communication within the Navigation Section, but the high professional skills of the Navigation Section's staff entirely preclude the possibility of such an error. In my opinion this explanation that the change in the waypoint was thought to be minimal in terms of distance is a concocted story designed to explain away the fundamental mistake, made by someone, in failing to ensure that Captain Collins was notified that his aircraft was now programmed to fly on a collision course with Mt. Erebus.

WHETHER CAPTAIN COLLINS RELIED UPON THE INCORRECT CO-ORDINATES PRODUCED AT THE BRIEFING ON 9 NOVEMBER 1979

256. I have already indicated my finding that it is really beyond dispute that Captain Collins plotted on a topographical map or maps the nav track of the proposed flight which would journey from Cape Hallett down to the destination co-ordinates located near the Dailey Islands at about the centre of the southern end of McMurdo Sound. This fact dominates the whole of the Inquiry. It is a fact which must always have been distinctly unpalatable to the management of Air New Zealand and to the Director of the Civil Aviation Division because it led to a conclusion which they strongly desired to avoid. But on the evidence, the conclusion is inescapable.

257. The starting point of this aspect of the Inquiry occurs towards the very end of the narrative of the flight. That starting point is, of course, the decision of Captain Collins to switch the aircraft back on to its nav track when the aircraft was turning into its final approach after completing the second orbit, and when it was only 6 minutes 15 seconds away from impact. That is to say, Captain Collins was proposing to fly the aircraft at about 2000 feet straight ahead, with the mountainside only 25 miles away. In addition, he was proposing to cover that 25 miles at 300 miles per hour. In these circumstances, it is and was folly to suggest that Captain Collins was not relying upon the false co-ordinates which had been changed without his knowledge shortly before the flight. That is why no serious attempt was made at the hearing to challenge this unassailable inferenee.

258. As will be recalled, the chief inspector had this to say (at para. 2.5 of his report) in regard to the false co-ordinates which had been in existence for 14 months prior to the disaster:

> "As all previous flights to McMurdo had approached the area in VMC earlier crews had not adhered to the flight plan track and hence had not detected the error. In the case of this crew no evidence was found to suggest that they had been misled by this error in the flight plan shown to them at the briefing".

The chief inspector explained this final sentence in the course of his testimony before the Commission. It turned out, not unnaturally, that he did not really mean what he had said. He agreed, in the course of his evidence (at T. 243) that in his opinion the crew had a misconception as to where their flight path was taking them in relation to Ross Island. He explained that sentence of his report just referred to by saying that he had no "evidence" in the sense of a statement by an eyewitness to the effect that he had distinctly seen Captain Collins plot on a map the erroneous path of the nav track from Cape Hallett down the centre of McMurdo Sound. In addition, the chief inspector had something further to say

during his evidence on this particular point. He made it clear during cross-examination by Mr Davison (at T. 249) that because the crew had not been provided with a topographical map upon which the nav track had been plotted, then either they should have plotted the track themselves on a map during flight or "had it been considered that such a procedure was cumbersome within the confines of the cockpit or the flight deck area, then the actual track could have been plotted on a map prior to departure". The evidence was clear that Captain Collins had in fact taken the latter course.

259. Mrs Collins testified that her husband owned a copy of a limited edition New Zealand Atlas. It had been presented to Captain Collins by the parents of Mrs Collins in April 1977. A copy of this atlas was produced in evidence as **Exhibit 46**. At page 184 of the atlas there is a detailed map setting out the area of the whole of the Ross Dependency and showing the Balleny Islands and Cape Hallett and McMurdo Sound. On page 185 is a map containing a detailed view of the area from Beaufort Island to a point about 100 miles south of McMurdo Station. The scale of this latter map is approximately 16 miles to the inch. If the last stage of the erroneous flight path had been plotted on this latter map, then in order to determine the aircraft's position a pilot could tell at a glance his exact position merely by referring to the miles to run on his instrument panel and then glancing at the map. It is common ground that Captain Collins brought this atlas with him to the RCU briefing on 9 November 1979 and that he was seen to be closely examining the two pages at a time when he was in possession of a flight plan showing the incorrect co-ordinates. It is also common ground that he took this atlas with him on the fatal flight.

260. Mrs Collins testified that from about 8 p.m. to 9.30 or 10 p.m. on the night before the flight her husband was working with a number of maps spread out over a table. She said that it was a reasonably frequent practice for Captain Collins to spend time in preparation for his flights by going over briefing materials and so forth, particularly in respect of a new route which he had not flown before or a route that he had not recently flown (Brief of Evidence pages 1 – 2). Mrs Collins herself did not pay attention to the maps or to the other materials with which her husband was working. More particular evidence was given by the two daughters of Captain Collins. Kathryn Collins (who is 17 years old) said that on the evening of 27 November 1979 her father was working at home "with a large chart of the Antarctica-Ross Sea region". She said that he had a ruler "or some measuring equipment" and was working on the chart. Kathryn Collins discussed with her father this impending flight to Antarctica and in order to explain the flight he opened the New Zealand atlas. He said that the scale (presumably referring to page 184) was a bit too small for demonstration purposes and he then referred to another larger map "which was not the one that he had been working on when I interrupted him". She went on to say that this larger map was of such extent that instead of opening it out on the table Captain Collins spread it out on the floor. He then explained to his daughter Kathryn, by reference to this map, that the aircraft would fly down McMurdo Sound near the coast of Victoria Land and he indicated that the aircraft would fly back on the same track.

261. The other daughter is Elizabeth Collins, who is 15 years old. She said that she glanced at the map her father was working on some time before her sister Kathryn had spoken to him. She asked whether the aircraft was to land on the Ross Ice Shelf which was depicted on the map.

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                CENTRE LANDING GEAR IS EXTENDED FOR TAKE OFF
OPS FLASH
NZN NZAA-NZCH RT NO      /      CAPT BALZIELL      RADIO LOG
06/11/79-1900Z  TRK.T  W/V  G/S  DIST ZEET FUELRM STN
M82  TE 901/07  TRK.M DDVVV FL   ZATA ZETA RQFUEL GMT

NZAA  AUCKLAND                                        .  FREQ P
3700.6S17446.9E                        S/H ....  101.4      S

NP    NEWPLNTH  193.6        400   123   21
3900.2S17410.9E 174.3        CLB   ....  ....   XX.X

NS    NELSON    199.3 23037 448   146   22      .
4117.8S17308.0E 179.3       FL31  ....  ....   91.3

RY    MT MARY   216.2 24037 444   208   28      .
4408.2S17016.8E 195.2       FL31  ....  ....   86.5

NV    INVRCRGL  211.8 27037 457   163   21      .
4624.8S16819.1E 189.2       FL31  ....  ....   83.1

AUKIS AKLND IS  198.4 29078 478   271   34      .
5042.0S16610.0E 173.4       FL29  ....  ....   77.5

55S   55S       185.7 29098 497   259   32      .
5500.0S16527.2E 156.2       FL29  ....  ....   72.5

60S   60S       185.7 31060 504   302   36      .
6000.0S16431.1E 150.2       FL33  ....  ....   66.8

BLYIS BALENYIS  185.7 31053 504   407   48      .
6645.0S16300.0E 349.5       FL31  ....  ....   59.6

CPHLT C HALLET  155.8 31063 532   367   41      .
7220.0S17013.0E 322.4       FL31  ....  ....   53.6

MCMDO MCMURDO   188.9 34054 517   337   40      .
7753.0S16448.0E 357.4       FL35  ....  ....   47.9

CPHLT C HALLET  008.9 34054 425   337   47      .
7220.0S17013.0E 177.4       FL33  ....  ....   41.5

70S   70S       358.8 33060 420   139   20      .
7000.0S17003.6E 168.9       FL33  ....  ....   38.8

65S   65S       358.8 31068 425   300   42      .
6500.0S16946.6E 168.7       FL33  ....  ....   33.2
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ZKNZP ON GATE 2. CLG DOWN FOR DEPARTURE.
OPS FLASH
NZP NZAA-NZCH RT NO      /      CAPT COLLINS       RADIO LOG
27/11/79-1900Z  TRK.T  W/V  G/S  DIST ZEET FUELRM STN
M82. TE 901/28 .TRK.M DDVVV FL   ZATA ZETA RQFUEL GMT

NZAA  AUCKLAND                                        .  FREQ P
3700.6S17446.9E                        S/H ....  100.9      S

NP    NEWPLNTH  193.6        425   123   20
3900.2S17410.9E 174.3        CLB   ....  ....   XX.X

NS    NELSON    199.3 30027 486   146   21      .
4117.8S17308.0E 179.3       FL31  ....  ....   91.0

RY    MT MARY   216.2 31027 481   208   26      .
4408.2S17016.8E 195.2       FL31  ....  ....   86.5

NV    INVRCRGL  211.8 31029 485   163   20      .
4624.8S16819.1E 189.2       FL31  ....  ....   83.3

AUKIS AKLND IS  198.4 32029 495   271   33      .
5042.0S16610.0E 173.4       FL29  ....  ....   77.9

55S   55S       185.7 31033 498   259   31      .
5500.0S16527.2E 156.2       FL29  ....  ....   72.9

60S   60S       185.7 30034 487   302   37      .
6000.0S16431.1E 150.2       FL33  ....  ....   66.9

BLYIS BALENYIS  185.7 29026 481   407   51      .
6645.0S16300.0E 349.5       FL31  ....  ....   59.3

CPHLT C HALLET  155.8 29021 490   367   45      .
7220.0S17013.0E 322.4       FL31  ....  ....   52.8

MCMDO MCMURDO   188.5 24015 463   336   43      .
7752.7S16659.0E 357.0       FL35  ....  ....   46.5

CPHLT C HALLET  008.5 24015 483   336   42      .
7220.0S17013.0E 177.0       FL33  ....  ....   40.8

70S   70S       358.8 29024 465   139   18      .
7000.0S17003.6E 168.9       FL33  ....  ....   38.4

65S   65S       358.8 29024 465   300   39      .
6500.0S16946.6E 168.7       FL33  ....  ....   33.3
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Her father said the aircraft would not land. He then pointed out where the aircraft would be going, and said that it would be travelling down MeMurdo Sound and would keep "fairly close to this bumpy lot", meaning thereby, the eastern coast of Victoria Land. Elizabeth Collins left the room and some time later returned and heard her father explaining the flight to Kathryn. Elizabeth Collins was shown a number of maps but could not identify the map her father was using that night. She said that the map her father showed her was quite a large scale map and that when opened out it was too large for the table and had to be placed on the floor.

262. Some questions were asked of Mrs Collins in cross-examination, but no counsel questioned her on the evidence that Captain Collins had been working on maps with a ruler and/or plotting instruments, and no counsel desired to cross-examine either daughter on the same topic. It therefore appears that Captain Collins had acquired two maps to which he referred on that night, in addition to the atlas which formed part of the family library. The probabilities are that Captain Collins used one or other of the large maps to plot a track from Auckland leading through each waypoint down to the termination of the nav track at the head of McMurdo Sound, and that he performed the same plotting procedure on the Ross Dependency map, illustrated at page 184 of his atlas. Finally, there can be no doubt at all that on page 185 of his atlas, which showed the McMurdo area on a scale of 16 miles to the inch, he plotted the last leg of the nav track from a point a little to the west of Beaufort Island down to the false co-ordinates near the Dailey Islands.

263. It will be noted that Captain Collins spent between 1½ and 2 hours working on these maps with the "other materials" referred to which were, no doubt, his briefing documents. If Captain Collins had plotted the complete flight path of TE 901 from Auckland to McMurdo and return, then in order to be able to refer to the various waypoint co-ordinates he would need to have had in his possession a computer print-out for the antarctic route. In my opinion he did in fact have such a print-out. Numerous print-outs have been produced in evidence, and there was evidently no difficulty in obtaining a print-out of the route if required for some particular purpose. According to Mrs Collins, her husband concluded his work with the maps at about 10 p.m. and then packed the maps and other written materials into his black flight bag in preparation for the following morning. It is clear, as I have said, that the atlas must also have been packed into the flight bag because it left the household that night and has never been seen again. The decision of Captain Collins to take with him the atlas is significant in the extreme. It could only have been taken because of the large scale data on page 185, which, with a line drawn down to the false waypoint, would show him his exact position at any moment in relation to Ross Island, Mt. Bird, Mt. Erebus, and McMurdo Station. The detail on page 184 would be available, almost certainly on larger scale, on one or other of the 2 maps, which he had been using, and the deduction is clear that the atlas was taken on the flight because of the track which Captain Collins had plotted on page 185. Fig. 7, page 96 shows the relevant section of the flight plan produced to Captain Collins at his briefing, and fig. 8, page 97 the corresponding section of the flight plan delivered to him on the morning of the fatal flight.

264. The witnesses in the case who were asked to describe the personality and working methods of Captain Collins were unanimous in their opinion. It did not matter whether they were executive pilots or line pilots. They said that he was careful, conscientious and methodical. The

latter adjective was particularly stressed. The fact was that there had been no topographical map produced at the briefing upon which the nav track had been plotted. And so Captain Collins, being a methodical man, did exactly what the chief inspector considered ought to have been done. He plotted all the waypoints on maps of his own on the night before the flight and packed the maps away, together with his atlas, and took them on the flight in his flight bag.

265. The airline, in its very comprehensive final submissions, did not touch upon the question as to whether Captain Collins had plotted the nav track in relianee upon the flight plan produced to him at the briefing. The final submissions of the Civil Aviation Division likewise omitted any specific reference to this point. No doubt the very experieneed senior counsel appearing for both organisations could see that there was no point in disputing a self-evident fact.

VISIT TO ANTARCTICA 26-29 NOVEMBER 1980

266. It was apparent that for the purposes of examining all possible causes of the disaster I would need to go to Antarctica, and I decided to coincide the visit with the first anniversary of the date of the disaster so that the southern point of the ice break-up would be about the same. It was arranged through the good offices of the Royal New Zealand Air Force that I would fly down to Antarctica on 26 November 1980. I was accompanied by Mr Baragwanath and Mr Harrison in their capacities as counsel assisting the Commission, by Air Commodore David Crooks (now Deputy Chief of Air Staff) and also by Air Marshal Sir Rochford Hughes. A further member of the party was Mr Edward Davies of Air New Zealand, who was going down for the purpose of laying a wreath at the cross which had been erected on the mountain side a week or two after the date of the disaster.

267. We travelled to Antarctica on a C−130 Hercules aircraft of the R.N.Z.A.F. The pilot was Flight Lieutenant Russell, and the commander of the flight was Wing Commander Gayfer. Upon approaching the continent of Antarctica I went on the flight deck for the remainder of the journey. The aircraft was flying at 29 000 feet, and with about 250 miles to run, we had crossed the Admiralty Mountains and the Victory Mountains and had come out over the Ross Sea. The view ahead was perfectly clear. There was a very long range of vision over Victoria Land to the right. There was no cloud, and the view of the continent was composed entirely of snow-covered mountains. In the distance as the aircraft came closer, there could be detected the outline of Ross Island, and the configuration of the island had been previously picked up by the aircraft radar.

268. At about 150 miles from McMurdo Wing Commander Gayfer took over the co-pilot's seat and said that it was proposed with my approval to bring the aircraft to the track followed by the DC10 and to execute the orbit to the right and the orbit to the left which the DC10 had followed. Thereafter the wing commander said he intended to fly directly at the mountain side along the exact track taken by the DC10 and he would pull away at a fairly late stage. I said I agreed with all this.

269. First of all, the aircraft flew to the Byrd Reporting Point to establish its position with Ground Control, and then we flew over the crash site, where parts of the wreckage are still visible. The aircraft was then flown away to the true north, reaching the same altitude as the DC10 before it had commenced its first orbit.