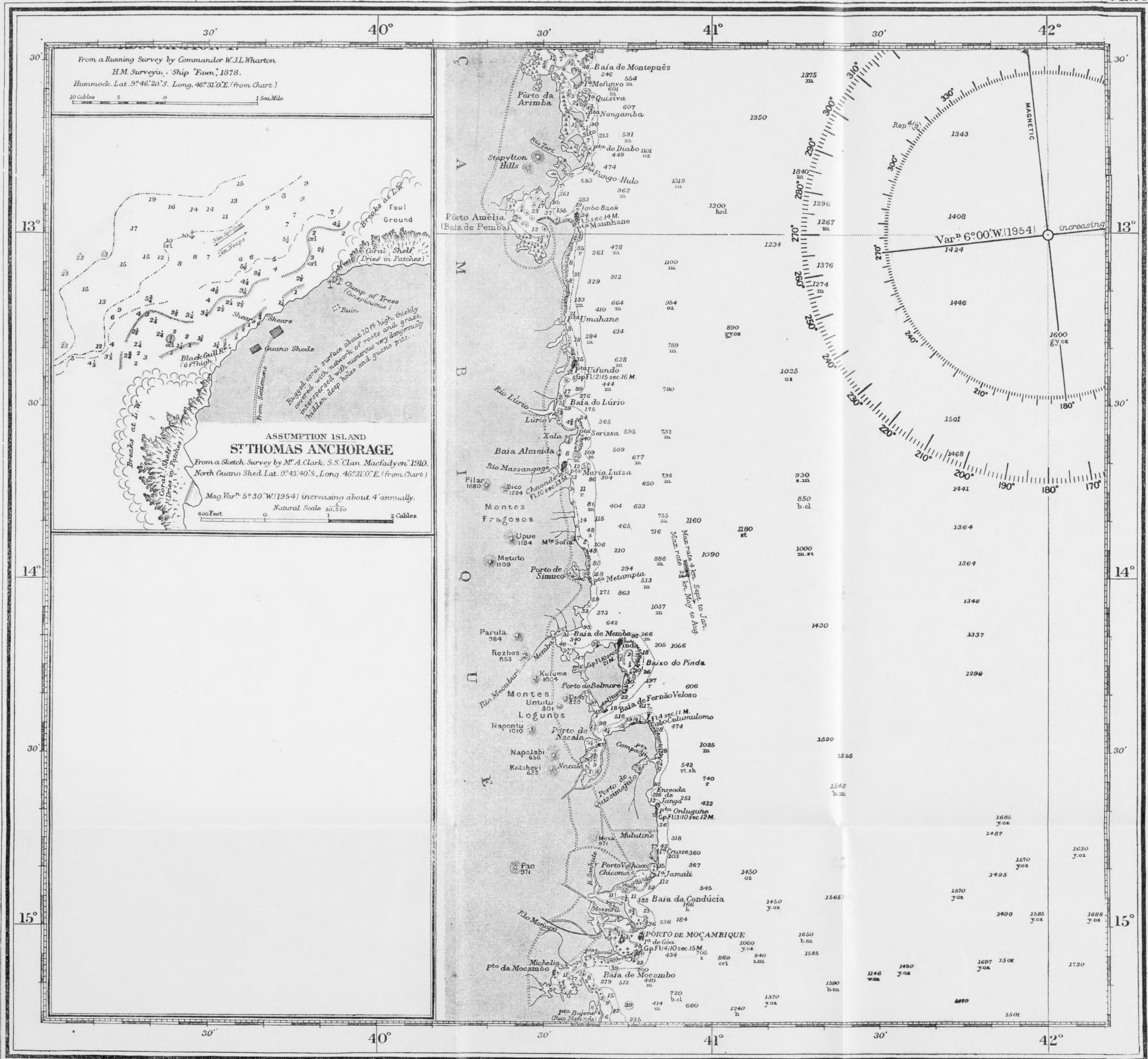
The sounding plan was as follows:

- (i) lines to be run radially from the beacon.
- (ii) lines  $20^{\circ}$  apart to be extended to the 500 fathom line.
- (iii) lines  $40^{\circ}$  apart to be extended to the 1000 fathom line.
- (iv) interlines and cross-lines to be run as found necessary as a result of (ii) and (iii).

In the event interlines were run  $5^{\circ}$  apart to delineate isolated peaks under 500 fathoms in depth, and the soundings were not carried sufficiently far out to cover the 1000 fathom line to the north of the seahigh.

While sounding the ship recorded the depth of water every 30 seconds and fixed her position every three minutes by gyro compass bearings and radar ranges of the beacon. Figure 2 shows a selection of the soundings obtained plotted on half the scale of the survey. They have been corrected for the speed of sound in sea water as given in Admiralty publication No. H.D. 282 (Tables of the Velocity of Sound in Pure Water and Sea Water for use in Echo-Sounding and Sound-Ranging. (D.J. Matthews.) 2nd Edition, 1939). Profiles of the feature on three equally spaced bearings have been drawn and are shown in Figure 3. In this drawing the horizontal and vertical scales are the same (7 200 feet to 1 inch).

From these two figures and taking into consideration also the other charted depths in the vicinity it would appear that the comparative isolation of this seahigh from the continental shelf can be accepted. If this is so then it clearly falls within the classification of seamount, i.e. « an isolated or comparatively isolated elevation of the deep-sea floor of approximately 3 000 feet or more ». The actual summit is fairly flat (an area of approximately 450 yards by 150 yards has less than 50 feet variation in height) but this area is so small in relation to the whole that it can certainly be regarded as having « a pointed top ». As it is also « roughly circular or elliptical in plan » it should be placed in the more restricted category of seapeak. The name « Paisley Seapeak » is being proposed.



Small corrections

Figure 2.

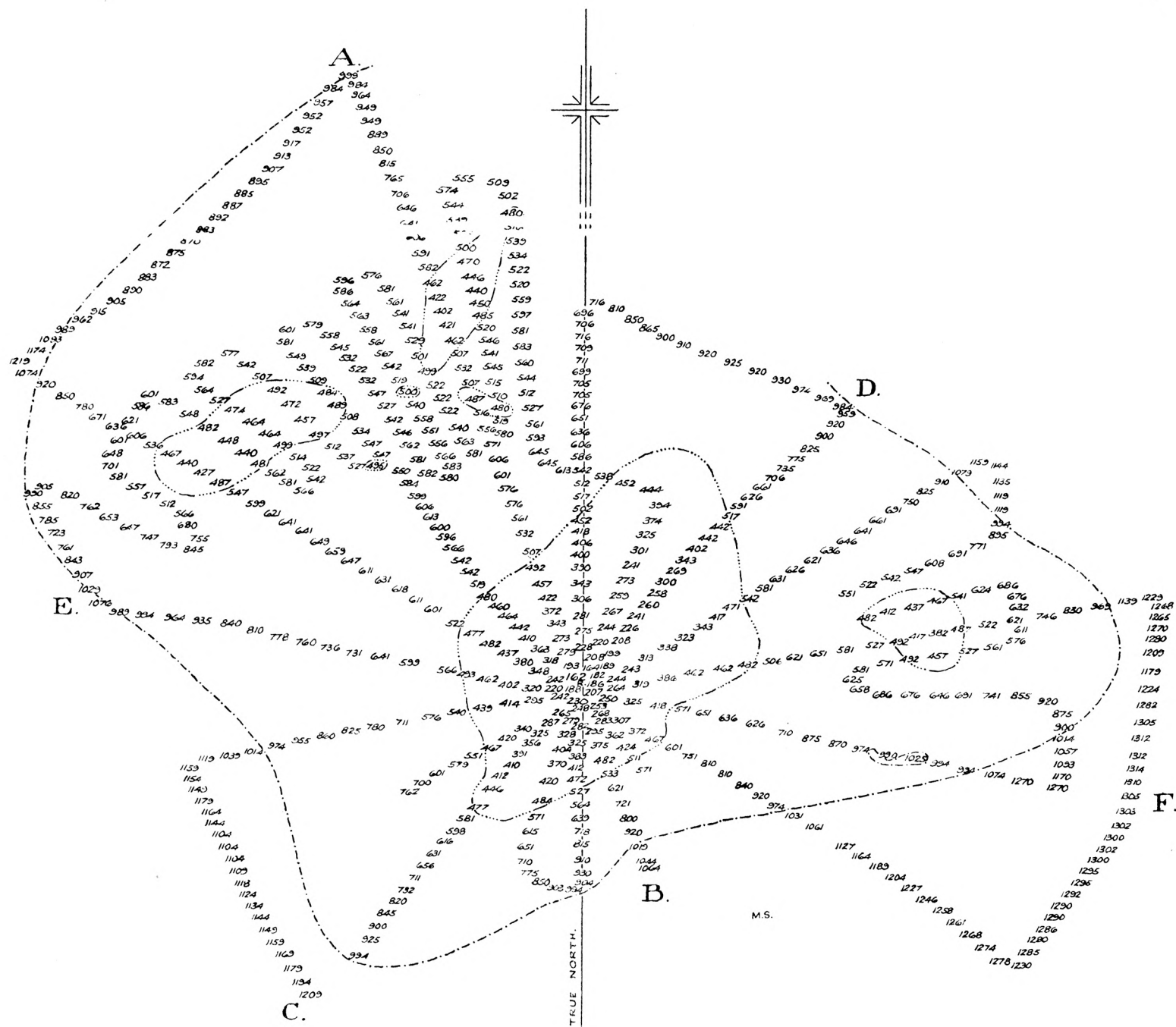
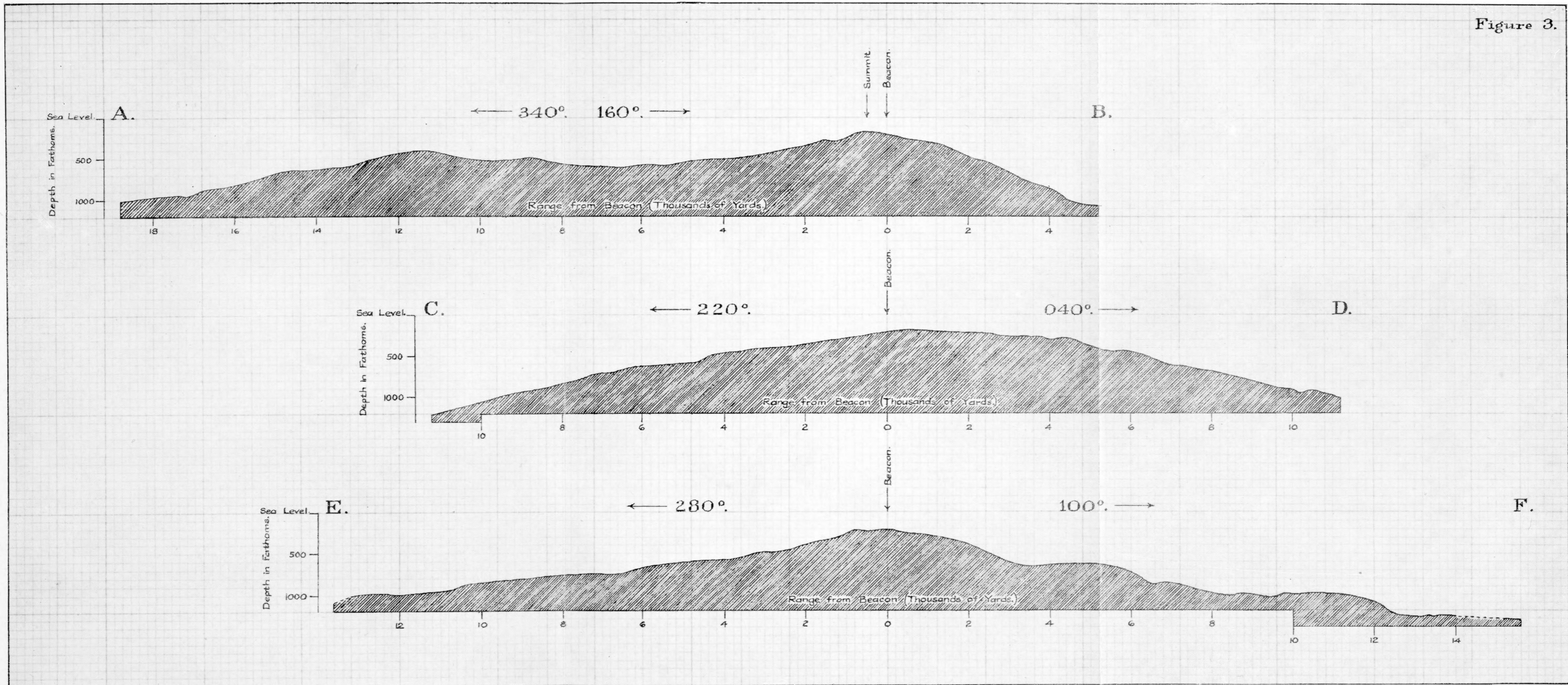


Figure 3.



Sounding was completed at 1600 on the second day, September 29th, and the ship then went into deep water at the edge of the seapeak to obtain a sample of the bottom. A fair sample, of Mud and Sand, was obtained in position 141°-8 000 yards from the beacon in approximately 1 200 fathoms using a Baillie rod. The ship then returned to the top of the seapeak to get another sample there. Hoping for a bigger sample, a bottom dredge was first used but after three abortive attempts this was abandoned and the Baillie rod was again sent down. The first cast again produced nothing but the second brought up a small chip of granitic rock. As the Baillie rod will not normally obtain a sample from a rocky bottom this was regarded as a stroke of luck unlikely to be repeated and no further attempts were made.

As the investigation was now reasonably complete and as the ship was getting very short of fuel, the beacon was weighed and the ship resumed her passage to Mombasa. Had circumstances permitted it would have been desirable to complete the delineation of the 1 000 fathom line to the north and north-east of the seapeak and also to have obtained further bottom samples from the slope of the seapeak.

Another point of interest would be to establish whether there is any connection between this seapeak and the 850 fathom sounding charted some 27 miles N.N.W. of it and between this and the 890 fathom sounding charted some 32 miles farther N.N.W. The natures of the bottom charted at these two points make it appear unlikely but the fact that they *are* shoal soundings and that they lie so nearly in a straight line is at least suggestive of the existence of a submarine mountain range. Even were the existence of such a range to be proved it would still appear to be completely detached from the continental shelf as a sounding of 1 100 fathoms lies on the extension of this N.N.W'ly. line and between the further shoal sounding and the mainland.

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