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## Titanic's Final Manoeuvre

By Captain L. Marmaduke Collins

*She never was under a port helm? - She did not come on the port helm, Sir - on the starboard helm.*

-----Titanic's QM Robert Hitchens to the British enquiry

At both inquiries it was adduced that, at the time of the lookout's warning, Titanic was steaming ahead at 22 knots and First Officer Murdoch had ordered the helm hard-a-starboard (rudder hard-a-port) while ordering the engines full astern. It was also adduced that approximately 37 seconds after the lookout's warning, the Titanic, having swung two points ( 22 ½ degrees) to port, struck her starboard bow against an iceberg. It was concluded there was no damage abaft Number 4 Boiler room. While the experts remain baffled as to why the damage did not extend the whole length of the ship, many have assumed the damage aft was avoided by Murdoch ordering the helm hard-a-port, which turned her back to starboard, after he had turned to port with a hard-a-starboard helm.

To the U.S. Senate inquiry, Fourth Officer Boxhall said he heard First Officer Murdoch tell Captain Smith, "I put her hard astarboard and run the engines full astern, but it was too close; she hit it before I could do any more. I intended to port around it."

To the British enquiry he said he heard Murdoch tell Captain Smith: " I hard-a-starboarded and reversed the engines, and I was going to hard-a-port round it but she was too close. I could not do any more."

There is no real evidence to support the contention that Murdoch ordered the Titanic's helm hard-a-port. Hydrodynamically, Murdoch's manoeuvre of reversing the engines full speed astern made a turn to starboard impossible with a hard-a-port helm. Therefore, it can only be deduced that he did not in fact order the helm hard-a-port.

Fourth Officer Boxhall, approaching the bridge at the time of impact, heard the three-bell warning, heard Murdoch give the order hard-a-starboard, and heard the engine-room telegraph bells ringing. (Br. Enq.15346). When he arrived on the bridge a moment later, he noticed the engine room telegraphs showing "FULL SPEED ASTERN" both [engines]. (Br. Enq 15350). At this point, the cavitation, cause by the propellers turning astern, would have negated all rudder effect.

In his evidence to both inquires, Boxhall made no mention of a hard-a-port order. Helmsman Robert Hitchens, in his evidence to both enquires, categorically denied the hard-a-port order, stating "She did not come on the port helm, Sir- on the

starboard helm." (Br. Enq. 1316). Hitchens remained at the wheel until 12.23 a.m., 43 minutes after the impact with the ice.

Quartermaster Oliver was the only one to give evidence that he heard a hard-a-port order. He stated he was checking the light of the standard compass, situated between numbered 2 and 3 funnels, 320 feet abaft the crow's nest, when he heard the three-bell warning. He did not hear the hard-a-starboard order given by Murdoch on the bridge 250 feet away. He said he heard the hard-a-port order after he had arrived on the bridge and "the iceberg was away up astern."

When Murdoch ordered the helm hard-a-starboard, the propellers were turning ahead, providing thrust to the rudder; this turned the ship to port two points (22 ½ degrees) according to Hitchens.

By the laws of hydrodynamics, when the Titanic's propellers were stopped from turning ahead, the rudder effect decreased; the port turn continued, but the rate of turn decreased. When the propellers were turned astern, all rudder effect was negated due to the cavitation. (It did not matter in which direction or at what angle the rudder was turned, there was no rudder effect.)

Momentum continued the turn to port, but the rate decreased to zero when the headway came off the ship.

To turn the Titanic, a ship 882 feet in length, back to starboard with a hard-a-port helm (a hard-a-starboard rudder), would require running the engines ahead for a considerable length of time. Boxhall stated "[ . . . ]I do not see how it was possible for the "Titanic" to be swinging after the engines were stopped. I forget when it was I noticed the engines were stopped, but I did notice it; and there was absolutely nothing to cause the "Titanic" to swing. (Br. Enq.15419)"

As a result, there could not have been a starboard turn (hard-a-port helm order) executed to swing the stern away from the illusory iceberg. It can only be deduced that Titanic did not collide with an iceberg, but, in fact, transited a "strip of heavy pack ice," which in all probability was infested with multi-year ice and growlers.

Under the influence of the surface (Gulf Stream) current Titanic remained on a westerly heading until she submerged at 2.20 a.m. It will be remembered that Captain Lord turned the Californian to the ENE heading and stopped, after reaching the ice edge. During the remainder of the night, under the influence of the surface (Gulf Stream) current, the Californian swung back to a westerly heading, remaining in that direction until gotten under way at 6 a.m.

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