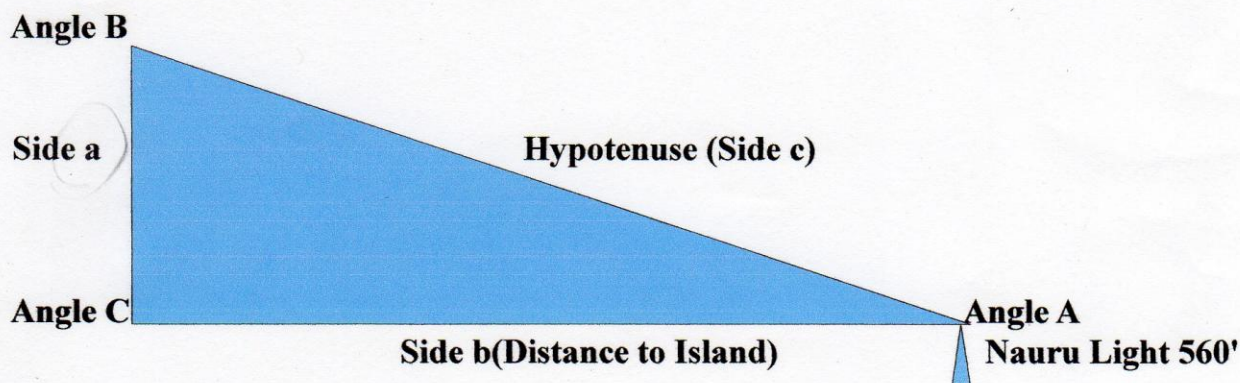


THE MISTAKE AT NAURU

To understand the mistake in navigation we must first understand the method of plotting their position. Noonan knew he was in the vicinity of Nauru Island because he could see the light on the island. We can assume this because the visibility that night at Nauru was 40 miles and at 10,000 feet he could have seen 120 miles away. With his Pioneer bubble octant he could calculate his exact compass bearing to the island, but the human eye cannot judge distance on the ocean at night. In fact, it is quite difficult to do in the day time. He would have also used the octant to get the angle from the aircraft to the light (Angle B on the diagram). The next measurement he needed was the length of one side of the triangle which would have been his altitude above the light. His aircraft altitude was 10,000 feet and the telegram had given the elevation of the light at 5600 feet. He would have computed his height above the light to be 4400 feet. The rest of the problem is simple geometry. He has two angles and the length of one side of the triangle with that information he could have computed the length of the other two sides and the third angle.



Angle B- is the angle from his Pioneer bubble octant to the light on Nauru - 89.09 degrees
Side a- is the aircraft's altitude minus the elevation of the light ($10,000 - 5600 = 4400$) .7272 miles
Angle C is 90 degrees

We cheated and used a Right Triangle Calculator. The results are as follows.

Angle A=.91 degrees

Side b=45.78 statute miles distance from Nauru

This gave Noonan a distance of 45.78 miles or for all practical purposes 46 miles from Nauru Island. The mistake would have been the same no matter where he was in relation to the island.

Had he been given the correct elevation for the light his calculations would have been as follows.

Side a= 1.7878 miles (9440 feet)

Angle C= 90 degrees

Angle B= 89.09 degrees

The result would have been 113 miles to Nauru the correct distance.

With this distance and bearing he would have plotted his position in relation to Nauru incorrectly. As a result of that mistake he would have miscalculated his wind drift and hence the direction and speed of the winds. Because of that he would have used the wrong drift correction angle for the rest of their flight. **FOR THE WANT OF A NAIL!**