HOW DID THEY GET THERE?

by Samuel Halpern

In my book, *Strangers on the Horizon: Titanic and Californian – A Forensic Approach* (published 2019), I applied a number of analytical methods to test the many conflicting and sometimes contradictory reports concerning the whereabouts of *Titanic* and *Californian* relative to each other, and to answer the question as to whether or not they were ever in sight of each other. In doing so, I included detailed analysis of distances, bearings, headings, speeds, drift rates, ranges of visibility and other quantifiable information that had never before been examined in any great detail. In particular, I looked at the path taken by the SS *Californian* as told to us by her Captain and Chief Officer, and highlighted some of the inconsistencies in her reported navigation leading up to her reported stopped position for the night of April 14, 1912. I also looked into the details concerning the path that *Titanic* took up to the point where she came to a stop following the collision with an iceberg, and delved deep into the question of how the famous but erroneous SOS distress position (41° 46'N, 50° 14'W) derived by her Fourth Officer may have come about.

Based on mutually supporting compass bearing observations taken by *Californian*'s Second and Third officers, and supported by a relative bearing reported by her Apprentice officer, I was able to show that *Californian* was located on a line-of-position (LOP) that was bearing 315° true (to the northwest) from *Titanic* during the time that both vessels remained stopped for the night, including the time when distress signals were being sent up from *Titanic* and seen by those on *Californian*.[1]

In that comprehensive study I was able to establish minimum and maximum distances between the two vessels while they remained on that line-of-position, and was subsequently able to determine the that the two vessels were between 12 to 14 nautical miles apart from each other using several independent analytical methods. These included the use of maximum geographic range tables, the geometry of the field of pack ice that was seen in the vicinity after daybreak, and independent ship sightings reported after daybreak from *Carpathia*, *Mount Temple* and *Californian*. In addition, I was able to explain why the lights of *Californian* were not seen early on from *Titanic*, how *Californian*'s appearance had changed as it swung slowly around while being stopped alongside a field of pack ice, and why it seemed to have mysteriously disappeared just before daybreak to those in the lifeboats. Furthermore, I addressed a number of issues and concerns that were brought up by the Marine Accident Investigation Branch during their relatively brief and incomplete Reappraisal of Evidence study of 1992.

In this article I will review the paths taken by the *Californian* and *Titanic* on April 14th 1912, and show how both ships came to rest where they did, when they did. Bear in mind that *Californian*, which was originally heading for Boston at 11 knots, came to a stop well over an hour before *Titanic*, which was heading for New York at more than 22 knots, struck an iceberg and came to a stop soon afterward. However, once both vessels were stopped dead in the water, the two ships drifted slowly southward with the local current along with all the field ice and icebergs that were about. While doing so, both vessels more or less kept the same relative position with respect to each other with *Californian* on that LOP bearing 315° true from *Titanic* until the latter sank beneath the Atlantic at 5:18am GMT (2:20am *Titanic* time) April 15th 1912.

The reader should also be aware that clocks on *Titanic* and clocks on *Californian*

were not keeping the same time, but were showing a time that was based on where each vessel had been when local apparent noon occurred that Sunday, April 14th 1912. Time kept on board each vessel was known as Apparent Time Ship (ATS), or more simply as Apparent Time. Local apparent noon for *Californian* came 12 minutes later than local apparent noon for *Titanic*, therefore, clocks on *Californian* were running 12 minutes behind clocks on *Titanic*, which is why we sometimes we will refer to a standard time reference such as GMT when describing some time event.[2]

Before getting started, and for general reference, I've included Figure 1-01 (taken from the book *Strangers on the Horizon*) that displays the planned transatlantic routes of both vessels, the SS *Californian* and the RMS *Titanic*, for mid April 1912. This is shown below.

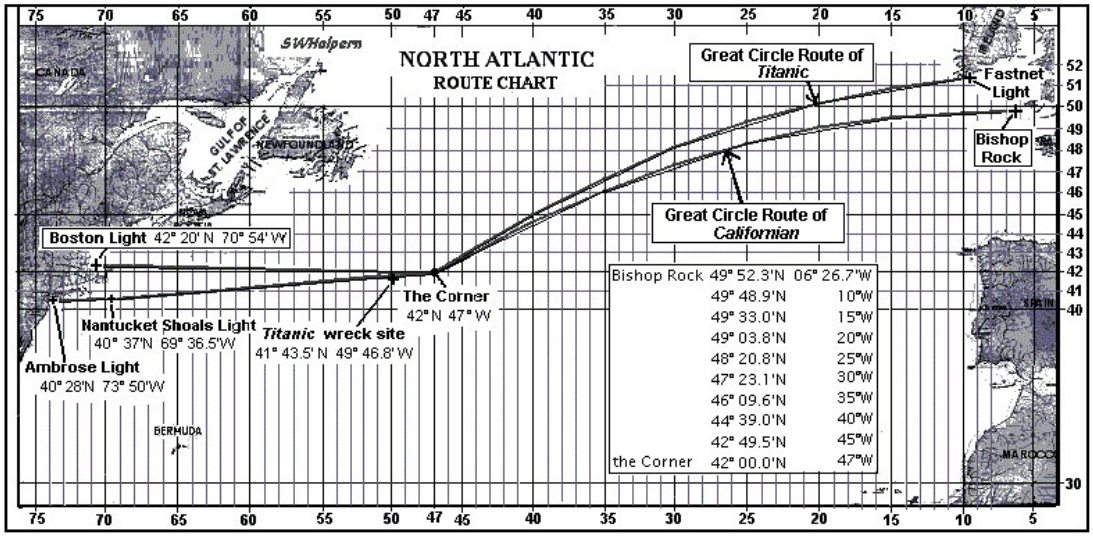


Fig. 1-01.

Where Did the SS *Californian* Stop?

In Chapter I of *Strangers on the Horizon*, we followed the route taken by the SS *Californian* as she crossed the Atlantic up to the point where she was forced to stop for the night because of a vast expanse of pack ice that was encountered in her path at 10:21pm (*Californian* ATS). Specifically, her logbook recorded a stopped position at 42° 05'N, 50° 07'W, and that position was used to claim during the 1912 inquiries that *Californian* was about 19½ to 20 nautical miles away from the *Titanic* SOS distress position that was given to her via wireless by the SS *Virginian* around 6am Monday morning, April 15th 1912. Yet, the information sent back to *Virginian*'s Captain Gambell from *Californian*'s Captain Lord (and later corroborated in a letter from Captain Lord to the Board of Trade on August 10th 1912), claimed that *Californian* was only 17 miles north of the SOS position, not the 19½ to 20 miles north that comes from the position (42° 05'N, 50° 07'W) that was later written down in *Californian*'s official logbook by her Chief Officer George Stewart.

What we were able to do in Chapter I of the book was to reconstruct the movements of *Californian* based on all the information that was available to us starting from when *Californian* changed course to due west (270° true) when she was believed to be at the so called Corner point (42°N, 47°W) for westbound steamers at 9:40am

(*Californian* ATS) that Sunday.[3] We also know that 15 minutes later, (at 9:55am)– *Californian*'s course was changed by 1° northward to make 271° true, which would have put her on a course straight for Boston Light. However, at 12:00pm noon, when a navigational sight of the sun was taken, it was discovered that *Californian* was actually 5 nautical miles north of where she should have been. Her course was then changed by 2° southward to make close to 269° true, which was a course that would be heading slightly south of due west. According to what Captain Lord explained in later years, that change of heading at noon was intended for *Californian* to come down to latitude 42°N at longitude 51°W before heading straight for Boston once again because of several ice reports he had received.[4]

We also know, from what we were told, that *Californian* was steaming at a reduced speed of about 11 knots that Sunday to save on coal consumption. Knowing *Californian*'s intended course changes and times, her speed, and where she was at noon that day, we were able to independently plot the path of *Californian* beginning from 9:40am up to the time she stopped at 10:21pm when she encountered that solid field of pack ice that blocked her path westward. When this was worked out, it was found that *Californian* should have been down to latitude 42° 02'N when she stopped for the night. However, according to what was entered in her official logbook, she was reported to have been 3 nautical miles further north, at a latitude of 42° 05'N, the same latitude that was recorded in her logbook for noon.

We also found, by working back in time, that at 6:30pm (*Californian* ATS), about 3 hours and 50 minutes before she was forced to stop, *Californian* should have been at 42° 03'N, 49° 10'W, a time when she happened to pass 3 large icebergs that were seen 5 miles to her south and later reported to the SS *Antillian* by wireless. In essence, the position given in the wireless message to *Antillian* showed that Captain Lord believed at the time that his ship was indeed heading slightly south of due west when those icebergs were sighted. The reported position of *Californian* in the message sent to *Antillian* checks almost perfectly with our independently derived Dead Reckoning (DR) position for *Californian* for that particular time.[5]

If it is to be believed, the explanation given during the British inquiry for the discrepancy between her logbook position for 6:30pm (42° 05'N, 49° 10'W) and what was communicated to *Antillian* for 6:30pm (42° 03'N, 49° 09'W), was that *Californian*'s Chief Officer Stewart had taken a navigational sighting of the pole star Polaris at 7:30pm (an hour later) that showed that *Californian* had somehow remained on the same 42° 05'N line of latitude all day Sunday from the time they thought they were at the Corner at 9:40am, until they came to a stop at 10:21pm. Yet the information Captain Lord sent to *Virginian*'s Captain Gambell around 6am the following morning indicated otherwise as was discussed in detail in the book.

Unfortunately, what was entered in *Californian*'s official logbook and what may have been written in *Californian*'s scrap log, where events for April 14th and 15th were first written down, could not be compared because the pages of her scrap log were not kept, but were thrown overboard after the official logbook was written up.

Figure 1-03 (taken from *Strangers on the Horizon* and reproduced below) shows the dead reckoning course for the SS *Californian* that we derived (solid line) based on a sustained speed of 11 knots, and the course headings that were previously mentioned. The starting point was *Californian*'s position for 9:40am, 5 miles north of the Corner point, up to the time that she stopped at 10:21pm on April 14, 1912. Also shown are the positions and resulting trackline that came out of what was recorded in *Californian*'s

official logbook (dashed line), a trackline that keeps the vessel on a constant line of latitude, 42° 05'N, all day Sunday until she stopped.

The reader should understand, that although we derived a DR stopping point for *Californian* at 42° 02'N, 50° 07'W, that does not mean that that was where *Californian* actually was when she came to a stop at 10:21pm that night. Our derived point is a Dead Reckoning (DR) point, based on course headings and speed that we were given. It does not include the affects of current, windage, or steering error which can be significant.

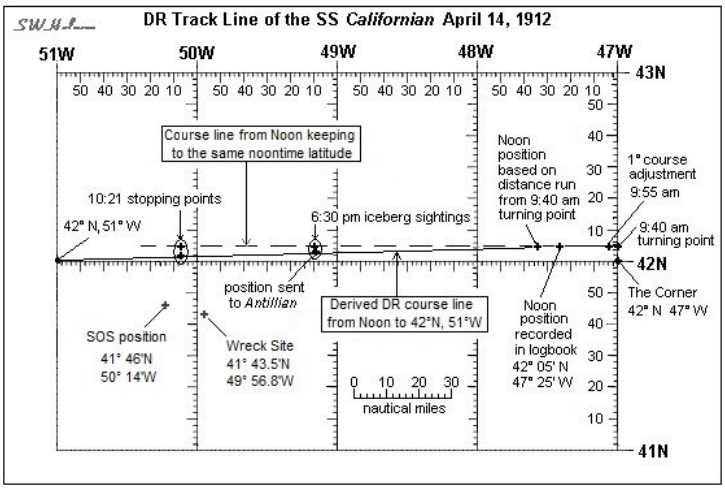


Fig. 1-03. DR track lines for the SS *Californian*.

As pointed out in Chapter VI of *Strangers on the Horizon*, other available data submitted into evidence showed that *Californian* experienced a drop of 20°F in measured sea water temperatures between noon and 4pm that Sunday afternoon. The water temperature at 4pm measured 36°F, only 4°F above the freezing point of fresh water. By 8pm the measured sea water temperature was down to the freezing point, 32°F, and it continued to drop a few degrees lower than that as *Californian* continued heading westward. This drop in water temperature suggests that *Californian* was entering a region where an extension of the south-setting Labrador current would have affected her path over the surface of the earth until she came to a stop about 6 hours and 20 minutes later. The effect of this current would continue to impact her stopped position after that time as well. This is the same cold water current that had set all those icebergs and pack ice far to the south in April of 1912.[6]

As we shall see, this south-setting current would also have an effect on the path of *Titanic* as she too headed westward until she encountered that fatal iceberg and foundered 2 hours and 40 minutes later. However, while each ship was steaming westward, the deflection of the their respective course lines southward would be affected differently primarily because *Titanic* was traveling at more than twice the speed of *Californian*, 22½ knots compared 11 knots. Therefore, when traveling a given number of nautical miles westward, it would take *Californian* about twice as long to cover the same distance compared to *Titanic*. We therefore would expect that *Californian* would have been set southward about twice as much as *Titanic* because she would be affected by this southerly moving river of water for twice the time, assuming the average strength and direction of the current acting on the two vessels was the same.

Where Did *Titanic* Stop?

In Chapter II of *Strangers on the Horizon* we were able to track the course of *Titanic* across the Atlantic up until the time she struck an iceberg at 11:40pm (*Titanic* ATS) Sunday night. We were able to find that *Titanic* had to be dead in the water by midnight at a position that was close to 2 nautical miles to the north and slightly east of the now known location of the wreck as was shown in Figure 2-07 of the book. We also were able to find the likely location where *Titanic* struck the iceberg relative to that midnight position by reverse navigating the reported movements of *Titanic* that took place just prior to, and immediately following contact with the iceberg.[7] Those movements included not only the turning of the vessel's head to starboard following an initial turn to port while the engines were still running ahead, but also the running of the engines in reverse for a very short time, and then running them slowly ahead again for a short time before the call came out to uncover the boats close to midnight.

After finally coming to a complete stop and facing northward, *Titanic* was carried southward by the local area current until she foundered at 2:20am (*Titanic* ATS) on April 15th 1912. After that, the lifeboats and wreckage in the area continued to drift southward with the local current at just over a knot.

Shown below is an appended version of Figure 2-07 from *Strangers on the Horizon* to which was added the likely location of where *Titanic* collided with the iceberg at 11:40pm (*Titanic* ATS) Sunday night. Also shown in that figure is the location of *Titanic* at midnight (by which time she was dead in the water), the location of where *Titanic* broke apart and sank (the wreck site), and the location of the wreckage and abandoned lifeboats seen at 11:20am (*Californian* ATS) Monday morning when *Californian* departed the area of the wreckage and abandoned lifeboats heading westward across the pack ice.

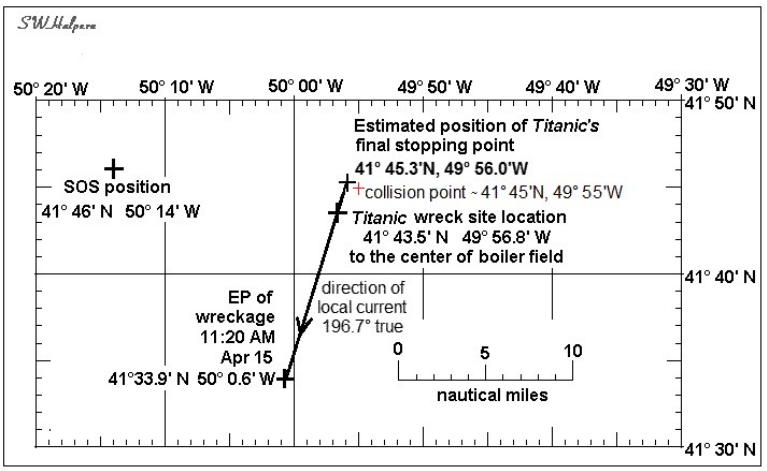


Fig. 2-07. *Titanic*'s likely collision point, final stopping point, foundering point, and wreckage seen late Monday morning.

Californian's Stopped Position Relative to *Titanic*

As noted before, and ignoring any external affects such as current, *Californian* should have come to a stop at a DR position near 42° 02'N, 50° 07'W, some 17 nautical

miles from *Titanic*'s erroneous SOS position. As was also mentioned before, *Californian* had to have actually stopped on a line-of-position (LOP) that was bearing about 315° true from the stopped *Titanic* based on specific compass bearings taken from *Californian* around 12:15am (*Californian* time) on April 15. Being on this line-of-position proves that *Californian* could not have been at the position given by Captain Lord at the two inquiries in 1912, nor could it have been at the DR position that we derived independently using the available dead reckoning navigational data. It was also mentioned that the reason for this was that *Californian* was most likely set southward during her westward travel late afternoon and evening by the same south setting current that drove all that pack ice and icebergs far to the south that April.

As explained in detail in *Strangers on the* Horizon, we were able to derive likely positions for the SS *Californian* at 10:21pm April 14th when she came to a stop near the edge of a field of pack ice, and for 2:05am April 15th (2:17am *Titanic* time) when all of *Titanic*'s lights went out as she broke apart just minutes before disappearing under the surface of the sea. These derived positions are shown below in Figure 8-01 from the book.

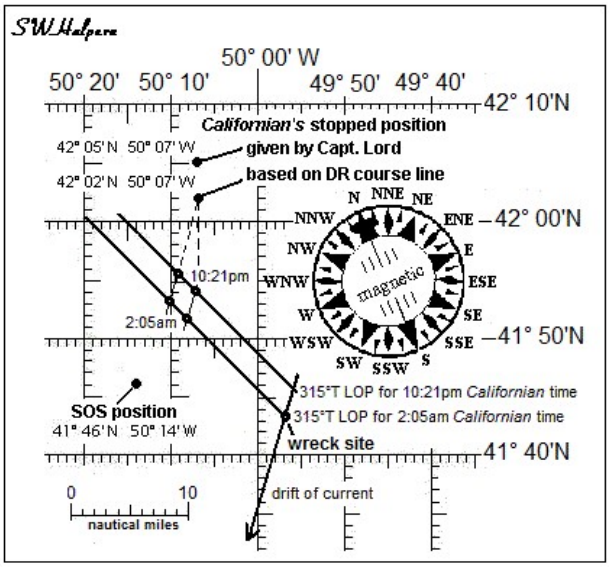


Fig. 8-01.

The two positions indicated for *Californian* on the 2:05am line-of-position (LOP) are 12 and 14 nautical miles away from the *Titanic* wreck site. The positions shown for *Californian*'s 10:21pm stopping time, before *Titanic* even came on the scene, were obtained by running the positions on the 2:05am LOP back by the current set and drift rate to 10:21pm, the same technique used by navigators in obtaining what is called a running fix, but working the problem backward in time. *Californian* had to have been somewhere between the two points shown when she first came to a stop.

Courses Made Good

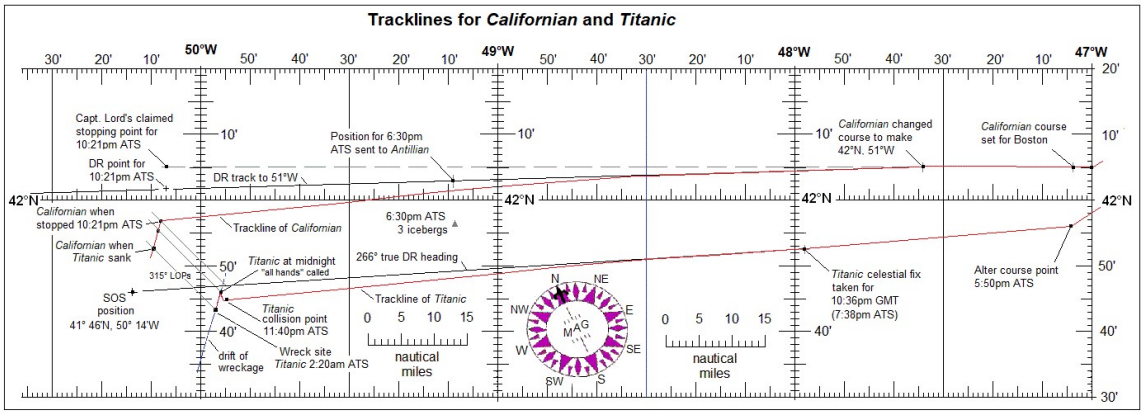
From all the positional information that we had about *Titanic*, we were able to produce a very good picture of *Titanic*'s course-made-good from noontime Sunday, April 14, to when she collided with an iceberg 11 hours and 40 minutes later. This was

done by using a standard navigational practice of starting from some known position, in this case *Titanic*'s deduced noontime position that we derived from the available evidence, and headed down toward the Corner on a heading of 241° true to where her course was altered for New York (specifically the Nantucket Shoals Lightship) at 5:50pm *Titanic* time. From there we took a heading of 266° true, the course that we were told she was on from *Titanic*'s Second and Fourth officers, and ran on that courseline for the next hour and 48 minutes which got us to a DR position for 10:36pm GMT (7:38pm *Titanic* time), the time that we took for the last celestial star sight taken that night in establishing a celestial fix.[8] The speed we used was the average measured speed through the water from noon to when the iceberg was struck, 22.3 knots.[9] We then compared our derived DR position to the celestial fix position that we previously obtained by reverse navigating and correcting the work of *Titanic*'s Fourth Officer Joseph Boxhall.[10] The difference between those two positions, in direction and distance, was then used as described in the book to obtain an estimated position (EP) for where *Titanic* most likely was when her course was actually altered at 5:50pm.

The track that *Titanic* most likely followed had taken her from her noontime position, down to that alter-course EP point for 5:50pm, then to our derived celestial fix for 7:38pm, and from there to our derived collision point for 11:40pm. That last leg of *Titanic*'s course would have included the effects of encountering a current that was setting her somewhat southward off her 266° true DR courseline as she unknowingly headed toward her fatal encounter with an iceberg at 11:40pm.

The resulting course-made-good for *Titanic* on April 14, 1912, starting from local apparent noon to that collision point at 11:40pm, was shown in Figure 2-10 of *Strangers on the Horizon*. What is presented here, however, is an expanded and more detailed chart that includes not only the track made good of *Titanic* that was shown in Figure 2-10 of the book, but also the track made good of *Californian*. This expanded chart, labeled "Courses Made Good – *Californian* and *Titanic*," is shown below, and covers the region from longitude 47° 00'W to 50° 30'W, and latitude 41° 30'N to 42° 20'N.

In addition to the paths of both vessels (shown in red), the chart includes the DR course lines of both vessels (shown in black), several key positions for *Titanic* and *Californian* as marked, the drift of wreckage, the likely location of those 3 icebergs that were sighted 5 miles south from where *Californian* really was at 6:30pm, and several other positions that we had talked about.



Courses Made Good – *Californian* and *Titanic*.

In deriving the trackline for *Californian* it was assumed that a south-setting current began to influence her path westward as early as around 4pm ATS, about 6 hours and 20 minutes before she stopped. This was the time when a temperature measurement of the sea water showed that *Californian* had entered a region of very cold water. At that time, *Californian* would have been close to the line of longitude marked 48° 30'W on the above chart. However, *Titanic* would not have reached that line of longitude along her courseline until sometime close to around 8:50pm (*Titanic* ATS), or about 2 hour and 50 minutes before she struck the iceberg. Thus we see that *Titanic* would have been set southward while heading westward less than half the time compared to *Californian* under the assumptions stated.[11] What we do know is that both vessels were being set slightly southward with the result that their respective tracklines deviated from their DR course lines starting somewhere close to when they crossed longitude 48° 30'W. The deviation from their respective DR courses would have continued up until the time that they independently encountered ice and came to a stop. After that, they would have continued to drift slowly southward with the local current while remaining about 13 nautical miles apart on a line running SE to NW true (the 315° LOP) as shown in the figure above until *Titanic* foundered.

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[1] A bearing of 315° true (to the NW) would appear close to north-northwest (NNW) on a magnetic compass in the vicinity of the wreck site. Magnetic variation was about 24° W for that location.

[2] Local apparent noon is when the sun reaches its highest point in the sky, and is dependent on the longitude of the observer on any given day. On Sunday, April 14th 1912, *Californian* time was running 3 hours 10 minutes behind GMT, while *Titanic* time was running 2 hours 58 minutes behind GMT.

[3] The Corner point (42°N, 47°W) is easily seen in Figure 1-01 where the two great circle routes for westbound steamers come together.

[4] From an affidavit Capt. Lord signed in 1959. The ice reports he received were referred to as Exhibits A and B in his affidavit.

[5] The ice report to *Antillian* read: "Captain *Antillian*. 6.30pm ATS [Apparent Time Ship] lat. 42.3 N, long. 49.9 W. Three large bergs five miles to southward of us. Regards. Lord." 42.3 N as written in the wireless message meant 42° 03' N, and 49.9 W meant 40° 09' W. The 1 minute-of-arc difference in longitude from our derived DR position for 6:30pm is an insignificant ¾ of a nautical mile, equivalent to about 4 minutes of steaming time at 11 knots.

[6] According to *Carpathia*'s Captain Rostron in a message to *Olympic*'s Captain Haddock, the south point of the pack ice had extended as far south as latitude 41° 16'N as seen on Monday, April 15th 1912. That is a distance of nearly 30 nautical miles south of the *Titanic* wreak site, and shows just how far the ice had drifted southward that April. (Source: PV *Olympic*.)

[7] See Figures 2-08 and 2-09 in *Strangers on the Horizon*.

[8] The transcripts from the inquires referred to the celestial star sights taken at 7:30pm. We were also told by 3rd Officer Pitman that they took about 10 minutes to complete. The calculations for a celestial fix would be adjusted to the time when the very last star sight was actually taken, which we took as 7:38pm ATS. Any error in this assumption by one or two minutes would inconsequently shift the position of the fix that we derived by less than a nautical mile to the east or west from the point we show.

[9] The speed we used came from a reported taffrail log reading of 260 nautical miles that was taken right after the ship struck the iceberg by QM George Rowe. Thus, 260 miles over 11 hours and 40 minutes, the time from noon to the time of the collision, gives us an average speed of 22.29 knots through the water.

[10] As was explained in great detail in Chapter II of *Strangers on the Horizon*, the error in Boxhall's work was found to be equivalent to an extra 29 minutes of steaming time at 22 knots, or an overrun error of 14 minutes-of-arc in longitude. That, plus the collision time that Boxhall used in his workup, 11:46pm instead of 11:40pm, caused his SOS position to be about 13 nautical miles too far to the west of where the ship actually foundered.

[11] More accurately, 2 hours 50 minutes compared to 6 hours 20 minutes, or about 45% less time.