

- (3) The tuning of the two radio compasses to the same frequency. As a result, only one "double" erroneous indication was available, whereas it would have been possible to have had useful indications from different sources for a "fix," by using the bearings of pairs of radio beacons.
- (4) The acceptance as reliable of radio compass indications in agreement with one another, after both radio compasses had been tuned to the NF frequency.
- (5) For the final navigation phase the use of the radio compasses only, without attaching the necessary importance to the contemporaneous indications of the compass and clock after noting appreciable differences between the information shown in the flight plan [*sic*—Translator] and the data which could have been obtained subsequently by observation and measurement.
- (6) Little co-operation by and inaccuracy in radio communications of the second pilot (as is apparent in the communication at 2029.30hr).
- (7) The interference of the Prague transmitter with the radio beacon NF.

The commander, aged 40, had been with BOAC since 1947; he had 9,454hr, 3,354hr as a commander and 1,223hr Comet 4 time. He had made three landings and three take-offs in Comets from Rome (Ciampino) in the previous year. The copilot, aged 40, had 10,442hr, 4,392hr in command, and 1,006hr in Comets. From the absence of information in the report, it is assumed he had not flown into the area during the previous year. According to evidence from BOAC's Comet Flight Captain, the commander had only had a briefing on the Fiumicino airport procedures and let-down. This was, he said, because BOAC considered that he had the necessary ability and skill and sufficient experience, and because in BOAC's opinion the airport presents no special difficulty.

At 2014.30hr Rome control cleared the Comet, which was on a scheduled flight from London to Johannesburg, to descend from Giglio direct to Civitavecchia. At 2027.30hr the Comet was cleared to establish radio contact with Rome approach. At 2028hr the aircraft advised that it had flown over Civitavecchia at 2027hr and was descending through 13,500ft heading for Fiumicino NDB, which it estimated at 2031hr. Rome approach cleared the Comet for flight of Fiumicino NDB at 1,300ft for a direct approach and to establish radio contact with Fiumicino Tower. At 2029.30hr the aircraft reported that it was descending through 9,000ft and estimating Fiumicino NDB(NF) *in one minute* (report's italics). A few minutes later the aircraft struck trees at 1,740ft about 60 miles from the airport.

The report notes that the copilot's 2029.30hr communication was based on an inaccurate estimate in that "it is impossible to lose 7,700ft in one minute only."

Before reaching Civitavecchia the pilot must have tuned one of the radio compasses to NF and on the basis of the indications obtained he left the track he had been following up to that moment. It is very probable that with the setting of the other radio compass unchanged, NR was seen to go round to starboard at about 2027hr (pilot's statement,

Appendix XIII-1). Subsequently this radio compass was also tuned to NF. As a result, indications agreeing with one another, caused by the interference of the more powerful station [i.e., Prague Radio, 273kc/sec—Ed] on the weak NF transmission, were erroneously accepted and a false QDM was used.

On reaching point C the pilot deviated from the track between Giglio NDB and Civitavecchia NDB and followed the indications of the radio compass needle. In so doing he thought he was on the route which is shown by a dotted line on the map, beginning at point C¹ and ending over Fiumicino NDB. This route is the same as C...A but displaced in a direction parallel to the latter by a distance of 60 n.m. A superficial critical examination of the situation could have revealed the erroneous conviction. In fact:—

(a) The time required to reach point C¹ from Giglio would have been about twice that required to reach point C and the heading some 25° to 30° greater in magnitude.

(b) The whole of the route would have been flown over the sea, whereas it was observed both with the aircraft radar and by direct observation that the aircraft passed over the coastline and subsequently flew over land.

(c) If the aircraft had followed the route C¹ to Fiumicino NDB, Civitavecchia NDB would always have been observed on the port side, whereas the crew saw it "go round" to starboard.

From the whole of the above considerations, it is deduced that the aircraft did not in any event fly over Civitavecchia NDB and therefore the communication made at 2028hr relating to such overflight is without foundation on fact.

If the crew had applied the prescribed procedure: (a) flight over NR; (b) flight away from NR on a track between 115° and 122°; and (c) use of NF indications only after flight over NR, the indications obtained would have made possible the regular continuation of the flight under consideration. Ample proof of this (says the report) is also provided by the regular completion of thousands of flights to Fiumicino Airport with use of the radio aids existing at the time of the accident.

Thus the report does not dissent from BOAC's claim after the accident that there was interference with Fiumicino NDB "NF" by Prague Radio; indeed, one recommendation (see below) calls for an increase in the power of NF. But, according to the report, during flight tests before and after the accident, including one with the same Comet, "no interference has been recorded of such a nature as to make the use of the assigned frequency inadvisable."

The recommendations of the report are:—

"(1) *To Pilots* Follow the procedures set forth in the ATC documents. In case of doubt, use all the navigation aids available in order to check the position before coming down below the safety height, particularly if there are fixed obstructions in the area and visibility is poor.

"(2) *To Airlines* Before pilots use an airport with which they are unfamiliar, arrange for them to carry a familiarization flight or at least flight simulator tests for the purpose of training in the air traffic and approach procedures established for the airport in question.

"(3) *To the Italian Inspectorate of Telecommunications* Study the possibility of replacing the working frequency of Fiumicino radio beacon by another frequency not subject to interference from other high power transmitters."

The probable track of the Comet (see text) is shown in this illustration, which is based on that included in the Italian accident report. The original shows a second possible final course a little to the south of that indicated by the full line on this map

