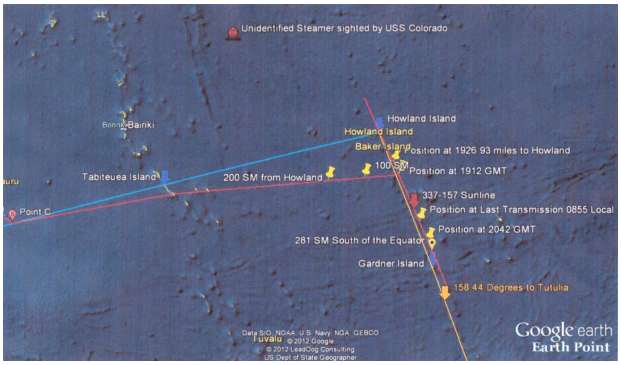
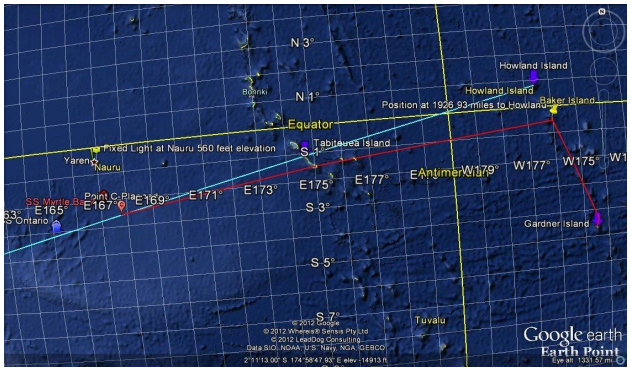




WHY DID THEY MISS THEIR TARGET?

By Robert Wheeler and Fred Nicely

For seventy-five years the general thought associated with Amelia Earhart is she got lost, ran out of gas and crashed into the ocean. That is a rather simplistic and insulting resolution to the mystery behind the demise of one of the foremost women of the 20th century.

Amelia Earhart was a consummate professional who left little to chance. She knew, because she was a woman, that any mistakes she made would be seized upon and blown completely out of proportion. Back then, it was easy to for a "stock" answer to her disappearance to achieve mass acceptance. They got lost means that she or her navigator, Fred Noonan, made a mistake -- in this case a fatal mistake. People don't blame Fred Noonan for the navigational mistake. We always hear SHE got lost. Never HE got them both lost. History isn't always kind to the underdog and women, at that time, were quite disempowered.

Fred Noonan was a top-notch navigator, both in the air and on the sea. He developed the routes that Pan American Airways used to fly the northern Pacific. He was an expert at celestial navigation as well. They also had the benefit of a low frequency Bendix Direction Finder radio to aid in their navigation. The route from Lae, New Guinea to Howland was a straight easterly course for 2556 Statute Miles. There were four known land masses along the way enabling Noonan to check his course and gauge the prevailing winds. Yes, it was a challenge, but he was more than up to it as he had been doing the exact same thing in the northern Pacific for Pan-Am.

So how did they get lost? There are many possibilities and theories that have been considered. One major theory is that the winds were stronger than previously forecasted. This, of course, suggests that Noonan was a rank amateur who couldn't see that he was tragically off course. It also suggests that Amelia was flying at his side oblivious of the winds and their effect on the aircraft's course.

Nauru Island is the Key to this Puzzle

It is located more than halfway along their route and it had lights that could be seen for 120 miles from 10,000 feet at night. As luck would have it, the visibility was perfect for spotting the lights. The *SS Myrtle Bank* was approximately 113 miles from Nauru when the Electra passed over her. Noonan probably would have used his Pelorus Drift Sight to get a sighting on the light and compute their distance from the island. (Drift Sight readings are designed for the surface of the ocean and when done

from an aircraft the readings must be corrected for altitude.) The altitude of the aircraft is of critical importance in the calculation*. In a telegram received at Lae the altitude of the light was given as 5600 feet above sea level instead of 560 feet (even 560 feet is questionable since today the maximum elevation on Nauru is 205 feet). It is doubtful that the elevation would have been noted on any chart that he had. Noonan would have based his calculations on 5600 feet instead of the actual altitude of 560 feet. His calculations would have shown them 46 miles from Nauru instead of 113 miles. THIS MISTAKE WAS THE BEGINNING OF THE END.

You might ask at this point what difference that would make? He would have used this number to show him exactly where he was. But, it would also tell him how far he had been blown off course since his last sighting of land. Because the reading was wrong, all his calculations from then on would have been based on that erroneous position. This would have been an extremely easy mistake to make. His calculations would have told him the wind was 157 degrees at 17 miles per hour instead of 090 degrees at 24 mph. He would have corrected the course of the aircraft to 083 degrees instead of 080 degrees.** His ground speed would have actually been 144 mph, but he would have calculated it at 148mph. With this over correction he would have been approximately 35 miles south of his course line by the time he reached Tabiteuea Island.

The Problem with Tabiteuea Island

When they reached Tabiteuea Island it was very dark. There was hardly any moon illumination, even if the night had been clear. The night was overcast with clouds at 10,000 feet obscuring the stars so he wouldn't have had much of a chance to get a fix by the constellations. Sightings on constellations are normally acceptable at 30 miles off the mark. Tabiteuea Island is a problem because it is shown as a single island on the charts. In fact, it is a 41 mile long reef with several islands above the surface of the ocean. It is almost a sure bet that all he would have made out from 10,000 feet, with no more illumination than he had, were wave actions on the islands.

Since they crossed the island near the present day village of Buariki, the wave action would have seemed the same as it was at the northern tip of the island. The northern tip of the island was where the plotted course line was situated. At this point Noonan was most likely satisfied they were no more than one or two miles south of course, which was excellent for a flight of 400 miles (actually 508 miles). Because of the navigation mistake, he had actually miscalculated his position on the course line by 108 miles. In effect, he would have been 108 miles further from Howland Island than he had plotted.

His calculations would have told him the flight time should have been 2 hours and 40 minutes. With the actual mileage being 508 and the actual ground speed 148 their arrival time would have been 3 hours and 26 minutes. Since he was satisfied with the aircraft's course he would have needed to recalculate the winds at 097 degrees, 41 miles per hour. This must have created some anxiety for both of them because they thought the headwinds had gone from 17 mph to 41 mph. They must have kept the same heading, but the ground speed had gone from a perceived 147 mph to 117 mph: a thirty mph decrease.

That would have prompted Amelia to increase her indicated airspeed from 130 mph to 150 mph. They still would have had 620 miles (actually 618 miles) to go which would have been 5 hours and 18 minutes at their present speed. It was 1441 GMT. They would have been airborne for 14 hours and 41

minutes. At 1736 GMT Noonan would have plotted their course and wrongly estimated their position as 200 miles from Howland.

Amelia radioed the *Itasca* that they are approximately 200 miles from Howland. The call was logged at 1744 GMT. At 1754 GMT Noonan would have taken a sighting on the rising sun and would have concluded that they were only 100 miles from Howland. This estimate, which by the way was correct, was passed forward to Amelia who broadcasted at 1811 GMT that they were approximately 100 miles from Howland. This call is a correction of the previous call since the earlier position report was based on an estimate. But the sun sighting would not have told them IF THEY ARE NORTH OR SOUTH OF THE POSTAGE-STAMP-SIZED ISLAND.

Answering a Confounding Question

This brings up a point which has confounded researchers for many years. Why did they travel 100 miles in 28 minutes? The simplest explanation is: it was a correction of an estimate. They proceeded to the 337/157 degree sun line and turned northwest as planned. Noonan would have built in an offset of 10-12 miles so that when Amelia turned northwest to look for the island the morning sun wouldn't be in her eyes. She would have reached the point where Howland should have been at 1928 GMT and there was no island visible. The reason would have been that she was 102 miles (88 Nautical Miles) to the south-southwest of her destination.

At this point we must speculate as to what went on between them. Noonan made a navigation mistake at the island republic of Nauru. He used his observations to compute wind direction and speed. This resulted in his flying the rest of the journey off course, failing to make his time estimates. At this point, Amelia probably wasn't too confident about his advice. He should have been able to take a sun sighting and know that he was about 60 to 100 miles southwest of Howland.

They had been in the air for 20 hours and had seen nothing for 95 percent of the time except uninviting ocean. She would have been flying into her fuel that was reserved for an emergency. Is it any wonder that as pilot-in-command she would have decided to make for known land, namely the Phoenix Islands? We feel certain that she had planned in advance to fly to these islands in case she couldn't find Howland. Faced with the same scenario, most good pilots would have made the decision to switch to their alternate plan. To believe that an aviator with her knowledge and experience, coupled with the expertise of her mentor, Paul Mantz, would attempt a 2556 mile overwater flight to a speck of land 2 miles long and 1 mile wide without an alternate plan borders on the insane.

A Sensible and Realistic Explanation

Logically, if she had been northwest of Howland and flew even further northwest, it would have made a bad situation worse. If she were southwest of her destination, she would have simply made it to the Phoenix Islands sooner than she expected. One can understand why she was under stress during her last radio transmission. She was flying the aircraft and at the same time trying to decide whether or not to ignore Noonan's advice. She must have thought back to the beginning of the flight when she had ignored his advice and been proven wrong. But, even today, with all the navigation devices available to experienced and novice aviators alike, both get lost on occasion.

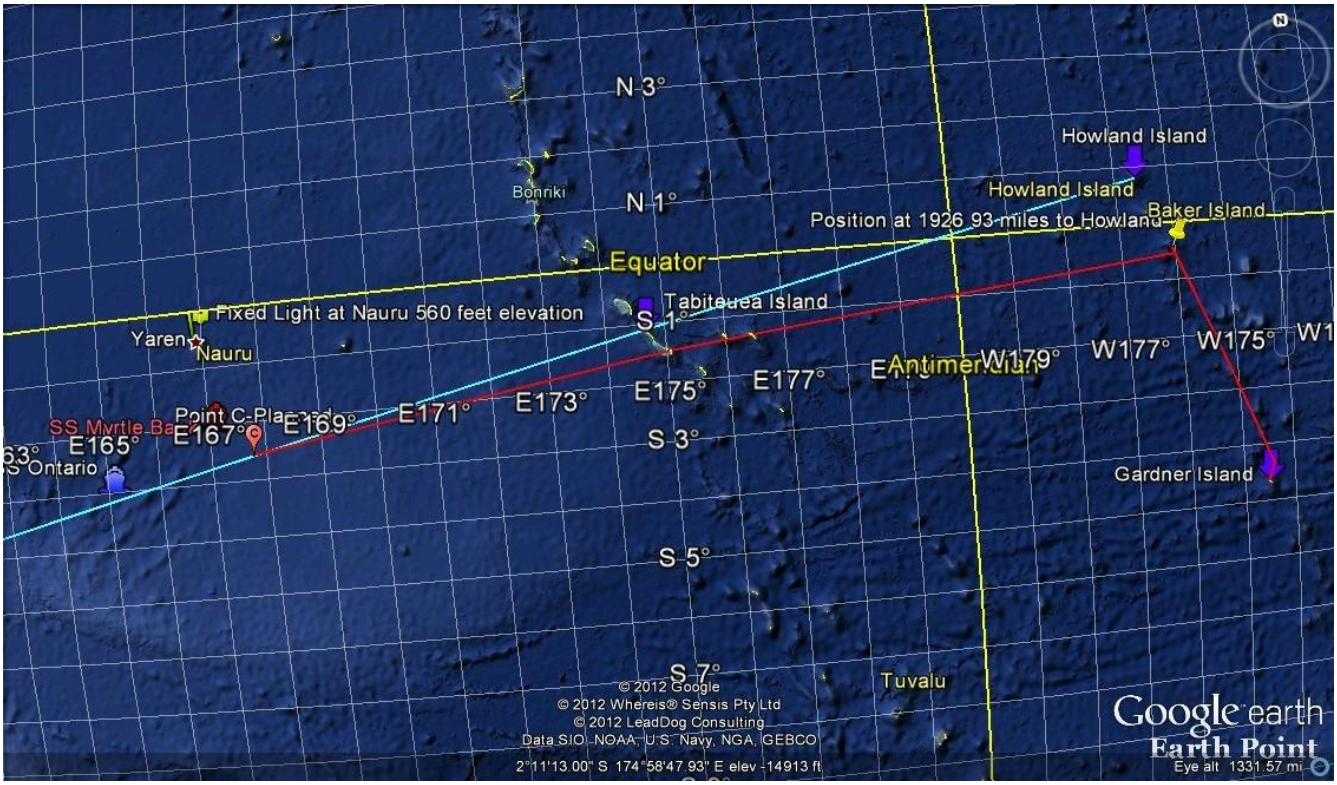
Our explanation of what happened is not the only one. It is, however the one that explains how a very

experienced aviator and equally talented navigator could not have *hit their target.* Heretofore most explanations of their failure have been explained by stronger than forecast winds, lack of communication between pilot and navigator, lack of knowledge regarding radio navigation, etc.

We disagree with these options. Our scenario explains why they ended up over 100 miles south of their course. They were both extremely competent, but not everyone is infallible in every situation. Our theory is simple. Noonan made a navigation error which compounded itself as the flight progressed. Amelia lost confidence in his advice and chose to disregard it for a seemingly safer course of action, as she had been taught. Sadly it ended up being a fatal combination for both of them.

*A full explanation is contained in the technical section of the website for those who want to delve further.

** The wind and navigation numbers are in the technical section listed under: The mistake at Nauru"



This is a depiction of their final route from a position south of Nauru labeled Point C to their closest position to Howland Island and then southeast to Gardner Island.