ACCIDENTS INVESTIGATION BRANCH
Department of Trade and Industry

PiperCherokee PA 28-180 G-AVYN

Report on the accident at Ashford Gill Head, near Pateley Bridge, Yorkshire on 23 September 1969

LONDON: HER MAJESTY'S STATIONERY OFFICE
1971

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Department of Trade and Industry
Accidents Investigation Branch
Shell Mex House
Strand
London WC2

14 July 1971

The Rt. Honourable John Davies MBE MP
Secretary of State for Trade and Industry

Sir,

I have the honour to submit the report by Mr G M Kelly on the circumstances of the accident to Piper Cherokee PA 28-180 G–AVYN which occurred at Ashford Gill Head, Gouthwaite Moor, near Pateley Bridge, Yorkshire on 23 September 1969.

I have the honour to be
Sir,
Your obedient Servant,

V A M Hunt
Chief Inspector of Accidents

Accidents Investigation Branch
Civil Accident Report No EW/C/327

Aircraft:	Piper Cherokee PA 28–180 G–AVYN
Engine:	Lycoming 0–360–A4A
Registered Owner:	M H Gill
Operator:	Newcastle Aero Club
Crew:	Pilot - Mr A P Teare - killed
Passengers:	None
Place of Accident:	Ashford Gill Head, Gouthwaite Moor, near Pateley Bridge, Yorkshire
Date and Time:	23 September 1969. Time not known; probably between 1505 hrs and 1520 hrs.
	All times in this report are GMT

Summary

The aircraft was being flown by a student pilot on a Visual Flight Rules (VFR) flight from Newcastle airport to Leeds/Bradford airport and return. Sixteen minutes after taking-off from Leeds/Bradford airport to return to Newcastle the student pilot called the Royal Air Force station at Leeming for a radio bearing. He was told that the direction finding facilities were not available. The acknowledgement of this message was the last radio call from the aircraft. Soon afterwards it crashed in bad weather on high ground and the student was killed. There was no fire.

The report concludes that the accident was due to an inexperienced pilot continuing his flight too far into deteriorating weather and colliding with high ground. Inadequate supervision of the pre-flight planning was a contributory factor.

1. Investigation

1.1 History of the flight

The flight from Newcastle to Leeds/Bradford airport and return, was intended as a map reading exercise for the student pilot, who had previously experienced some difficulty and disorientation with map reading during navigation training.

Before taking-off the student pilot obtained a weather forecast for a period covering only the outbound route from Newcastle to Leeds/Bradford but he used it to prepare his navigation flight plan for both outbound and return flights. He drew the track between the two airports on a 1:500,000 (about 7 miles to the inch) navigation chart, and marked out a six-minute time speed scale showing the expected position of the aircraft at the end of each six-minute period along the track for both outbound and inbound flights. In making his calculations he used 120 miles per hour for the airspeed and 30 knots for the windspeed and treated the Ground Speed figures thus obtained as knots. This error resulted in a calculated Ground Speed that was 16 knots too high and estimated times of arrival that were too optimistic because each six-minute sector was 2-3 miles too long.

His instructor checked the flight plan before departure but made no comment on the errors created by the mixture of m.p.h. and knots in the calculations or the fact that the weather forecast covered only the outbound flight. He briefed the student to keep clear of and below cloud and advised him to turn east into the Vale of York if he encountered cloud drifting off the hills. He also briefed him to commence his return flight as soon as possible after landing at Leeds/Bradford airport, not to stay on the ground longer than 30 minutes, and to request clearance by radio through the military air traffic control zone of the RAF station at Leeming.

The aircraft took off from Newcastle at 1233 hrs, the student estimating his arrival at Leeds/Bradford airport at 1325 hrs. He landed at 1330 hrs having reduced altitude during the last 16 minutes of the flight to remain clear of cloud and having eventually descended to 1,000 feet 10 minutes before reaching the airport. During this period he called for three radio bearings, which showed that the aircraft passed to the east and south of the airport, before he reported "airfield in sight".

After landing he went to the Yorkshire Flying Services pilots' training school but apparently spoke to no one – although it may have been from there that he telephoned his wife and spoke of the hazy weather conditions – and went to the airport flight planning section to ask where he should pay his landing fee. Although he spent almost 70 minutes on the ground at Leeds/Bradford airport there is no evidence that he either gave or sought information about his return flight or the weather.

The student called Leeds/Bradford air traffic control for taxi clearance for the return flight at 1427 hrs. He confirmed, on request from ATC, that his destination was Newcastle and that his planned cruising altitude was 2,000 feet. He eventually took off at 1442 hrs and set course over the airfield at 1443 hrs (73 minutes after landing) and giving his estimated time of arrival at Newcastle as 1616 hrs. He reported leaving the Leeds/Bradford special rules zone about 5 minutes later and was cleared to call Preston FIS.

The first call to Preston was too weak for them to identify but another aircraft relayed a message giving the details of his flight. He called Preston again at 1458 hrs for clearance to change frequency to RAF Leeming and experienced no difficulty. This was the last communication between Preston and the aircraft. The student then asked Leeming for a bearing but was told that the direction finding facilities were not available. Apparently he did not understand the message, for he repeated his request, informing Leeming that his reception was very weak. Leeming repeated that there were no D/F facilities. This communication ended at 1503 hrs and nothing further was heard from the aircraft. According to the ATC controller at Leeming, the student's voice was normal and there was no trace of anxiety.

The weather 20 miles north of Leeds/Bradford on the aircraft's track to Newcastle deteriorated rapidly at about 1430 hrs giving low cloud, drizzle and poor visibility. At times when the aircraft could have been in their vicinity three witnesses situated six to nine miles apart reported having either seen or heard a low flying light aircraft pass by. The first saw a small training type aircraft flying normally but at a low altitude on a northerly heading towards deteriorating weather conditions of low cloud, drizzling rain and deteriorating visibility. The second saw a similar aircraft turn near Pateley Bridge and fly in the general direction of the accident site, in similar weather conditions to those reported by the first witness. A farmer working in a field about five miles to the south of the accident site heard a low flying single engine aircraft flying above cloud to the north of him. He heard the engine noise stop abruptly after the aircraft had passed by, and thought the noise had been blanketed by the adjoining hills. He reported what he had heard to the police some time later when he found that an aircraft was missing in the area. The weather at the time was similar to that reported by the other witnesses and cloud completely obscured the aircraft from his sight. None of the witnesses attached any importance to the matter until later so did not check the time of occurrence.

After a two-day air search the wreckage was found 1,640 feet amsl eight miles west of its intended track and 17 miles from Leeds/Bradford airport. The pilot had been killed and the aircraft destroyed. There had been no fire. G–AVYN had not been seen on radar and no witness of the accident could be found. There was no evidence to establish precisely when the accident had occurred.

1.2 Injuries to persons

Injuries	*Crew*	*Passengers*	*Others*
Fatal	1	-	-
Non-fatal	-	-	-
None	-	-	-

1.3 Damage to aircraft

Destroyed.

1.4 Other damage

None.

1.5 Crew information

Anthony Peter Teare, aged 22, held a student pilot's licence. His total flying experience, all accumulated at the Newcastle Aero Club since 2 June 1969 in Cherokee aircraft, amounted to 39 hours 41 minutes, and included 50 minutes instrument flying. Records show that he had completed four dual cross-country navigation exercises, on one of which he had experienced difficulty in map reading. On his final solo triangular cross-country navigation exercise he spent the last 20 minutes homing to Newcastle on radio bearings. He was given further dual instruction but still tended to lose track of his position, on one occasion taking 10 minutes over a town to locate his position. Because he felt he was weak at map reading Mr Teare requested further navigation practice and the remaining time required to qualify for the issue of his private pilot's licence was being used for this purpose when the accident occurred. One of the instructors at the Newcastle Aero Club who had taken Mr Teare on a number of dual navigation flights, reported that his general handling of the aircraft was slightly above average but that he was prone to become disorientated and to lose touch with his map reading if any untoward happening such as a diversion due to cloud interrupted the planned sequence of the flight. Similarly an unusual occurrence in the pattern of R/T procedure could put him completely out of phase.

1.6 Aircraft information

The aircraft was built by the Piper Corporation in the United States of America in 1968 and was registered in the United Kingdom in the name of its present owner on 26 July 1968. On 3 May 1968 a two-year certificate of airworthiness in the passenger transport category had been issued. The aircraft was painted red and white and was equipped with a full blind flying panel, radio and radio navigation aids. It had been maintained in accordance with an approved maintenance schedule.

The aircraft and engine had completed a total of 875 hours flying and the current certificate of maintenance had been issued on 22 September 1969 after a routine four-monthly check.

On the day of the accident the aircraft left Newcastle with 50 gallons of fuel. There would have been about 35 gallons in the tanks at the time of the accident and the weight of the aircraft would have been approximately 1,840 lb. The weight and centre of gravity were within the authorised limits throughout the flight.

1.7 Meteorological information

The weather forecast was provided by the Preston meteorological office through the flight planning section at Newcastle (Woolsington) airport and covered the direct route from Woolsington to Leeds for departures between 1200 and 1400 hrs and arrivals between 1245 and 1500 hrs. It read as follows:

Situation:	A warm front lying NW Ireland to NE Dublin to Bristol Channel at 0800 hours is moving NE at about 20 knots.
Wind at 2,000 feet:	230°, 30 knots.
Temperature at 2,000 feet:	08°C.
Cloud:	Patches 3/8 stratus in SW front, by end of period 6/8 stratocumulus base 3,000 to 4,000 feet, tops 6,000 to 8,000 feet, occasional base 2,000 feet later in period. Low cloud covering hills.
Visibility:	200 metres or less in hill fog, 3 to 6 kilometres in smoke, otherwise 7 to 15 kilometres. Hill fog patches later in period. Smoke haze near towns.
Area forecasts	
Leeds (1000 hrs to 1900 hrs):	Surface wind 200°, 14 knots; visibility 8 kilometres; cloud 4/8 stratocumulus 3,000 feet, 7/8 stratocumulus 4,500 feet. Becoming (1400 hrs to 1700 hrs) surface wind 260°, 22 knots; cloud 6/8 stratocumulus 1,500 feet.
Teesside (1000 hrs to 1900 hrs):	Surface wind 200°, 12 knots; visibility more than 10 kilometres; cloud 4/8 stratocumulus 4,500 feet.

The Meteorological Office provided the following weather appreciation for the route from Leeds/Bradford airport to the accident site for the period 1442 hrs to 1515 hrs.

At 1200 hrs a warm front was situated from Prestwick to the Cumberland coast to Liverpool and was moving east-northeast towards the Pennines at about 20 knots. This warm front at 1500 hrs was lying along the length of the Pennines, orientated approximately NNE to SSE and in the vicinity of the accident site.

Wind at 2,500 feet:	250°, 30 knots.
Temperature at 2,000 feet:	12°C.
Cloud:	2/8 stratocumulus at first, base 2,500-3,000 feet, increasing rapidly northwestwards to 8/8 stratus at 1,500 feet. Lowering at the warm front to 800 to 1,000 feet covering much of the higher ground.
Visibility:	8 to 15 kilometres, but 2 to 4 kilometres in drizzle on the warm front. Below 200 metres in hill fog.
Weather:	Fine at first, but drizzle and hill fog in the accident site area.
Icing index:	Nil.
Turbulence:	Light, but probably locally moderate in the vicinity of the warm front.
Mean sea level pressure:	1023 mbs.

The synoptic chart for 1500 hrs on the day of the accident shows the front lying across the track between Leeds/Bradford and Newcastle.

Obervers on the ground a few miles from the accident site confirmed that there was a sudden change in the weather situation at about 1430 hrs with a deterioration in the visibility, and low cloud and drizzle moving in from the southwest.

1.8 Aids to navigation

The aircraft was fitted with a multi-channel VHF radio set, ADF, VOR, and ILS equipment. The pilot's training was limited to the VHF equipment.

The unserviceability of the VDF facilities of RAF Leeming had been promulgated in NOTAM UKO 1209 issued by the Royal Air Force on 16 September 1969. Because the facility was a military one and not listed in the *Air Pilot* the NOTAM was not circulated to all civil flight planning offices. It was available at the AIS offices in London, Manchester and Prestwick, and details could have been given to enquirers planning to use the facility.

Assistance was available through Preston Air Traffic Control Centre in the area of G–AVYN's track for guidance by radar or VDF on the distress radio frequency.

1.9 Communications

Apart from the difficulties already recorded in the history of the flight communications were satisfactory.

1.10 Aerodrome and ground facilities

Not applicable.

1.11 Flight recorder

None required and none fitted.

1.12 Wreckage

Examination at the scene of the accident showed that the tip of the starboard wing had struck the ground while the aircraft was banked steeply to starboard. Both wings had separated from the aircraft as it cartwheeled. The engine and cockpit had come to rest inverted inside the forward end of the fuselage, lying on the portside wall. The port wing fuel tank was intact and almost full of fuel; the starboard tank had been ruptured when the wing broke up.

Examination of the cockpit instruments and controls revealed no evidence of pre-crash failure or malfunction. The altimeter was set to 1020 mbs (one mb less than the regional QNH), the direction indicator to 180° and the aircraft clock was still running and showing the correct BST. The VHF radio was tuned to 122.1 MHz, the Leeming ATC frequency. The carburettor heat was off and the fuel cock was selected to the port tank. The airspeed indicator, which was calibrated in both m.p.h. and knots, was damaged.

There was no evidence of pre-crash malfunction or failure in the airframe or the engine. Damage to the propeller and marks in the ground were consistent with the engine having been under power at impact.

1.13 Fire

There was no fire.

1.14 Survival aspects

The accident was not survivable.

1.15 Tests and research

Not applicable.

2. Analysis and Conclusions

2.1 Analysis

The weather forecast the pilot used to prepare his return flight was for a period covering only the outbound leg. It showed a warm front with low cloud and poor weather moving towards the proposed track. The supervising instructor clearly had the progress of this front in mind when he told the student to keep clear of and below any stratus drifting off the hills, if necessary to turn towards the east, and not to stay more than 30 minutes at Leeds/Bradford airport before the return flight. It was unfortunate that there was no prior communication with Leeds/Bradford. If there had been it would have become known that the Yorkshire Flying Services had concluded an hour and a half before G–AVYN took off from Newcastle that the weather in the Leeds/Bradford area was unsuitable for solo cross-country flying by student pilots. The student himself apparently took no advice at Leeds/Bradford about weather for the period covering the return flight and stayed longer than 30 minutes. By the time he took off for Newcastle the front and the bad weather lay across his track and to the east of the first part of it. His briefing to turn east into the Vale of York to avoid low cloud would in this circumstances be inappropriate and he would have to take some other action.

It seems likely that he became disorientated as he had done in the past. His attempt to reorientate himself with radio assistance from RAF Leeming was unsuccessful and the terrain over which he soon found himself was moorland, with few distinctive or easily recognisable physical features. This and the small scale of the chart he was using would have made map reading difficult even in fair weather, and in the event the flying conditions turned out to be worse than he had expected.

The difficulties of keeping track of his position and of reorientating himself can only have been aggravated by the errors in his calculated flight plan. To this extent these errors contributed to his becoming lost. A decision to turn back was postponed too long and the pilot's subsequent efforts to remain in sight of the ground and find his position led him into low cloud and poor visibility and to descend below the level of high ground in his vicinity.

Although the supervising instructor's pre-flight briefing was sound as far as it went it did not cover the eventualities that arose during the student's return flight. These eventualities could have been anticipated if the instructor had noted that the weather forecast offered by the student for his approval covered too short a period of time, and the student's task would have been less difficult if the instructor had pointed out the errors in the flight plan calculations.

In view of the student's known weaknesses in pilotage the instructor's pre-flight supervision would seem to have been in some respects inadequate, and this must, in the circumstances, be considered as having contributed to the accident.

It is noted that had the pilot completed this flight successfully he would have qualified for his private pilot's licence.

2.2 Conclusions

(a) *Findings*

(i) The documentation of the aircraft was in order.

(ii) The aircraft had been properly maintained and loaded.

(iii) There was no evidence of failure or malfunction of the aircraft, its engine or equipment.

(iv) The pilot was properly licensed, but as a student was only permitted to fly under the supervision of a qualified flying instructor.

(v) The weather forecast used for the pre-flight planning covered only the period of the southbound flight.

(vi) The navigation flight plan and chart preparations contained errors that were not corrected by the supervising instructor and could have contributed to the pilot becoming lost.

(vii) The aeronautical chart used for the flight was too small in scale for accurate map reading at low levels over the terrain encountered by the pilot.

(viii) The pilot continued his flight too long into deteriorating weather, became involved in a task beyond his training and experience, and collided with high ground.

(b) *Cause*

The accident was due to an inexperienced pilot continuing his flight too long into deteriorating weather and colliding with high ground. Inadequate supervision of the pre-flight planning was a contributory factor.

G M Kelly
Inspector of Accidents

Accident Investigation Branch
Department of Trade and Industry
June 1971