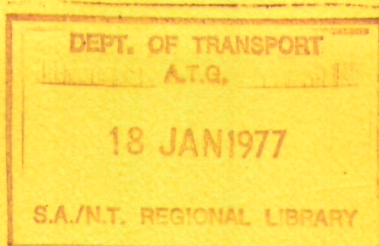




Department of Transport
Australia



ACCIDENT INVESTIGATION REPORT

Air Safety Investigation Branch

**DH114 2E/A1 Aircraft VH-CLS,
near Cairns Airport,
Queensland,
on 23 October 1975**



Special Investigation Report 76-1

AIR SAFETY INVESTIGATION BRANCH

Accident Investigation Report

**Connair Pty Ltd
Heron DH114 2E/A1 Aircraft VH-CLS
near Cairns Airport, Queensland
on 23 October 1975**

The Secretary to the Department of Transport authorised the investigation of this accident and the publication of this report pursuant to the powers conferred by Air Navigation Regulations 278 and 283 respectively.

Prepared by Air Safety Investigation Branch

August 1976

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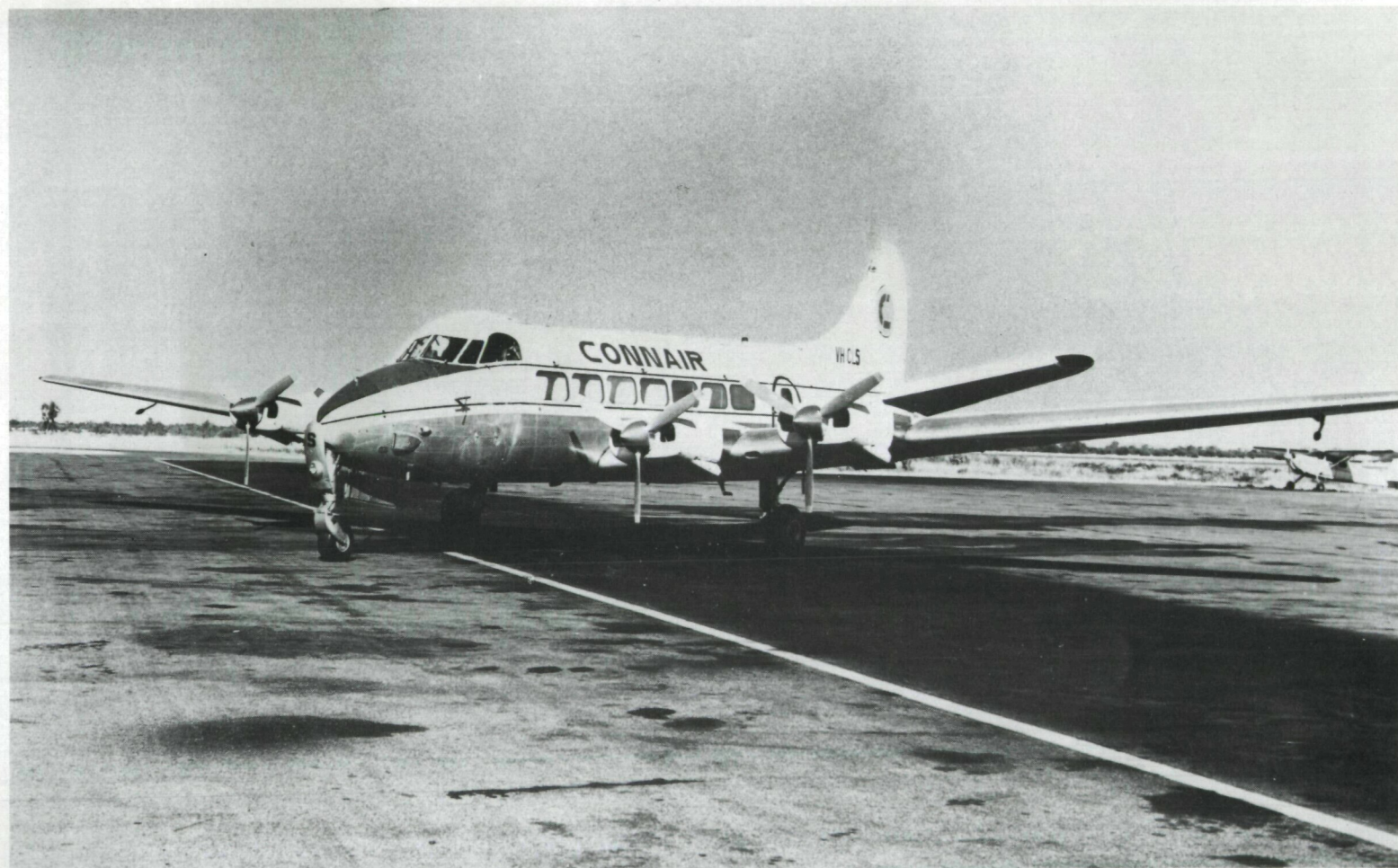
Contents

	THE ACCIDENT	Page 1
Section 1.	FACTUAL INFORMATION	1
1.1	History of the Flight	1
1.1.1.	Nature of the Operation	1
1.1.2.	Description of the Flight	1
1.1.3.	Reconstruction of the Final Flight Path	4
1.2	Injuries to Persons	7
1.3	Damage to Aircraft	7
1.4	Other Damage	7
1.5	Personnel	7
1.5.1.	Flight Crew	7
1.5.2.	Air Traffic Control	8
1.6	Aircraft Information	9
1.6.1.	History	9
1.6.2.	Loading	9
1.7	Meteorological Information	10
1.7.1.	Forecast Conditions	10
1.7.2.	Observed Conditions—MET and ATC	11
1.7.3.	Observed Conditions—Witnesses	13
1.8	Aids to Navigation	13
1.9	Communications	14
1.10	Aerodrome and Ground Facilities	14
1.11	Flight Recorders	15
1.12	Wreckage and Impact Information	15
1.13	Medical and Pathological Information	16
1.14	Fire	17
1.15	Survival Aspects	17
1.16	Tests and Research	17
Section 2.	ANALYSIS	17
Section 3.	CONCLUSIONS	24
	APPENDIXES	
A	Diagram—Probable Flight Path of VH-CLS	25
B	Chart—Cairns Terminal Area	28
C	Chart—Runway 15 ILS Procedure	29
D	Transcript of Communications	30
E	Photographs	33

Note 1: All times are Eastern Standard Time except where otherwise stated. Times are based on the 24-hour clock and, where applicable, seconds are shown using a 6 figure group.

Note 2: Metric units are used except for airspeed and wind speed which are given in knots; and for elevation, height and altitude where measurements are given in feet.

Note 3: Magnetic variation is 6° 56' East.



THE ACCIDENT

On 23 October 1975 Hawker Siddeley Heron DH114 2E/A1 aircraft, registered VH-CLS, with a crew of three and eight passengers aboard, departed Mount Isa, Queensland, for Cairns on a regular public transport service. The flight proceeded to the vicinity of Cairns without reported incident and at 1917 hours Eastern Standard Time (EST) it was cleared for, and acknowledged instructions for an ILS (instrument landing system) approach to Runway 15 at Cairns Airport.

At 1926 hours the flight reported 'going round' and, at about this time a number of people located at various positions to the north of the airport observed an aircraft manoeuvring at a low height. Shortly afterwards the aircraft crashed at a point 2813 metres north-west of the threshold of Runway 15. Heavy rain and lightning were in the general area of the accident site.

The aircraft was virtually destroyed, and all of its occupants were killed as a result of the accident.

1 FACTUAL INFORMATION

1.1 HISTORY OF THE FLIGHT

1.1.1 Nature of the Operation

Hawker Siddeley Heron DH114 2E/A1 aircraft registered VH-CLS was operating under a current certificate of registration the holder of which was Connair Pty Ltd. The aircraft was operated by Connair Pty Ltd and, at the time of the accident, it was engaged on a regular public transport service operated under the terms of a current airline licence. The service, designated Flight 1263, was from Alice Springs to Cairns landing at Mount Isa en route, the scheduled times of departure from Alice Springs and Mount Isa being 1255 hours Central Standard Time (CST) and 1650 hours (EST) respectively, the scheduled time of arrival at Cairns being 1940 hours.

1.1.2 Description of the Flight

The crew of VH-CLS commenced duty at Alice Springs at about 1200 hours CST on 23 October 1975. The captain attended the Operational Control Centre (OCC) and received a copy of the forecast of the en route conditions and relevant aerodrome forecasts for the intended route and landing points. He compiled a flight plan which covered the proposed flight to Mount Isa and Cairns and which indicated that the flight category was Instrument Flight Rules (IFR). Arising from a prediction of thunderstorms being in the vicinity of Mount Isa Airport provision was made for sixty minutes 'holding' fuel on arrival at Mount Isa in addition to the standard fuel requirements. This flight plan was approved by air traffic control and endorsed as valid for a departure from Alice Springs until 1325 hours CST.

At 1257 hours CST VH-CLS taxied to Runway 30 at Alice Springs and, upon receipt of further clearances together with advice that the 'holding' fuel requirement for Mount Isa was no longer in force, the aircraft took-off, the departure of the flight being reported as 1304 hours CST. During the flight to Mount Isa VH-CLS reported at the appropriate reporting points and landed at Mount Isa at 1535 hours after making a visual approach. There is no evidence that this sector of the flight was other than a normal, routine operation.

At Mount Isa the flight crew went to the Briefing Unit where they checked the forecast for Cairns which had been issued at 1017 hours for the period 1200 to 2400 hours. An amended aerodrome forecast for Cairns for the period 1800 to 0600 hours on 24 October was received at Mount Isa at 1604 hours, but there is no evidence that it was brought to the attention of the crew either during their visit or subsequent thereto. At about 1635 hours, after the flight crew had left the briefing office, Mount Isa Tower received a telephone call from the Townsville OCC with an operational requirement (OPR) message for VH-CLS. This message was complementary to the predictions contained in the amended aerodrome forecast for Cairns and specified that during the period from 1730 hours on 23 October to 0600 hours on 24 October, aircraft arriving at Cairns were required to carry, in addition to standard fuel requirements, sufficient fuel to permit thirty minutes 'holding' due to a prediction of intermittent periods when the visibility would be reduced to 4000 metres with cloud at 1000 feet. This message was relayed to the captain and subsequently, on departure from Mount Isa, it was reported that the aircraft's endurance was 350 minutes, which was 81 minutes in excess of all the obligatory fuel requirements.

At 1646 hours VH-CLS taxied to Runway 34 at Mount Isa, and the flight reported its departure as 1655 hours at which time it was climbing to its planned cruising altitude of 7000 feet. As the flight progressed position reports at the appropriate reporting points were received. At 1801 hours, VH-CLS advised that it was descending to cruise at 6000 feet, and checked with the relevant flight service unit for information concerning any conflicting traffic. No reason was given for this change in cruising altitude nor was any required.

Subsequently, at 1849 hours, VH-CLS reported as being at the Saucebottle Creek position, 146 km southwest of Cairns, at an altitude of 6000 feet and indicated that its estimated time of arrival (ETA) at the Bibbohra VOR, 35 km west of Cairns, was 1912 hours. VH-CLS was then advised by the Cairns aerodrome/approach controller, through the Cairns Flight Service Unit (FSU), to expect an ILS approach to Runway 15 at Cairns Airport.

At 1854 hours the Cairns aerodrome/approach controller issued an air traffic clearance, for transmission through the Cairns FSU, authorising VH-CLS to enter the control area via the 049 degree radial of the Bibbohra VOR cruising at 6000 feet and using an altimeter setting of 1006 millibars. In addition, the terms of the clearance required the flight to report on the Cairns tower frequency when over the Bibbohra VOR.

At about 1855 hours, the Weather Service Office (WSO) located at Cairns Airport observed a thunderstorm, without precipitation, in the vicinity of the airport and the following 'special' aerodrome weather report was issued:

Wind	: 360 degrees True (T) at 6 knots
Visibility	: 10 km or more
Present weather	: Thunderstorm without precipitation
Cloud	: 1/8 cumulo-nimbus, base 3000 feet
	4/8 cumulus, base 2300 feet
	4/8 strato cumulus, base 4000 feet
Dry Bulb	: 27 degrees Celsius
Dew Point	: 23 degrees Celsius
QNH	: 1006 millibars

A written record maintained by the Cairns FSU indicates that this report was transmitted to VH-CLS at 1901 hours, and a hand-written note containing significant elements of this 'special' aerodrome weather report was located in the aircraft wreckage.

At 1909 hours, the Cairns WSO issued the following 'special' aerodrome weather report:

Wind	: 360 degrees (T) at 5 knots
Visibility	: 10 km or more
Present Weather	: Slight or moderate thunderstorm with rain
Cloud	: 2/8 cumulo-nimbus, base 3000 feet 3/8 cumulus, base 2300 feet 4/8 strato cumulus, base 4500 feet
Dry Bulb	: 27 degrees Celsius
Dew Point	: 23 degrees Celsius
QNH	: 1006 millibars

No evidence was found that this report was transmitted to VH-CLS.

At 1910:47 hours, VH-CLS reported to the Cairns aerodrome/approach controller that it was over the Bibohra VOR at 6000 feet and, following confirmation by VH-CLS that its 'preferred approach' was an ILS approach, it was cleared 'on the Bibohra zero four nine radial, descend to three seven zero zero for an ILS approach Runway one five, and report at Buchan Locator'. VH-CLS acknowledged this instruction and advised that the aircraft was leaving 6000 feet.

At 1917:29 hours, VH-CLS reported over the Buchan Locator turning outbound onto a heading of 330 degrees this being the standard ILS procedure; the aerodrome/approach controller cleared the aircraft to undertake an ILS approach and instructed it to report leaving 3700 feet.

At 1920:54 hours, VH-CLS reported 'leaving three seven zero zero' implying that the aircraft had commenced the final approach segment of the ILS approach; on this basis it could be expected that the aircraft would cross the runway threshold at about 1926:40 hours. The aerodrome/approach controller acknowledged the report and transmitted to the aircraft 'wind from the northwest, maximum downwind component Runway one five not above six knots, runway wet, clear to land'. VH-CLS acknowledged.

At 1922: 53 hours, the aerodrome/approach controller notified VH-CLS 'there's a moderately heavy shower at the field now, visibility er is reducing as the shower moves south, visibility to the south at the moment er in excess of four thousand metres, high intensity approach and runway lighting is on, advise when you would like the intensity decreased'. VH-CLS acknowledged.

At 1926:23 hours, VH-CLS reported 'going round' and the aerodrome/approach controller instructed VH-CLS to 'make missed approach on a heading of zero three five and climb to three seven zero zero', this instruction being appropriate to the standard missed approach procedure. VH-CLS acknowledged this instruction in standard terms consistent with the requirement for acknowledgment of the altitude assignment. This transmission ended at 1926:43 hours and was the last recorded communication from VH-CLS.

Transmissions from the aerodrome/approach controller at 1928:04, 1929:28 and 1930:01 hours, directed to VH-CLS, were not acknowledged.

At 1929:57 hours, the Cairns FSU received advice, by telephone, that an aircraft had 'just crashed' south of Holloway Beach. Emergency services were alerted and the aircraft wreckage was found at about 2005 hours.

The location of the accident site was latitude 16° 51 ' 17.8" South Longitude 145° 44 ' 3.5" East, at an elevation of 17 feet.

The accident occurred at night at about 1928 hours, civil twilight having expired at 1840 hours.

1.1.3 Reconstruction of the Final Flight Path

The probable final flight path of VH-CLS from 1920:54 hours when it reported commencing descent from 3700 feet, in accordance with the ILS procedure, until it crashed has been reconstructed on the basis of information obtained from some fifty witnesses and is shown at Appendix A. The reconstruction has been based primarily on the evidence of 24 witnesses and a resume of their evidence follows: the information obtained from the other witnesses closely corroborates this evidence and there is very little confliction in the various observations. However, two witnesses (positions Number 10 and 24) expressed their opinion that the aircraft was in a steep left bank turning to the left, immediately before impact: all of the other witness evidence pertaining to this aspect indicates that the aircraft was banked and turning to the right. There were no aircraft other than VH-CLS in the final approach sector of the ILS between 1835 and 1950 hours. Witnesses, in the Holloway Beach and Machans Beach areas, nominated times of hearing or sighting between 1925 and 1930 hours.

The witness at position Number 1 has considerable pilot experience and he is the owner of a twin-engined aircraft. He was at a position abeam of the location on the ILS track to Runway 15 where an aircraft should be at an altitude of 2700 feet on descent during the final approach for landing. He was inside his home when he heard the engines of an aircraft which seemed to be travelling in a southerly direction closer to his position and lower than the normal traffic. He heard a substantial increase in engine noise which he associated with an application of power and the engines went out of synchronisation. He gained the impression that the aircraft then turned and proceeded in a south-easterly direction. A storm was imminent with lightning and thunder in the area, but no rain.

The witness at position Number 2 was on the balcony of his house when he saw and heard an aircraft, just off the coast heading in a south-easterly direction in a straight line. An assessment of the height and track of the aircraft, after comparison with the height of an aircraft present at the time of interview, suggests that the aircraft was at a height between 1000 and 1500 feet at the time of sighting, and slightly closer to the coastline than the ILS track. He described the rain at his location as torrential and there was continuous lightning and thunder, but he was of the opinion that the main part of the storm was to the south of his position.

No witnesses were located in the Yorkeys Knob area who saw an aircraft at the relevant time. Four witnesses at positions Numbers 3, 4, 5 and 6 heard an aircraft with the sound travelling generally from north to south, apparently passing overhead or in close proximity to positions 4, 5 and 6, and then possibly proceeding inland. It was raining heavily and there was a storm in the area.

The witness at position Number 23 is employed as an airport porter. He saw an aircraft which he recognised as a Heron approach Holloway Beach from the north-west, turn right and pass over his position on a southerly heading before turning to the left at a position he considered was consistent with the ILS track. He estimated the height of the aircraft to be about 120 feet. It was raining heavily and there was lightning in the area. About two minutes later he heard the sound of the aircraft's engines for some fifteen seconds, there was then an abrupt cessation of noise.

The witness at position Number 7 observed an aircraft which had approached his position from the sea apparently in level flight. It flew in a straight line and passed almost directly over his house on a southerly heading. He then observed it turn sharp left at a position and in a direction which he estimated would lead it to the runway. He estimated its height to be 500-600 feet. The witness at position Number 8 saw a small four engined aircraft turning across the coast and proceeding inland over the northern edge of the Holloway Beach village whilst turning to the left. He described the rain as torrential at that time and there were numerous lightning flashes.

The witness at position Number 9 is an aircraft maintenance engineer who has pilot experience. He first heard an aircraft approaching close to the eastern side of his house and then from his position on the patio, saw its lights directly above him at a height he estimated to be 400 feet. It was travelling in a straight line—subsequently measured as 190 degrees magnetic—and apparently in level flight until it made a sharp turn to the left in the vicinity of the Cairns NDB aerial system some 700 metres south of his position. He described the rain as heavy.

The witness at position Number 10 is a Departmental flight service officer. He was at his home and saw the lights of an aircraft over the Cairns NDB making an approach towards the airport. It was raining heavily 'but it had eased somewhat' since commencement of a storm shortly after 1900 hours. He judged the height of the aircraft to be about normal for that stage of an ILS approach (642 feet). Subsequently an aircraft appeared from the area south-east of his location travelling from east to west and in a steep bank which he thought was to the left although 'I can't be sure of my reasoning'. In addition he observed, in the background, the hazard beacon on the top of Lumley Hill 3460 metres distant, elevation 1085 feet, adjacent to the western boundary of the airport. The aircraft descended sharply and seconds later he heard a dull impact sound. He reported his observations, by telephone, to the Cairns FSU. Subsequent re-enactment of his actions suggests that the report was received approximately two minutes after the impact occurred.

The witness at position Number 11 was on the balcony of her home when, through binoculars which she uses frequently to watch the movement of aircraft, she sighted an aircraft to the west of her location. A storm was just starting and it was raining 'but not as heavily as just before'. The aircraft appeared to her to be lower, faster, and further inland than the normal approach path, and she noted the features of the terrain over which it was flying. She then lost sight of the aircraft but shortly afterwards saw an aircraft appear on the southern side of her house travelling in a westerly direction. The aircraft was in a steep vertical bank with the 'red wing light on the top and the green one on the bottom' and about the same height as her previous sighting. It disappeared from view and one or two seconds later she heard the sound of three impacts.

The witness at position Number 12 was on the patio of his home listening to aircraft and Cairns Tower transmissions on a VHF radio, and watching a storm in his immediate vicinity which involved very heavy rain, continuous lightning and constant rumbling thunder. After listening to an exchange of communications he was watching in the direction from which he knows that aircraft appear when 'coming from Buchan NDB'. He heard the sound of engines and saw the lights of an aircraft, to the north-west of his position, which appeared to be following the normal approach pattern in respect of height and direction. Shortly after passing south of his position the aircraft's lights moved in a pronounced turn to the left and disappeared from his view. After a lapse of time, which he estimated as about three minutes, he heard the sound of aircraft engines to the south of his position with the aircraft apparently travelling in a westerly direction. This was followed by a dull thump and a cessation of engine noise.

The witness at position Number 13 observed an aircraft pass east of her position proceeding in a south-easterly direction and subsequently it appeared to turn towards the north. Some minutes later she heard a 'very loud aircraft noise . . . very close to me'. She did not see the aircraft on this occasion or hear the aircraft crash. When compared with aircraft flying the ILS track, she stated that the aircraft which she had observed was considerably east of the track being flown by these aircraft.

Two witnesses were at position Number 14 both of whom have pilot experience. One witness heard an aircraft then, through a screen of trees, saw the lights of an aircraft making an approach on what appeared to be the normal track—with which she was familiar—but at a lower than normal height. The aircraft then commenced a fairly

tight turn to the left and there was an increase in engine noise similar to an increase in engine power. Some minutes later an aircraft appeared from the east and passed almost overhead proceeding on a south-westerly heading. Her husband observed the aircraft at the time of the second sighting and he estimated its height as 400 feet. He recognised it as a Heron and noted that all four propellers were rotating and that the engine noise sounded normal; he is a licensed aircraft maintenance engineer. It was raining heavily and there was extensive lightning.

Two witnesses were at position Number 15, one observed an aircraft approaching very low from a direction subsequently measured as 300 degrees magnetic; the aircraft then passed slightly to the north of his position. The other witness observed an aircraft going away from his position in a direction subsequently measured as about 150 degrees magnetic. About one to one-and-a-half minutes later the aircraft reappeared from the area south-east of their position and passed slightly to the north of them travelling in a northwesterly direction.

Two witnesses were at position Number 16 when they saw the lights of an aircraft flying towards them through rain. One of these witnesses, who has an extensive aeronautical background, believed that the aircraft was lower than normal and that it was offset from the runway centreline such that a turn to its right would have been required to effect a landing on Runway 15. As he watched the aircraft it turned to its left with about fifteen degrees of bank and descended until it disappeared from his view behind trees on the eastern bank of the Barron River. The other witness thought that the aircraft was on the normal approach track but lower than normal when, from a position near the southern bank of the Barron River, it made a steeply banked turn to its left and passed from his view behind trees on the eastern bank. Less than two minutes later 'the engine noise stopped abruptly'.

The witness at position Number 17 was looking out of an eastern facing window of her beachfront home and was some seven metres above sea level. She heard a loud roar and observed an aircraft fly past proceeding in a northerly direction parallel to the beach and a few metres off-shore. She was 'looking down on it' and it appeared to maintain the same height until it disappeared behind trees to the north. 'There was almost continuous lightning which lit up the sea and heavy pelting rain. I saw the rain hitting the aircraft. The lightning was of a continuous sheet type—not chain or forked lightning'.

Two witnesses were at position Number 18. One witness, who is a licensed aircraft maintenance engineer, was on the patio on the eastern side of his house. He heard the sound of an aircraft, then observed it and recognised it as a Heron. It was travelling in a northerly direction about fifty metres off-shore: it then turned slightly to its left before disappearing from view. He could clearly see the cabin lights and the pattern of the upper red rotating beacon on the surface of the fuselage, and he estimated the height of the aircraft as 30 feet when he first saw it, increasing to 80 feet. The other witness was nearby and first heard the loud noise of an aircraft. She then observed an aircraft travelling in a northerly direction off-shore; but close to the shoreline flying very low. The aircraft then made a sharp left turn and disappeared from view. There was very heavy rain, possibly the rainfall had been heavier before the sighting, continuous sheet lightning to seaward, no significant wind, and the visibility was described as 'not bad'.

The witness at position Number 24 was on the veranda of his home watching a thunderstorm with lightning, rumbling thunder and torrential rain. He saw an aircraft to the west of his position apparently making a normal approach to the airport and he lost sight of it in the usual direction he associated with an aircraft landing on Runway 15. Three to four minutes later he observed an aircraft approaching his position from a south-easterly direction turning slightly to its left. It then 'seemed to go into a left bank curving away from me, approximately to the west' following which he 'saw it go into a

near vertical bank, I think to the left'. It then descended rapidly, disappeared from view, and about five seconds later he heard the sounds of a crash.

The witness at position Number 19, who has pilot experience, was awakened by the onset of very heavy rain, vivid lightning and thunder. About one minute later he heard the sound of an aircraft's engines, initially at low power followed by an increase in engine power. He recognised the sound as being a Heron aircraft. Some one to two minutes later he again heard the aircraft, then he visually identified it as it passed south of his position. It was heading in a westerly direction at a height he estimated as 50 to 100 feet above the houses. Just before it disappeared from his view the aircraft commenced a turn to the right and, shortly afterwards, he heard a thump. At this time he observed 'the two flashing hazard beacons on Edge Hill' which are 3460 and 4430 metres distant and adjacent to the western boundary of the airport.

Two witnesses were at position Number 21. One witness saw an aircraft approaching from the east making a gradual left turn towards the airport, similar to a left-hand circuit visual approach, but lower than normal for such an approach. The other witness was located on the southern side of the same house and, shortly after the foregoing sighting, observed an aircraft to the west of the house heading in the normal direction of the airport but lower than the usual approach. She then saw the aircraft carry out a sharp 'U' turn to the right at the same height, fly level for a short time, then descend steeply until it passed from her view behind trees. She was of the opinion that the aircraft had crashed and drove off in search of it. It was raining heavily but it was not torrential, and there were lightning flashes.

The witness at position Number 20 heard an aircraft approach from the east, he then observed it slightly north of his position proceeding in a westerly direction at a height he estimated as 200 feet. The outline of the aircraft was blurred by heavy rain but its lights were clearly discernible.

The witness at position Number 22, was driving along a road in a westerly direction when she saw what she thought was a 'bright red falling star' close to her on her left and which 'came in parallel to me very fast'. the red light appeared to go into the ground then came up again during which time she returned her vision to the roadway. She could not recall how far it travelled, and she did not hear the sound of an aircraft. It was raining heavily at the time.

1.2 INJURIES TO PERSONS

All of the occupants, namely two flight crew one cabin attendant and eight passengers, were killed.

1.3 DAMAGE TO AIRCRAFT

The aircraft was virtually destroyed by impact forces.

1.4 OTHER DAMAGE

There was no other damage.

1.5 PERSONNEL

1.5.1 Flight Crew

Captain [REDACTED], aged 30 years, was the pilot in command of the aircraft; he held a senior commercial pilot licence which was current until 31 January

1976. His licence endorsements authorised him to fly DH114 Heron aircraft and he held a first class instrument rating endorsed for ADF, VOR, DME, ILS and LOCALISER radio navigation aids. Captain [REDACTED] total flying experience at the time of this accident was 3859 hours of which 1030 hours had been gained in DH114 Heron aircraft. Since obtaining his endorsement on 1 July 1974 to fly DH114 Heron aircraft, he had flown the Mount Isa to Cairns route on 42 previous occasions and on 37 of these flights the approach and landing had been made at night. His total experience at night, however, was 87 hours. He had recorded 114 hours as having been flown under instrument conditions and he had recorded ILS approaches as having been completed at Cairns on 10 occasions since 1 January 1975. Examination of flight and meteorological records since August 1974 indicate that on two occasions only, both on 12 February 1975 at Alice Springs, had Captain [REDACTED] completed an ILS approach in actual instrument meteorological conditions. On all other occasions the cloud base had been in excess of 1500 feet with good visibilities. His most recent proficiency check was successfully completed on 7 June 1975, and his most recent medical examination was passed on 1 July 1975. In the 90 days preceeding this accident he had flown 210 hours, all in DH114 Heron aircraft. He had been off duty for the two days preceding this flight and, on the evening of 22 October 1975 he had retired at about 2200 hours CST arising at about 0900 hours CST the following day.

VH-CLS was approved for operation by a minimum crew of one pilot subject to additional flight crew being required in specified circumstances. The aircraft was not permitted to be operated under the instrument flight rules unless it was equipped with an automatic pilot providing automatic stability on the three axes; or, in the case of commercial operations, it carried an additional flight crew member who was the holder of at least a commercial pilot licence and a flight radio-telephone licence, and who was to be provided with seating alongside the pilot in command. At the time of the accident VH-CLS was not equipped with an automatic pilot and it was engaged on a commercial operation under the instrument flight rules. The carriage of a second flight crew member who was the holder of a commercial or higher category pilot licence and a flight radio-telephone licence was thus mandatory.

Mr [REDACTED] aged 29 years, was the second flight crewmember in VH-CLS, his duties being concerned with the operation of radio equipment and the provision of flight management assistance to the captain. He was not required to hold a pilot licence endorsed authorising him to fly DH114 Heron aircraft. He was the holder of a current radio-telephone licence; and a commercial pilot licence which had expired on 30 September 1975. This licence authorised him to pilot various single-engined aircraft: it was endorsed with a Class 4 instrument rating (night VMC), the radio aids for which the rating was valid being ADF and VOR. His most recent medical examination was passed on 1 October 1975, and his log book showed that he had completed the flying requirements, in single-engined aircraft, for renewal of his commercial pilot licence. His application for renewal, which was dated 21 October 1975, was being processed at the time of the accident. At the time of this accident he had flown 109 hours as a second flight crew member in DH114 Heron aircraft and he had successfully completed the pilot engineering course for the aircraft type.

In addition to the foregoing experience Mr [REDACTED] held a private pilot licence which was current until 31 January 1976. His total flying experience, as a pilot, at the time of the accident was 184 hours. He had been off duty for the two days preceding this flight.

1.5.2 Air Traffic Control

An Air Traffic Control Unit is established in the Cairns Tower with provision for two operating positions; the tower can be operated by one or two air traffic controllers. Normally it is manned by either an aerodrome/approach controller, or an

aerodrome/approach controller assisted by a tower co-ordinator, the staff roster being influenced by expected traffic densities predicated on the scheduled movements of aircraft. From time to time an additional aerodrome/approach controller is present in the tower from an overlapping shift—his duties are to assist, as directed, the oncoming aerodrome/approach controller who is nominally the controller-in-charge.

On 23 October 1975 an aerodrome/approach controller and a tower co-ordinator were rostered for duty from 1300 hours to 2000 hours, and an aerodrome/approach controller was rostered for duty from 1700 hours to 2400 hours. This staffing arrangement provided for two aerodrome/approach controllers and one tower co-ordinator to be on duty in Cairns Tower between 1700 hours and 2000 hours.

At the time of the accident there was only one controller—Mr [REDACTED], an aerodrome/approach controller—on duty in Cairns Tower. As the controller-in-charge he had, between 1700 and 1800 hours, released the other two air traffic controllers from duty. Mr [REDACTED] aged 32 years, holds an air traffic controller licence which is current until 30 September 1977. His licence endorsements authorised him to provide an aerodrome/approach control service at Cairns Airport, an endorsement which he first obtained on 30 November 1973. His most recent proficiency check was successfully completed on 31 July 1975 and his most recent medical examination was passed on 23 August 1975. He had been on duty for 2 hours 30 minutes at the time of the accident.

1.6 AIRCRAFT INFORMATION

1.6.1 History

The Hawker Siddeley Heron DH114 2E/A1 aircraft Serial Number 14067 registered VH-CLS, was constructed in England in 1955 as a DH114 aircraft, by the De Havilland Aircraft Co. Ltd. Connair Pty Ltd purchased the aircraft in 1965 at which time it had completed 4031 hours in service. Subsequently in 1974, when the aircraft had accumulated 12 745 hours in service, Connair Pty Ltd carried out a re-engining modification and installed Lycoming engines fitted with Hartzell propellers, in accordance with an Australian supplemental type certificate. The aircraft type designation then became DH114 Series 2E/A1. It was fitted with conventional dual flight controls and it was equipped for flight under instrument rules on regular public transport operations, the appropriate duplicate instruments being installed in the right-hand instrument panel.

There was a certificate of airworthiness current for the aircraft which was to remain in force provided that the aircraft continued to be maintained by Connair Pty Ltd in accordance with an approved system.

The aircraft's total time in service at the time of the accident was 14 986 hours. Prior to the departure of the aircraft from Alice Springs on this flight a maintenance release had been issued at 1035 hours CST, and a pre-flight and a daily inspection had been carried out. At the time VH-CLS departed from Alice Springs there were no known defects in the aircraft or its equipment. No evidence was found that any defect had become apparent prior to the departure of the aircraft from Mount Isa for Cairns.

Subsequent to the accident a number of minor discrepancies were found in records of the maintenance system but these discrepancies did not affect the operation of the aircraft and they could not have had any bearing on this accident.

1.6.2 Loading

The maximum permissible gross weight for take-off and landing in this aircraft, having regard to structural considerations, was 5868 kg. The documentation prepared for the departure of the aircraft from Mount Isa indicated that the take-off weight was

5786 kg; however there were errors in the documentation and the loading of the aircraft. It is probable that the actual take-off weight was approximately 5895 kg; and that the centre-of-gravity was at or about the permissible forward limit.

It is probable that the weight of the aircraft at the time of the accident was 5470 kg. It has been calculated that the centre-of-gravity was within the specified limits.

Consideration was given, in the examination of the aircraft load, to the possibility of dangerous products having been on board the aircraft. No evidence was found to support any belief that an item of dangerous cargo was on board the aircraft or could have contributed to this accident by being placed deliberately or inadvertently on board.

The type of fuel being used was AVGAS 100.

1.7 METEOROLOGICAL INFORMATION

1.7.1 Forecast Conditions

Prior to commencing the flight from Alice Springs the captain obtained aviation forecasts for the flight which contained a forecast of the en route conditions to Mount Isa and Cairns, and an aerodrome forecast for Cairns Airport which, in accordance with standard practice, covered a radius of 9 km from the centre of the airport. The forecast of the en route conditions had been issued at 1017 hours and, for the en route sector from 407 km west of Cairns to Cairns, it predicted that there would be scattered rain showers and occasional thunderstorms with moderate turbulence increasing to severe in and near the thunderstorms. The aerodrome forecast predicted a visibility of 30 km, rain showers, and 4/8 cumulus cloud at 2500 feet.

Shortly after the time VH-CLS landed at Mount Isa, the Townsville WSO filed an amended aerodrome forecast for Cairns, valid for the period covering the scheduled time of arrival of VH-CLS. It predicted a visibility of 40 km, rain showers, 4/8 cumulus cloud at 2000 feet with intermittent periods of less than thirty minutes duration when the visibility would be 4000 metres and the cloud 5/8 stratus at 1000 feet. There is no evidence that this amended forecast was addressed to, or passed to VH-CLS. However, the complementary operational requirement for the carriage of thirty minutes 'holding' fuel and the reason therefore, namely a prediction of intermittent periods when the visibility would be reduced to 4000 metres with cloud at 1000 feet, was advised to the captain prior to the departure of VH-CLS from Mount Isa.

At 1848 hours, when VH-CLS was in the vicinity of the Saucebottle Creek reporting position en route to Cairns with an estimated time of arrival of approximately 1920 hours, the Townsville OCC requested that the Cairns FSU advise VH-CLS that the aerodrome forecast for Cairns was about to be amended to predict thunderstorms for temporary periods of less than sixty minutes duration; and that sixty minutes 'holding' fuel would be required. This advice was transmitted to VH-CLS. The amended aerodrome forecast was originated by the Townsville WSO at 1856 hours and it predicted a visibility of 40 km, rain showers, 4/8 cumulus cloud at 2000 feet, temporary periods of less than sixty minutes where the visibility would be 4000 metres, thunderstorms, 2/8 cumulo nimbus at 2000 feet and 5/8 stratus at 1000 feet. This amended aerodrome forecast was received at Cairns at 1910 hours; it was not addressed to VH-CLS and there is no evidence that VH-CLS was advised specifically of this text. A complementary operational message was originated by the Townsville OCC at 1900 hours; it required sixty minutes 'holding' fuel and contained the reason therefore, namely a visibility of 4000 metres, thunderstorms, and cloud at 1000 feet. It was addressed to VH-CLS and was received in Cairns at 1913 hours. There is no evidence that VH-CLS was advised specifically of this text.

1.7.2 Observed Conditions—MET and ATC

At 1430 hours, fifty-six minutes after VH-CLS departed from Alice Springs, the weather at Cairns Airport was recorded by the Cairns WSO as a wind of six knots from 360 degrees (T), a visibility of 35 km and 5/8 cumulus at 2500 feet. A routine weather radar observation by the Cairns WSO, using remote equipment located at an elevation of 2164 feet, 11.4 km from Cairns Airport on a bearing of 307 degrees (T), indicated broken rain areas inland along the western slopes of the ranges to the west and south-west of Cairns, but little or no development on the coastal ranges to the north-west.

At 1500 hours, a routine upper-wind balloon flight by the Cairns WSO recorded the wind velocity at 1000 feet as 360 degrees (T) at 18 knots backing to 300 degrees (T) at 26 knots at 3000 feet. Between 7000 feet and 14 000 feet the wind was recorded as from a north-westerly direction, it then backed to 300 degrees (T) at 44 knots at 18 500 feet being 290 degrees (T) at 36 knots at 34 000 feet. The surface wind remained at 360 degrees (T), at about 10 knots.

At 1730 hours, a routine weather radar observation by the Cairns WSO indicated scattered moderate to strong echoes on the western slopes of the ranges from the north-west to the south-west of Cairns, and scattered moderate to strong echoes on the coastal ranges to the north-west. A line of solid moderate echoes was observed to the south. In the sector between south-west and south of Cairns the radar revealed little significant development. The routine aerodrome weather report recorded the visibility as 30 km, 5/8 cumulus at 2300 feet and 4/8 strato cumulus at 4000 feet.

At 1830 hours the routine aerodrome weather report prepared by the Cairns WSO recorded the visibility as 30 km, 4/8 cumulus at 2300 feet and 5/8 strato cumulus at 4000 feet. An aircraft in the circuit area, however, reported that the cloud base was broken at 1100 to 1200 feet to the south-east of the airport. In addition the aerodrome/approach controller thought he had seen lightning and requested that a special weather radar observation be undertaken. This observation indicated two significant echoes bearing 220 degrees (T) and 290 degrees (T) from the radar head at 37 km up to a height of about 35 000 feet. In addition a small line of echoes positioned in the vicinity of the radar head, and apparently moving in the general direction of the airport, was observed; however because of the relative positions of the line of echoes and the radar head it was not possible, at that time, to determine the height or strength of the weather involved—the elevation limitation of the aerial is approximately 16 degrees. In accordance with normal practice the radar was then switched off.

During the next ten minutes the aerodrome controller observed a thunderstorm referred to as 'a bit of a storm', over the airport or just to the north of the airport with considerable lightning and he referred this observation to the Cairns WSO. Additionally he instructed the Cairns FSU to pass information to this effect to an aircraft approaching Cairns (VH-ESL). Such transmission by the Cairns FSU could have been heard by VH-CLS and the evidence supports this. At 1849 hours the aerodrome/approach controller advised VH-ESL that there appeared to be a line of storms moving from the north-west to the south-east and that they were in the vicinity of the airport at this time. At 1851 hours, in response to a request from VH-CLS, he advised the flight that the cloud base at the airport was approximately 2000 feet with some lower patches and that there seemed to be an improvement in the weather to the north-east which appeared to him to be moving towards the airport.

At 1855 hours the Cairns WSO issued a 'special' aerodrome weather report (see para. 1.1.2 Description of Flight) the significant element being a thunderstorm with rain in the vicinity, and this report was transmitted to VH-CLS at 1901 hours. At 1902 hours the aerodrome/approach controller stated to the Cairns FSU that the cloud base seemed to be about 2000 feet to the north-east, that the storm appeared to be to the north-west of the airport, that there was lightning in the area, and that visibility was

good. The surface wind recorded at this time backed to 320 degrees (T) with the mean speed decreasing to about 5 knots. At 1907 hours the controller commented to the Townsville OCC that 'the visibility below cloud is quite good' and 'I can't see any showers at the moment'.

Examination of the pluviograph record maintained at Cairns Airport by the WSO indicates that light rain commenced to fall at 1909 hours and a 'special' aerodrome weather report was issued at this time (see para. 1.1.2 Description of the Flight) the significant elements being a slight or moderate thunderstorm with rain and 2/8 cumulo nimbus cloud at 3000 feet. This report was not advised to VH-CLS.

At 1914 hours the aerodrome/approach controller commented to the Townsville OCC in relation to lightning, that it was 'around us' to the west and north. In addition he commented that the movement of the weather had been from the north-west to the south-east and it appeared that the storms, or storm, was directly west of the airport and that it would pass to the west and then to the south of the airport. It appeared to be moving in a southerly direction.

The pluviograph record indicates that at 1923 hours heavy rain at a rate of 60 mm/hr commenced to fall at the airport and that it continued at this rate until 1928 hours. At 1923 hours the aerodrome/approach controller advised VH-CLS 'there's a heavy shower at the field now visibility is reducing as the shower moves south visibility to the south at the moment is in excess of four thousand metres . . . ' and; at 1925 hours, the wind direction recorded at the airport veered from 320 degrees (T) to 020 degrees (T) with the mean speed increasing to 12 knots with gusts to 20 knots. At 1928 hours the aerodrome/approach controller advised the Townsville OCC 'we've got a very moderate to heavy shower over the field now, visibility is down to about two thousand metres'.

NOTE: The landing minima applicable to the approach to be undertaken by VH-CLS were a cloud base of 294 feet and/or a visibility of 1200 metres.

At 1930 hours the Cairns WSO issued a 'special' aerodrome weather report as follows:

Wind	: 020 degrees (T) at 12 knots
Visibility	: 5000 metres
Present Weather:	Heavy thunderstorm with rain
Cloud	: 2/8 cumulo-nimbus, base 3000 feet 5/8 strato-cumulus, base 4500 feet 2/8 stratus, base 1000 feet
Dry Bulb	: 24 degrees Celsius
Dew Points	: 23 degrees Celsius
QNH	: 1006 millibars
Trend	: Temporary visibility 4000 metres; thunderstorm, 2/8 cumulo-nimbus, base 2000 feet; 5/8 stratus, base 1000 feet

The rate of rainfall eased at 1928 hours and continued at a moderate rate until 1943 hours when it became intermittent at a light rate of fall. During the period 1935 hours to about 1945 hours the wind decreased to less than 5 knots, it then backed to a predominately south-westerly direction with a mean speed of 14 knots with gusts to 20 knots. At 2005 hours heavy rain again commenced to fall; this continued until 2025 hours at which time the rain ceased and the visibility improved to 6000 metres or greater. During this period the cloud remained similar to that recorded at 1930 hours. By 2100 hours the weather conditions had improved to better than the criteria requiring the issuance of a 'special' report.

At 2030 hours, a routine weather radar observation by the Cairns WSO and which was the succeeding observation to that which had been requested by the

aerodrome/approach controller at 1831 hours, indicated an area of solid moderate to strong echoes over Cairns approximately 75 km wide and extending 150 km to the north-north-west and 75 km to the south-east.

1.7.3 Observed Conditions—Witnesses

There is a significant degree of uniformity in the witness evidence in that the reports consistently refer to clouds building up in more than one direction at about 1900 hours; rain variously described as torrential to moderate commencing after 1900 hours with VH-CLS observed in heavy rain in the Machans Beach area; good visibility in the rain; extensive visibility below cloud; cloud base at least in excess of 1000 feet; no destructive wind; many witnesses not conscious of wind gusts with others in certain areas referring to a wind change from a westerly component to an easterly component; and almost unanimous agreement that there was extensive sheet or chain lightning and an almost continuous rumble of thunder, with very occasional forked lightning to the ground this being more prevalent after the time of the accident. Three witnesses refer to a bright flash of lightning in the general area of the aircraft seconds before the accident. Other witnesses who were watching the aircraft at that time did not observe such lightning, and others did not refer to lightning in conjunction with their observations of the aircraft.

The last aircraft to land prior to the approach of VH-CLS did so at 1835 hours, approximately fifty-three minutes before the time of the accident. The aircraft had been flying in the local area, it was still daylight, and the captain states that although the cloud cover was increasing with isolated rain shower areas it had no effect on the flight checks he was conducting. He states that he did not observe the storm which 'struck the airport not long after I landed'. The first aircraft to make an approach to Cairns Airport after the accident, did so 28 minutes later, and landed on Runway 15 at 1956 hours having successfully completed an ILS approach. The pilot states that as he approached Bibbohra VOR from the west there was 'very extensive lightning activity' and he diverted around a number of storm cells. Whilst he was in the ILS holding pattern the aircraft was in cloud, the aircraft was 'subjected to severe turbulence and there was lightning all round the aircraft'. During the approach the flight encountered turbulence which was 'probably extreme and very heavy continuous rain'. He became visual at about the Outer Marker (7.2 km from the runway threshold) at an altitude of about 1200 feet, flight conditions improved, and he completed the landing. The next aircraft to land did so at 2107 hours, 99 minutes after the accident, this aircraft being equipped with weather radar. The aircraft entered the rear of a storm cell whilst it was in the ILS holding pattern but the ILS track to the airport was clear with a number of active cells showing upon the aircraft's radar about 5.5 km to seaward of the ILS track. The aircraft descended through the base of the cloud at an altitude of about 2500 feet.

1.8 AIDS TO NAVIGATION

Runway 15 at Cairns Airport is fully equipped for instrument approaches. There is available a full instrument landing system including locators, markers, and high intensity approach lighting which has six stages of brilliance. In addition to the aids serving Runway 15, the Cairns Airport terminal area is served by a VHF Omni Range (VOR) and Distance Measuring Equipment (DME). The configuration of the aids is depicted in Appendix B.

The ILS approach to Runway 15 is shown at Appendix C; the procedure requires an aircraft which is proceeding from the Bibbohra VOR to the Buchan Locator, as did VH-CLS, to turn to the left at the Buchan Locator onto the reciprocal heading of the ILS, complete a 180 degree procedure turn and commence descent on the ILS from an

altitude of 3700 feet on passing the 10 DME distance from Cairns. Provided that an aircraft is established on the ILS localiser track, descent on the 3 degree glide slope of the ILS is then permitted to an altitude of 300 feet in instrument meteorological conditions, this altitude being reached at the Middle Marker 1150 metres prior to the runway threshold. If visual reference is not established by this time, or a landing straight ahead cannot be effected, the procedure requires that the aircraft be turned left onto a heading of 035 degrees magnetic (M) and climbed to an altitude of 3700 feet.

It has been stated by the aerodrome/approach controller that the monitoring systems indicated all the aids were operating and serviceable at the time of the approach of VH-CLS. Ground and flight serviceability checks were carried out after the accident occurred and no evidence was found of a failure or malfunctioning of any of the aids in the Cairns area at the time of the approach of VH-CLS, or at the time of the accident. No record is kept of the history of stage variation of the approach lighting system however, the aerodrome/approach controller has stated that it was selected to maximum brilliance. His communications to VH-CLS, and some witness evidence, support this statement. One witness indicates that, at the time VH-CLS was approaching the airport, he did not observe the glow in the sky which he associates with the operation of the approach lighting when selected to, or near maximum brilliance—tests indicate that such a glow is not visible under conditions of heavy to torrential rain.

1.9 COMMUNICATIONS

Communications with VH-CLS were normal in all respects from the time the flight commenced at Alice Springs. Initially HF communication facilities were used between the Cairns FSU and VH-CLS, subsequently communications were conducted on VHF on the frequency of 124.6 MHz. From the operating position in use in the Cairns FSU normal transmission is simultaneous on 124.6 MHz and 121.2 MHz; additionally, a communication being received on either of these frequencies is automatically and simultaneously re-transmitted on the other. Communications from the Cairns FSU, or from aircraft communicating with the FSU, normally are recorded on the ground. However, arising from an inadvertent wiring omission at the particular operating position in use, the transmit program from the Cairns FSU was not being recorded and had not been recorded since May 1975.

VHF communication facilities were used between VH-CLS and Cairns Tower on the frequency of 124.9 MHz. There is no evidence that the communication equipment in VH-CLS or Cairns Tower was subject to any fault. All communications from Cairns Tower, or from aircraft communicating with the Tower, are recorded on the ground and, at Appendix D, there is a transcript of the communications associated with the approach of VH-CLS and the accident notification. Aural examination of this recording by persons familiar with the voices of the crew suggests that all these communications from VH-CLS were made by the second flight crew member, Mr Scaife.

1.10 AERODROME AND GROUND FACILITIES

Cairns Airport is located 4.6 km to the north of the city of Cairns on a coastal shelf of low-lying land, 1.8 metres (6 feet) above mean sea level, which extends north-west along the coast for about 15 km and varies from 1 km to 5.5 km inland. A line of mountains lying in a general north-south direction rises from the coastal shelf to an average height of 3000 feet.

At night, the view from the control tower to the north-west through north to the south-east presents a 'black void', and three visibility assessment lights are installed to assist air traffic controllers. Two of these lights are located on masts in the general approach area for Runway 15, one at 1850 metres on a bearing of $319^{\circ} 05'$ (T) from the control tower and one at 3916 metres on a bearing of $352^{\circ} 15'$ (T); the third is located to the south-east of the airport at 7024 metres on a bearing of $109^{\circ} 41'$ (T). One or two lights from residences at Yorkeys Knob, some 8700 metres distant, can be seen from the control tower but the settlements of Machans Beach and Holloway Beach are not visible.

The control tower is located 775 metres south-east of the threshold of Runway 15, on the western boundary of the airport movement area which is parallel to and adjacent to Runway 15/33. The floor of the cabin is 15.3 metres above the aerodrome level, and the position of the console is such that the controller can observe the runway and the approach areas thereto. Visibility from the cabin is obstructed from 172° degrees (T) through west to 322° degrees (T) by a line of hills about 1000 metres west of the control tower which rise to a height of 1250 feet.

Runway 15 at Cairns Airport is aligned $156^{\circ} 28' 50''$ (T). The runway surface is a bitumen sealed pavement 2011 metres long and 35 metres wide with low strength blast areas at each end 61 metres in length. It is served by low intensity omni-directional and high intensity uni-directional side lighting, and a T-VASIS system to provide visual approach slope guidance to landing aircraft. The total system has available six stages of brilliance, the intensities of which are matched with the approach lighting system. The method of operation is similar to that of the approach lighting system and no record is kept of the history of stage variation of the lighting. Witness evidence clearly indicates that the runway lighting system was operating on high intensity, and the aerodrome/approach controller has stated that it was selected to maximum brilliance.

1.11 FLIGHT RECORDERS

Flight recorders were not installed in this aircraft nor is there any requirement for such equipment to be installed.

1.12 WRECKAGE AND IMPACT INFORMATION

The wreckage trail commenced at a point 2761 metres from the threshold of Runway 15 on a bearing of $333^{\circ} 36'$ (T) and where the aircraft first came into contact with trees some 20 metres in height. The trail was about 45 metres in width at its widest point and extended some 180 metres. The first ground impact was on cleared ground about 50 metres beyond the first point of tree contact and the major portion of the wreckage trail was in a sugar cane field. The alignment of the various ground marks, and the general distribution of the wreckage, indicated an impact heading of about 322° degrees (T).

Large portions of both wings and part of the port tailplane were detached from the aircraft during its passage through the trees. The nature of this damage, and the damage to the trees, indicates that the aircraft was banked about 40° degrees right wing down and that it was descending along a flight path approximately 14° degrees below the horizontal in a normal flight attitude. There was no evidence of yaw.

The major portion of the wreckage contained the rear fuselage—less the port outer tailplane, fin and rudder; the rear half of the passenger compartment roof; the inboard half of the port wing with the Number 2 engine attached and a small section of inboard starboard wing; the passenger compartment floor and associated under-floor plumbing; and the cockpit. The aircraft was virtually destroyed by the impact, but it remained generally in large readily identifiable sections. Except for the cockpit area it

was not extensively fragmented. No pieces of the aircraft were found outside this wreckage trail.

The examination of the aircraft wreckage revealed that the landing gear was retracted and locked up at the time of the initial tree impacts; the flaps were up; all four engine cowl flaps were in their open positions; all four propeller governors were at their maximum rpm settings; all four propellers had been rotating at substantial speed at impact; all four engines were capable of normal operation, and the evidence overall indicated that they had been operating at substantial power at impact. Both direct vision windows were closed; the windscreen wiper arm was in a position consistent with it having been operating at the time of impact; there was no evidence that the windscreen structure had been subjected to a localised loading such as that associated with a tree or large bird. The restraint harness inertia reels for the two flight crew were in their manually locked positions; the cockpit instrument panel and Grimes lights were illuminated; the flight instruments revealed no evidence of malfunctioning; the captain's altimeter sub-scale was set at 1007 millibars.

An examination of the radio communication and navigation equipment was carried out. The VHF navigation receiver was found selected on and selected to 112.30 MHz, the Biboohra VOR frequency; the VOR course selector was at about 035. When the navigation receiver was tested on the Cairns ILS frequencies the localiser receiver component operated normally but the deviation sensitivity of the glideslope receiver component, whilst providing an accurate indication of the glideslope centreline, was such that it would have required an aircraft deviation of about 16 per cent more than normal to produce a given deflection of the glideslope needle. The DME was found selected on and selected to Channel 1, the Cairns DME channel; the Number 1 VHF transceiver was found selected on and selected to 124.9 MHz, the Cairns Tower frequency; the Number 2 VHF transceiver was found selected to 122.1 MHz, a Mount Isa FSU frequency, but it was not determined whether it was on or off; the HF transceiver was found selected off and selected to 6533 kHz, the primary HF route frequency; the Number 1 ADF function switch was found in the ANT position and selected to 364 kHz, the Cairns NDB frequency. The control panel of the Number 2 ADF was extensively damaged and examination of the control positions was inconclusive: possibly it was selected to 380 kHz the Buchan Locator frequency.

There was no evidence in the wreckage of explosion, an in-flight fire or ground fire after impact, or that the aircraft had been struck by lightning. No evidence was found of any pre-existing defect or malfunction which could have affected the operation of the aircraft at the time of the accident.

Photographs showing the swathe cut through the trees, and general views of the main wreckage area are presented in the Appendixes to this report.

1.13 MEDICAL AND PATHOLOGICAL INFORMATION

Post-mortem examinations were conducted of the bodies of all the occupants of the aircraft. The injuries sustained by the occupants, whilst severe, were not extreme. There was a regular pattern of crush injury consistent with the ground impact. There was no evidence that the occupants had been exposed to any abnormal condition during the flight.

As part of the routine post-mortem examination procedure, sections of the heart of Captain [REDACTED] were subjected to histological examination; this revealed collections of lymphocyte cells and some disintegration of heart muscle fibres suggesting the condition known as isolated focal myocarditis.

In 1965 Captain [REDACTED] passed the medical standards applicable to the issue of a student pilot/private pilot licence. In 1968 he passed the medical standards applicable

to the issue of a commercial pilot licence and, for the next five years the annual renewal medical examinations. In January 1974 he passed the medical standards applicable to the issue of a senior commercial pilot licence and which included an electrocardiogram which was within normal limits; he passed renewal examinations for this licence in July 1974, January and July 1975. Inquiries subsequent to this accident did not reveal any evidence of illness, however trivial, during the six weeks prior to his death.

1.14 FIRE

There was no fire.

1.15 SURVIVAL ASPECTS

This was not a survivable accident.

1.16 TESTS AND RESEARCH

A flight check of the final flight path of VH-CLS, as reconstructed on the basis of the witness evidence, was flown in a similar Heron aircraft. This check indicated that the manoeuvres involved were well within the performance capabilities and limitations of the aircraft type.

An analysis of the various turn rates which would have been required for the conditions pertaining at the time of the accident, indicated that all turns could have been accomplished with an aircraft bank angle not exceeding 38 degrees.

2 ANALYSIS

There is no evidence that the flight from Mount Isa to Cairns was other than normal until the approach for landing was commenced. All communications with the flight were normal; progressive information concerning the weather had been passed to the flight and the captain was aware of the general situation; the aircraft was equipped for an ILS approach and the captain was qualified to carry out such an approach.

The communications from VH-CLS are consistent with the flight having commenced an ILS approach, and the times of these communications are consistent with such an approach having been initiated—however witness evidence indicates that the flight did not conform precisely to the ILS approach procedure. Subsequently, the advice received from the flight was to the effect that it was 'going round' and it acknowledged air traffic control instructions concerning the missed approach procedure—however witness evidence indicates that the flight did not climb away and conform with the procedure. There is no evidence to suggest that the aircraft was not capable of normal operations and, as the aircraft was carrying ample fuel, availability of fuel should not have been a factor in any decision to depart from specified operating procedures.

There is no doubt that heavy to torrential rain was encountered co-incident with the descent of the aircraft to the minimum permissible altitude and an attempt to align the aircraft with the runway for the final phase of the landing approach. In addition it is possible that an increase in the tailwind component was experienced at this time. The rain did not cause the accident neither did the possible increase in the tailwind

component; however it would appear that the weather in the vicinity of the ILS approach area influenced the conduct of the flight and consequently this aspect, together with the experience of the captain, is discussed in detail.

Analysis of all available information indicates that, at the time VH-CLS commenced the ILS approach procedure, the general weather situation in the vicinity of Cairns was such that the cloud base was about 2300 feet with a basic visibility of some 30 km. A line of moderate storm cells had formed on the western side of, and adjacent to the ILS track lying in an irregular line in an approximate north-south direction. The line of cells had a general movement towards the east or north-east at a speed of 10 knots. Heavy rain had commenced to fall ahead of the line at Trinity Beach Holloway Beach and Machans Beach, with light rain at the airport. It is estimated that the leading edge of the line arrived at Buchan Point at about 1830 hours and at the airport at 1900 hours but the data available are insufficient to determine with confidence the precise movement of each individual cell within the line, or the precise degree of development of each cell at the time of the approach of VH-CLS. However, the evidence suggests a cell structure of less than 9 km in diameter, probably in the order of 5.5 km, and suggests a convective turbulence within the cells of at least 'severe'. Additionally there is some evidence to suggest that the storm activity was more severe in the Yorkeys Knob area between 1900 and 1930 hours than close to the airport at that time.

The segment of the reconstructed flight path (Appendix A) from the vicinity of Buchan Point to Holloway Beach is based on scattered reports but all the information obtained is consistent with such a flight path having been flown. Initially, after leaving the Buchan Point area the aircraft was probably clear of rain. The 'sighting' report north of Yorkeys Knob suggests that, although the aircraft might have been flying the ILS track, it was flying at least 1000 feet lower than the ILS glide slope altitude at that location; that it was proceeding clear of cloud below the cloud base; and it was probably flying in or about to enter heavy rain at that time. The 'hearing' reports in the Yorkeys Knob area suggest that the aircraft deviated seawards, possibly to circumnavigate heavy rain and rising terrain.

The segment of the reconstructed flight path commencing at Holloway Beach and terminating at the accident site is derived from a large number of sightings with many of them utilising a positive geographical background. It was possible therefore to determine this segment of the flight path with a high degree of accuracy in respect of both the track over the ground and the maximum altitude flown. The variations in altitude as depicted on the reconstructed flight path are based on witness estimates and data obtained from witnesses, and they are subject to interpretation; however they are consistent with the flight pattern as described by the witnesses.

The witness evidence suggests that as the aircraft proceeded inland from Holloway Beach, it was proceeding around the rear of a heavy rain shower into conditions of lighter rain, and this might have been evident to the captain for the aircraft was traversing a reasonably well settled area with numerous ground lights. The flight path then followed by the aircraft is entirely consistent with an attempt being made, using instrument indications, to intercept the ILS track and to do so at about the correct glideslope altitude. The overshoot to the west of the localiser centreline and subsequent over-correction taking the aircraft back to the eastern side of the centreline is typical of an attempt to intercept the track at a relatively large angle in an area where the localiser on-course signal is quite narrow.

Additionally, the evidence clearly indicates that at this time, about 1925 hours, the leading edge of a storm cell entered the area generally delineated by a line between the Cairns NDB and the airport, and this brought with it wind changes together with heavy rain which would have reduced the flight visibility. However, the evidence is

consistent with the approach lighting being on and operating in the high intensity range, probably at maximum brilliance and, at about this stage of the flight, it would have been clearly visible to the captain who would thereby have been aware of his proximity to the runway and the fact that the aircraft was not in a good position from which to proceed with a landing. He may, or may not have been aware of an increase in the ground speed of the aircraft.

The 'go round' advice from VH-CLS was received at 1926:23 hours, 17 seconds prior to the calculated ETA of the aircraft at the runway threshold for a standard ILS approach, and this ETA is not varied to a significant extent by a flight path such as that reconstructed for VH-CLS. It is calculated that the aircraft would then have been about 1 km from the runway threshold and therefore the timing of the transmission is entirely consistent with it having been made as the aircraft was observed turning onto an easterly heading over the Barron River. Furthermore the time calculated to fly from this position to the accident site is approximately two minutes which is consistent with the time lapse to the estimated time at which the accident occurred.

Prior to his departure from Alice Springs the captain was aware that occasional thunderstorms were predicted over the final 407 km of flight from Mount Isa to Cairns. In addition, prior to his departure from Mount Isa he was aware that the aerodrome forecast for Cairns had been amended to include intermittent periods of rain of less than thirty minutes duration with reduced visibility, and he was aware that the carriage of additional fuel was required to cover such a contingency. As he decided to uplift from Mount Isa an even greater quantity of fuel there is little doubt that, at that time he was conscious of the fact that the predicted weather conditions for Cairns were such that instrument meteorological conditions would be encountered.

During the course of the flight from Mount Isa to Cairns the flight was specifically advised of an intended amendment to the aerodrome forecast to predict thunderstorms of less than sixty minutes duration. The flight was advised some thirty minutes before its ETA Cairns to expect an ILS approach and, in response to a request from VH-CLS, the flight was advised of the weather situation as observed by the aerodrome/approach controller at that time. Some 17 minutes before entering the ILS pattern preparatory to commencing the ILS approach, the flight was advised that there was a thunderstorm in the vicinity of the airport. Subsequently, as the flight commenced the ILS approach, it was advised that the runway was wet and, at the time when the flight was some 14 km from the airport, and possibly before it had encountered rain, it was advised that there was a moderately heavy shower at the airport with the visibility reducing.

It is considered therefore that, prior to his commencing the ILS approach, and during the approach to the airport, the captain was in receipt of sufficient information to be aware of the possibility of encountering adverse weather. Additionally, there is no doubt that during the flight from the vicinity of the Bibbohra VOR to the Buchan Locator he would have encountered thunderstorms and lightning, as did the aircraft which flew the same route some 14 minutes after VH-CLS, and which subsequently completed an ILS approach and landed at Cairns Airport about 28 minutes after the accident.

Nevertheless, examination of the meteorological services and information provided to the captain reveals that the aerodrome forecast for Cairns which he received prior to his departure from Alice Springs, valid for the period 1200-2400 hours, did not predict the thunderstorm conditions experienced during the period 1900-2030 hours, although it was substantially correct over the periods 1200-1900 hours and 2030-2400 hours. The route forecast provided to him at Alice Springs did not to any significant degree differ from the actual weather conditions encountered en route. The aerodrome forecast had been based primarily on network data obtained at 0300 and 0600 hours, the data being similar to that obtained on the two previous days

and which had led to afternoon thunderstorm development on the coastal ranges to the west and south of Cairns with the prevailing north-westerly winds steering any shower or storm spill-over to the area south of the airport. This is a common pattern in the Cairns area.

The indications in the 1430 hours weather radar observation of some cloud development on the ranges to the north-north-west of the airport, in addition to that expected and indicated to the west, and a significant increase in the air stream flow above 5000 feet led to the amendment of the aerodrome forecast to predict showers, periods of reduced visibility and cloud at 1000 feet. It is considered that this amendment took due cognizance of the information available; it was proper having regard to that information; and it was available at Mount Isa prior to the departure of VH-CLS from Mount Isa. However, this amended aerodrome forecast still did not predict the thunderstorm conditions experienced during the period 1900 to 2030 hours.

The 1500 hours upper wind information recorded by the Cairns WSO showed a significant change in both the wind direction and speed above 3000 feet. This change resulted in a northward extension of the cloud development along the ranges to the north-west of the airport and such development was indicated in the 1730 hours weather radar observation. This data alone were sufficient evidence to have warranted an amendment of the Cairns aerodrome forecast by the forecaster then on duty at Cairns. Such amendment could have been issued at or about 1730 hours and it would have been proper to have included the possibility of thunderstorms of a duration greater than thirty minutes but less than sixty minutes.

In the event such an amendment, to become effective immediately, was originated eighty-six minutes later at 1856 hours by the forecaster on duty at Townsville who had then assumed the responsibility for Cairns, and who states that all the relevant data had come to his attention only a short time beforehand. Additionally, there is evidence that he had the benefit of the actual visual observations of storm activity which were being made at Cairns after 1830 hours. Although the aerodrome forecast was not amended at the most opportune time it is not insignificant that the pertinent information, namely a prediction of thunderstorms and a requirement for sixty minutes 'holding', was made known to VH-CLS at about 1848 hours, some forty minutes prior to the termination of the flight and prior to the flight having entered the Cairns area.

The evidence clearly indicates that the Cairns aerodrome/approach controller was observing the weather quite closely from at least 1830 hours when broken cloud with a base of 1100 to 1200 feet appeared in the circuit area, and shortly afterwards when he observed lightning in the general area of his responsibility. Additionally, it suggests that at no time prior to or during the approach of VH-CLS did he observe a storm or adverse weather on the ILS approach path. He states that the only weather he observed on the approach path was the onset of heavy rain at the airport, and comparison of the timing of this advice to VH-CLS and the airport pluviograph record confirms that he transmitted the advice immediately.

The controller was conscious of a line of storms to the west and north-west of the airport and on more than one occasion between 1840 and 1914 hours his recorded comments are to the effect that it was to the west of the ILS track and that he believed it was moving in a south-easterly direction and would pass to the west and south of the airport. Other witnesses on the airport believed also that the storm was moving in a south-easterly direction, and at least one witness was of the opinion that the weather was reasonably clear to the north. However, as the controller's view to the west of the airport through to a bearing of 322 degrees (T) is obstructed by hills rising to a height of 1250 feet some 1000 metres west of the control tower he was not in a position to adequately monitor the approach to the airport of any weather from a westerly

direction. In fact it is only possible for him to observe the base of such weather when it reaches the airport.

Witness evidence indicates without any doubt that heavy rain was falling in the Holloway Beach-Machans Beach area from about 1900 hours, and that there was heavy rain and storm activity in the Yorkeys Knob area prior to the passage of that area by VH-CLS. There is no suggestion in the evidence that low cloud was associated with this rain, and there is very little suggestion that, at this time, the lightning in the area was other than cloud to cloud. The controller's field of view from 322 degrees (T) through north, embracing the ILS approach path and the Holloway Beach-Machans Beach area was unobstructed but, with the exception of the two visibility assessment lights at 1850 metres and 3916 metres, and one or two isolated residential lights at Yorkeys Knob 8700 metres distant, he had no background against which he could observe the onset or passage of rain in this area, even though there were flashes of lightning in the sky. It is considered that, at night with significant cloud cover, rain showers in the vicinity of and adjacent to the ILS track will generally not be discernible from Cairns Tower.

The controller had available to him the meteorological surveillance radar which is normally operated every three hours, and when requested by air traffic control for the safety of aircraft operations. Arising from technical limitations of the equipment at Cairns, and staffing limitations, continuous operation is undertaken only in emergency situations. Generally, at Cairns, requests by air traffic control result in individual observations as each request is received. At 1831 hours the controller requested that a radar observation be undertaken in an endeavour to ascertain the source of lightning which he had observed. This was done and it was determined that there were two developed thunderstorms some 37 km to the west of the airport. The radar was then switched off. It is possible that because it was secondary to his prime objective the controller did not realise the significance of one item in the advice which he received, namely the advice of a small line of echoes of undetermined intensity in the vicinity of the radar head. This placed these echoes some 11 km from the airport on a bearing of 307 degrees (T) and about 5.5 km west of the ILS track. Alternatively, the controller might have decided that he could observe this line of cloud visually for, in fact, this is what he attempted to do; and it might be significant that the radar observation had been requested nine minutes prior to the expiry of civil twilight. Furthermore, in relation to the degree of the cloud build-up at this time, it might be significant that the captain of an aircraft which had been operating locally at Cairns Airport shortly beforehand did not observe storm activity in the area.

It is probable that had a series of radar observations been undertaken over the following fifty minutes the easterly or north-easterly movement of the line of cells could have been detected prior to the approach of VH-CLS. Additionally, it is possible that the radar returns might have indicated the degree of rain or cloud build-up involved but, as the maximum altitudes which the radar is capable of detecting on the ILS track are approximately 9600 feet at the Buchan Locator, 6800 feet adjacent to the radar head, and 12 400 feet at the threshold of Runway 15, information derived concerning the intensity of the weather would have been limited. Nevertheless it is considered that greater use of the meteorological surveillance radar facilities should have been made by the air traffic control system.

The witness evidence indicates that the aircraft did not conform with the ILS procedure, and that it did not conform with the missed approach procedure. It suggests that, from shortly after the ILS approach was commenced until the accident, the aircraft was being flown by visual reference. In particular the gradual loss of height observed by witnesses as the aircraft turned away from the ILS track towards Machans Beach is consistent with the known effects of a pilot attempting to maintain height by

visual reference when flying over featureless terrain on a dark night with no horizon discernible. It might be significant that height was regained as the aircraft proceeded in a westerly direction over the settlement of Machans Beach where residential lighting was available; however, coincident with the relatively steep turn being initiated, this turn having been to the right, the aircraft departed from the residential area and again entered an area of unlit featureless terrain where there was absolutely no visual reference ahead of the aircraft. In a moderate to steep turn the nose of a Heron aircraft will tend to lower and the aircraft will descend. Visually a pilot would probably not detect this under the flight conditions which existed immediately prior to the accident; alternatively, if he was reverting to instrument flight at this time, it would take a few seconds to do so and detect the change of attitude and loss of height. Under either of the foregoing conditions impact with the ground was almost inevitable. In addition, the situation may or may not have been accentuated by temporary blinding of the captain by a flash of lightning which some witnesses reported in the immediate area of the aircraft at this time.

To attempt to fly the aircraft by visual reference from the vicinity of the Buchan Locator to Cairns Airport, and subsequent to initiating the missed approach, was contrary to the procedures applicable to the type of operation on which the aircraft was engaged, namely a regular public transport operation to be conducted in accordance with the instrument flight rules. Both the aircraft and the captain were equipped to undertake such an operation and no significant fault was found subsequently with the aircraft equipment. Why the captain did not conform with the ILS approach procedure, or follow the missed approach procedure is a matter for conjecture, certainly none of the transmissions from the aircraft indicated that anything was amiss with the operation of the aircraft or the crew.

One aspect considered during the course of the investigation was the medical evidence in respect of the collections of lymphocyte cells and slight deterioration of the heart muscles found in the heart of the captain, and which are suggestive of the condition known as isolated focal myocarditis. When considered in isolation, incapacitation cannot be absolutely excluded on the basis of the medical evidence, but no complementary evidence was found concerning the operation of the aircraft, its equipment, or communications which support a conclusion of incapacitation either total or partial, immediately apparent or insidious. Furthermore, if the captain had become incapacitated to any degree either before or after the last communication, the flight path of the aircraft immediately after that communication was such as to alert the second flight crew member. Although he was not endorsed to fly the aircraft type, he had sufficient experience to fly the aircraft to a safe altitude on a compass heading as required by the procedures; and, as the holder of a Class 4 instrument rating he was qualified to undertake visual flight at night, at altitude. Such flight could have been undertaken east of the ILS track in the general area of the missed approach procedure, and this would have been known to him. It is considered therefore, that the evidence of heart disease is incidental to the circumstances of this accident.

Another aspect considered was the aeronautical experience of the captain. Prior to obtaining his first class instrument rating, and being trained and approved as a pilot in command of DH114 Heron aircraft on regular transport operations, Captain [REDACTED] had never been exposed as a member of flight crew, to airline operating procedures; virtually all his previous experience had been gained in general aviation operations flying under the visual flight rules. Records indicate that since he had commenced flying regular public transport operations he had not been confronted with a weather situation which had required him to divert or contemplate diversion to an alternative aerodrome; he had not been confronted with a weather situation which had required him to 'hold' pending an improvement; and he had completed two only ILS

approaches in actual instrument meteorological conditions, both of these approaches having been on the one day at Alice Springs eight months prior to this accident. Having regard to his relative inexperience in actual instrument meteorological conditions, particularly in respect of actual ILS approaches, and the probability that the flight had encountered moderate to severe turbulence in cloud whilst en route from the Bibbohra VOR to the Buchan Locator, it is possible that Captain [REDACTED] was influenced to attempt a visual procedure when the opportunity appeared to be present.

Similarly, his relative inexperience in airline operating procedures might have influenced his decision to undertake an approach when apparently there was no urgency to do so. The total endurance of the aircraft at this time was some three hours and the flight could have 'held' pending an improvement in the weather—experience indicates that thunderstorm activity will move from an area in thirty to sixty minutes and, in fact, the weather conditions at the airport improved fifteen minutes after the accident for a period of fifteen minutes, and the storm activity at the airport ceased sixty minutes after the accident. Alternatively, the flight could have proceeded to another aerodrome, however the predictions for the aerodromes generally available to VH-CLS were not dissimilar to that for Cairns.

Nevertheless it is considered that the weather conditions encountered by VH-CLS during the final minutes of flight were not beyond the performance capabilities of the captain, or of the aircraft. The witness evidence, and the evidence of the captain of the following aircraft, does not suggest that there was low cloud, significant turbulence below cloud, or grossly reduced visibility. There is no doubt that VH-CLS encountered heavy rain at a critical stage of the approach, and that the flight visibility would have been reduced, but there is no evidence that the visibility was such as to preclude a landing. The wind changes which occurred at about the time VH-CLS was attempting to intercept the ILS in the vicinity of the Cairns NDB resulted essentially in an increase in the downwind component being experienced and would have had no catastrophic effect on the aircraft. After the landing approach was abandoned, and the aircraft proceeded around its orbit, it probably encountered winds from various directions arising from the outflow from the particular cell in the area. The wind speed as measured at the airport during the passage of the storm cell was a mean of 12-14 knots with gusts to 20 knots and the evidence of witnesses in the area of the orbit undertaken by VH-CLS does not suggest that the wind speed was in excess of that recorded at the airport, if anything the witness evidence is suggestive of lesser wind speeds. In a Heron aircraft the landing approach is undertaken at an indicated airspeed significantly in excess of the stalling speed, and the indicated airspeed used for a missed approach is a minimum of some 20 knots in excess of the stalling speed with such airspeed generally being some 40 knots in excess. There is no evidence to suggest that the wind strength or gusts associated with the movement of the storm cell were excessive and it is unlikely that any phenomenon was encountered which had a significant effect on the performance of the aircraft.

The cause of the accident was that following the misalignment of the aircraft with the runway and abandonment of the landing approach, the captain did not immediately initiate a climb to a safe altitude. Why such action was not taken has not been determined.

Having regard to the fact that the undercarriage and flaps were found retracted; that the engines had been operating at substantial power; and that the aircraft was turning away from the airport immediately prior to the accident; it is possible that the captain was in fact initiating action to depart from the area at the time of impact.

3 CONCLUSIONS

1. The pilot in command of the aircraft, and the air traffic controller on duty in Cairns Tower, were appropriately licensed for the duties they were undertaking. The second flight crew member of the aircraft was appropriately qualified for the duties which he was undertaking but his pilot licence, of a category specified to be held for such duties, was technically invalid at the time of the accident.

2. There is no evidence of any defect in the aircraft which could have contributed to the accident.

3. At the time of the accident the aircraft was loaded within safe limits.

4. There is no evidence of any defect, malfunction, or non-operation of the appropriate aerodrome facilities and aids to navigation which could have contributed to the accident.

5. The forecasts of the aerodrome weather conditions for Cairns Airport, available to the pilot in command prior to his departures from Alice Springs and Mount Isa and pertinent to the time of arrival of VH-CLS, did not predict the thunderstorm conditions experienced during the period 1900 to 2030 hours.

6. During the course of the flight of VH-CLS from Mount Isa to Cairns, including the approach to the airport, the pilot in command was in receipt of sufficient information at appropriate times, to be aware of the possibility of encountering weather such as that which prevailed at the time of the accident.

7. Coincident with the aircraft reaching the minimum permissible altitude for the instrument landing system procedure, the aircraft encountered heavy to torrential rain and, possibly, it experienced an increase in the tailwind component.

8. The general weather conditions in the area embracing the instrument landing system approach path were such that the cloud base was about 2300 feet with a basic visibility of some 30 km. In addition, a line of moderate storm cells had formed on the western side of, and adjacent to the approach path. The cells lay in an irregular line in an approximate north-south direction, and had a general movement towards the east or north-east at a speed of 10 knots. The cell structure was probably in the order of 5.5 km in diameter, and the convective turbulence within the cells was possibly 'severe'.

9. The air traffic controller on duty was conscious of a line of storms to the west of the instrument landing system approach path but, apparently, he did not recognise the difficulties of visual perception in the circumstances that prevailed. It is probable that had frequent operation of the Cairns meteorological surveillance radar facilities been activated by the air traffic control system between 1830 hours and 1930 hours, a more useful appreciation of the weather conditions would have been available to the controller.

10. The weather conditions at Cairns Airport were better than the minima prescribed for landing on Runway 15 from an instrument landing system approach.

11. When in close proximity to the airport the aircraft was misaligned with the runway. It turned away from the airport, descended to a low height above terrain, and completed about 270 degrees of a left hand orbit. It then entered a turn to the right during which it descended and crashed.

12. The flight did not conform to the prescribed instrument landing system procedure, neither did it conform to the prescribed missed approach procedure.

Cause: The cause of the accident was that, following misalignment of the aircraft with the runway and abandonment of the landing approach, the pilot in command did not immediately initiate a climb to a safe altitude. Why such action was not taken has not been determined.

APPENDICES

APPENDIX B

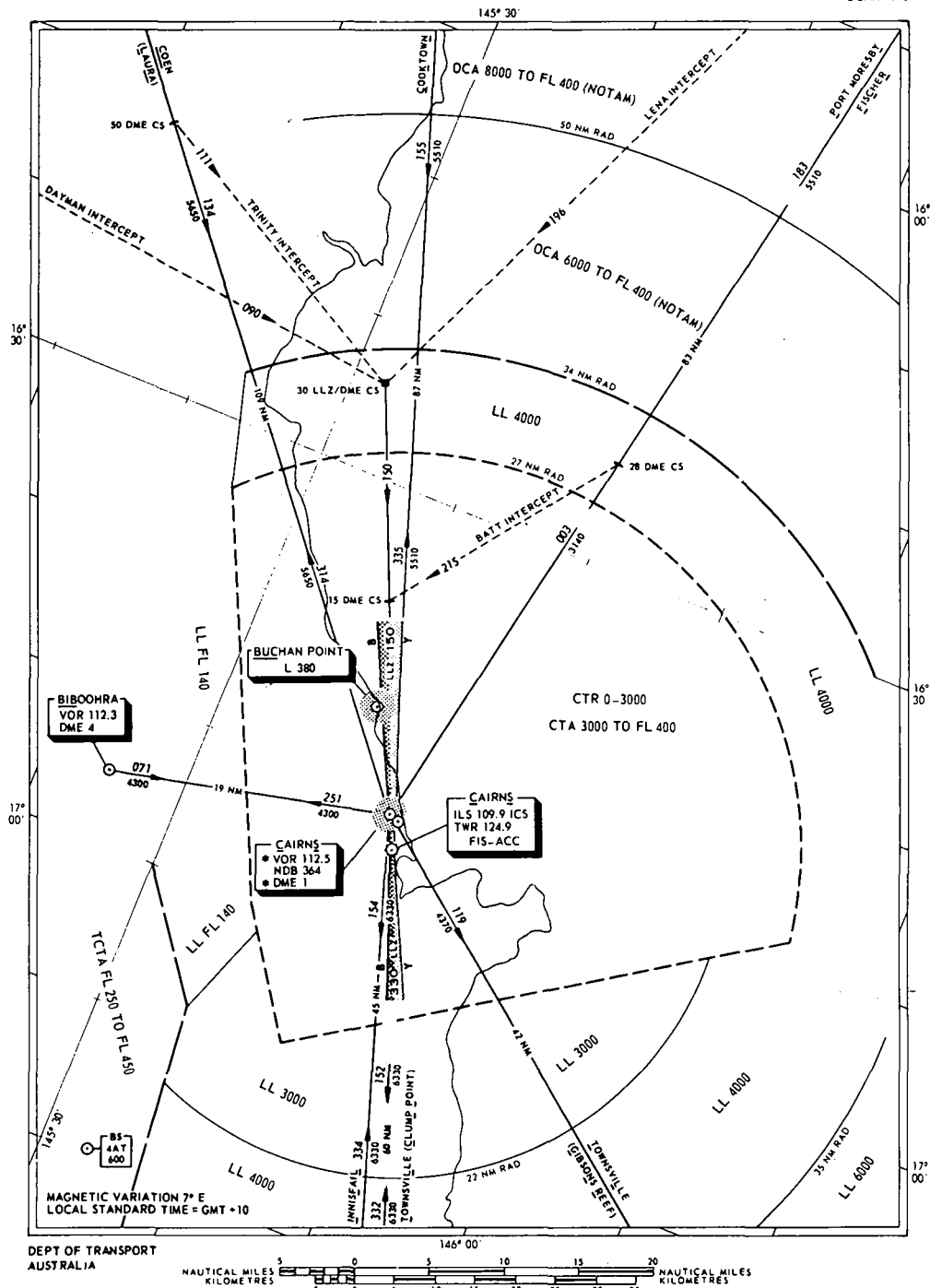
AIP AUSTRALIA

CAIRNS TERMINAL AREA

BEARINGS ARE MAGNETIC
ALTITUDES SHOWN IN FEET

AUS-RTC 3

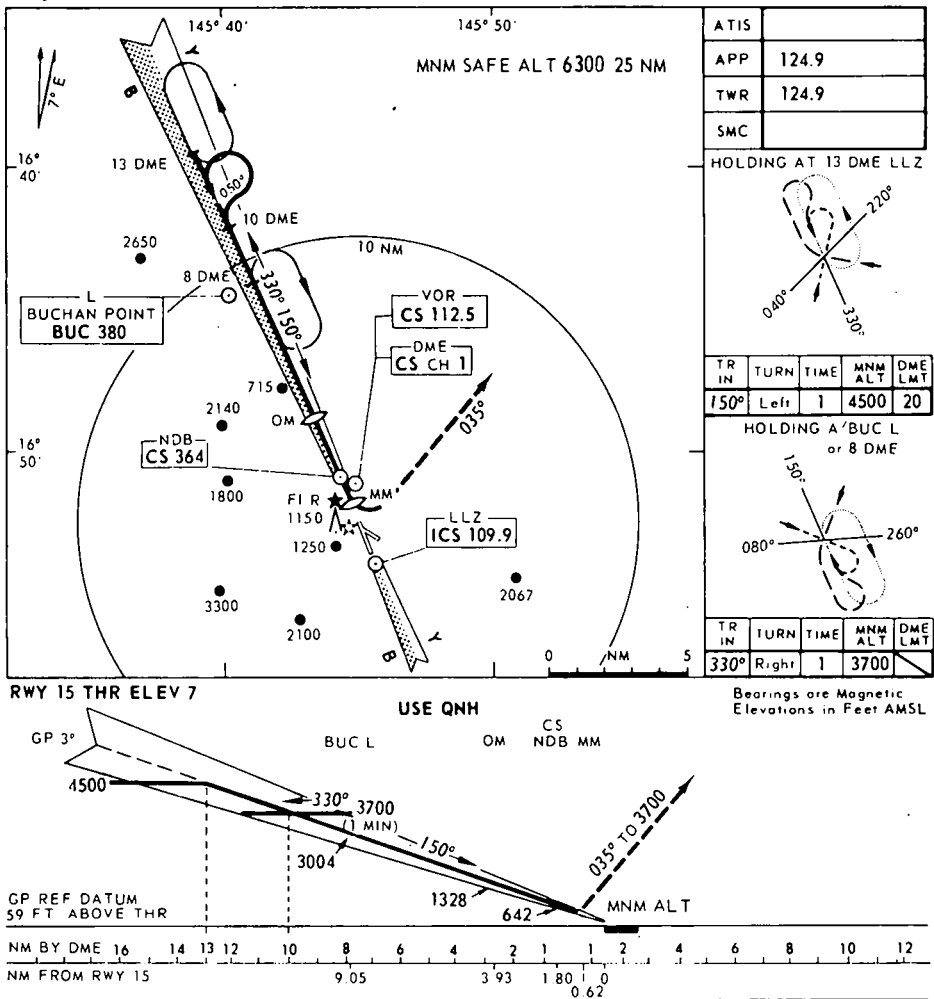
2 JAN 1975

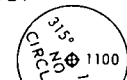


APPENDIX C

RWY 15 ILS or LLZ
CAIRNS, QLD

Changes. VOR added



MINIMA		DAY			NIGHT			NOTE: 1.* CIRCLING 2. THIS PROCEDURE MAY BE FLOWN WITHOUT REFERENCE TO BUC LOCATOR BY DME EQUIPPED AIRCRAFT ONLY								
		MNM ALT (QNH)	CEILING	VIS	MNM ALT (QNH)	CEILING	VIS									
LDG RWY 15 ILS	300	294	1.2 km	300	294	1.2 km										
LDG RWY 15 LLZ	400	394	2 km	400	394	2 km										
CIRCLING	1100	1094	4 km	1300	1294	4 km										
ALTERNATE		1594	6 km		1794	6 km										
DME DIST	12.5	12	11	10	9	8	7	6	5	4	3	2	1	0.6	0.8	
ALTITUDE	4500	4360	4040	3700	3400	3080	2765	2445	2130	1810	1490	1165	830	400	300	

AIP Australia
Dept of Transport
2 JAN 1975

AD Elev 6

RWY 15 ILS or LLZ
CAIRNS, QLD

APPENDIX D

TRANSCRIPT OF COMMUNICATIONS CONCERNING VH-CLS RECORDED AT CAIRNS BETWEEN 1910:47 HOURS AND 1930:28 HOURS EST ON 23 OCTOBER 1975

LEGEND:

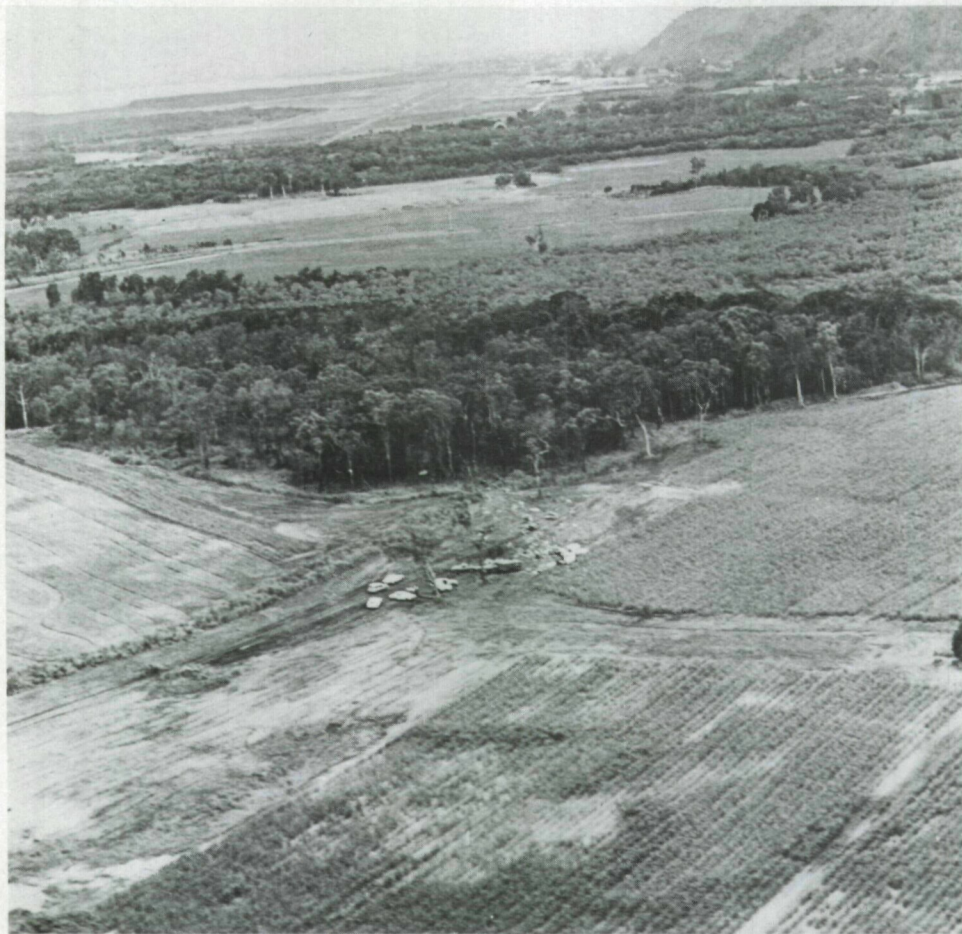
CLS : DH114 Heron Aircraft, VH-CLS
TWR : CAIRNS TOWER
ESL : PA30 Twin Comanche Aircraft, VH-ESL
FS : CAIRNS FLIGHT SERVICE UNIT
QUINN: MR. [REDACTED], who first reported
the accident by telephone to
Flight Service
— : Unintelligible word
() : Editorial Note

TIME EST	FROM	TO	TEXT
Hr:Sec			
1910:47	CLS	TWR	CAIRNS TOWER this is CHARLIE LIMA SIERRA BIBOOHRA six thousand
1910:55	TWR	CLS	CHARLIE LIMA SIERRA CAIRNS TOWER good evening QNH one zero zero six Runway one five wind a light north easterly and confirm you preferred approach ah ILS approach
1911:12	CLS	TWR	CHARLIE LIMA CHARLIE LIMA SIERRA affirmative
1911:17	TWR	CLS	CHARLIE LIMA SIERRA Roger ah when estab- lished on the BIBOOHRA zero four nine radial descend to three seven zero zero for an ILS approach Runway one five and report at BUCHAN Locator
1911:31	CLS	TWR	CHARLIE LIMA SI... SIERRA three seven zero zero
1912:23	CLS	TWR	CHARLIE LIMA SIERRA leaving six thousand
1912:26	TWR	CLS	CHARLIE LIMA SIERRA
1917:29	CLS	TWR	CHARLIE LIMA SIERRA over BUCHAN turn- ing outbound on six three three zero
1917:36	TWR	CLS	CHARLIE LIMA SIERRA clear for final report leaving three seven zero zero

TIME EST	FROM	TO	TEXT
1917:41	CLS	TWR	CHARLIE LIMA SIERRA three seven zero zero
1920:54	CLS	TWR	CHARLIE LIMA SIERRA leaving three seven zero zero
1921:02	TWR	CLS	CHARLIE LIMA SIERRA Roger wind from the north-west maximum downwind component Runway one five not above six knots runway wet clear to land
1921:21	CLS	TWR	CHARLIE LIMA SIERRA
1922:53	TWR	CLS	CHARLIE LIMA SIERRA there's a moderately heavy shower at the field now visibility is reducing as the shower moves south visibility to the south at the moment is in excess of four thousand metres high intensity approach and runway lighting is on advise when you would like the intensity decreased.
1923:21	CLS	TWR	CHARLIE LIMA SIERRA
1926:23	CLS	TWR	CHARLIE LIMA SIERRA going round
1926:28	TWR	CLS	CHARLIE LIMA SIERRA Roger make missed approach on a heading of zero three five and climb to three seven zero zero
1926:39	CLS	TWR	CHARLIE LIMA SIERRA three seven zero zero (Note: This transmission ended 1926:43)
1928:04	TWR	CLS	CHARLIE LIMA SIERRA what would be your maximum acceptable downwind component on Runway one five (Note: Nil reply from VH-CLS. Reply received from VH-ESL)
1928:17	ESL	TWR	ECHO SIERRA LIMA one five knots
1928:20	TWR	ESL	ECHO SIERRA LIMA Roger
1929:28	TWR	CLS	CHARLIE LIMA SIERRA advise your maximum acceptable downwind component (Note: Nil reply from VH-CLS)
1929:52	FS		CAIRNS AIRPORT FLIGHT SERVICE good evening
1929:54	QUINN	FS	Hello who's speaking
1929:55	FS	QUINN	[REDACTED] speaking
1929:56	QUINN	FS	[REDACTED] listen mate
1929:57	FS	QUINN	Good day [REDACTED]
1929:57	QUINN	FS	You've got an aircraft just crashed
1929:58	FS	QUINN	Where
1929:59	QUINN	FS	Just out past my place south of Holloways Beach
1930:01	FS	QUINN	Oh Jesus

TIME EST	FROM	TO	TEXT
1930:01	TWR	CLS	CHARLIE LIMA SIERRA CAIRNS TOWER
1930:04	FS	QUINN	That'll be ESL Mike
1930:05	QUINN	FS	Eh listen I just—out to watch him and he came out in a low dive and er I'm just going out to have a look now he's er
1930:11	FS	QUINN	Just just hold the line I'll get onto OPS will you
1930:12	QUINN	FS	Yeah listen
1930:13	FS	QUINN	Just hold on mate
1930:14	QUINN	FS	Just check with the tower and make absolutely sure will you
1930:16	FS	QUINN	Righto mate just hold on
1930:22	TWR	FS	TOWER
1930:23	FS	TWR	Are you there Dave
	TWR	FS	Yeah
1930:24	FS	TWR	██████████ on the phone there's an aircraft just crashed behind Holloways
1930:28	TWR	FS	That's CHARLIE LIMA SIERRA righto would you get er oh yeah right okey dokey.

APPENDIX E



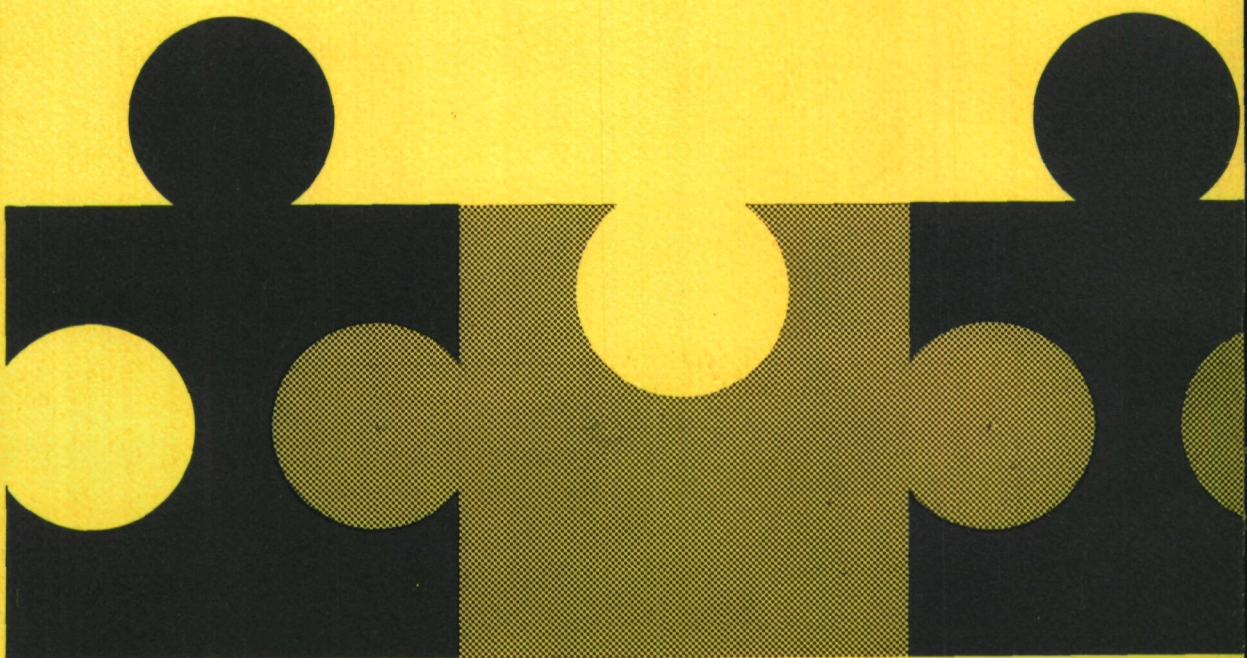
Accident Site (Airport in background)



General view of main wreckage



Tree swathe viewed from ground impact point



THIS COPY NOT FOR SALE