

datory procedures, has been imposed on the traffic flow. Such influence however can only be exercised through the medium of some form of centralized organization ashore.

The willingness of almost every vessel to follow without question the necessary instructions given for the general benefit was a most noticeable feature of last December's operations. This feature is, perhaps, the most significant development to have occurred in such waters for a very long time. By this means can a clear fairway be maintained for the execution of rational movements as required under the over-riding circumstances of berths and terminals at the time, which are now the deciding factors in the programme.

This was very amply demonstrated during the recent performance.

Maybe the greatest lesson of all comes from the fact that on 19th December a small vessel was sunk, fortunately without loss of life. This ship had no v.h.f., no radar, and no pilot—surely food for thought.

A Cautionary Tale

P. R. J. Reynolds

I SUPPOSE this incident might be entitled 'How not to find a lightship'. It took place in the 1930s while I was serving in the *M.S. Potter*, one of the United States Line's long-haul cargo motorships of the period. She was a three-island, five-hatch ship which could lift eight-thousand tons and move it at eleven knots. She was my home for five years and wound up as part of a breakwater at the Normandy beachhead.

Navigationally, about the only concession that she and her sisters made to modernity was the fact that they were power-driven. There were no RDFs, no echo-sounders, a taffrail log was towed and, when on soundings, depth was ascertained by means of the poop-mounted Kelvin 'sounding machine'. There were still those among our seniors that thought an enclosed wheelhouse, which we did have, contributed to the decadence of the race.

We had completed discharging an Australia-ECNA general cargo at St. John, New Brunswick, and were returning to New York empty for a few days of voyage repairs after which we would go on the loading berth for India, China/Philippines or back again to Australia. Our regular Skipper was on leave for the coasting voyage and would rejoin on the loading berth; his relief was a respected senior Master but a relatively unknown quantity to us three deck officers who had been in the ship for some years.

Our course lay from the Bay of Fundy, around outside of the Nantucket Shoals light-vessel and thence to the Fire Island light-vessel in the New York approaches. It was a crystal clear day in February with a north-west gale creating quite a lumpy sea and causing us to make considerable, too much as it transpired, allowance for leeway due to our light condition. I had the first watch and the Skipper joined me on the bridge after lunch as we expected to pick up the (Nantucket) light-vessel at about 1400 hours; we were dead reckoning on the

basis of a morning fix and soundings and expected to raise the lightship a few points off the starboard bow.

When the lightship failed to make its appearance as scheduled I decided to observe the Sun and Venus for a double check. I did not attach too much importance to this information at the time as I assumed, as did the Skipper, that we had not been going quite as fast as we thought over the ground and the lightship would appear in due time. The two lines of position did not plot as expected and while reworking my computations I heard the Skipper sing out from the bridge 'I have her'. Laying aside my workbook and picking up binoculars I repaired to the bridge wing and there, five or six miles broad off our starboard bow, lay a black lightship with *Nantucket* very clearly painted along her starboard side.

Bearings were taken, position plotted, &c. and the course reset for Fire Island. Eight bells followed shortly thereafter and I went below to dinner. However, upon retiring I was unable to sleep because of a niggling question in my mind as to why the Sun/Venus observations, which had appeared excellent in all respects, would not plot, or at least plot acceptably. Mulling over all the associated facts, a light burst when I realized that the lightship we saw had been heading beam-on to a forty-knot wind, a highly unlikely situation had she been at anchor and I had not checked for the presence of an anchor ball as she had been a bit too far off for that.

I concluded that we must have seen the regular *Nantucket* light-vessel proceeding from her station to Boston for periodic overhaul and that the relief lightship must have taken over the station; the fact that we had not seen the latter to port indicated that we must have passed about ten miles inside; you can imagine that chills were running up and down my spine at this point in view of all the foul ground we had traversed if this were true. At this point in time, about 2000 hours I unobtrusively returned to the chart-room, and carefully replotting my Sun/Venus lines, obtained a 1400 position well in on the Shoals which was also quite consistent with the track the lightship would have used in proceeding from her on-station position towards Cape Cod and Boston. Did I inform the Master, as required by law and custom? I might have had he been our regular Skipper but I did not in this case—for reasons of foolish pride, I suppose, not wanting to look silly if my hypothesis turned out false in the end. I postponed this decision by advancing my own position to midnight, when I would return to the bridge, and noted that at that time we should be eight miles due east of Montauk Point Light and that it should bear dead ahead; with clear water between now and then.

I came up on the bridge early telling my colleague that I couldn't sleep (certainly no untruth) and found that we were in and out of snow showers with some visibility problem. Just after midnight, however, Montauk Light appeared at twelve o'clock and a bit high; my diagnosis confirmed, I altered course to make an offing and informed Father of the situation via the voice tube. He acknowledged my explanation with an injunction to keep her five miles offshore and that was that, somewhat to my surprise.

On the following afternoon, after paying off the crew, the Old Man took me aside and, with a half-smile, asked 'When did you first realize that the lightship was laying across the wind?' I related the above series of events, expecting that I might be blasted for not informing him of my misgivings early on. He chuckled, though, and said that the thought had not occurred to him until after my mid-

night call off Montauk which had caused him to lay awake wondering how she could possibly have gotten so far inshore in the course of the short run from *Nantucket*. (I should have mentioned above that the offshore light-vessels, such as *Nantucket*, had diesel power for use in going to and from station. I don't believe they could do much better than six or eight knots however and at a distance appeared to be stationary.)

Marine and Air Traffic Control

J. D. Proctor

MARINE and air navigation can still learn from each other. Mariners are following aviation in adopting some routing and control but aviation could follow mariners in their refusal to accept routing and control unless it is cost effective. However it may be easier in the marine case to measure the cost and probability of a collision than it is in the aerial case. But many states have established mandatory airways and routes; originally their navigational aids were very useful and in the event of forced landing the search and rescue people knew where to look. But many airliners now have self-contained nav aids like the inertial navigation system (INS) or doppler so that they can navigate off airways, and also forced landings are rare. In the history of air traffic control at first it applied only around airports; when it spread to routes many aircraft were quite happy to fly off airways. But now airways have proliferated and have become customary and respectable to airline pilots so that few complain when some states force aircraft to follow lengthy and costly routes. The only virtue of airways is their freedom, theoretically, from uncontrolled traffic and from military dangers. If A.T.C. were confined to those situations where the risk of collision without A.T.C. would be worse than, say 1 in 10,000,000, flying would be a little more expeditious, but everyone feels secure within the system and insecure, guilty and uncomfortable outside it, so A.T.C. is used universally by airliners. Of course traffic density often necessitates routing under present systems of air traffic control. For example over perhaps half of the United States at jet cruising level any route may be followed with A.T.C. permission with a radar vectoring service around any traffic at one's own level and with advice from A.T.C. of the flight levels of other aircraft which may be near enough to be seen. Over the other half the permitted routes are limited to specified routes unless traffic is light.

The navigation of airliners along airways and routes is nothing like as precise as the navigation of a train along its track. Airliners on an airway are dispersed over at least a few miles laterally and a few hundred feet vertically. So mistakes by controllers and pilots which happen in every flight information region (FIR) most days are unimportant, unlike mistakes on railways. In the en route phase in the air a mistake lowers the level of safety only a little, from perhaps 10^{-7} to 10^{-5} . In many cases natural dispersion provides more safety than A.T.C. does but sacred A.T.C. which is generally essential and excellent is ubiquitous. In many areas mandatory routes force aircraft to congregate and so increase the traffic density so much that A.T.C. becomes necessary. Nearer the runway