Brief Description of the Accident and its Attendant Circumstances

On the morning of the 12th August, 1960, Flt. Lt. Wickham of No. 7 Sqn. was ordered to carry ut a 6 hr. Profile Flight in Valian Aircraft XD 864. In the absence of his own co-pilot on other duty, he had to seek a replacement and he agreed to take with him Flt. Lt. Howard, an inexperienced co-pilot from No. 138 Sqn. with whom he had not flown before. The crew arrived late at the aircraft and had to hurry their checks, omitting the autopilot and zero reader checks. During the checks the control of the tailplane incidence and the compass were selected to the co-pilot. This was the normal drill followed by Flt. Lt. Wickham when the co-pilot was to complete the take-off. The aircraft took off at 09.35 Z on the 26 runway, climbing rather more steeply than usual, and the nosewheel of the undercarriage failed to retract. The Captain was aware of this and elected to remain in the local area to "sort it out". The aircraft climbed rather steeply and levelled out approximately at circuit height. At about six nautical miles from the airfield the aircraft, in the clean condition apart from the nosewheel but with a low engine power setting, started a normal turn to the left. The aricraft came out of the turn but was unsteady and descending rapidly. The aircraft recovered into a shallow dive and continued to descend. Additional engine power was applied late in the descent but when just above the ground, the port wing dropped sharply. The nose dropped and the aircraft hit the ground at a slow forward speed but with high engine power at about 09.38 Z, approximately seven nautical miles from Kittering. The aircraft hit the ground in a direction of about 109dM on a heading of 044°M. The aircraft exploded, caught fire and all five members of the crew were killed. The flight was authorised but there was a lack of detail of the exercise in the authorisation book and no time of the take-off was detailed. The flight as a routine flight for which self-briefing was the rule. The Captain Flt. Lt. Wickham was a competent and experienced captain but the co-pilot was relatively inexperienced and had not flown with the crew before. The aircraft was serviceable for the flight and the weather was good.

Diagnosis of the Causes Including all Contributory Factors

1. Confirmation of the Aircraft at the Time of the Crash. On visiting the scene of the crash, the Board agreed with the A.I.B. representative that the first priority was to establish the configuration of the aircraft at the time of the crash. The A.I.B. report proves that.....Appendix 'A' the aircraft was in the clean condition, i.e. under-carriage and flaps up and airbrakes in, with the exception of the nosewheel which was down.

2. Eye witness Accounts The next priority was to obtain eye-witness accounts covering the period of flight of the aircraft. From the many eye-witnesses that there were, all of whom told the same basic story, the Board selected those considered most reliable and in the most advantageous positions to obtain a clear view. At least two witnesses for each stage of flight have beenrecorded. The eye....2nd, 3rd, 4th witness accounts indicate that the aircraft recovered.... and 5th from a normal turn unsteadily with less noise than usual...Witnesses (i.e. low engine power) and descending rapidly.

/The

The port wing dropped and the aircraft recovered.....2nd and 3rd into a shallow dive at low forward speed. Shortly..... witnesses before the crash, engine power was applied but the..... 2nd witness port wing dropped again with the aircraft close to ..... 1st, 4th and the ground and the aircraft crashed. This sequence..... 5th witness of events is characteristic of an incipient stall during a low power turn, a stall on recovery from the incipient stall and another final stall due to too harsh a movement of the control column during the final stages of recovery. The Board considered the possibility of engine failure, control difficulty and airspeed indicator errors.

3. Serviceability of the Aircraft. The A.I.B. report indicates that the engines were under considerable power on impact and eye-witnesses indicate that the..... Appendix 'A' engines were running, but at low power before, during..... 2nd, 3rd and and just after the turn. The A.I.B. report indicates 5th witness that there was no electrical failure as the generators, rotary transformers and inverters were all rotating..... Appendix 'A' at speed at the time of impact. The H.B.S. (power supplied by either No. 1 or No. 3 inverter) was also..... 20th witness apparently operating. The P.F.C.U. electric motors were test run satisfactorily after recovery and the P.F.C.U. hydraulic motors were also serviceable after..... Appendix '..' the crash. The flap motor was fully serviceable and the last selection had been a normal up selection. The emergency flap motor was damaged in the crash but has every indication of being serviceable before the crash. The Balance tabs were ~~properly~~ connected and operating and the trim tabs were correctly positioned for the take-off condition. The T.P.I. was in the normal position for take-off at this weight and this position is also nearly the same as that required for level flight at 144,000lbs. A.U.W. at 160K.....Appendix 'C' The Autopilot and Autostabiliser have not been recovered, but examination of their gyros after the crash would not indicate whether they were selected on or at standby.....Appendix 'A' because the landing shock would have disturbed the selections. The cockpit area was almost completely destroyed and no switches have been recovered..... Appendix 'A' There is no reason to suppose that either was selected on, as there was insufficient time to achieve a suitably stabilised condition to engage the autopilot, and..... 11th there is no need for the autostabiliser at low altitude. Witness The elevator and rudder artificial feel units were (recalled) definitely engaged and the aileron feel unit piston shaft showed identical shock loading marks but had been torn..... Appendix 'A' from its mounting. It is therefore reasonable to assume that the aileron feel unit was also correctly engaged. The control input rods from the cockpit to the P.F.C.U.'s were extensively damaged and severed by the explosion..... Appendix 'A' on impact, but they showed no signs of pre-crash fracture and as the aircraft was observed to react properly to the correct recovery action from a typical stall, it is reasonable to assume that the controls were functioning normally prior to impact. Examination of the Form 700 showed that since the previous flight the first pilots instrument panel had been removed and replaced. The pilot -static piplines.....24th and 25th had not been disconnected but a leak and sensing test..... witnesses was completed to ensure that no kinking of the piplines

had occurred. The test was entirely satisfactory and proved that the airspeed indicator was serviceable. The copilots instrument panel had not been removed since the previous flight so there is no reason to doubt the serviceability of the co-pilots airspeed indicator. The Board checked the calibration cards of the two airspeed indicators and found.....Appendix 'S' that the errors did not exceed one knot over the range 100 - 200 K. The Board therefore conclude that there was no unserviceability of engines, flying controls or airspeed indicators. The A.I.B. report also indicates that there Appendix 'A' was no structural failure.

4. Estimation of Flight Path of the Aircraft. The Board then plotted the estimated flight path of the aircraft.....Appendix 'T' from the evidence of witnesses and deduced an approximate radius for the 'normal' turn performed by the aircraft.....Appendix 'Z' From this, the Board calculated the possible combinations of speed and angle of bank for a correctly banked turn to.....Appendix 'B' meet the observed flight path. Examination of the resulting figures prove that the aircraft must have been very close to the stall during the turn because the Captain knew the.....6th, 8th and nosewheel was down and would be observing the limiting speed 23rd witness of 170K for lowering the undercarriage which was to be his.... 11th witness next function. In the short period of level flight prior.... 5th witness to the turn the engines were running irregularly. The Board consider this typical of engines which have just been throttled well back from a high power position prior to restabilising at a new power setting. The subsequent less than normal noise would indicate that a low power had been .....3rd witness selected and the approach to the stall in the ensuing turn would be accelerated by this low engine powersetting. The Board therefore decided to conduct a series of tests in a Valiant Flight Simulator in an endeavour to reproduce the pattern observed before the crash.

5. The Simulator Tests. The tests showed that if the.....Appendix 'C' take-off and climb were steep and at high power, a very large reduction of power was required to achieve stable level flight below 170K. To control the speed it was necessary to throttle almost right back and then increase to a low power of about 6,000 R.P.M. The tests also showed that if the speed of entry into the turn was 160K or less with the power appropriate to that for level flight and the angle of bank 30°, the aircraft would reach the stalling speed by the time it had turned through 90°. There would also be loss of height during the turn prior to the stall so the aircraft would have considerable downward inertia on recovery from the turn even if the aircraft did not actually stall. The Board considered that these tests were too closely similar to the observed behaviour of the aircraft to be ignored.

6. Estimation of the Speed of the Aircraft. The Board noted that the Captain had made all preparations for the co-pilot...18th witness to complete the take-off and the unusually steep take-off....7th, 17th and and climb tends to confirm this. There is no evidence to.....18th witness prove whether or at what stage the Captain may have reassumed control, but it is reasonable to assume that he was in no way worried by the failure of the nosewheel to retract as this is not an unknown defect and it is covered by a Flying Order....Appendix 'L' It follows that he may well have left the Co-pilot in control until a late stage in the flight. Due to the inertia of the aircraft it would take some time to settle to stabilised level flight and if the aircraft was slowing down intentionally because the inexperienced co-pilot had overshot his height and possibly..7th witness his speed also, it is reasonable to assume that the engine power selected was even less than that required for stable level flight at the maximum speed for lowering the undercarriage i.e...11th witness

170K. As the average airspeed for the whole flight was approximately 160K., it is reasonable to assume that the..... Appendix 'B'
airspeed at the time of the initiation of the turn was within the range 150 - 170K. At the low power setting observed, this is dangerously near the stalling speed at the 30° angle..... Appendix 'B'
of bank for a normal turn (137K). The Simulator tests have confirmed that in the observed aircraft configuration the speed falls off in the turn relatively rapidly and..... Appendix 'C'
leads to a stall. The slow speed associated with these manoeuvres is supported by the post crash indication of 122·8K obtained from the airspeed potentiometer in..... 20th witness
the N.B.S. The Board noted that the pilots of the aircraft had retracted the flaps and had not attempted..... 6th witness
to put them down again. The retraction of the flaps..... Appendix 'A'
before complete retraction of the undercarriage is contrary to standard procedure and Pilots Notes for the Valiant ..... 15th witness
Had the crew retained the 20°flap, the speed margin would have been greater and the accident unlikely to have..... Appendix 'B'
occurred. The Board therefore conclude that the aircraft didin fact enter the turn at about 160K. with a low power setting.

7. Medical fitness of the Crew. Post Mortem examination of the members of the crew indicate that all the crew were..... 9th witness recalled
medically fit for the flight and that there was no/ ~~of~~ sudden major sickness or inhalation of toxic agents which might have adversely affected the efficiency of the crew. There is no evidence to show whether there was any sudden minor sickness in the crew just prior to the accident. The Indications of correct recovery action from the stall would suggest that such sickness certainly did not affect both of the pilots, and probably neither of them.

8. Attitude of the Crew to Flying. There is evidence to suggest that the Captain may have been approaching an overconfident stage in his flying. The decision to allow an untried co-pilot to take-off on his first flight..... 18th witness
with the crew is at least unwise, particularly for a non-A.F.I. The non-observance of standardised procedures, contrary to the Squadron Commander's orders, also suggests..... 13th witness recalled
that the Captain thought he knew more and better than most pilots. Such an attitude can lead to slow reactions in emergency. From the evidence it is also clear that Flt. Lt. Bullen made little or no attempt to equip himself with a..... 22nd and
protective helmet. This reflects on Flt. Lt. Bullen, and also..... 26th
on Flt. Lt. Wickham for allowing him to continue flying without his full flying equipment. witnesses

9. The Board's Reconstruction of the Accident. The Board consider that the evidence supports the following chain of events. The crew were short of time and their preparations for flight were rather hurried. Nevertheless. ..... 18th witness
The Captain decided that he would allow the co-pilot to take-off and complete the climb. The co-pilot took off..... 7,17th and
and climbed rather more steeply than usual with full..... 18th witnesses
climbing power. The nosewheel failed to retract so the..... 6th, 7th
speed was kept down to 170K. The aircraft levelled off..... 17th and
between 1,000 and 1,500 ft above airfield level(300 ft)..... 18th witnesses
but the co-pilot allowdd the speed to exceed 170K so the Captain throttled right back temporarily to help control speed and height. This attracted the attention of the..... 5th witness
eye-witnesses. The aircraft lost a little height but stable level flight was achieved for a very short time.

With the aircraft flying at about 160 K. with a power setting of approximately 6,000 r.p.m. and a height of about 1,000 ft above airfield level. The Captain is likely to have selected this height to remain in the visual circuit pattern and to remain below the height ..... Appendix 'M' (1,500 ft above the airfield) at which following aircraft who were leaving the local area would be flying. The Captain then ordered the co-pilot to start a normal 30° banked turn to the left to bring the aircraft on the downwind leg prior to completion of undercarriage checks. The Captain would be keeping a look-out to the left in the turn. As the aircraft turned it would lose speed and height until it reached the stalling speed of 137 K. after about.. Appendix 'C' 90° of turn. The unsteadiness of the aircraft would then attract the Captain's attention and he would doubtless order the co-pilot to come out of the turn, or take control himself. Realising the seriousness of his position he would grab the controls. The automatic reflex action to pull back could stall the aircraft and normal stall recovery action would have to be taken. The call for extra power may well have been delayed or the opening of the throttles delayed, either by indecision as to who was in control, or by the slow reactions of the co-pilot. The Captain would make every endeavour to avoid hitting the ground, but unfortunately the ground he was flying towards was higher than he would expect .....Appendix 'T' (350 ft. A.M.S.L.). Still sinking, he pulled the control column too far back and stalled into the ground ..... 1st Witness. from a low height at low forward speed, but with the engines..... Appendix 'A' developing more and more power ..... 2nd Witness

10. Summary. The Board find that the aircraft, in a clean configuration apart from the nose wheel which was down, entered a normal turn at a speed of about 160 K. with an engine power setting which was too low to maintain height and speed. The aircraft lost speed and height and eventually stalled. It recovered but stalled again when just above the ground. The Board could find no evidence to suggest unserviceability of the aircraft, except the nosewheel.

Primary Cause of the Accident.

The Board find that the primary cause of the accident was pilot error in entering a turn with insufficient speed and/or engine power to maintain an adequate safety margin over the stalling speed for the relevant flight configuration, i.e. clean aircraft. This resulted in loss of control and the crash of the aircraft.

Secondary Causes of the Accident.

The Board find that the secondary causes of the accident were :-

(a) The failure of the nosewheel to retract.

(b) Pilot error in retracting the flaps before complete retraction of the undercarriage. This is contrary to standard procedure as taught and as detailed in A.P. 4377 A. - Pilots Notes for the Valiant Aircraft, Part IV, Paragraph 10.

Contributory Causes of the Accident.

There is no direct evidence to prove that the co-pilot definitely completed the take-off, climb and turn. If in fact, he did so, the Board consider it would be a contributory cause as he might not appreciate his high stalling speed in a turn at the heavy weight of the aircraft. There is

evidence to show that the preparation for flight was hurried. The Board consider that the relief felt by the pilots in achieving the required take-off time, followed by the realisation that the flight was abortive due to the nosewheel malfunction, may have inculcated a sense of relaxation or disappointment sufficient to distract them from proper concentration during the short period of flight after take-off. There is no evidence to show the state of mind of the pilots, but if the Board is correct in its surmise, the hurried preparation for flight would form an additional contributory cause of the accident. ..... 16th Witness

Allocation of Responsibility.

The Board find that the Captain Flt. Lt. B. J. Wickham is directly responsible for the accident.

The Board find that the degree of responsibility amounts to blameworthy negligence, unless there was sudden sickness to one of the pilots in which case the degree of responsibility amounts to negligence.

Injury to Personnel.

The Board find that the following Service personnel suffered fatal injuries :- ..... 9th Witness

1. Flt. Lt. B. J. Wickham (196536) G.D./P.
2. Flt. Lt. W. R. Howard (2766512) G.D./P.
3. Flt. Lt. H. G. Bullen (51039) G.D./N.
4. Flt. Lt. A. J. Ireson (2540707) G. D./N.
5. 3510412 Sgt. R. H. Johnson, Air Sig.'A'

The Board find that there were no injuries to any other Service personnel and no injuries to any civilian personnel.

Damage to Civilian Property.

Damage by burning was caused to growing barley and sugar-beet. Most of the barley damaged was beyond recovery but some of the sugar-beet may be recoverable. Some large pieces of aircraft have been well scattered by the explosion and salvage of these will inevitably cause further damage as they are too heavy for man-handling. About six acres of sugar-beet show signs of damage and the Board are of the opinion that the area of barley damaged may be larger than immediately apparent due to contamination by fuel.

The Board find that the present estimate of the cost of the damage is about £300 (Three Hundred Pounds) which is subject to increase due to completion of salvage. An accurate figure of the cost can only be obtained nearer the time of harvest in the autumn. ..... Appendix 'E'

Service Personnel on Duty.

The Board find that all five of the Service personnel who received fatal injuries in the accident were on duty at the time of the crash. ..... 11th Witness

Relevant Orders and Instructions

The Board find that the following orders and instructions were not complied with:

1. All external and internal aircraft checks were not completed with a check list. (Flying Order Book Section 'B', Order No. 11) .....18th Witness

2. Flaps were raised before the undercarriage was fully retracted (Standard procedure and A.P. 4377 A.- Pilots Notes for Valiant Mk. 1 Aircraft, Part IV, Paragraph 10.) .....Appendix 'A' .....6th Witness

3. Flt. Lt. Wickham has not been flight checked since 24th September, 1959 when he renewed his Master Green Instrument Rating. He should have been checked in the period 24th January, 1960 - 24th May, 1960. (Bomber Command Standing Orders and Instrctions - Air Staff, Part III (Training) Order No. 1. .....Appendix 'R'

Escape Facilities

The Board find that the crew did not attempt to use escape facilities and were removed from the remains of their seats after the crash. The canopy bolts had not been fired electrically. .....9th Witness

Conflicting Evidence

The evidence shows that the civilian eye-witnesses did not notice that the nosewheel was down. The Board consider that only an expert witness trained to note such details would have seen the nosewheel since it does not project much from the fuselage. The Board therefore accept the A.I.B. report that the nosewheel was down at the time of the crash. The Board find that the evidence of the 8th witness conflicts with the evidence of the 6th and 23rd witnesses on the order of the R/T calls dealing with the discovery of the nosewheel malfunction. The 8th witness did not record the actual times or order of the R/T calls. The 8th witness also conflicts with the 10th witness on the order in which instructions were given to the crash crew. As the 10th witness noted his times, the Board has no hesitation in prefering the evidence of the 6th, 10th and 23rd witnesses to that of the 8th witness.

Recommendations

The Board make the following recommendations:-

1. That the circumstances of the accident be published in the form of an incident report worded to draw attention to the high stalling speed of the Valiant aircraft in a turn at high A.U.W.'s in the clean configuration. This should also receive further stress in O.C.U. instruction.

2. That the Valiant flying syllabus of 232 O.C.U. be amended to include an emergency circuit and overshoot at the start of Exercise 9, the Day Heavy A.U.W. Take-off and landing Exercise.

3. That heavy A.U.W. emergency circuits be introduced as a regular Simulator practice.

4. That the possibility of introducing some form of stall characteristic or warning in the Simulator be investigated.

8F. (9)

5. That the need for compliance with check lists and standard operating drills in the interests of flight safety be emphasised with all crews.

6. That the possibility of gross errors accruing from hasty preparation for flight be again emphasised with all crews.

7. That Captains should not allow co-pilots to complete the take-off on the co-pilots first flight with the crew, unless the Captain is a Q.F.I. giving flying instruction at the time.

8. That the graphs depicting stalling speeds in S.D. 745, Operating Data for Valiant, be extended to the maximum all up weight of the aircraft (The highest depicted at present is 140,000 lb.).

Observations

The Board makes the following observations:-

1. Examination of the records of flight checks completed by No. 7 Sqn. disclosed that checks were up to date ..... Appendix 'R' with the exception of the Flight Commanders and Flt. Lt. Wickham (Exhibit 'M')

2. Examination of the Authorisation Book revealed a paucity of information relating to the scope of the flights ordered. Times of take-off ordered were omitted in many cases as were details of the nature of ..... Appendix 'K' continuation training to be undertaken. Statements such as "DIV AS REQD" seem pointless (Exhibit 'E').

3. It would seem prudent to allow ample time for preparation for flight on occasions when the final composition of the crew is not determined until the morning of the flight in question.

4. Examination of the Form 700 disclosed cases in which the majority of the Before Flight Inspection had been ..... 17th Witness signed for the previous day/night. The Board do not (recalled) welcome this practice and suggest that consideration be given to amending B.C.T.S.I. Vol. 1. Part 4, Leaflet 2 to clarify this point.

5. The practice of adding loose leaves to current Forms ..... 17th Witness 700 is to be deprecated. (recalled)

6. No copies of the R.A.F. Wittering Technical Order Books have yet been issued to No. 7 Sqn. who have been at Wittering since 27th July, 1960.

7. A copy of the Check List Supplement Volume Navigation ..... Appendix 'Q' Radar was recovered from the scene of the crash. It would appear an unnecessary security risk to carry these check lists on everyday routine flights unless they are specifically required for use.

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R.A.F. FORM 412
(Page 8a)
(Revised September, 1958)

Certified True Copy. J. Leyden FLTLT

25. Conclusions of the Board, including brief description of accident. Findings and recommendations of the Board (Note 11). (10)

8. A connection to one of the Rudder/Elevator P.F.C.U.....Appendix 'A' electric motors had been incorrectly crimped. Although this had no bearing on the accident, a reminder to technical personnel on correct crimping practice is desirable.

9. The Board wish to record their appreciation of the assistance rendered by Mr. R.C. Clarke of the A.I.B. His perseverance in following up points requested by the Board is to be commended.

Signature of President ...M.RITCHIE... Wg. Cdr.

Signatures of Members H.D. HUGHES Sqn. Ldr.

D.S. COLLIER Sqn. Ldr.

Date... 24th August, 1960

1. I agree in general with the conclusions, findings and recommendations of the Board but have the following comments to make.

2. (Para. 4 Estimation of Flight Path of Aircraft) The Board have remarked that the next function would have been to lower the undercarriage. I disagree with this and suggest that a pilot would first of all normally lower 20 degrees of flap, which he can do at any speed below 195 Kts. The limiting speed for undercarriage locked down is also 195 Kts, so it is reasonable to assume that he entered the turn at any speed up to 195 Kts. Why the captain did not lower 20 degrees of flap again as soon as he noticed his nosewheel down must remain a matter for conjecture. I agree with the Board however, that the pilot appears to have throttled back too far and allowed the aircraft to stall in the turn.

3. (Para. 10 Summary) When the Board say the aircraft recovered, but stalled again just above the ground, I think they mean that the pilot succeeded in levelling the wings but was still descending in a semi stalled condition. I am sure the pilot at no time recovered from the initial stall.

4. I agree with the Boards' findings as to the primary and secondary causes of the accident.

5. I do not agree with the Boards' views on the contributory causes of the accident. It is the captain's responsibility to appreciate the high stalling speed and it is very easy to monitor what the co-pilot is doing. The captain would be responsible too for selecting the power settings and monitoring the airspeed. I agree that the evidence indicates that the preparation for flight was hurried, and while there can be no excuse for this, I do not consider it was a contributory cause.

6. I agree with the allocation of responsibility.

7. (Relevant Orders and Instructions)

(Para. 1) It is normal squadron practice to use a check list.

(Para. 2) This is certainly not normal practice. The Squadron Commander is astonished that Flt. Lt. Wickham, who gave every impression of being a sensible and cautious pilot, would do such a thing.

(Para. 3) The Squadron has been through a very turbulent period with overseas detachments and exercises. Because of his experience, Flt. Lt. Wickham had been left until the last to be checked by the Squadron Commander.

8. (Recommendations)

I agree with the recommendations of the Board.

9. (Observations)

(Para. 1) Already commented on.

(Para. 2) The take off times are entered on the pre flight briefing pro-forma in the Operations room and displayed on all operations boards. A list of continuation training exercises is displayed in the front of all authorisation books and the appropriate exercises should have been noted opposite Flt. Lt. Wickham's flight. This oversight has been drawn to the attention of the Squadron Commander.

(Para. 3) Agreed.

(Para. 4) Any amending of B.C.T.S.I. Vol. 4, Part 4, Leaflet 2 under the two flight/two shift system, it is felt, would be unnecessarily restricting.

(12)

(Remarks of Station Commander, cont'd)

(Para. 5) Agreed. Although this is not normal practice appropriate orders will be issued.

(Para. 6) This was an oversight which has been rectified. The Squadron arrived as recently as 27th July, 1960.

(Para. 7) These check lists are frequently required in the air and are kept with similar classified material in the navigator's satchel.

(Para. 8) The exhibit is being suitably displayed and brought to the notice of all technical personnel.

(Para. 9) The Station wish to add their appreciation to that of the Board.

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1 Certified True copy.....

1st Witness

Mr. ALAN FOSTER (18) farmworker of 1 SCOTGATE, HARRINGWORTH, NR. CORBY, NORTHANTS, being duly sworn states:- "At approximately, 10.30 a.m. on 12th August, 1960 I was working on a field in SPANHOE airfield near the intersection of two runways. I was on a tractor at the time which was stationary with the engine running. I heard a loud whistling noise above the noise of my tractor looked up and saw a large jet aircraft flying comparatively level about 50 ft. above the runway and along the line of the runway. It appeared to be going slower than I normally expect these aircraft to fly at. When it was almost opposite me, about 150 yards away, the nose appeared to rise sharply and the left wing went down. The aircraft then slid into the ground, hitting the left wing first, just on the other side of the runway about 200 yards from me. There was a loud thud and a flash of flame followed by clouds of smoke. I them drove me tractor nearer to the wreckage to see if I could be of any assistance but there was too much smoke and flame and I had to withdraw. As far as I can estimate the first fire engine arrived about 15 - 20 minutes after the crash".

signed A. FOSTER

Question No. 1

"Did you notice whether any of the wheels were showing?"

Answer No. 1

"No, it happened too quickly to notice and it was obvious that the aircraft was going to crash which occuplied all my attention."

signed A. FOSTER

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2.

Certified true copy..... 9/4/61

2nd Witness

Mr. L.E. GOLLAND (58) farmer of GRANGE FARM HARRINGWORTH, NR. CORBY, NORTHANTS being duly sworn, states:- "At approximately 10.30 a.m. on 12th August, 1960 I was working in a field just south east of HARRINGWORTH about 150 yards from a road rail bridge on the LAXTON road. I saw a large white aircraft similar to those that fly from WITTERING approaching up the WELLAND valley from the north east. It appeared a little lower than usual for these aircraft but otherwise completely normal as others I have watched. I saw it turn normally to pass over SHOTLEY village and levelled out flying towards LAXTON. I noticed that though apparently level it was losing height rapidly; during this descent it banked violently to the left and straightened up again heading towards SPANHOE airfield. It then went into a dive and out of my vision. At this time I heard a violet rev of engines followed by a terrific ball of flame and smoke".

signed L.E. GOLLAND

Question No. 2
"Did the engines sound normal before the aircraft went into the dive?".

Answer No. 2
" Yes, quite normal, but I was surprised to see the aircraft losing height so rapidly".

Question No. 3
"Did the speed appear to be the same as those aircraft you have seen before?".

Answer No. 3
"No. much slower".

signed L.E. G OLLAND.

Question No. 4
"Did you notice if the wheels were down or if anything fell from the aircraft".

Answer No. 4
"The wheels were definitely not down and I am convinced that nothing fell from it all the time I watched it".

signed L.E. GOLLAND

(15)

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3

Certified true copy.....

3rd Witness

Mrs. BERTHA DOLBY (55) housewife of 35 HARRINGWORTH, NR. CORBY, NORTHANTS, being duly sworn states:- "At about 10.35 a.m. on 12th August, 1960 I was walking along the WAKERLEY road on the edge of HARRINGWORTH when I saw an aircraft flying up over the meadows from the direction of the railway. I was attracted to it because it was quieter than normal and appeared quite low. In addition the wings were wobbling and as it passed just in front of me the left wing tipped down. Then he straightened up, and appeared to pass over SNOTLEY with increasing speed. It passed out of my sight and immediately afterwards I saw flames and a big pall of smoke".

signed B. DOLBY

(16)

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4

Certified true copy.....

4th Witness

Mr. TERRANCE WYMANT (24) machinist of 21 CLYDESDALE ROAD, CORBY, NORTHANTS being duly sworn, states:- "At shortly before 10.50 a.m. on 12th August, 1960 I was working at MARTIN'S QUARRY on the HARRINGWORTH- LAXTON road near the junction of the road to DEENE: this is on the opposite side of the road to SPANHOE airfield. I was looking out across the WELLAND valley in a northerly direction and a large white aircraft flying along the valley towards HARRINGWORTH. The aircraft turned in a normal manner to the left and flew straight towards me, I could not hear the sound of the engines and I noticied that it appeared to be lower than others I have seen flying in that area. As the aircraft came closer I could see that it was wobbling and losing height. Just as it appeared in line with the roadside hedge I noticed that the wheels were not visible; the aircraft then banked to the left the wings being at a steep angle. The aircraft then appeared to do a cartwheel and a ball of fire and smoke came up from the airfield. I then ran across to the wreckage to see if I would render any assistance."

signed T. WYMANT

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5

Certified true copy.....

5th Witness Mr. GEORGE DEXTER (43) farmer, of REDHILL COTTAGE BARROWDEN, OAKHAM, RUTLAND, being duly sworn, states:-

"At approcimately 10.45 a.m. on the 12th August, 1960 I was working in a field on the north rise of the WELLAND valley to the west of BARROWDEN village. I saw a VALIANT aircraft flying along the valley towards the WELLAND viaduct at SEATON. I paid particular attention to it because the engine noise was not a regular as usual. The aircraft was flying at a height somewhat lower than those which climb straight ahead from WITTERING but not unduly low to be disterbing. As the aircraft got close to the viaduct it turned in a normal manner to the left. I took my eyes off the aircraft for a short time and when I looked again it was in a steep bank to the left and losing height rapidly. It appeared to twist over and dived towards the ground and a fraction of a second later I saw a terrific shoet of flame and a large cloud of smoke."

signed G. DEXTER

CONFIDENTIAL

6

Certified true copy... 9/11/41

6th Witness

Flight Lieutenant THOMAS EDWARD BANKS CHAMBERS (583836) VALIANT captain of No. 49 Squadron. Royal Air Force WITTERING being duly sworn, states:- "On the 12th August, 1960 I was Officer in Attendance in the Tower. At approximately 09.27Z hours whilst taxying to take off point, aircraft XD 864 was given clearance to remain on the Approach frequency as he was having some difficulty on the local frequency This was not considered abnormal because aircraft do experience screening on certains parts of the airfield. When XD 864 took off at 09.35Z hours I watched him through benoculars. The take off appeared to be normal and I saw the main wheels start to go up. As the aircraft was clibing just past the end of the runway, another aircraft (Call sign 65) with Flt. Lt. BEESON as captain. called the tower on local frequency to say that the nose wheel on XD 864 appeared to be down. Shortly afterwards the pilot of XD 864 called on Approach frequency and stated that he thought his nose wheel was still down. The local Controller Flt. Lt. S. BLURTON confirmed that the nose wheel was down. The pilot of XD 864 reported that he was staying in the local area to "sort it out". I saw the aircraft climb away and noticed that it appeared to steepen its climb just before levelling out at an altitude which I thought to be 1800 feet Q.N.H. After the aircraft had levelled out I could see with the aid of binoculars that the nose wheel was still down and that the main wheels and flaps were up. The aircraft flew level for a short while and then began a turn to port. At this point I considered that there were no difficulties and I ceased to watch the aircraft. A short time afterwards the local/approach controller drew my attention to a column of black smoke in the direction of the Bomb Dump; he despatched the Mk 6 Fire Tender with instructions to go and investigate. I instructed the local and Approach controllers to call XD 864 as I ould not see him and had not heard from him, but no contact was made. The MK 6 Fire Tender reported the fire to be off the airfield and was instructed to proceed in the direction of DUDDINGTON village to investigate. I telephoned SQUADRON LEADER BAILEY who was the O.C. Flying to inform him of the circumstances and he instructed me to inform WING COMMANDER BROADBENT, The Wg. Cdr. Operations, and to enquire if No. 3 Group had made contact on W.T. I informed Wg. Cdr. BROADBENT who instructed me to initiate crash procedure which I immediately did. No. 3 Group then reported that no contact had been made with XD 864 on W.T. Shortly after this a message was received from Royal Air Force COLTISHORE to the effect that an aircraft had been reported crashed at HARRINGWORTH village. The MK 6 Fire Tender was informed by radio and was instructed to procede to HARRINGWORTH village. I am not able to give the exact times at which these incidents took place as it is not the practice of the Officer in Attendance in the Tower to keep a log".

/ page 7 of original

signed T.E.B. CHAMBERS

Page 8 of original
7th Witness

Certified true copy... 9.4.11

Flight Lieutenant ROBERT LESLIE BEESON (4102751) Valiant Captain of No. 49 Squadron, Royal Air Force WITTERING, being duly sworn, states:- "At approximately 09.35Z hours on 12th August, 1960. I was in the cockpit of Valiant aircraft XD 823, facing north in the 'B' Flt. Dispersal of No. 49 Squadron which is about 2,000yards from the threshold of runway 26. I noticed a Valiant aircraft flying past with the nose wheel extended but the main undercarriage fully retracted. I informed the Tower of this fact and continued to watch the aircraft. The aircraft climbed away in the normal manner and appeared to initiate a turn to port but resumed its original heading very shortly afterwards. It continued to climb and then I noticed that it appeared to be descending gently again as if it had overshot its intended height. I thought that it was about 1,800 ft Q.N.H. at the time. At this point with the aircraft about 2 miles away I ceased to watch it and carried on with my cockpit checks".

signed R.L. BEESON

Question No. 5

"Did the aircraft appear to be doing a normal take off?".

Answer No. 5

"The aircraft was higher than normal and my immediate impression was that it had just completed a low overshot to allow the Tower to inspect the undercarriage."

signed R.L. BEESON

(20)

CONFIDENTIAL

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8th Witness

Certified true copy.....

Flight Lieutenant SIDNEY ARTHUR BLURTON (2221515), G.D. Pilot, employed on Air Traffic Control duties at Royal Air Force WITTERING, being duly sworn states:-

"On the morning of the 12th August, 1960 I was on duty as Local Airfield Controller in the Tower. At about 09.10Z hrs. aircraft XD 864, (call sign 87), called for taxy clearance on the Approach frequency. Clearance was given to taxy on the Approach frequency and whilst taxying, efforts were made to establish contact on the Local frequency. These proved unsatisfactory, so R.T. contact was maintained on the approach frequency, At 09.35Z hours XD 864 was cleared for take off again on the approach frequency. Immediately after take off. Flt. Lt. BEESON, captain of aircraft XD 823 (call sign 65), informed me on the local frequency that the nose wheel of the aircraft that had just flown past him still had the nose wheel "down". I called 87 on the Approach freqneucy and informed him of this fact. 87 acknowledged and said that he was remaining in the local area to "sort it out". From the tone of thereply I gathered that the captain was aware of this. Immediately after this, 65 started taxying and my attention was concentrated on the control of this aircraft. At, 09.38Z hours I saw smoke appearing in the direction of the Bomber Command Armament School and I immediately dispatched the MK 6 Fire Tender to investigate. A short time later the MK 6 Fire Tender called on radio stating that the fire was off the air-field, so I instructed him to proceed outside the airfield to investigate further. At 09.49Z hours. 65 took off and was asked to investigate the smoke, and later reported that it appeared to be from a Crash fire. At approximately 10.00 hours the Mk 6 Fire Tender reported its arrival at the scene of the fire and reported that it was an aircraft accident. Full crash procedure was initiated as set out in the local Airfield Controllers/Check list, a copy of which I hereby produce marked Exhibit 'A'.

/ Page 10 - / continued

signed S.A. BLURTON

CONFIDENTIAL

Certified true copy.....

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9th Witness

Squadron Leader JOHN FRANK HOBSON (501540) Senior Medical Officer of Royal Air Force WITTERING, being duly sworn, states:- "I am the Senior Medical Officer at Royal Air Force WITTERING, and at about 09.45Z hours Station Sick Quarters received a message from the Tower stating that there had been an accident and that we were to report to the Tower. On the way to the Tower we were met by an officer who joined us and proceeded with us, accompanied by two fire appliances to the scene of the accident. On arrival I saw the burning remains of an aircraft from which I subsequently supervised the removal of five (5) corpses All five corpses were together in a small area in the wreckage. To the best of my knowledge the appeared to be in aircraft seats. I took the corpses to a public mortuary at KETTERING Hospital. At the post mortem examination carried out on the 13th August, 1960, I understand that all corpses were identified. I am in possession of a protective helmet which has subsequently been identified as that of Flt. Lt. WICKHAM, which appears to have been worn on his head at the time of the accident. The cause of death given by the pathologist in all five cases was "Shock and haemorrhoage due to decapitation and multiple injuries as a consequence of impact in an aircraft".

signed J.F. HOBSON

(21a)

CONFIDENTIAL

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Certified True Copy.....

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9th Witness: (Recalled)

Squadron Leader J.F. HOBSON (on his former oath) states:- "I have examined the medical records and the results of the post mortem examination of all members of the crew. There have been no recent illnesses and there is no past history which are likely to have been of significance in this accident. Examination of blood in the case of SERGEANT JOHNSON showed a level of 14 per cent. of carboxyhaemoglobin. In view of the fact that SERGEANT JOHNSON was known to be a smoker and that the blood sample was badly contaminated, this is not thought to be of any significance. FLIGHT LIEUTENANT HOWARD showed a level of 1 per cent. which is not considered to be of any significance and the other three (3) crew members showed a NIL level. To sum up there appears to be no medical evidence to suggest that any of the crew were in any way unfit for the flight."

Signed. J.F. HOBSON

CONFIDENTIAL

Certified true copy... L. Stephens RAFM

No. 4184272, Corporal LESLIE ALEXANDER SPENCE, Aerodrome Fireman Driver, of Royal Air Force WITTERING, being duly sworn, states:- "I am the Aerodrome Fireman Driver who was in charge of the WITTERING Crash Crew on the morning of 12th August, 1960. At 09.38Z hours I was instructed by the Tower to investigate some smoke in the direction of the Bomber Command Armament School. I proceeded with the MK 6 Fire Tender to the area concerned and reported by radio that the smoke was from a position off the air-field. I was then instructed to proceed and investigate the smoke. When we were approaching LEAFON the Tower informed us that it definitely was an aircraft fire on SPANDOS airfield and we were to go there. We arrived at the scene of the crash at 09.43Z hours and found some civilian fire vehicles and ambulances already there. I informed the Tower that it definitely was a VALIANT and that according to information received, there were no survivors. My crew and I then assisted with the extinction of the burning wreckage.

signed L.A. SPENCE

Question No. 6

"Have you raised a copy of the R.A.F. F2888 for the accident to VALIANT XD 864.

Answer No. 6

"Yes, I hereby produce the F.2888"
(Exhibit "K").

signed L.A. SPENCE

CONFIDENTIAL

 Certified true copy...

11th Witness

Squadron Leader HOWARD CHARLES WALTER SPACKMAN (153105), "A" Flight Commander of No. 7 Squadron, Royal Air Force WITTERING, being duly sworn states:- "I am the "A" Flight Commander of No. 7 Squadron Royal Air Force WITTERING. On the morning of 12th August, 1960 I briefed and authorised Flt. Lt. WICKHAM and crew to carry out a profile flight in VALIANT aircraft XF 864, details of which are shown on R.A.F. Form 2919, R.A.F. WITTERING briefing/ De-briefing pro-formae/ and Valiant loading sheet which I hereby produce as Exhibits "B", "C" and "D" respectively. I also produce a certified ture copy of an extract from the Authorisation Book Exhibit "E". I satisfied myself that the weather was fit and instructed the crew to carry out self briefing in the normal way. The crew was a normally constituted crew with the exception of the co-pilot, Flt. Lt. HOWARD, who was a member of No. 138 Squadron and who had not flown with this crew before. The normal co-pilot for this crew was away on duty on this day. Flt. Lt. WICKHAM had attended his ground continuation training lectures and I am satisfied that he was aware of the action to be taken in the event of undercarriage malfunction, as detailed in the Flying Order Book, Section C, Order No, 24, a copy of which I hereby produce (Exhibit "F"). I also produce a diagram showing the normal circuits in use at Royal Air Force WITTERING (Exhibit "G").

signed H.C.W.SPACKMAN

CONFIDENTIAL

Certified True Copy...

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11th Witness; (Recalled)

Squadron Leader H.C.W SPACKMAN (on his former oath) states:- "The maximum speed for lowering the undercarriage of the VALIANT aircraft is 170 knots and if the nose wheel fails to retract, pilots are expected not to exceed this speed if their intention is to carry out the normal drill. The usual speed on the circuit is 150 knots, but the All Up Weight when completing circuit continuation training is usually in the order of 105,000 lbs. or less. The normal angle of bank used in the circuit is 30 degrees. It is not normal practice to engage the auto-pilot unless the aircraft has attained stable and correctly trimmed level flight, and it would be inadvisable and no useful purpose would be served by engaging it immediately after take off. The auto-stabilizer serves no useful purpose at low altitudes, and is normally left in the "stand by" position until required at high altitude. I saw FLIGHT LIEUTENANT WICKHAM at the meteorological briefing on the 12th August, 1960 and his briefed time of take off was 09.30 hours Z. I produce, herewith, a list of the dates on which flight checks of the Squadron crews have bee completed. (Exhibit "M"). I have interviewed Mr. JEFFERSON who was FLIGHT LIEUTENANT WICKHAM'S batman, who informed me that when he entered the room which FLIGHT LIEUTENANT WICKHAM occupies in the Officers' Mess, Royal Air Force, WITTERING at 06.00 hours Z on 12th August, 1960, the bed which FLIGHT LIEUTENANT WICKHAM normally sleeps in had not in fact been used and he did not see FLIGHT LIEUTENANT WICKHAM on the morning of the 12th August, 1960. From this information I gathered that FLIGHT LIEUTENANT WICKHAM had travelled from HONINGTON on the morning of the 12th August, 1960. However, I have no reason to believe that he spent other than a quiet evening at home with his wife".

Signed. H.C.W. SPACKMAN.

(24)

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12th Witness

CONFIDENTIAL

12.

Certified true copy.....

Squadron Leader DEREK ARTHUR PERKINS (57649) 'A' Flight Commander of No. 138 Squadron, Royal Air Force Wittering, being duly sworn states:- " I am the "A" Flight Commander of No. 138 Squadron, Royal Air Force WITTERING. Flt. Lt. HOWARD has been a member of my Flight since April, 1960. I have flown with him several time during this period and consider him to be a competent co-pilit but rather slow to re-act due to his inexperience. On the morning of the 12th August, 1960 I received a telephone call from Flt. Lt. WICKHAM of No. 7 Squadron, who asked if I had a co-pilot who could fly with him on that day. I told him that FLT. LT. HOWARD was available but warned him that FLT. LT. HOWARD was a junior co-pilot on the Squadron and an inexperienced one. As far as I can recollect I advised FLT. LT. WICKHAM to keep an eye on FLT. LT. HOWARD. FLT. LT. WICKHAM accepted the information with the words, "That's quite allright".

signed D.A. PERKINS.

(57)

(24a)

CONFIDENTIAL

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Certified True Copy.....

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12th Witness (Recalled)

Squadron Leader D.A. PERKINS, (on his former oath), states:- "FLIGHT LIEUTENANT HOWARD had a total flying hour experience of 408 hours of which 116 were on the VALIANT. He did not hold an instrument rating as he had not yet reached the required standard. To the best of my knowledge, he has no previous history of any flying accidents and he had not experienced a nose wheel malfunction before. It has not been necessary to issue any warnings or reproofs and he was, if anything, under-confident. I flew with him myself several times shortly after he arrived on the Squadron, and as a result of that, I asked for reports of his progress from his captain. As far as I can ascertain, he was at the meteorological briefing on the morning of the 12th August, 1960 and he had definitely spent the previous night at home watching television. I received the telephone call from FLIGHT LIEUTENANT WICKHAM asking for the services of a co-pilot between 08.00 and 08.15 hours Z on the 12th August, 1960.

Signed. D.A. PERKINS.

(25)

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13th Witness

CONFIDENTIAL

13.

Certified true copy.....1.8.Sept 1961.

Wing Commander BLAISE PETHERBRIDGE MUGFORD, (128917) Officer Commanding No. 7 Squadron, Royal Air Force WITTERING being duly sworn, states:- "I am the Officer Commanding No. 7 Squadron R.A.F. WITTERING, a post which I have filled since November, 1958. FLT. LT. WICKHAM has been a VALIANT aircraft captain in this Squadron since October 1957. He has a total of over 3,600 hours flying time which includes SHACKLETON and CANBERRA experience, and 810 hours 1st pilot time on VALIANT aircraft. I regard him as an experienced, capable and reliable captain, who has shown a steady improvement in his knowledge of the aircraft and its systems, in which he has now reached an above average standard. He was meticulous in following standard procedures and drills, and had the capacity to devise the sensible and correct course of action for himself when the situation demanded. He had flown with inexperienced co-pilots before quite successfully and to my knowledge had no personal worries that could have affected him. He was a thoroughly well balanced officer with a wide range of interests. He was in current flying practice and had completed nearly half of the current quarter's pilot training. Apart from the co-pilot, the crew have been together for about four months, but the two navigators have been with the captain for three years. I regarded them as a good crew and they were up to date with their emergency drill practices. The Air Electronics Officer Sgt. JOHNSON has fifteen months experience on the Squadron and had been reported upon favourably by his previous captain, by the Air Electronics Officer leader and also by FLT. LT. WICKHAM himself.

signed B.P. MUGFORD

25a

CONFIDENTIAL

Certified True Copy

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13th Witness (Recalled)

Wing Commander B.P. MUGFORD (on his former oath) states:- "To the best of my knowledge, and certainly in the time that I have had the Squadron, FLIGHT LIEUTENANT WICKHAM has not had any previous accidents. He was a keen, energetic and confident pilot, but not a Q.F.I. It has never been necessary to issue any warning to him, although during the Standardisation Unit visit in February, 1960, this crew was found to be using an old fashioned method of astro-navigation from which all crews had been advised to change. The normal procedure for raising the undercarriage and flaps is to delay retraction of the flaps until the undercarriage is fully retracted and all lights out. This practice has been evident in all tests that I have carried out. Furthermore, I have made a special point with all my pilots that flap retraction should be delayed until the climb has been comfortably established and a safe height has been reached. This, I suggested, should be at least 500 - 1,000 feet with a heavy load. I have made a practice of flying with all new crews on arrival and have endeavoured to arrange for them to be checked at six (6) monthly intervals thereafter, either by myself, my Flight Commanders or the Instrument Rating Examiner. FLIGHT LIEUTENANT WICKHAM was tested by me on the 21st July, 1959 and he was tested by SQUADRON LEADER SPENCER for the renewal of his Master Green instrument rating on the 24th September, 1959. The Squadron was short of one (1) co-pilot, away on leave preparatory to commencing a captain's course at Royal Air Force GAYDON, and FLIGHT LIEUTENANT WICKHAM'S normal co-pilot had been detailed to go with the SquadronQ.F.I. whom I had selected to collect a repaired aircraft from MALTA".

Signed. B.P. MUGFORD.

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14th Witness

C O N F I D E N T I A L

16.

Certified true copy...

Squadron Leader CHRISTOPHER ROGER COLE SPENCER (58726) 'B' Flight Commander of No. 7 Squadron, Royal Air Force WITTERING, being duly sworn, states:- "I am the 'B' Flight Commander of No. 7 Squdron , Royal Air Force WITTERING, and the Squadron instrument rating examiner. On the 5th August, 1960 I flew in VALIANT XD 864 on a complete instrument rating test with FLT. LT. BRETTELL and as far as I was concerned the aircraft behaved normally with normal response flying controls and engines. The two defects noted on this flight were connected with V.H.F. which had no reception on No. 1 Box, and very limited range on No. 2 and with the port underwing tank which failed to jettism fuel when seleted. As a result of my experience on this aircraft I would regard it as being one of the more difficult aircraft to fly precisely in the pitch plane because it appeared to require more elevator movement than normal to initiate a correction thus making it very easy to overcorrect. This is more noticeable at altitude than at ground level where reactions are com pletely normal

signed C.R.C. SPENCER

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15th Witness

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15.

Certified true copy...

Flying Officer NORMAN PETER COCHRANE REA (4203002) VALIANT co-pilot of No. 7 Squadron, Royal Air Force WITTERING, being duly sworn states:- "I am a co-pilit on No. 7 Squadron, Royal Air Force WITTERING, and have been with the Squ dron for fifteen (15) months. For the whole of the time I have been on the Squadron I have been the normal co-pilot in Flt. Lr. WICKHAMS crew, and have flown approximately 350 hours with FLT. LT. WICKHAM. When I flew with FLT. LT. WICKHAM we carried out the normal cockpit checks in the dispersals and on all occasions after carrying out the tail plane incidence checks FLT. LT. WICKHAM always stated either "1st pilot fine", or "co-pilot fine", dependant on which pilot was going to carry out the take off. When all checks were complete Flt. Lt. WICKHAM would taxy out to the take off point and in the majority of cases FLT. LT. WICKHAM carried out all the R.T. procedure. If FLT. LT. WICKHAM was going to carry out the take off he would line the aircraft up on the runway and then do all pre-take off checks. After take off clearance, I would set 7,00 R.P.M. on all engines, call engines normal and ON FLT. LT. WICKHAMS instructions select 8,000 R.P.M., at which point the brakes would be released by FLT. LT. WICKHAM. I would check the speed at the Acceleration Check Point and when airborne, FLT. LT. WICKHAM would call for brakes and undercarriage up. I would wait four seconds then select undercarriage "up", throttle back to 7,800 R.P.M. and await FLT. LT. WICKHAM's instructions to select flap "in". The instructions to select flap "in" would be dependant on the aircraft's speed and was very often whilst the undercarriage was still retracting. After selecting flap "in" we would go through the after take off drills and engine R.P.M. would normally be adjusted as required by myself. If I was going to carry out the take off FLT. LT. WICKHAM would line the aircraft up on the runway and I would carry out the pre-take off checks. I would also have control of the brakes and throttles. After take off clearance had been received I would select 7,000 R.P.M. on all engines, call all engines normal, then select 8,000 R.P.M. and release the brakes with FLT. LT. WICKHAM steering. I would carry out the take off, checking speed at the Acceleration Check Point. When airborne I would ask for all after take off drills and adjustments which would be performed by FLT. LT. WICKHAM. While I have been flying with FLT. LT. WICKHAM we hav not experienced any undercarriage malfunction, neither have we had to remain in the local circuit at a heavy weight".

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Signed N.P.C. REA

(23)

CONFIDENTIAL

16. Certified True Copy....

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16th Witness Mr. WILFRED HENRY IRESON, aged 51 years, Senior meteorological of Royal Air Force, WITTERING being duly sworn, states:- "I am the Senior meteorological Officer of R.A.F. WITTERING and on the morning of the 12th August, 1960, I was the forecaster on duty at that station. I carried out the normal meteorological briefing at 07.30 Z hours, on the 12th August, 1960 which was attended by FLIGHT LIEUTENANT WICKHAM and crew. I produce herewith a certified extract of the weather observations recorded in the register of daily observations (Exhibit "H"), and a copy of the local area forecast distributed to all crews who were flying that morning (Exhibit "J"). The weather was good and the observations recorded at WITTERING are equally applicable to the area of the crash which is close by".

Signed...W.H. IRESON

CONFIDENTIAL

18.

Certified True Copy

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17th Witness: Flying Officer RAYMOND JOHN NORSWORTHY, (504843), Engineer Officer of No. 7 Squadron, Royal Air Force WITTERING, being duly sworn states:- "I am the Engineer Officer of No. 7 Squadron Royal Air Force WITTERING. At about 09.35 hours Z on 12th August, 1960 I was standing in "B" Flight dispersal No. 7 Squadron, which is at the upwind end of the runway that was in use at the time. I saw VALIANT XD 864 as it passed over the end of the runway and noticed that it was climbing more steeply than usual and that the nose wheel was still extended although the main wheels were retracted. I watched the aircraft, which continued to climb at this steeper angle until it levelled out at what I thought was about 2,000 feet. At this point I ceased to watch it and instructed CHIEF TECHNICIAN McCAFFERTY to report the nose wheel malfunction to the Tower".

Signed. R.J. NORSWORTHY

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Certified True Copy 1944

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17th Witness: (Recalled)

Flying Officer R.J. NORSWORTHY (on his former oath) states:- "I hereby produce certified copies of R.A.F. Form 1167 (Exhibit "N") which give the deviations on the last calibrations of the Air Speed Indicators which were fitted to the 1st and 2nd pilot's positions on VALIANT XD 864 on the 12th August, 1960. These calibrations were carried out at Royal Air Force, HONINGTON on the 9th May, 1960. When two or three aircraft are required to be ready for their crews early in the morning, it is sometimes the practice to complete as much of the Before Flight inspection as is practicable the night before. The vital items are left until the morning of the flight and this applies to VALIANT XD 864 on the morning of the 12th August, 1960.. These vital items are annotated to be completed in the Change of Serviceability and Repair Log of the F.700. Excluding re-fuelling a Before Flight inspection takes approximately one hour. When the time came to sign the Replenishment Certificate in the F.700 on the night of the 11th August, 1960, it was found, by the tradesman concerned, that there was no room to record the replenishment. It is normal for Technical Control to raise new copies of F.700s, and as it was after normal working hours, temporary sheets were signed and attached to the current F.700 to record the replenishment. A new F.700 for VALIANT XD 864 was to have been produced on the morning of the 12th August, 1960 and the appropriate signature for the replenishment already mentioned would again have been recorded in the Replenishment Certificate of that F.700".

Signed.... R.J. NORSWORTHY.

Certified True Copy

18th Witness

No. 1387901, Chief Technician JOHN COLYER Mc CAFFERTY, Aircraft Servicing Chief, of No. 7 Squadron, Royal Air Force WITTERING, being duly sworn, states:- "I am the Aircraft Servicing Chief in charge of VALIANT aircraft XD 864. At 07.00 hours Z on 12th August, 1960, I took over VALIANT aircraft XD 864, and by referring to the F 700 and the hand-over book, I determined that the After Flight servicing had been completed and signed for, and that the Before Flight servicing had been completed with the exception of the Replenishment Certificate, the hood detonator plug and contact breakers, and the underwing tank 28 volt fuses. I instructed the appropriate tradesmen to complete the outstanding items of the Pre-Flight inspection supervised their work, and ensured that they signed the relevant columns of the F.700. At 08.20 hours Z, I scrutinised the F.700, assured myself that all the necessary rectifications and inspections had been signed for and that the aircraft was fully serviceable to fly. I then signed the F.700 with the local time of 09.20 hours. I went to the aircraft with the F.700 to await the crew and to complete checks similar to those which I knew the pilots would do. At about 08.55 hours Z the aircrew arrived, and four of the crew including a co-pilot I had not met before entered the aircraft. The captain, FLIGHT LIEUTENANT WICKHAM, did a complete external check although he did not use a Check List. He then thoroughly perused the F.700 and signed the acceptance column. He got into the aircraft and started the internal checks. He completed Tail Plane Incidence (T.P.I.) and trimming checks without any intercommunication. He then called on the intercommunication system for the internal checks. He went through the whole Check List quite normally with the following exceptions:- (a) He did not complete auto-pilot and zero reader checks, and (b) when he came to the T.P.I. and compass checks he said, "T.P.I. to co-pilot fine, take off", and, "compass to co-pilot". / The Air Electronics Officer queried these by repeating them and FLIGHT LIEUTENANT WICKHAM confirmed that these were selected to the co-pilot position. The remainder of the checks, including the start up, were quite normal and I heard the plotter and the navigator/radar report their equipment serviceable. The aircraft taxied out at about 09.25 hours Z and stopped about, 60 yards from the dispersal for a short time. It then continued taxying and I returned to the dispersal offices. I saw the aircraft take off, and when it passed me the nose wheel was "down", although the main undercarriage appeared to be fully "up", and the aircraft was climbing at a steeper angle than normal. As the aircraft was climbing I noticed that it turned slightly to port, but then continued straight ahead. I then went to telephone to the Tower to ask them to let the pilot know that the nose wheel was down".

/ Page 22 / continued

Signed. J.C. McCAFFERTY

Question No. 7. "When the aircraft was climbing away did you observe the position of the flaps?"

Answer No. 7 "To the best of my knowledge they were "up".

Signed. J.C. McCAFFERTY.

C O N F I D E N T I A L

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18th Witness (Recalled).

Chief Technician J.C. McCAFFERTY (on his former oath) states) "I have just remembered another point. When the crew arrived they had no in-flight rations, and FLIGHT LIEUTENANT WICKHAM said that the request for rations had been put in late but he hoped they would be there in time for take-off. He asked me to leave the door open until they arrived. The door check was delayed until the rations arrived which was while we were doing the emergency flap checks."

Signed... J.C. McCAFFERTY

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Certified True Copy.

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19th Witness: Flight Lieutenant BRIAN HOPLA, (3512305), Navigator/Radar of No. 7 Squadron, Royal Air Force, WITTERING, being duly sworn states:- "I am a Navigator/Radar of No. 7 Squadron Royal Air Force WITTERING. On Thursday, 11th August, 1960, at approximately 15.45 hours Z I spoke to FLIGHT LIEUTENANT WICKHAM in the Officers Mess at Royal Air Force HONINGTON. In the course of conversation I mentioned that I was travelling to STAMFORD on 12th August, 1960. He then asked me what time I was going, and I replied that I would be arriving at STAMFORD at about 10.00 hours Z. He replied that he had to be at WITTERING for briefing at 07.30 hours Z. I did not see him again after this. It is seventy eight (78) miles by road from HONINGTON to WITTERING and normally it takes up to two (2) hours to cover this distance by car".

Signed... B. HOPLA.

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22

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20th Witness: Flight Lieutenant HAROLD LAX, (523949), Technical (Sigs) Officer, of Royal Air Force, WITTERING, being duly sworn, states:- "I am the Officer Commanding Navigational Bombing System (N.B.S.) Servicing Flight of Royal Air Force WITTERING On the 14th August, 1960 on instructions of the Board of Enquiry I inspected the N.B.S. computer Calculators 1, 2 and 3, the N.B.S. Control Unit Type 595 and Green Satin equipment which had been removed from the scene of the accident to VALIANT XD 864 and handed to me by the Board. I examined the N.B.S. Calculators and found that the Calculator 1 was so badly damaged that no reliable information could be obtained from it. The Calculator 2 had only physical damage, but no definite information could be obtained from it due to the absence of other computors which provide inputs to it. The airspeed section of the Calculator 3 was almost completely undamaged and I ascertained that the settings indicated a true air speed of 122.8 knots. The design characteristics of this system are such that in normal operation there is a log between input changes and movement of the airspeed setting. Furthermore, if electrical power is completely cut off from the system, the airspeed setting will remain in the position it was occupying at that time. I examined the Control Unit Type 595 which was badly damaged; however, it was possible to ascertain that the function switch was in the Automatic Frequency Control (A.F.C.) position. This is the usual operating position for the N.B.S. radar when the equipment is in use and is functioning normally. The Green Satin Indicator was very badly damaged but the indications appeared to be a ground speed of 170 knots and a starboard drift of 13 degrees. The Green Satin Tracker Unit was comparatively undamaged and by comparison with two serviceable units, the positions of the computing potentimeters indicated a ground speed of between 155 and 170 knots. The Green Satin equipment gives only an approximate indication of ground speed at low altitudes, this unreliability is also accentuated by aircraft altitude".

/ Page 27 - original /

Signed... H. LAX.

(34)

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34

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21st Witness: No. 576552, Master Signaller MAURICE JOHN GILLHAM, Air Signaller (A), of No. 7 Squadron, Royal Air Force, WITTERING, being duly sworn, states:- "I am an Air Signaller "A" of No. 7 Squadron, Royal Air Force WITTERING. On the 15th August, 1960 I visited the scene of the accident to VALIANT XD 864 and recovered various documents. I brought them back to Royal Air Force WITTERING, identified them, and compiled a list which I hereby produce (Exhibit "L") I subsequently handed them to Squadron Leader E. LARRAWAY, A.F.C., the Wing Air Electronics Officer of Royal Air Force WITTERING for safe custody".

Signed....M.J. GILLHAM.

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Page 30 of original.

22nd Witness: No. 3517692, Senior Aircraftsman IVOR NEIL FARROW, Flying Clothing Worker, at Royal Air Force, WITTERING, being duly sworn, states:- "I am a Flying Clothing Worker employed in the Flying Clothing Section at Royal Air Force WITTERING. On the morning of the 12th August, 1960, I was on duty in the Flying Clothing Section at Royal Air Force WITTERING, issuing equipment to the aircrew who were to fly. I issued five (5) sets of flying equipment to the crew who were to fly with FLIGHT LIEUTENANT WICKHAM as captain. The sets of equipment were complete with the exception of that of FLIGHT LIEUTENANT BULLEN, which did not have a protective helmet. There are other aircrew members on this station who do not have protective helmets, and I understand that this is because the required sizes are not available in the Station Equipment Section.

Signed.....I.N. FARROW

(3)

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3b

Certified True Copy.....

23rd Witness: Flight Lieutenant BRIAN NEVILLE BENNETT, (3502324), co-pilot of No. 138 Squadron, Royal Air Force, WITTERING, being duly sworn, states:- "I am a co-pilot on No. 138 Squadron, Royal Air Force, WITTERING. On the morning of the 12th August, 1960, I was flying as co-pilot to Group Captain L.H. TRENT, Station Commander, in VALIANT WZ 401. At shortly after 09.30 hours Z I heard an aircraft (Call sign 87) report to the Tower that he thought his nose wheel had stuck down and asked the Tower for confirmation. The Tower replied in the affirmative, and 87 said he would remain in the local area to "sort it out". Group Captain TRENT remarked that 87 had no alternative but to burn off fuel and land again. I have subsequently learned that the call sign 87 was that of FLIGHT LIEUTENANT WICKHAM'S aircraft".

Signed.....B.N. BENNETT

(57)

CONFIDENTIAL

27.

Certified True Copy 9th

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24th Witness: No. 4249700, Leading Aircraftsman BRIAN DAVID STEPHENS, Instrument Mechanic (General) of No. 7 Squadron, Royal Air Force, WITTERING, being duly sworn, states:- "I am an instrument mechanic on No. 7 Squadron, Royal Air Force, WITTERING. On the 8th August, 1960, with Corporal BEWSLEY, I carried out a leak test to the port pitot and static systems of VALIANT XD 864. The leak test was completely satisfactory and the systems did not show any signs of a leak at all. I remained at the port wing tip with the leak tester and did not go into the cockpit."

Signed.... B.D. STEPHENS.

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28.

Certified True Copy

25th Witness: No. 1923152, Corporal PHILIP HENRY JOHN BENSLEY, Instrument Fitter (General) of No. 7 Squadron, Royal Air Force, WITTERING, being duly sworn, states:- "I am an Instrument Fitter on No. 7 Squadron, Royal Air Force, WITTERING. On the 8th August, 1960, the port instrument panel of VALIANT XD 864 had to have a leak and sensing check after the panel had been brought forward to enable a Radar Altimeter MK 6 to be changed. The bringing forward of the instrument panel does not entail the disconnection of either the pitot or static systems. In conjunction with L.A.C. STEPHENS, when the panel had been replaced, I carried out the leak test which was completely satisfactory, and did not show a leak. The leak tester was then disconnected from the pitot head, I went into the cockpit, L.A.C. STEPHENS blew down the pitot head and I observed that the port Air Speed Indicator moved in a clockwise direction. I then signed for the leak test in the current F.700 of VALIANT XD 864".

Signed. P.H.J. BENSLEY

(39)

CONFIDENTIAL

31.

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Certified True Copy 9/8/61

26th Witness: Squadron Leader CYRIL REGINALD SCOTT-JACKSON, (59164), Officer Commanding, Supply and Movement Squadron, Royal Air Force, WITTERING, being duly sworn, states:-
"I am O.C. Supply and Movement Squadron, Royal Air Force, WITTERING. On the 12th August, 1960 with the exception of three (3) sizes, stocks for the complete range of Protective Helmets were held at Royal Air Force, WITTERING. The remaining three sizes could be obtained on priority demand. On the 12th August, 1960 there were no outstanding demands for any individual aircrew member. I have checked, the F.667B and find that FLIGHT LIEUTENANT BULLEN did not hold on his charge a Protective Helmet. I have confirmed with Royal Air Force HONINGTON that there was no outstanding demand in respect of a Protective Helmet for FLIGHT LIEUTENANT BULLEN at that station, from which FLIGHT LIEUTENANT BULLEN has just arrived".

Signed. C.R. SCOTT-JACKSON

(45)

List of Appendicies

A. A.I.B. Report (Statement by Mr. R.C. CLARKE).
B. Estimation of speed and radius of turn.
C. Tests completed in Valiant Flight Simulator.
D. Table of Technical Evidence.
E. Assessment of damage to civilian property.
F. R.A.F. Wittering Air Traffic Control Crash Alarm Check List.
G. F. 2919 (A.T.C. flight plan) for flight.
H. R.A.F. Witturing briefing/debriefing proforma for the flight.
J. Specimen Valiant loading sheet for XD 864 at fuel WT. recorded in F.700.
K. Photographic copy of an extract from No. 7 Sqn. Flight Authorisation Book.
L. Extract from flying order book (Sec. 'C' order No. 24 RE. undercarriage Half.)
M. Details of R.A.F. Wittering instrument & visual circuit patterns.
N. Weather extracts from Meteorological Register.
O. Copy of R.A.F. Wittering local area forcaste for 12th August, 1960.
P. F.2888 (Report of attendance at aircraft fire.)
Q. List of documents recovered from XD 864.
R. List of flight checks of No 7 Sqn. crews
S. Certified true copies of airspeed correction cards for XD 864.
T. Map/Diagram of scene of accident showing flight path of aircraft.
U. Photographs of scene of accident and aircraft wreckage.
V. Forms 5,000 serial & forms 414 fo Flt. Lt. B.J Whickham and Flt. Lt. W.R. Howard.

not included

Certified True Copy.....

Richard C. Clarke, 62 Uxendon Hill, Wembley Park, Middlesex

I ma a Senior Investigating Officer on the Staff of the Chief Inspector of Accidents, Ministry of Aviation, Berkeley Square House, London W.1.

I have examined the wreckage of Valiant BK Mk. 1 XD 864 and established the following material facts:-

Scene of the accident. The first impact marks indicated that the aircraft had struck the ground with the port wing first, red navigation light glass being found at this point, on a heading of 44°M and had subsequently continued in a direction of 109°M. The initial depression of the wing in the ground was slight. Evidence of ground flash fire commencing in the region where the port underwing tank had struck the ground suggested that compression ignition took place in that tank and rupture of all tanks immediately following the first impact spread a ground flash fire over a wide area. Dispersal of the aircraft structure also indicated that an explosion took place at the same time, but the limited extent of the wreckage trail suggested a low speed on primary impact. Severe ground fires had continued to burn, notably in the cockpit, wing tank and nose wheel bay, which were almost entirely consumed. There was no evidence to suggest that a fire had occured in the air, or that the aircraft had suffered any pre-crash structural failure.

Aircraft Configuration. The aircraft had struck the ground in a "clean" condition with the exception of the nosewheel, which was extended i.e. its operating jack ram contracted and doors open. The main undercarriage was found to be retracted and its doors closed. Evidence from the flap screw jacks indicated that the flaps were UP and from the dive brake screw jacks that the dive brakes were IN.

Flying Controls. Detailed examination of all flying control surfaces and their operating systems showed that all were properly connected and working in the correct sense prior to impact. Manual trim tab settings were measured from residual actuator settings compared on a similar aircraft and were as follows:- Aileron and Rudder - Neutral. Elevator - .75 division nose down. Balance Tabs - all Neutral. The tailplane incidence setting was found to be approximately .75 division aircraft nose up. The rudder and elevator feel unit catches were found to be engaged in their respective plates. The aileron feel unit release mechanism was not recovered, but as the extension of the feel unit piston shaft was similar to those of both the Elevator and Rudder, it is felt that theailcron feel unit was probably in operation. No trace could be found of the Autopilot Mk. 10 Controller or amplifier unit. All three servo-motors were recovered but no relevant evidence could be extracted from them. It is felt that had the autopilot been selected to ON, the torque limit switches in the servo-motors would have probably operated due to the shock-load imposed by the impact. In this case the evidence, if any, shown by the gyros would have indicated that the unit was either on STAND BY or ON. The same conditions apply to the stabilizer. No evidence came to light suggesting any pre-crash mechanical failure or mal-functioning in any flying control circuit or system.

Engines. Examination of all four power units revealed that they had been under considerable power at the moment of impact, all compressor and turbine blades being either torn off or severely bent to the opposite direction of shaft rotation.

Electrical Equipment. Evidence from circumferential score marks on the commutators on all four generators indicated that they were revolving at the moment of impact. All three Type 350 inverters were recovered, and the shearing of their keyways securing the cooling impellors to the armature shafts, together with the bursting of the impellor bosses showed that their armatures had been revolving at high speed when the aircraft struck the ground. The same conditions were observed in the cases of the three rotary transformers. Examination of both the 100A and 153 inverters revealed that they too were revolving at the moment of impact. The flap motor, aileron, elevator and rudder electric motors operating the P.F.C.U.'s were recovered, tested and found to be in a satifactory working condition. On dismantling the main leads from one of the elevator/rudder electric P.F.C.U. motors terminal block box, all the leads and terminals were found to be satisfactorily attached. However when withdrawing these from the box, the positive lead wire pulled out from its terminalp lug. Examination revealed that the lug had been crimped at the top nearer the terminal end than the other lugs, and in consequence had only a poor grip upon the wire. There was no evidence of arcing and wire marks on the unterior of the crimped portion of the lug showed that a satisfactory contact was being maintained up to the time of dismantling.

/The

The P.F.C.U. hydraulic motors were found to be in excellent condition and apparently, serviceable, all parts being free to move. The setting on the flap selector drum cams indicated that the last flap selection prior to the accident had been 'Normal Up' on the main flap motor. The Emergency flap motor armature had been torn out of the motor, but its condition and that of the field coils showed no evidence of unserviceability.

Miscellaneous Equipment. All the Methyl-Bromide fire extinguisher bottles were recovered, but none were found to have been operated electrically. Both ejector seats and rails were recovered, the seats in the cockpit area, the rail some eighty yards distant. Evidence from the rails indicates that both had been torn away from their rear securing fittings in a forward and slightly starboard direction. Score marks down the sides of the rails showed that they had been fired out of the cockpit area, probably when the seats were inverted. Neither port nor starboard rails were damaged by fire, whilst one seat had been almost entirely consumed and the centre part of the other severly damaged by the cockpit ground fire. Examination of the ejector seat guns showed that the primary charges had been detonated by the withdrawl of the scars, but in both cases none of the secondary charges had fired. The port seat drogue gun cartridges had been fired by extreme heat, the starboard seat drogue gun by withdrawal of the sear

Signed R.C. CLARKE.

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APPENDIX 'B'

Certified True Copy. J.O. Stephens Sgt RAF

Estimation of Speed and Radius of Turn

Measurement of Radius of Turn from map (1 in. to 1 mile)
(see Appendix D(1)) = 0·55 ins.
Therefore Approximate Radius of Turn = 0·55 x 5280 ft.
= 2904 ft.

Estimated A.U.W. of Aircraft : 143,000-144,000 lb.
Stalling Speed (Clean) in level flight : 126 K.
Stalling Speed (Clean) at 30°bank : 137 K.

Angle of Bank is given by formula $\tan \theta = \frac{v^2}{gr}$

Speed in Turn	Angle of Bank	Stalling Speed (Clean) (from SD 745)	Speed margin	Stalling Speed (20° flap) (from SD 745)	Speed margin
130 K.	27°	136K.	-6K.	122K.	+8 K.
140 K.	31°	138 K.	+2 K.	124 K.	+16 K.
150 K.	34°	141 K.	+9 K.	126 K.	+24 K.
160 K.	38°	144 K.	+16 K.	129 K.	+31 K.
170 K.	41°	148 K.	+22 K.	132 K.	+38 K.

Approximate total distance of flight as measured from map = 8 statute miles.
Approximate total flight time = 3 mins.

Therefore Average speed during flight = 160 m.p.h.

Note:- A small error in the actual time of flight would make a large difference to the calculated average speed, but the Board consider that the best estimate of the average ground speed is about 160 Knots.

APPENDIX 'C'

Certified True Copy.....

Tests Completed in Valiant-Flight-Simulator

Introduction

1. The Board visited the Valiant Flight Simulator at Marham to conduct tests designed to reproduce the circumstances of the flight under investigation. For the first test, only the first pilot was briefed on the requirement.

2. Initial conditions for all tests were those appropriate to the take-off condition of Valiant XD 864 viz:-

(a) Fuel load: Full internals plus 6,000 lbs in each wing tank.

(b) A.U.W. : 145,000 lb.

(c) C.G. : 47·55 ft. aft of datum.

(d) Q.N.H. : 1,008 mbs.

(e) Manual Elevator: ¾ division nose down.

(f) T.P.I. : -0·75.

Test No. 1

3. Intended Pattern.

(a) Normal take-off, 8,000 r.p.m., heading 260 degrees M. with simulated nose wheel failing to retract selected. Co-pilot in control.

(b) Raise undercarriage and flaps together.

(c) Throttle back to 7,600 r.p.m. when speed reaches 150 K.

(d) When main undercarriage and flaps up, increase engine power to 7,800 r.p.m., maintaining climbing speed below 170 K.

(e) Level out at 1,800 ft. Q.N.H.

(f) Throttle back to maintain level flight at 160 K.

(g) At approximately 6 nautical miles, enter 30 degrees bank turn without increasing engine power.

4. Data Required. Height variation when levelling out and during turn. Speed variation during turn.

5. Conduct of Test. A comparatively inexperienced co-pilot from R.A.F. Marham was selected and briefed to take-off normally, climb to 1,800 ft. level out and enter turn to port at 30 degree bank. A simulator Instructor was fully briefed on object of exercise and acted as Captain.

6. Result of Test. When nose wheel failed to retract, co-pilot called for reduction of power to reduce speed and angle of climb to make take-off gentle and keep speed within limits. He levelled out + or - 75 ft. and with 7,000 r.p.m. selected immediately entered turn to port at 30 degree bank. Speed was maintained between 160 K. and 170 K. through 180 degree of turn. As the co-pilot did not conform to the steep climb pattern required, this test was repeated later (Test No. 4)

Test No. 2

7. Repeat of Test No 1 except that levelling out speed should be 150 K. with appropriate power.

8. Conduct of Test. Co-pilot was rebriefed, this time requesting him to continue climbing after take-off with normal full climbing power and to stabilise on level flight at 150 K. before entering turn.

9. Result of Test. Co-pilot levelled out + or - 100 ft. Reduced power to 6,400 r.p.m. but air speed increased to 175 K. Power was reduced to 5,500 r.p.m. to reduce speed but almost immediately restored to 6,000 r.p.m. as speed fell off. Lost 200 ft. of height. Entered turn at 1,600 ft. and during first 45 degree of turn speed fell to 145 K and height to 1,400 ft. After 90 degrees of turn speed had fallen to 140 K. and height to 1,200 ft. Thereafter speed fell very rapidly below 137 K. (Calculated Stalling Speed) so the Captain took control, excluding T.P.I., and simulated recovery from a stall calling for increase of power. Lost a further 600 ft. of height.

(NOTE: The Simulator will not stall, so the characteristics below the calculated stalling speed do not conform to the aircraft behaviour.)

Test No. 3

10. Repeat of Test No. 1 except levelling out speed should be 170 K. with appropriate power.

11. Conduct of Test. As in Test No. 2 but aircraft stabilised in level flight at 170 K. before entering turn.

12. Result of Test. Co-pilot levelled out + or - 100 ft. Power was reduced to 6,000 r.p.m. and then increased to 6,400 r.p.m. to stabilise. Airspeed in turn varied from 170 to 165 K. but did not fall below 165 K. during 135 degrees of turn.

Test No. 4

13. Repeat of Test No. 1 as originally intended, but if speed dropped to 137 K. in the turn, the bank was to be increased to 45 degrees before taking recovery action.

14. Conduct of Test. As in Test No. 2 except that aircraft was stabilised in level flight at 160 K. before entering turn.

15. Result of Test. Co-pilot levelled out + or - 100 ft. Power reduced below but readjusted to 6,000 r.p.m. to hold 160 K. In first degree of turn, speed fell to 145 K. with 300 ft. loss of height. In next 45 degrees of turn attempt was made to hold height but a further 100 ft. was lost and speed fell to 130 K. before Captain could take over and complete recovery action and call for power. Total height lost in manoeuvre was just under 900 ft.

Discussion of Results of Tests

16. The test were designed to reproduce observed patterns disclosed by the evidence of witnesses as follows:-

(a) Steeper than normal climb from take-off. (7th, 17th 18th Witnesses)

(b) Irregular engine noise when levelled out.
(This is characteristic of closing the throttles) (5th Witness)

(c) Engines at low power in and after turn. (2nd, 3rd Witnesses)

(d) Loss of height and instability in recovery from turn. (2nd Witness)

(e) Shallow dive and increase in power. (2nd Witness)

(40)

APPENDIX 'C' Continued
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17. A speed range of 150 K. to 170 K. was selected for trial because any lower initial turn would have resulted in a stall almost as soon as bank was applied and any higher speed would have been above the limiting speed for lowering the undercarriage. The estimated total distance covered from take off to crash is about 8 nautical miles. With a time interval of 3 minutes, this gives an average ground speed of 160 K. As there was a slight tail wind the average airspeed would be slightly less than 160 K. Normal circuit flying (but with flaps down) is completed at 150 Kts. so the speed selected is not likely to be far removed from 160 K. In the trimmed condition for 160 K., a Simulator Test gave a T.P.I. Setting of just under - 1·0.

18. Accepting the fact that the Simulator (as distinct from the aircraft) will not stall, the only reliable simulation is in the loss of speed and height up to the stage at which the calculated stalling speed (137 K. at 144,000 lb. at 30 degrees of bank) is reached. The tests therefore indicate that any aircraft entering a 30 degree banked turn at 150 - 160 K. with flaps up and the power appropriate to the relevant straight and level flight condition, will lose speed and height and reach the stalling speed after approximately 90 degree of turn. If the speed on entry is 170 K. or, of course, higher, and with the appropriate power, the turn can be completed safely.

19. The Board considered the possibility of completing a confirmatory test in the air, but the hazards associated with such a test and the risk of severe stresses on the test aircraft do not allow the Board to recommend such a flight test.

Signed.....K. RITCHLEY

Table of Technical Evidence

Detailed below is a table of the technical evidence which was obtained to give the configuration and serviceability of the aircraft at the time of the accident. This technical evidence is given in narrative form in either Appendix 'A' or in the 20th witness' evidence.

System or Part of Aircraft	Item Examined	Information Obtained
Nose undercarriage.	Actuator	Actuator fully retracted indicating nose undercarriage as fully 'down'.
Main undercarriage.	Actuators	Actuators fully extended indicating main undercarriage as fully 'up'.
	Undercarriages	Both undercarriages in the 'up' position.
	Doors	Doors in 'up' position.
Flaps.	Screw Jacks	All screw jacks in 'up' position.
	Flap selection drum	Last selection was to the normal 'up' position
	Electric motors	Tested and found to be un a satisfactory working condition.
	Emergency motor	The motor armature had been torn out, but its condition showed no evidence of unserviceability.
Dive brakes.	Screw jacks	Screw jacks showed the dive brakes to be 'in'
	Gear box	Stop nut in mechanism showed the dive brakes to be'in'.
Elevator) Rudder)	Powered Flying Control Unit(P.F.C.U.	Hydraulic motors apparently serviceable and free to move.
	Electric motors	Motors tested and found to be in working order.
Aileron.	P.F.C.U.	Hydraulic motors apparently serviceable and free to move.
	Electric motors	Motors tested and found in working order.
Elevator, Rudder, Aileron, Elevator Trim, Elevator Balance, Rudder Trim, Rudder Balance, Aileron Trim, Aileron Balance	Control Surfaces	Detailed examination revealed that all were properly connected and were working in the correct sense prior to impact.
Elevator Balance, Rudder Balance, Aileron Balance	Tabs	All adjusted to neutral.
Rudder Trim	Actuator	Setting neutral.
Aileron Trim	Actuator	Setting neutral.
Elevator Trim	Actuator	Setting revealed 0·75 division 'nose down' trim.
Tail Plane	Tail Plane	Contact plate position on threaded spindle gave 0.75 division aircraft 'nose up'

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APPENDIX 'D' Continued

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System or Part of Aircraft	Item Examined	Information Obtained
Elevator feel unit Rudder feel unit	Feel release units	Units in 'engaged' position.
	Feel unit piston	Piston extension similar to elevator and rudder, thus considered to be engaged.
Engines	Four engines' compressor and turbine blades and discs.	All engines were under coniserable power, with blades either torn off or bent back in the opposite direction to the shaft rotation.
Generators	Four generators	Examination endicated that they were revolving at the time of the impact.
Rotary transformers Inverters	Three rotary transformers Three type 350 One type 100 A One type 153	Examination showed that all machines had been revolving at high speed at the moment of impact.
Fire Extinguishers	All methyl bromide fire extinguishers	Extinuishers had not operated. This is considered to be due to either (a) A large amount of [illegible] on the aircraft not allowing the inertia type crash switches to operate, or (b) The explosion severing the fire extinguisher electrical leads before the operation of the inertia switches could fire the bottles.
Ejection Seats	Two seats damged	The primary charges were detonated by the withdrawal of the scars, these were considered to have been operated by the break up of the aircraft and seats. The secondary charges did not fire, and the rails were thrown a distance of some eighty yards from the cockpit area where the seats were.
N.B.S. System	Calculator 4 Control Unit Type 595	A true speed of 122·8 knots. Function switch on Automatic Frequency Control position.
Green Satin	Indicator	Indicators appeared to show a ground speed of 170 knots and starboard drift of 13 degrees.
	Tracker Unit	Potentiometers indicated a ground speed of between 155 and 170 knots.

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APPENDIX 'E'

Reference:-
WAI/157/1/192/LO

AIR MINISTRY DIRECTORATE OF WORKS,
Headquarters No. 1 Works Area,
Elm House,
Elmer Street,
GRANTHAM, Lincs.

15th July ,1960

The Officer Commanding,
R.A.F. Wittering

Valiant Aircrash - 12th August, 1960
Spanhoe Airfield

I inspected the above crash on Saturday, 13th August, 1960.

Damage was caused to growing barley and sugar-beet, and of the latter approximately six acres were affected. Some sugar-beet was completely destroyed , whereas the remainder suffered burning to foliage which varies considerably according to the distance from the actual site of the crash. At this early stage it is not possible to forecast how the yield and sugar content will be affected by the burning of the foliage. The extent to which the sugar-beet will recover naturally from the effects of burning is something that only time can reveal. An accurate assesment of the true loss can only be ascertained nearer to the time of harvest in the Autumn.

Only a "Spot" estimate of crash damage can, therefore, be given, and in my opinion this does not exceed £300 (Three hundred pounds).

This figure does not take into consideration the additional damage, which will be caused during salvage operations, and which can only be examined after salvage has been completed.

It is requested that every effort will be made to keep salvage damage to the minimum.

(A .E.D. TONGE)
for Superintending Engineer

(50)

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APPENDIX 'F'
EXHIBIT 'A'

CRASH ALARM.

Certified True Copy

Details of essential Calls and Action.

Controller.

i. Inform and despatch Crash Crew.
ii. Put out Crash Tannoy Stating type of Aircraft.
iii. Give Filter room information and order Crash Action.
iv. Send O.C. Day/Night to scene of Crash to act as Officer i/c.

Crash Crew. Proceed as ordered and open up on R.T. making check calls and reporting progress.

Filter room switchboard operator.

i. Ring S.S.Q. (DIRECT LINE).
ii. Deleted .
iii. Warn P.B.X. of Aircraft Crash, this will ensure Top Priority on all calls.
iv. Inform Tech. Control (348).
v. " Squadron Commander.
vi. " Station Commander.
vii. " O.C. Flying Wing.
viii. " S.T.O. or S.Eng.O.
ix. Duty Squadron Commander to Tower.
x. Inform S.A.T.C.O.
xi. " Watnall.
xii. " Ops. (Direct Line) and ask them to inform Ops. 3 Group.
xiii. Check with Controller whether civilian police or Fire Services are required.
xiv. Tell Met. of time of accident.

~~APPENDIX "G"~~ CONFIDENTIAL APPENDIX "G" (51)

~~EXHIBIT "B"~~

Gerbl Sqn Ldr. I.D. Flt Chem 92nd

AIR TRAFFIC CONTROL FLIGHT PLAN

R.A.F. FORM 2919 (REVISED JULY 1956)

TO BE COMPLETED IN DUPLICATE

EXHIBIT "B"

One copy to be retained by captain of aircraft—one copy to be retained by Air Traffic Control

CONTRÔLE DE LA CIRCULATION AÉRIENNE—PLAN DE VOL

À REMPLIR EN DOUBLE

Une copie doit être conservée par le commandant de bord. Une copie doit être conservée par le Contrôle de la Circulation Aérienne

Radio c/s or aircraft identification Indicatif d'appel radio ou identification de l'aéronef	Type of aircraft Type d'aéronef	Point of departure Point de départ
A IDAH 87	B VALIANT	C EGXT

ROUTE DETAILS
ACHEMINEMENT

D Cruising level Niveau de croisière		D.R. time Durée estimée du vol	To (place) À (lieu)
CLIMB	ft.	0014	EAST CLIMB AWAY TO 5311N
CLIMB		0012	5430N 0120E. 0032E
390		0046	5025N 0408W
410	ft.	0057	5632N 0016E
390		0024	RBS 5552N 0415W
420	ft.	0020	RBS 5458N 0138W
410		0052	6052N 0052W
420	ft.	0110	5312N 0430W
410		0009	RBS 5326N 0258W
420	ft.	0015	5215N 0033E 0052W
410		0009	RBS 5225N 0045E
410	ft.	0005	5232N 0142E
360		0017	5248N 0112W
DESCENT	ft.	0018	BOLD and LAND
	ft.		

Point of first intended landing
Premier point d'atterrissage prévu

E EGXT

	E.T.D.			A.T.D.		
	Day	Hr.	Min.	Day	Hr.	Min.
F	12	09	35			

True air speed at cruising level
Vitesse vraie au niveau de croisière

G 430

Total DR time to point of first intended landing
Durée totale estimée du vol jusqu'au premier point d'atterrissage prévu

H 06.08.

Alternative aerodromes
Aérodromes de dégagement

I EGDG EGOV

Radio transmitting frequencies
Fréquences radio

J 116.46 117.9 101.34 ~~109.66 104.53 151.29~~ 152.73 102.67

Delete navigation aids not to be used in flight
Barrer les équipements non utilisés en vol

K 1 ILS | ~~2 SBA~~ | 3 DECCA | ~~4 DME~~ | ~~5 VOR~~ | 6 GEE | ~~7 LORAN~~ | 8 RAD COMP | 9 ~~BABS~~ | ~~10 LOOP~~

Total number of crew and passengers and surname of captain of aircraft
Nombre de personnes à bord et nom du commandant de bord

L 5/WICKHAM

Amount of fuel on board in hours and mins.
Quantité de carburant à bord, en heures et minutes de vol

M 0700

Pilot's instrument rating. Rank, name and appointment of any V.I.P. aboard. Any other pertinent information
Qualification de vol aux instruments du pilote. Autres renseignements

N MASTER GREEN
EMBELLISH

INFORMATION AND ITEMS NOT FOR TRANSMISSION
RENSEIGNEMENTS À NE PAS TRANSMETTRE

Delete rescue aids not carried in aircraft
Barrer les équipements de secours non installés à bord

1 Dinghy Canot pneumatique	2 Life Belt Veste de sauvetage	3 1st Aid Kit Trousse de premiers secours	~~4 Dinghy Radio~~ ~~Poste radio portatif~~	5 Sarah	6 Parachutes	7	8
				✓	✓		

Certified flight planning carried out
Planning du vol effectué

Captain
Cdt. bord

G.M.T.
T.M.G.

Take-off time limit
Heure limite de décollage

G.M.T.
T.M.G.

Air traffic clearance instructions
Instructions du Contrôle

0842Z CR ATC HS

(95221) D.L.

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APPENDIX "H"
EXHIBIT "C"

52

H.B. ~~This proforma need not be submitted for Lone Rangers and Western Rangers, provided that the co-pilot submits to Ops. details of planned fuel~~ outbound and inbound.

BRIEFING/DE-BRIEFING PROFORMA

I. BEFORE FLIGHT (For Exercises such as Groupex, Kingpin etc. the only details required are Date, Sqn., Captain, and the three sets of fuel figures).

Date...12.8.60..... Sqn...7..... Captain ...[redacted].....

Airframe No .....XD.86..... Captain's Inst. Rating .H.C.....

(1) Full details of sortie (Include approx times at RBS site etc. If 'window' is being dropped, state area and approx. time).

2 PRIMARY REV STAGE J.

.....

4 VIS RBS GIBRUN 1200 - 12102 RAINBOW 1230 RUBY COBH 1450 BRANDOB 1455

.....

(2) E.T.D..0935.(G.M.T.) Duration .....0600 hrs..... .....

(3) F 2919/~~Not~~/Submitted (4) Embellish/Not/Required

(5) Fuel (For all Flights) Overhead on return ....14000..... lbs..

(For Groupex/Kingpin etc.) at F.D.P. ..... lbs..

and Overhead Kinloss if diverted from F.D.P. ..... lbs..

(6) The crew is fully-constituted or

~~The following is/are not constituted crew(s):-~~

.....

(7) CERTIFIED THAT ALL CREW MEMBERS ARE FULLY BRIEFED

Signed ...[redacted].....(Captain)

Details checked (with F.2919) at ....0930.Z by .....[redacted].....(Ops. Clk.)

II. AFTER FLIGHT (To be completed for all flights including Exercises)

(1) Detail successful/Not successful/Partially successful
(2) The following have been completed:-
(a) Special Occurrence Signal/Report)
(b) Sortie Failure Report) Delete as
(c) Irregular Release Report) Appropriate
(d) Practice Emergency Call Report)
(e)

(3) Bombing De-brief

R.B.S.		VISUAL		N.B.S. (LIVE)	
TARGET	RUNS	TARGET	RUNS	TARGET	RUNS

Signed ....., (Captain)

APPENDIX "J" EXHIBIT "D" B.C. FORM TRG.5.

(53)

VALIANT LOADING SHEET

CAPTAIN F/L WICKHAM CO-PILOT F/L HOWARD

DATE 12 AUG 60 A/C. No. XD 864 FUEL S.G. .76

OP. WT. 83186 C. of G. 47.095 SCALE "C" -33.8

FUEL	GALLONS	POUNDS	SCALE "C"
FUS. 1		5586	
FUS. 2		10412	
FUS. 3		9773	
WING 1		8345	
WING 2		7129	
RESERVE		4484	
TRANSFER		3396	
BOMB BAY			
UNDER WG.		12000	+8.7
WATER-M			
TOTALS		63125	

STORES	TYPE	POUNDS	SCALE "C"
L.P. 1			
L.P. 2			
L.P. 3			
L.P. 4			
L.P. 5			
L.P. 6			
WINDOW			
TOTAL			
GRAND TOTAL		63125	

OPERATING WEIGHT	83186	lb.
START A.U.W.	146311	lb.
START C. of G.	47.555	ft.

Certified True Copy F/L Wickham RAAF

C.B.H. 31829 - Wt. 24459 - Dd. BM.4191 - 9000 - 10/58

APPENDIX "K" - EXHIBIT "E"

Form 1575.

ACTION BEFORE FLIGHT						ACTION AFTER FLIGHT					
(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j)	(k)	(l)
Serial No. of Order	Date	Aircraft Type No.	Captain of Aircraft and Pilot(s)	Crew	Duty or Practice	Approximate Duration of Flight	Initials of Flight Commander ordering flight	Initials of Captain of Aircraft that he understands the order	Time of take-off	Time landed	Duty carried out, or reason for not doing so. (To be filled in by the Pilot)
103	11 AUG.	VALIANT 381	S/L SPENCER F/L JONES.	F/L [illegible] F/L SCHILD F/O KOLM	2 x 2/k, 2 RDS, 1 DIV. AS ORD	1.30					
104	11 AUG	VALIANT 207	F/L SIMPSON F/O TURNER	F/L CHADWICK F/L WICKHAM W/O SILVER	2 x 2/k, 3 RDS DIV. AS ORD	7.15					
105	11 AUG	VALIANT 825	F/L CHERRINGTON AO STEWART	F/L LESLIE F/L WILSON F/O WATSON F/L THOMSON	3 RDS. X/C DIV. AS ORD	5.30					
106	12 AUG	VALIANT 381	S/L SPACKMAN F/O BOYLE	F/L TOPHAM F/L HOARE F/O ROWE	PROFILES	6.00					
107	12 AUG	VALIANT 862	F/L WICKHAM F/L HENRY	F/L IRESON F/L BULLEN SGT. JOHNSON	PROFILES	6.00					
108	12 AUG	VALIANT 207	F/L NORMAN F/O PORTER	F/L ATKINSON F/L HALL F/S KOOTSEY	PROFILES WITH IVO BEACH	6.00					

55

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(55)

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APPENDIX "L"
EXHIBIT 'F'

EXTRACT FROM FLYING ORDER BOOK

Section 'C'
Order No.24

Action in Event of Undercarriage Malfunction

1. There have been instances of undercarriage malfunction in which Captains have resorted to various expedients in an attempt to raise an undercarriage in order to proceed with a sortie. Whilst exceptionally there may be operational or other reasons which render this necessary, it is in general forbidden.

2. There are many technical arguments which support this and the following are merely representative:-

(a) Sluggish operation of the Valiant undercarriage either in retracting or lowering is usually caused by a slipping clutch in the actuators. Any further operation of the actuator could well burn out the clutch and prevent lowering by any means including the "extreme emergency" system.

(b) The practice of "twitching" the nose wheel steering of the Valiant in the air in order to effect a retraction, which has frequently been resorted to in the past though now expressly forbidden, will damage the internals of the nose wheel strut and can result in the nose wheel jamming in the wheel well.

(c) Re-selection of the retraction cycle on the Canberra after trouble has been experienced during lowering could result in mal-sequencing between the D-doors and legs, leading to the door closing before the leg retracts. This will prevent the leg subsequently from being lowered.

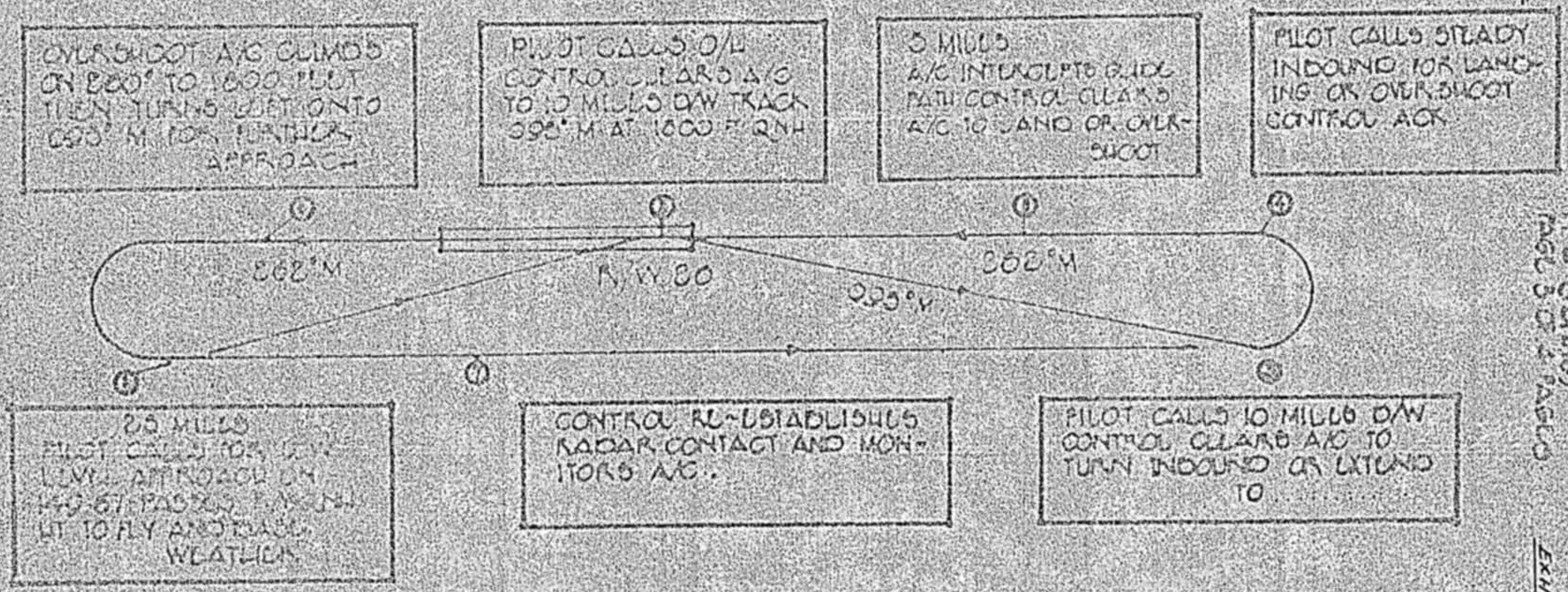
(d) Re-selection on sny undercarriage system which uses hydraulic jacks, e.g. Vulcan, Victor and Canberra, may result in loss of hydraulic fluid and opening up cracked components to the extent that the emergency lowering system is made inoperative.

3. When confronted with any of the many and varied forms of malfunction, cockpit diagnosis and previous experience can be dangerously misleading and apart from the all important question of safety of the aircraft it is desirable that a malfunctioning system is left as undisturbed as possible so that the original cause can be identified after landing. The penalty of an occasional abortive sortie is an acceptable price for the prevention of a wheels up landing.

4. On some aircraft a failure to retract an undercarriage may be caused by a simple fuse failure and in such cases, with which appropriate crews will be familiar, fuse checking of applicable circuits is permissable and in the event of a fuse failure being found, one fuse change is allowed before abondoning a sortie. For all other forms of malfunction,, unless it is vitally necessary to proceed with the sortie, the undercarriage is to be lowered, left undisturbed and a landing made as soon as practicable.

January, 1960

APPENDIX "M"



L/L IES FREQ APPR AND AS INSTRUCTED

OBSTACLE HEIGHT 300 FT. RECIPROCAL TRACK PROCEDURE AVAILABLE IF REQUIRED

INTERNATIONAL STANDARD CIRCLE
PT II (OPERATING)
PAGE 3 OF 4 PAGES

EXHIBIT "6" (1)

(56)

15 Feb. 60

R.A.F. WITTERING

MANDATORY CLIMB-OUT LANES (EASTERLY CLIMB-OUT)

R/W 26

1. Take-off on R/W 26 and fly straight ahead at 1800 feet to range 3 n.m.

2. At 3 n.m. turn port onto track 072T for position WB(5241N 0011E). (Note that in the turn the speed should be kept down to a fairly low but safe speed in order to keep the turning circle to a minimum and thus eventually avoid overflying Peterborough at low altitude.)

3. Maintain 1800 feet on track 072T until 5 n.m. east of Wittering i.e. at longitude 0020W.

4. At this point commence climb to position WB.

5. At position WB turn port onto track 023T and continue to position WI(5311N 0032E).

6. At position WI alter heading for next turning point, continuing climb as required.

Danger/Prohibited Areas UK 270(50,000 feet) UK 263 (50,000 feet)

Still-Air Flight Plan

Tr(T)	Leg to	Approx. Height IAS	From	To	Leg Dist.	Approximate Leg Time	Total Time
253	R/W QDM	150	0 - 1800		3	1.2	1.2
T	Turn Pt.	180	1800		5	2.0	3.2
072	DR climb	210	1800		6	1.8	5.0
072	Climb to WB	265	1800 - 15000		20	4.0	9.0
023	Climb to WI	265	15000 - 30000		33	5.0	14.0
-	To top of clb.	.73M	30000 - T.O.C.		-	-	-

N.B. It is recommended that the navigator's flight plan normally commence with the leg WB-WI. The still-air timings from take-off to WB (9.0 mins.) will normally be reasonably accurate except in strong wind conditions.

R/W 08

1. Take-off on R/W 08 and fly straight ahead at 3,000 feet to range 5 n.m.

2. At 5 n.m. range, commence climb and turn starboard onto track 080T for position WB (5241N 0011E).

3. At position WB turn port onto track 023T, continuing climb to position WI (5311N 0032E).

4. At position WI alter heading for next turning point, continuing climb as required.

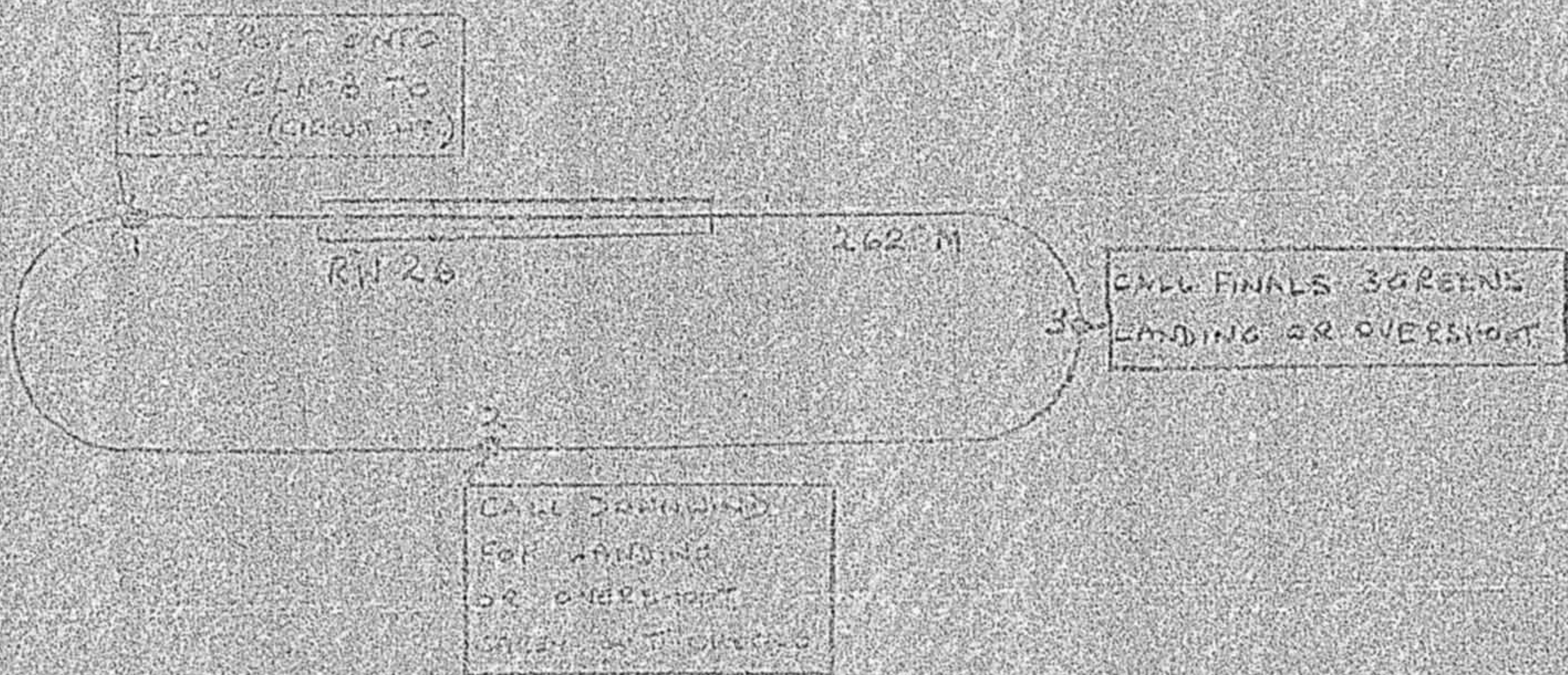
Danger/Prohibited Areas UK 270 (50,000 feet) UK 263 (50,000 feet)

Still Air Flight Plan

Tr(T)	Leg to	IAS	From	To	Leg Dist.	Leg Time	Total Time
073	R/W QDM	150	0- 3000		5	2.0	2.0
080	Climb to WB	265	3000-15000		19	4.0	6.0
023	Climb to WI	265	15000-30000		33	5.0	11.0
-	To top of clb.	.73M	30000-T.O.C.		-	-	-

Exhibit "G" (1)

(85)



VISUAL CIRCUIT R/W 26

(57)

15 Feb. 60

R.A.F. WITTERING

MANDATORY CLIMB-OUT LANES (WESTERLY CLIMB-OUT)

R/W 26

1. Take-off on R/W 26 and fly straight ahead at 1800 feet to range 3 n.m.

2. At range 3 n.m. turn port onto track 222T and commence climb for p position X (5200N 0125W).

3. As soon as possible obtain, fro... HACK GREEN RAFRADAR on 133.74 (Channel R), clearance to fly through Airway Amber 2 (which will be entered at 5217N 0100W; approx. height 17,000 feet, approx 6 mins. after take-off). Hack Green will require to know:-

   (a) Aircraft callsign and aircraft type.

   (b) Estimated position (preferably as a bearing and distance from Hack Green located at 5301N 0231W).

   (c) Heading

   (d) Altitude

   (e) Request for clearance through Airway Amber 2 near Daventry Beacon.

4. If unable to obtain clearance from Hack Green, obtain clearance from Wittering to orbit under radar surveillance gaining height to overfly Airway at FL 250+.

5. From position X (5200N 0125W) alter heading for next turning point, continuing climb as required.

R/W 08

1. Take-off on R/W 08 and fly straight ahead at 1800 feet to range 3 n.m.

2. At range 3 n.m. turn STARBOARD onto reciprocal of R/W QDM, maintaining this heading at 1800 feet to 0035W.

3. At this point (approx. 5232N 0035W) commence climb on track 224T for position X (5200N 0125W).

4. Obtain Airway clearance from Hack Green, or orbit clearance from Wittering as per paras. 3 and 4 for R/W 26 above.

5. From position X (5200N 0125W) alter heading for next turning point continuing climb as required.

P.T.O. for Easterly Climb-out

APPENDIX 'N' - EXHIBIT "H"

Grandfeed from Batty.

L. D. Lytton
Major

EXTRACTS FROM HISTORIC DAILY REPORT OF [illegible] AUGUST 1960.

	0857 G.M.T.	0952 G.M.T.
WIND.	360°/4. 15 knots.	350°/5. 16 knots.
VISIBILITY.	13 n.m.	13 n.m.
WEATHER.	Fine.	Fine.
CLOUD.	2/8 Cu. 2000 ft. 1/8 Ci. 25000 ft.	5/8 Cu. 2500 ft.
SEA TEMPERATURE.	1009 m.b. 78°.	1009 m.b. 81°.
REMARKS.	Dog.	Dog.
POSITION OF (STRATEGIC TRANSPORT SATELLITE)		
ALTITUDE.	4000/4000 n.m.	4000 n.m. 290°/5. 71.1 miles.

No special cloud observation was done at 0952 G.M.T. as the Meteorological Office was of [illegible] that an accident had occurred with 1020 G.M.T.

I, Alfred N. Lyman, Duty Forecaster during the above period hereby certify that these above records are a true extract from the Daily Register, [illegible] at Meteorological Office, Royal Air Force, Hightower.

A. N. Lyman F/O
15/8/60

EXHIBIT J

FOR CAST FOR AREA WITHIN 20 MILES RADIUS OF

ADJUSTED BASIS.

FOR THE PERIOD FROM 0600 GMT 1/8 1980 TO 2100 19 1/8 9 HR

ALL HEIGHTS ARE ABOVE MEAN SEA LEVEL

SYNOPTIC SITUATION: At 0000Z complex low pressure [illegible] expected to move E.N.E. Associated main upper [illegible] and moving away east with western edge reaching Gulf Coast by 0900Z. Ridge of high pressure with axis at 10 degrees west of 70 degrees W.L. Northerly airstream expected over the area.

WINDS (DEG. TRUE AND KNOTS)

320-350 12-18 gusts 22-25

SURFACE becoming 290-330 08-12 late in period.

TEMPS (DEG.C)

3,000ft	010	20	becoming	330	20		PS 02	
10,000ft	350	15	becoming	330	20		MB 07	
20,000ft	310	10	becoming	320	25		LB 20	
30,000ft	310	30	but 240	15	except at GD up to 1200Z			
34,000ft	270	25	but 250	15	except at GD up to 1800Z			
40,000ft	310	20	but 260	15	except at GD up to 1500Z			
45,000ft	300	15	but 260	15	except at GD up to 1500Z			
50,000ft	280	15	but 260	15	except at GD up to 1500Z			

CLOUD [illegible] few cirrus [illegible] 1500-4500 ft top 25000 ft. Mid and high cloud 5/8-7/8 sc base 4500-6500 ft top 20000 ft. Occas Cb 25000-30000 ft. levels 1/000-20000 ft. 1/8 25000-30000 ft. Occas Cb/Cc tops to 35000 ft. remaining bases.

Low level bases: Mon patchy Sc at 5000 ft. 3/8 Cu developing 3/8 to around 6000 ft with tops building to 7000-10000 ft. Bases 1500 ft later with occasional tops to 15000 ft and bases lowering to 1000 ft in showers. All clouds dispersing by early evening. Sparse cirrus 25000-30000 ft.

SURFACE VISIBILITY: [illegible] over northern bases at first, otherwise 10-20nm [illegible] 2-5nm in showers. 3-6nm in Yorks and Lincs late in period.

WEATHER:

PT, MD: Cloudy at first then [illegible] cloudy with [illegible] and Lincs. Fine this evening, but some [illegible] and Lincs very late [illegible].

POSITION OF 0 DEG.C ISOTHERM:

ICING:

PROBABILITY:

Certified True Copy

APPENDIX "P"
EXHIBIT 'K' (62)

ROYAL AIR FORCE
FIRE SERVICE

R.A.F. FORM 2888
(*Revised July* 1955)

REPORT OF ATTENDANCE AT AIRCRAFT FIRE OR OCCURRENCE

Indicate by a tick the recipient of each copy

Air Ministry (O.9) 2 Copies	Command Headquarters	Group or Wing Headquarters	Unit Copy	Air Ministry Reference

NOTE.—If the space provided for completion of any item on this form is insufficient, additional plain sheets of paper should be used and attached.

Bomber Command No. 3 Group R.A.F. Station Wittering

1. AIRCRAFT FIRE CALL OR OCCURRENCE

Date 12th August, 1960 Time of call or incident observed 10.38 a.m.

Method of call Telephone Time taken to reach aircraft 16 mins.

Distance of aircraft from 1st line appliances (7) Seven miles yards

Was incident anticipated? No Time fire extinguished 12.05A (90%)

Type, No. and service role of aircraft Valiant XD 864 7 Sqn. A/C

Location of aircraft. (Give reasonably exact description stating whether on or off airfield) on disused Spanhoe airfield 7 miles S.W. of R.A.F. Wittering

2. PARTICULARS OF FIRE OR OCCURRENCE

Did fire occur? Yes

Extent of damage (e.g., whether negligible, partial or total destruction) Total Distruction

Point of origin of fire (if observed or easily ascertainable) Not ascertainable

If aircraft was in motion, state when occurred (e.g., aircraft taxying, taking-off, after take-off, airborne, colliding in air or with ground objects, crashing, landing, unknown, etc.) A/C exploded on impact

If aircraft was stationary (1) state its location (e.g., on airfield, at dispersal, on runway, on taxi-track or perimeter, in hangar, at mooring) and (2) whether fire occurred while at rest, during maintenance work, re- or de-fuelling, loading or unloading bombs, starting engines, unknown, etc.

N/A

State whether fire or occurrence involved, other aircraft, station buildings, vehicles, civilian property, railway or industrial property, etc. Involved crops in the immediate vicinity of impact also crops in area where A/C parts were dispersed on exploding.

3. CAUSE OF FIRE

(Cause of fire, not cause of crash, is required.) Where no person witnessed the incident, write "Unknown".

1. If aircraft was in motion (e.g., impact of crash, collision in air, observed to be on fire in flight prior to landing or crashing, in collision with ground objects, etc.) due to impact

2. If aircraft was stationary state presumed cause of actual ignition (e.g., defective electrical equipment, broken inspection lamp, smoking, petrol vapour ignited by sparks from , etc.)

(631)

4. COMPLEMENT OF AIRCRAFT, RESCUES, ESCAPES AND FATALITIES

(Indicate "S" for Service personnel and "C" for civilian.)

(*a*) Number in crew 5 'S' Number of passengers Nil

(*b*) Number escaped unassisted and method, i.e., self, thrown clear, parachute, etc. None

(1) with burns None (2) with impact injuries None

(3) with burns and impact injuries None

(4) uninjured (including those suffering from shock) None

(*c*) Number released or assisted out alive None

(1) with burns None (2) with impact injuries None

(3) with burns and impact injuries None

(4) uninjured (including those suffering from shock) None

(5) Give details of action taken to release passengers and crew and difficulties encountered. (Indicate whether rescue action taken by crash crew or other persons)

Aircraft completely disintegrated on arrival.

(*d*) Number of fatalities (if obtainable)

(1) Due to fire injuries None

(2) Due to impact injuries 5

(3) Due to burns and impact injuries None

(4) Other causes of death (please specify) None

5. BAGGAGE AND/OR FREIGHT

(Give brief details of type and quantity of baggage or freight carried where known or easily ascertainable)

Nil

6. FIRE-FIGHTING, OR FIRE PREVENTION DUTIES CARRIED OUT

(*a*) Appliances attending or backing up (including public fire, ambulance and other service vehicles):

TYPE	CONTROLLING AUTHORITY
C.P. Mk. VI VA D/P Ambulance R.A.F. Water Tender 400 galls. Corby Water Tender 400 galls 8 galls Foam Uppingham Foam Tender 150 galls Oakham	Royal Air Force Kettering Fire Brigade

(b) Appliances in use (in order of usage) :

Appliances	Quantities of extinguishing Agents carried				Quantities of extinguishing Agents used			
	Water	Foam Compound	C.O.,	Others (Specify)	Water	Foam Compound	C.O.,	Others (Specify)
1.	700 gals	110 gals	12lbs	C.B.M. 16 gals	500 gals	75 gals	Nil	Nil
2.								
3.								
4.								
5.								
6.								
7.								
8.								

(c) Give brief description of action by station crash truck crews or other personnel, indicating the order of application of the various agents, any difficulties encountered and any relevant information or suggestions conducive to increased efficiency in methods or equipment for extinguishing aircraft fires On arrival of the Mk. VI The civilian Fire Tender from Corby was extinguishing the remains of the Burning Cockpit. Crash I joined in and extinguished remaining small fires.

7. SPECIAL RISKS

(a) Fuel in use Avtag.

(b) Estimated quantity of fuel present at time of incident 8, 240 galls

(c) Estimated quantity of fuel left when fire extinguished Nil

(d) Was any considerable quantity of fuel spilled? Yes

(e) Did baggage or freight contribute markedly to the fire? N/A

(f) Did armament or pyrotechnics contribute to the fire? Not Known

(g) Specify type of fuel tanks and where located Rubberised tanks in Wings or Fuselage Alluminium under Wing Tanks.

(h) Was rocket assistance used for take-off? No.

8. WEATHER AND GROUND CONDITIONS

(a) Weather conditions 4/2500 Vis 13 N.M.

(b) Wind force Northerly 10 - 15 knots.

(c) Type of terrain Undulating - Crash occured on ground 350 A.M.S.L.

(d) State of ground (dry, wet, icy, etc.) Dry

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Certified correct copy ..... APPENDIX "Q"

EXHIBIT 'L'

LIST OF DOCUMENTS RECOVERED FROM VALIANT XD 864

15TH AUGUST, 1960.

1. Bomber Code - Cover 350

1 Bomber Code - Insert for 12th Day

1 Check list Navigators (Plotter)

1 Check list Navigator (Radar)

1 Check list Supplement Volume Navigator Radar.

1 T4 Aiming Table

1 ACP 131.

1 Operating Data for Valiant (SD 745)

1 Compass log book

Various O.C.U. Notes for Navigators and A.E.O.'s

Various Maps, charts and flight planning documents.

(Sgd.) (M.J. GILLHAM)

Certified correct copy J.A. Hopkins Sqn Ldr

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APPENDIX "R"
EXHIBIT "M"

No. 7 Squadron Crew Checks

Captain	Date of Check	Details
Sqn.Ldr.Spackman	22nd.Dec.1958	Sqn.Cdrs.Check-Wg.Cdr.Hazlewood.
	25th.Sept.1959	I.R.T. Sqn.Ldr. Spencer
Sqn.Ldr.Spencer	24th.Dec.1958	I.R.E. Renewal - Wg.Cdr. Chopping
	3rd.Dec.1959	I.R.E. Renewal - Sqn.Ldr.Welford
	1st.Apr.1960	Independent Flight with A/Cdr. Coles.
Flt.Lt. Wollicome	19th.Oct.1959	Standardisation Flight QFI Check
	4th.Mar.1960	I.R.T. Sqn.Ldr. Veale
Flt.Lt.Webb	7th.Apr.1959	Sqn.Cdrs.Check (Night)
	12th.Feb.1960	Sqn.Cdrs.Check (Day)
	16th.Mar.1960	I.R.T. Sqn.Ldr.Spencer
Flt.Lt.Cheesborough	23rd.Dec.1959	I.R.T. Sqn.Ldr. Spencer
	18thFeb.1960	Standardisation Flight (Day)
Flt.Lt. Lucas	14th.Dec.1959	Sqn.Cdrs.Check (Night)
	8th.July.1960	Flt.Cdrs.Check (NIGHT)
	4th.Aug.1960	I.R.T. Sqn.Ldr. Spencer
Flt.Lt. Brettell	17th.Feb.1960	Standardisation Flight (Day)
	5th.Aug.1960	I.R.T. Sqn.Ldr. Spencer. (Night)
Flt.Lt.Wickham	21st.July.1959	Sqn.Cdrs.Check (Day)
	24th.Sept.1959	I.R.T. Sqn.Ldr.Spencer

(SGND.) H.A.Spackman Sqn.Ldr.

APPENDIX "S"

XD. 864

NOTE

The correct indicated air-speed minus the instrument reading = the algebraic sum of the corrections for pressure head position and for instrument error.

CERTIFIED TRUE COPY
R.S. NORSWORTHY
R.S. NORSWORTHY
FLYING OFFICER.

H90148 Wt. 45208-BJ.236
18M(S) 7/56 Gp. 840
F. & C. Ltd.

1ST. PILOT R.A.F. FORM 1167

Airspeed Indicator Reads	Correction to Obtain Rectified Airspeed
50	
65	0
65	-1
85	-2
145	-1
275	0
325	+1
375	0
575	+1
600	+2

REF NO
6A/3360

SER NO
613/57

DATE
9.5.60

D.J. SAWYER CPL.

2ND PILOT R.A.F. FORM 1167

Airspeed Indicator Reads	Correction to Obtain Rectified Airspeed
50	
55	+1
95	+2
105	+1
125	0
175	+1
275	0
375	-1
470	-2
490	-1

REF NO
6A/4380

SER NO
HW 535

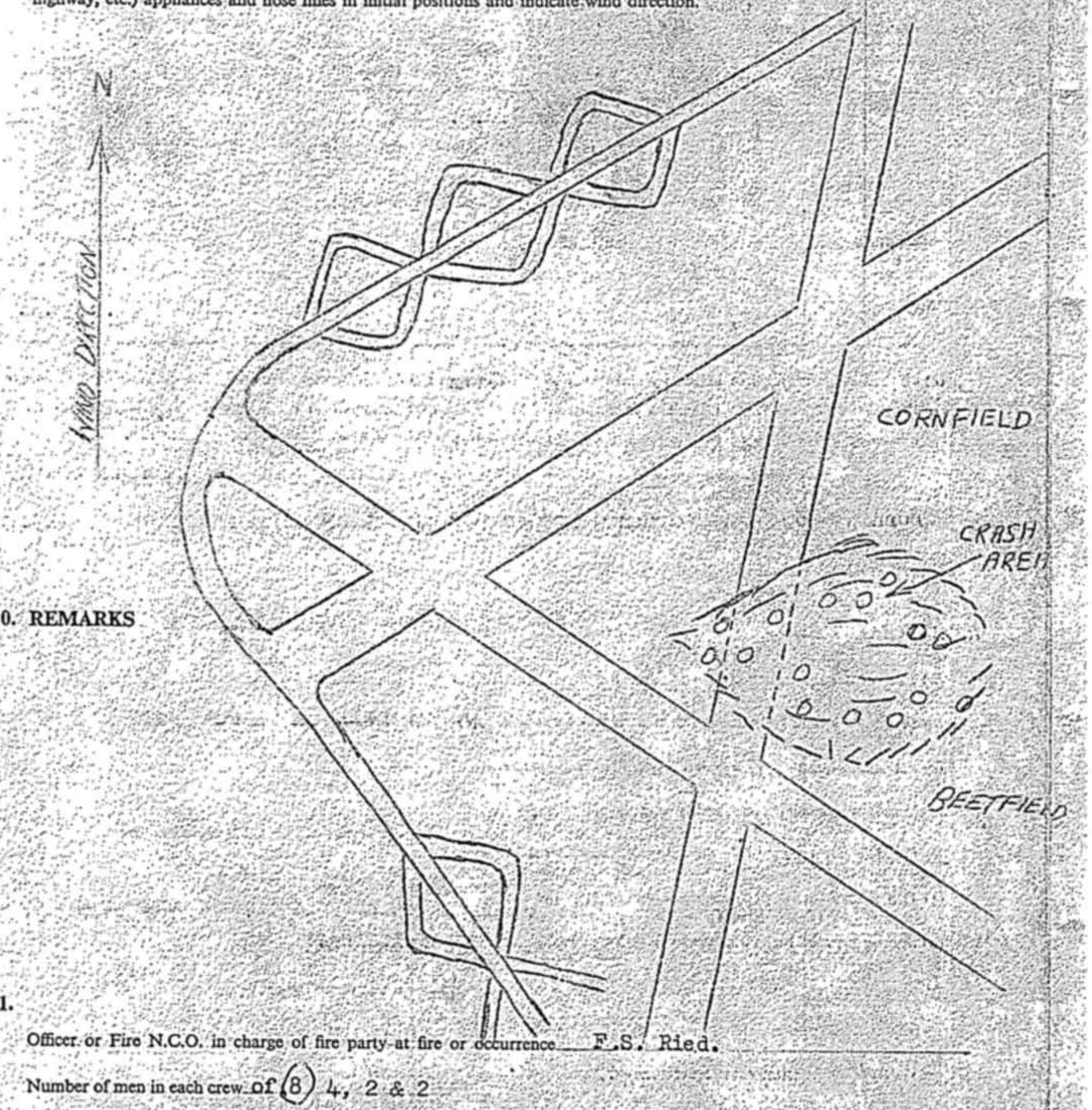
DATE
9.5.60

D.J. SAWYER CPL.

Appendix 'I' (68)

9.

Make a sketch plan showing position of aircraft in relation to a prominent landmark (e.g., runway, control tower, public highway, etc.) appliances and hose lines in initial positions and indicate wind direction.



10. REMARKS

11.

Officer or Fire N.C.O. in charge of fire party at fire or occurrence F.S. Ried.

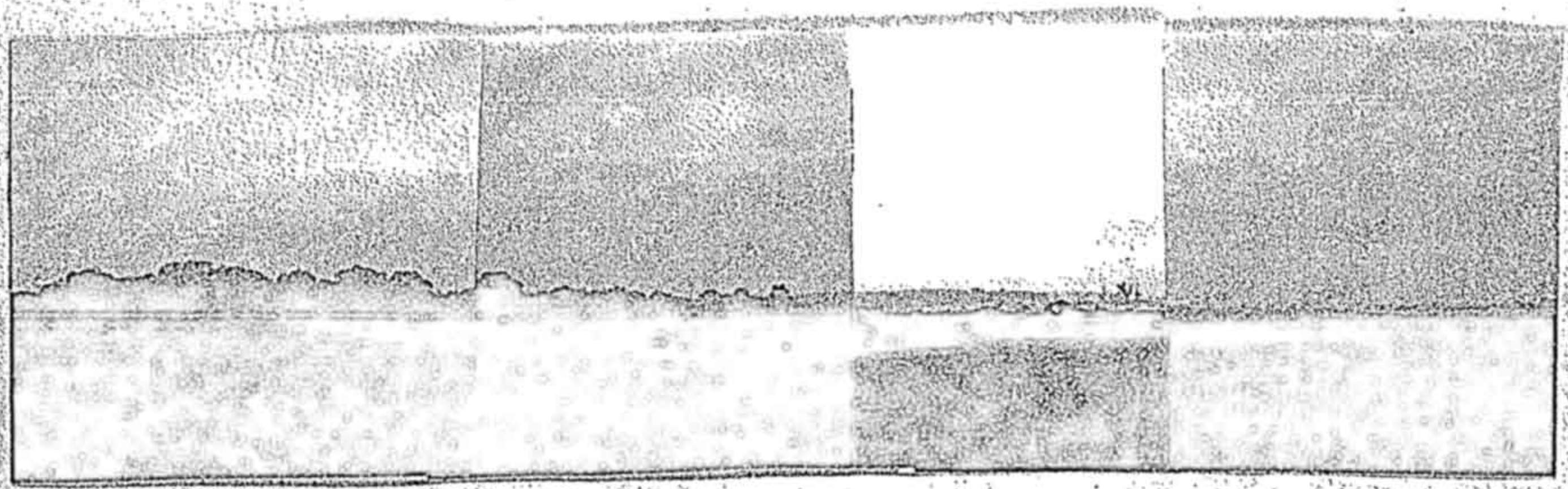
Number of men in each crew of (8) 4, 2 & 2

Report compiled by Cpl. Spence L. Date 12th August, 1960

Signature of Fire Officer or Officer i/c. Incident A. Ried F/Lt

H88390 Wt. 42861-BJ.621 36M 11/55 Gp. 840 P. & C. Ltd.

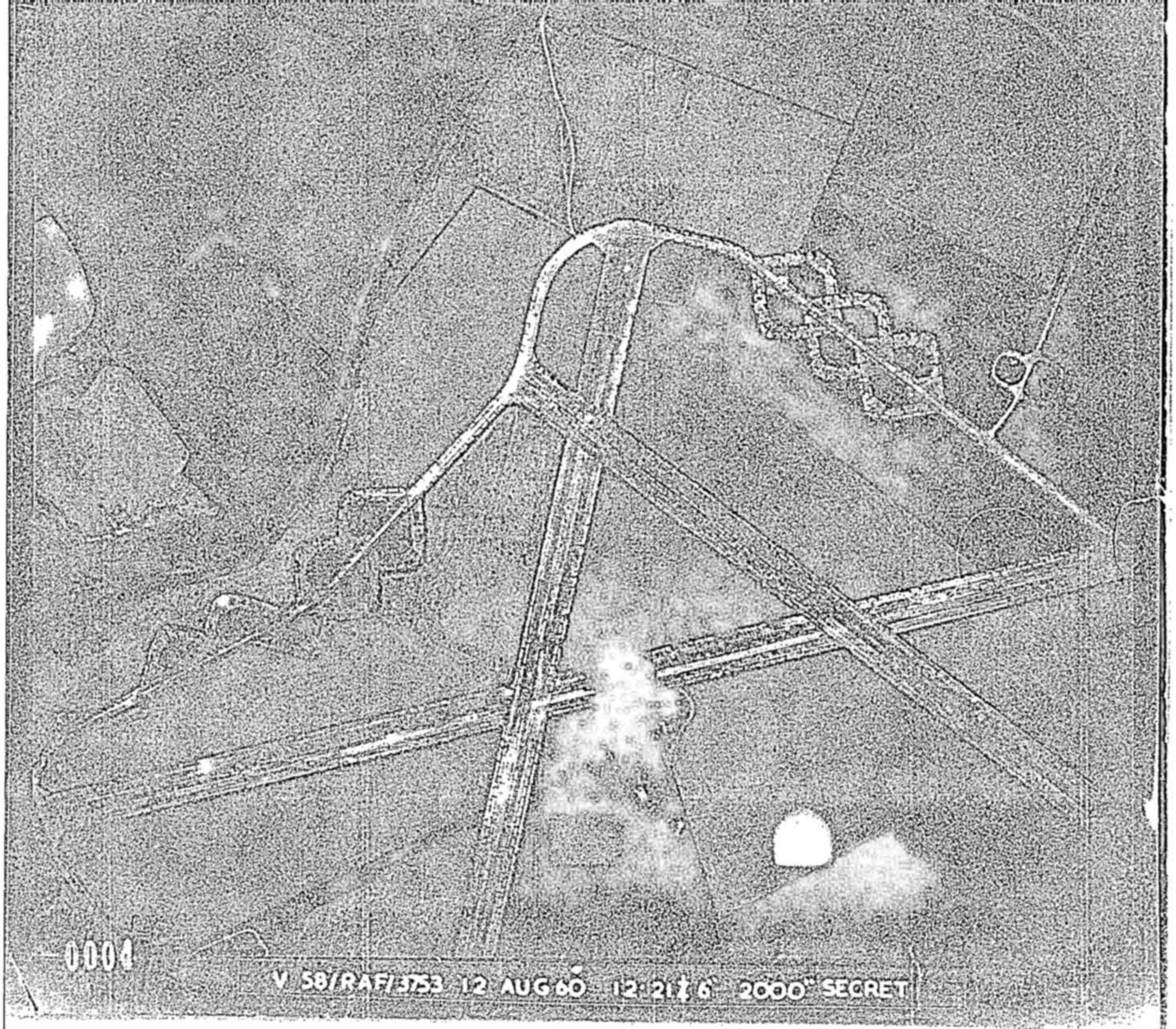
VALIANT B.K.1. XD 818



PANORAMIC VIEW OF SCENE OF THE ACCIDENT

FIRST IMPACT - PORT WING TIP - IN FOREGROUND. FLASH FIRE AND AREA OF DISINTEGRATED WRECKAGE BEYOND FOR 200 YDS

Appendix 'J' (69)


0004
V 58/RAF/3753 12 AUG 60 12:21½6 2000' SECRET


F 95558/RAF/3753 12AUG 60 12:26Z 12° 250° SECRET.

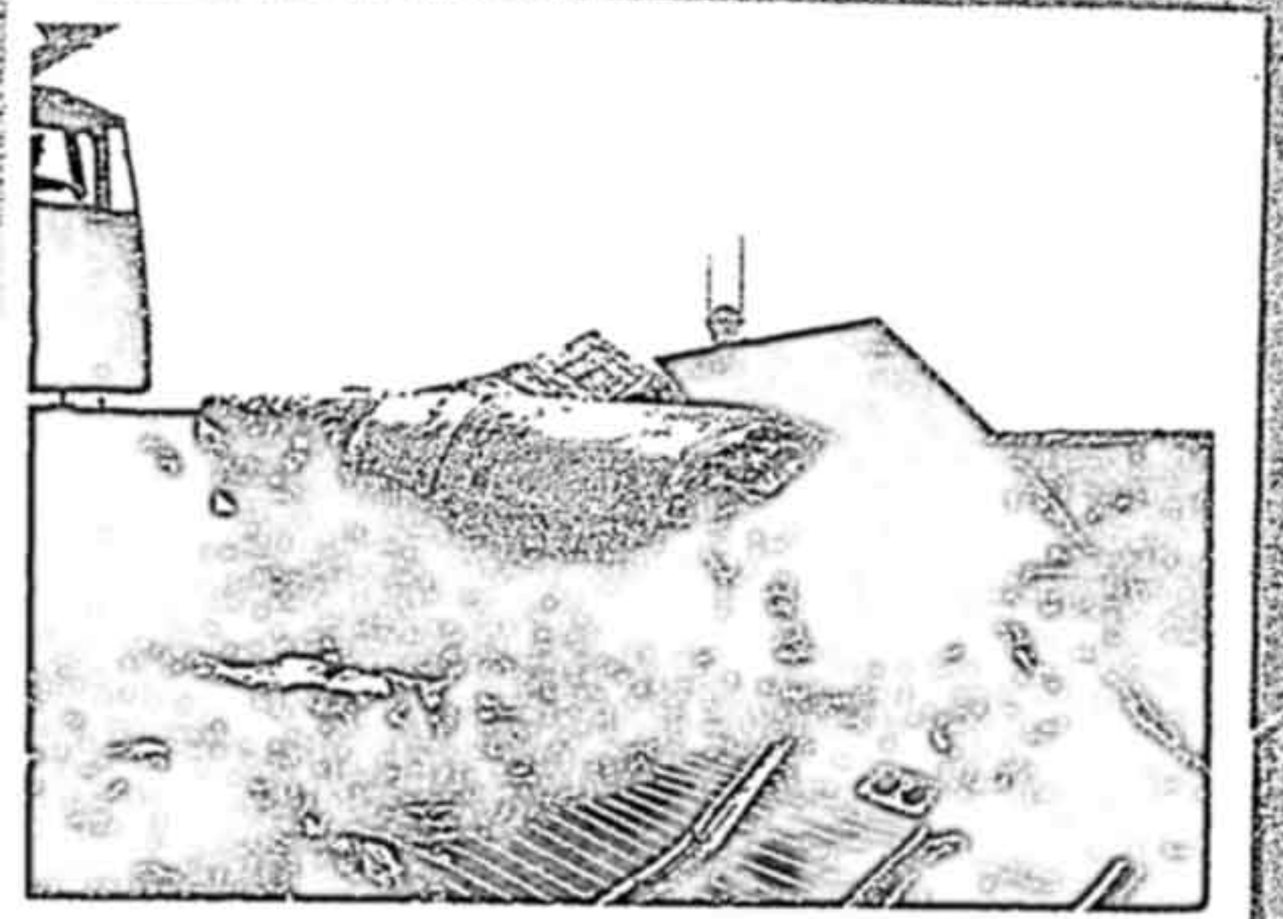

FI 95558/RAF/3753 12 AUG 60 12:26½ 12° 250° SECRET.


WITT RAF 2010/G 13 AUG 1960 CRASHED A/C XD064 RESTD

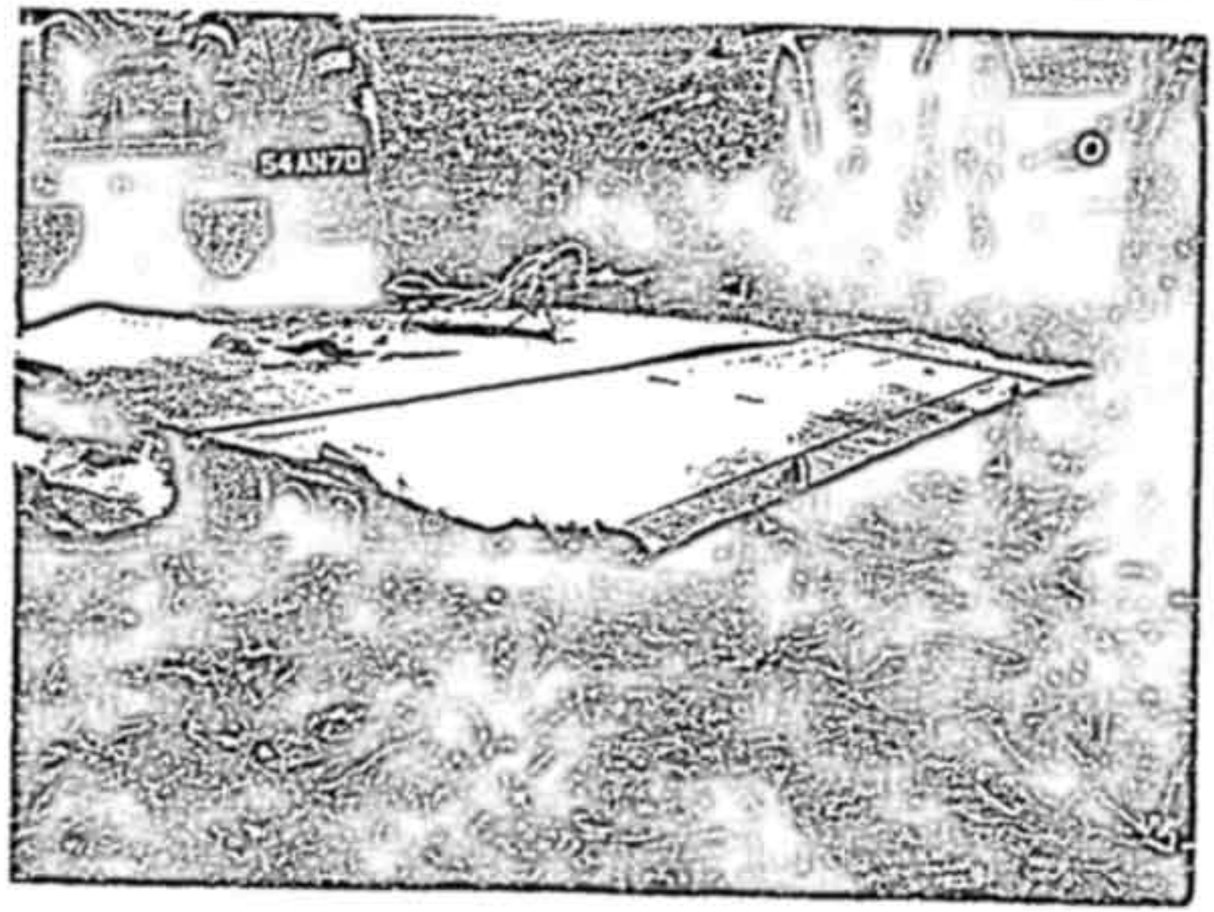

WITT RAF 2010/G 13 AUG 1960 CRASHED A/C XD064 RESTD



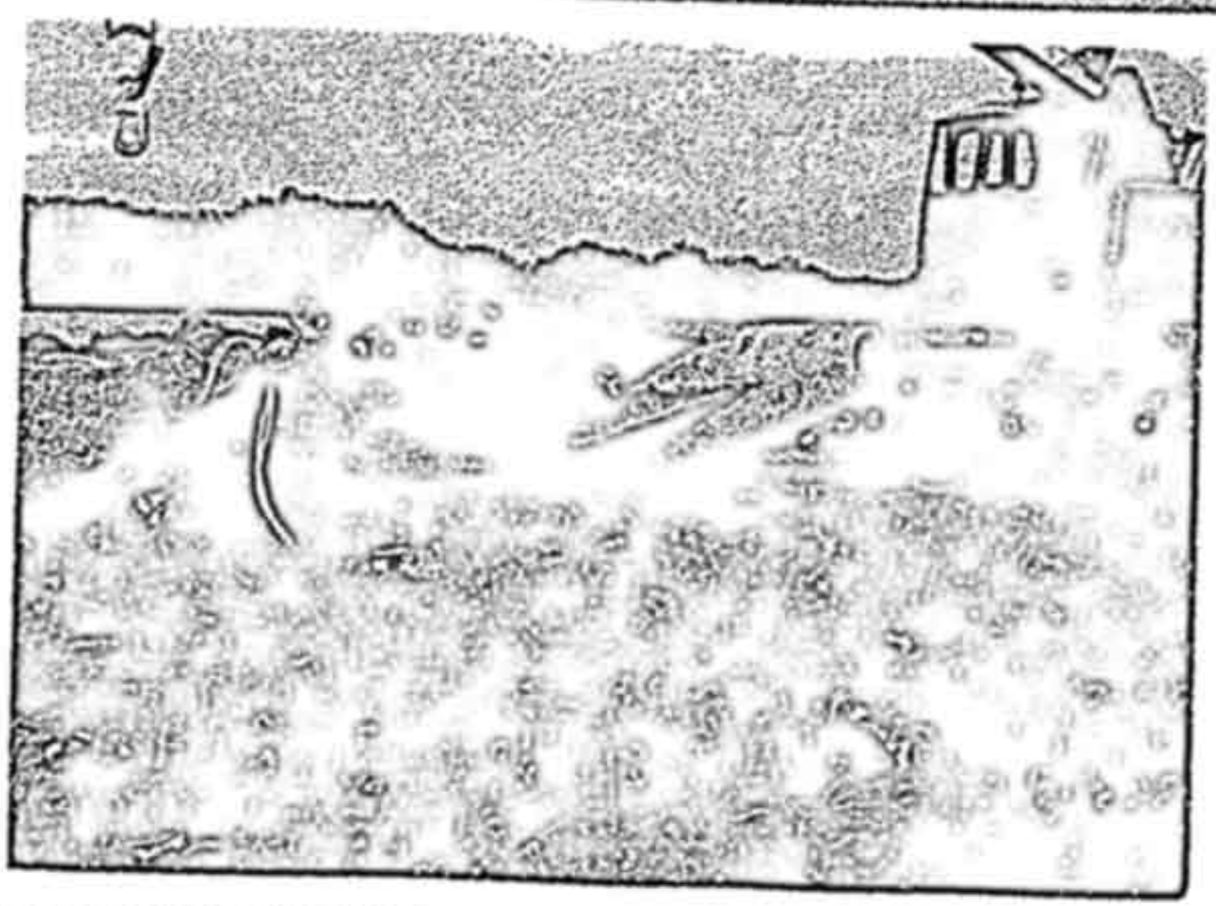
STBD MAIN U/C - LOOKING F.



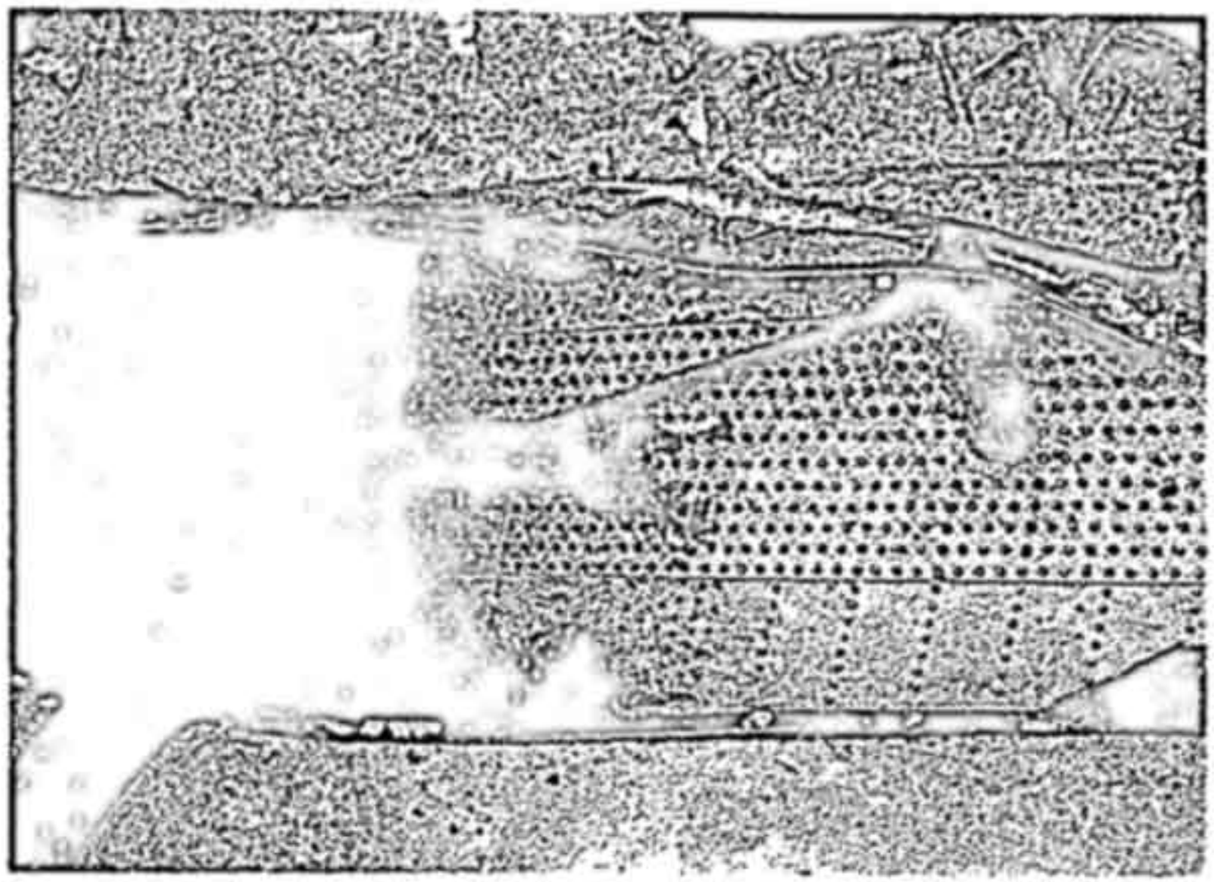
REAR FUSELAGE & T/PLANE



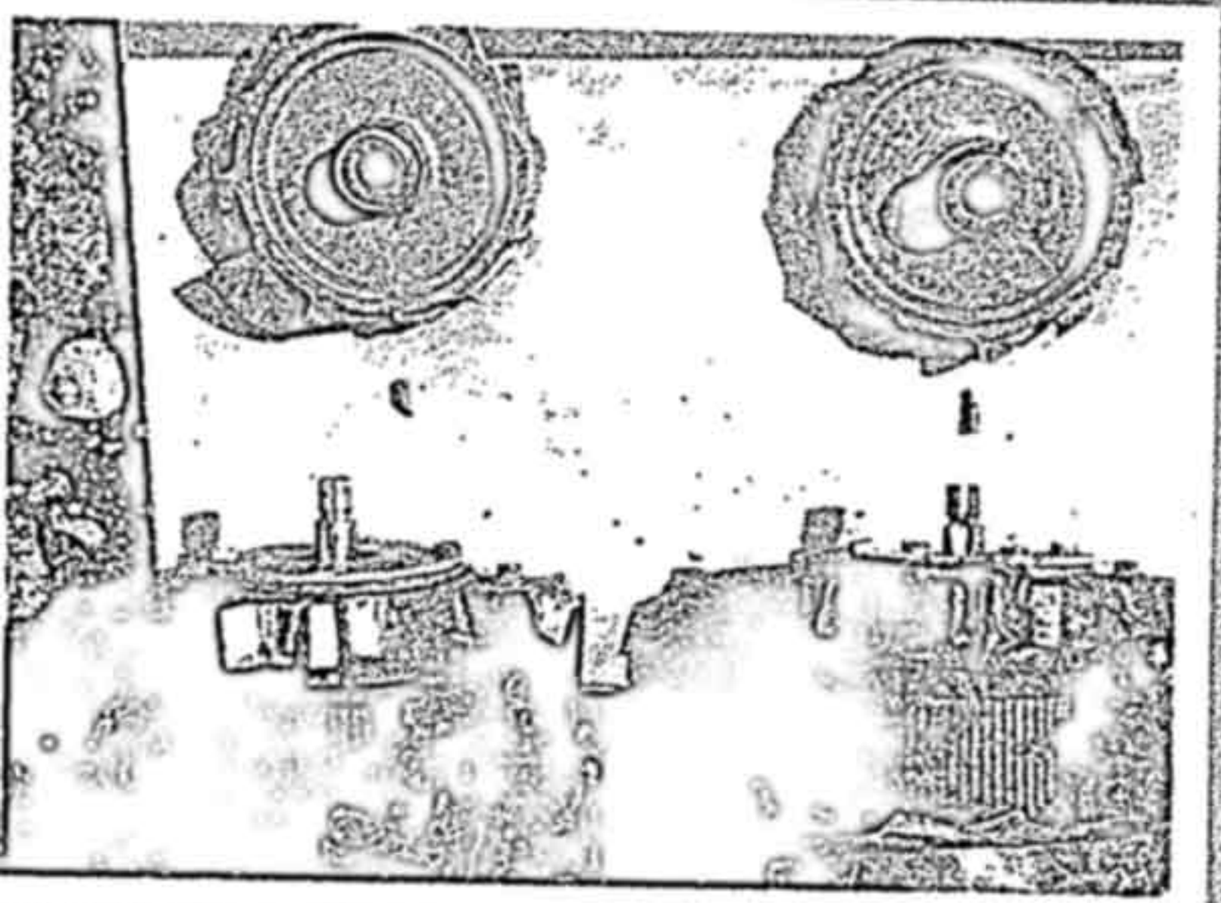
TOP RUDDER - NOTE TAB IN NEUTRAL POSITION.



REAR FUSELAGE & BOTTOM RUDDER

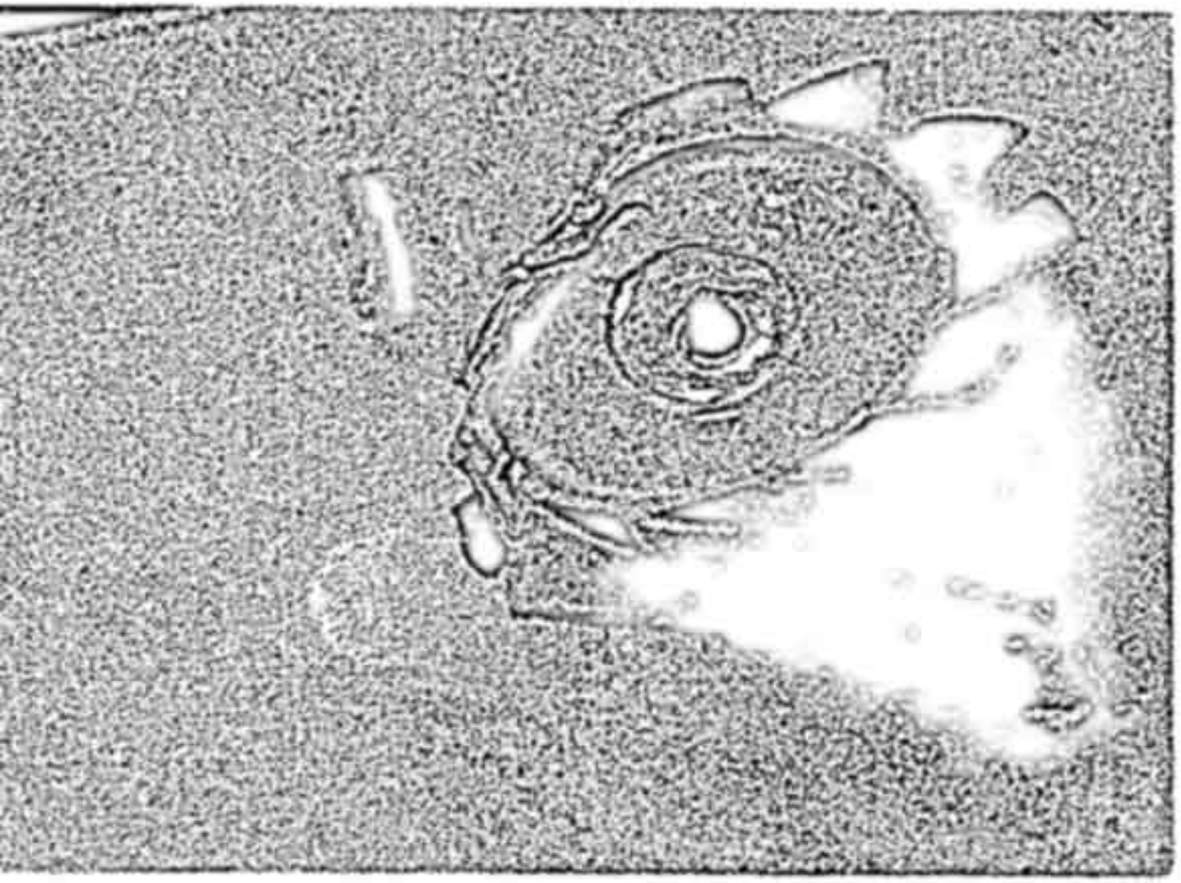


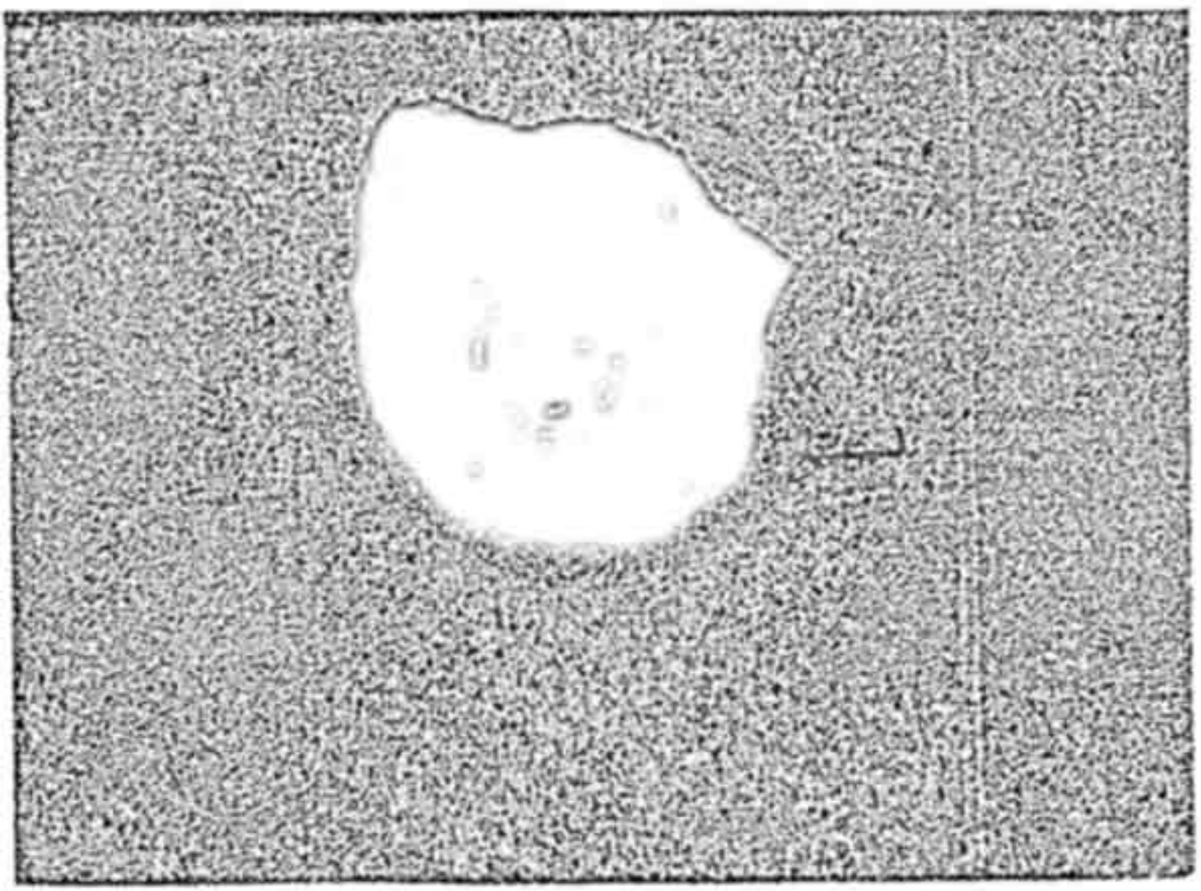
T/PLANE / RUDDER / ELEVATOR CONTROL LOCKS - DISENGAGED



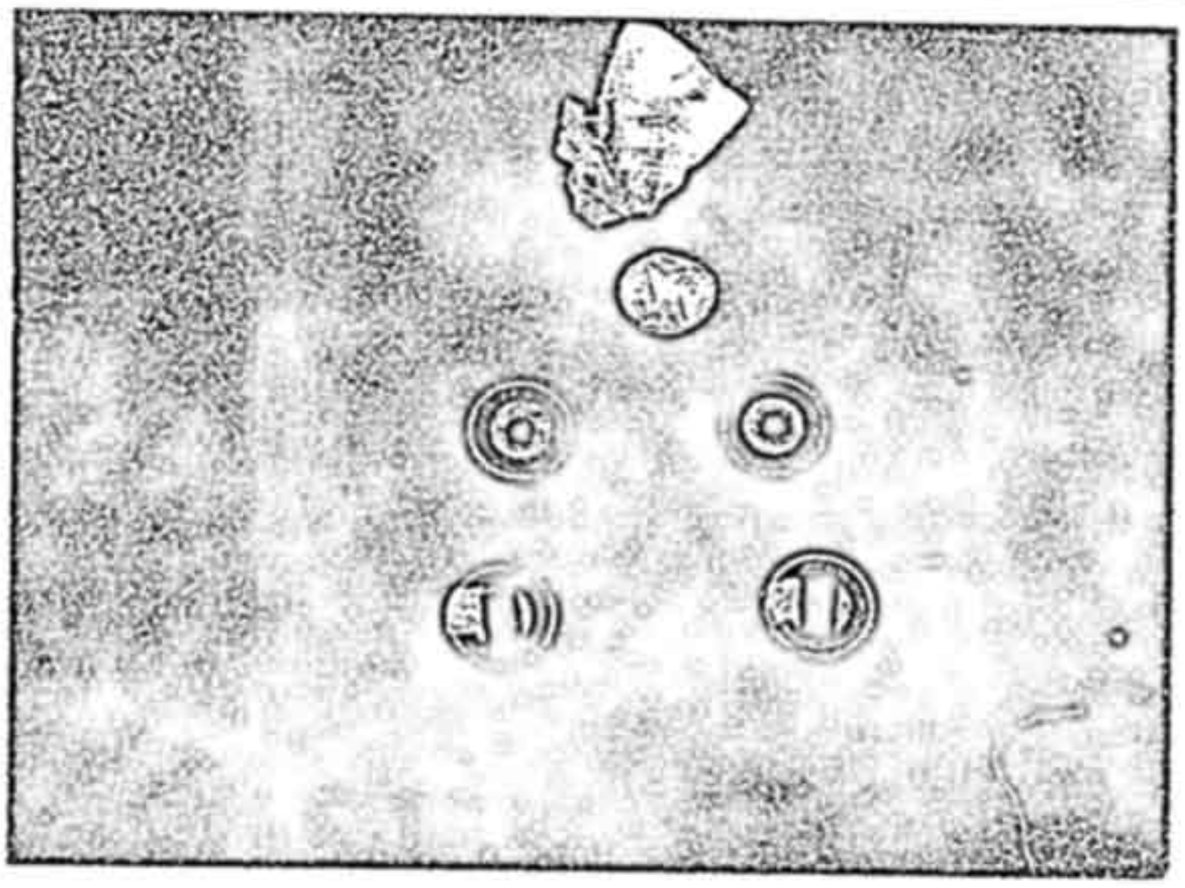
3 TYPE 350 INVERTERS

NOTE: SHEARED KEYWAYS & SEVERELY DAMAGED COOLING IMPELLOR BLADES BOTH INDICATING INVERTER ARMATORES REVOLVING AT HIGH R.P.M AT MOMENT OF IMPACT.

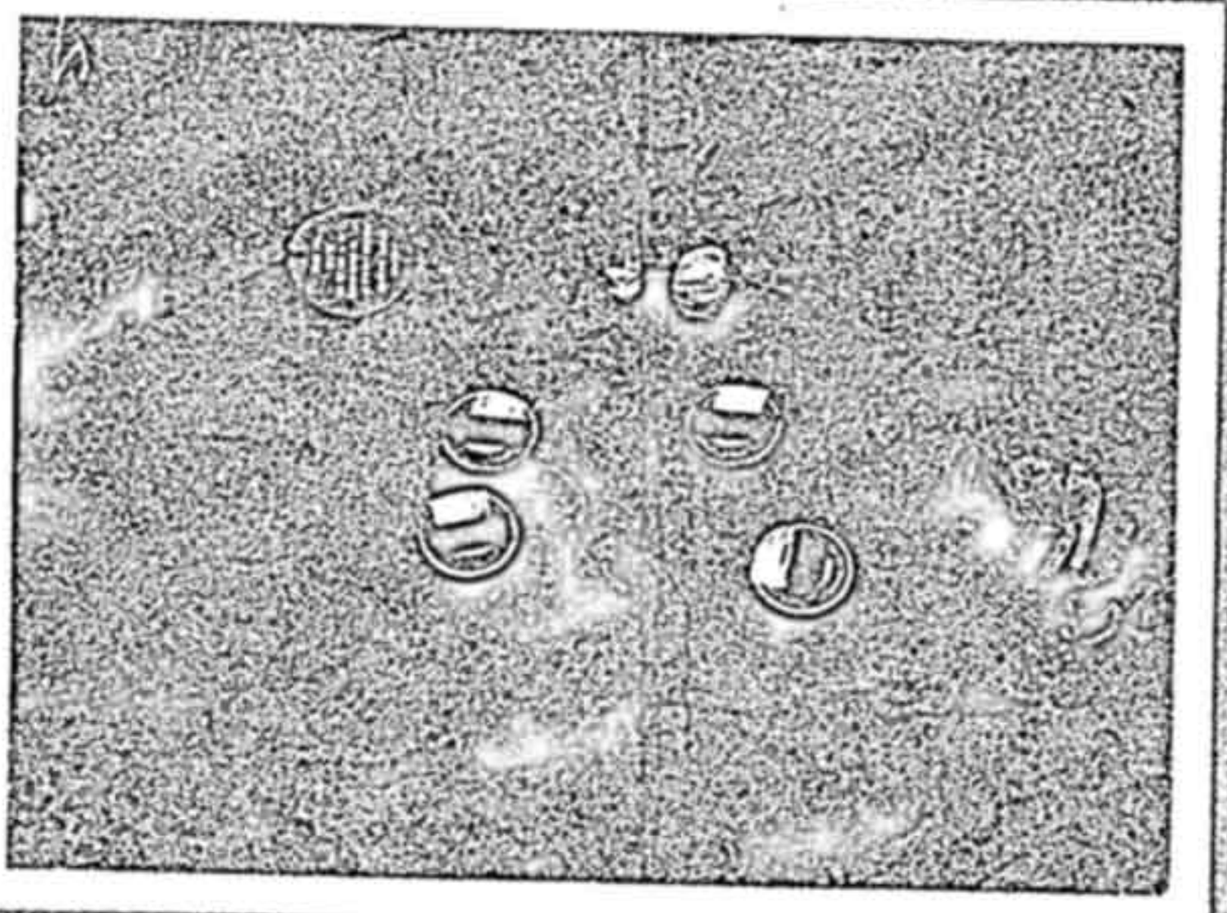




ROTARY TRANSFORMER
NOTE DAMAGED KEY & KEYWAY SIMILAR TO THE TYPE 350 INVERTERS.

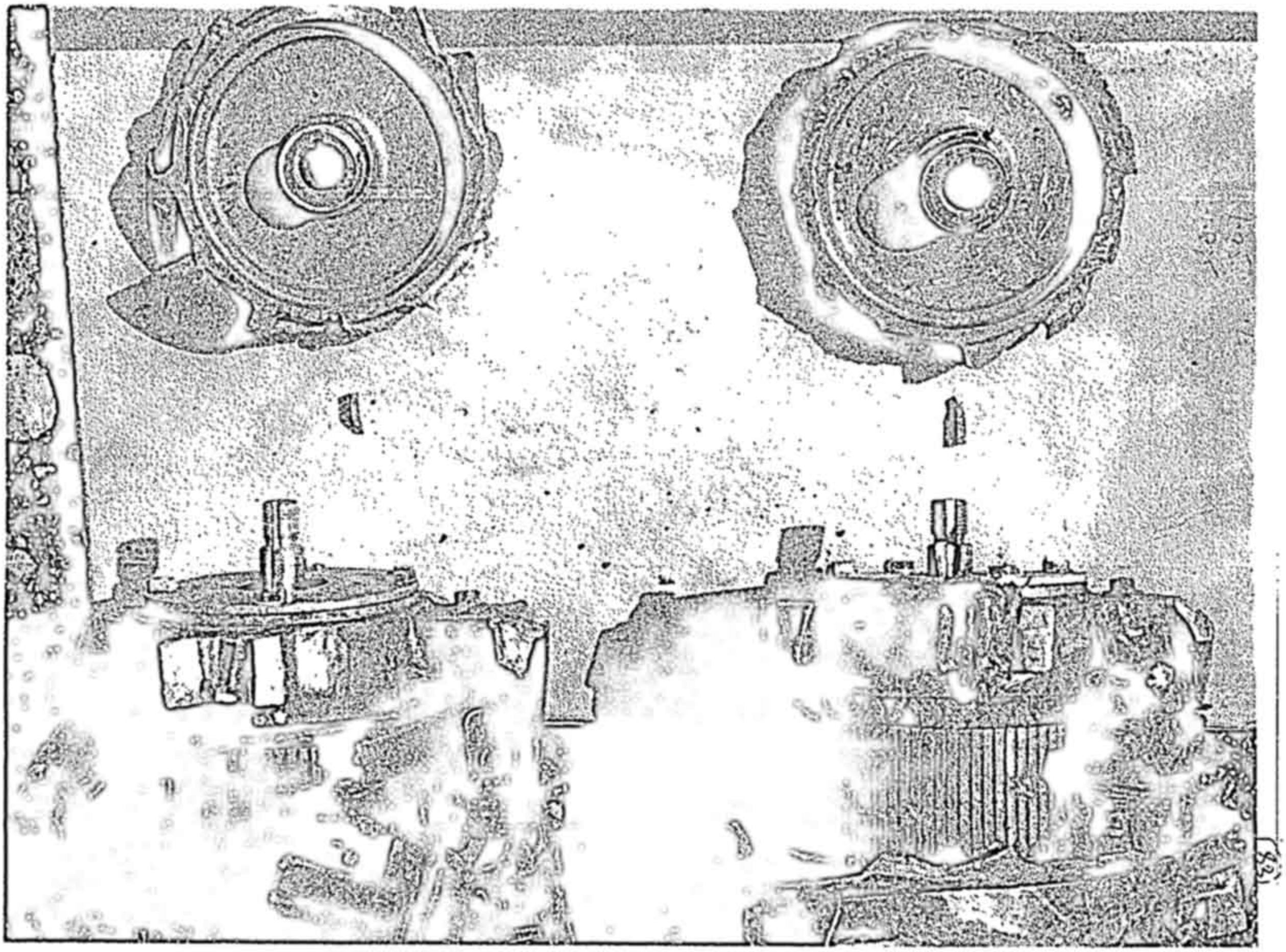


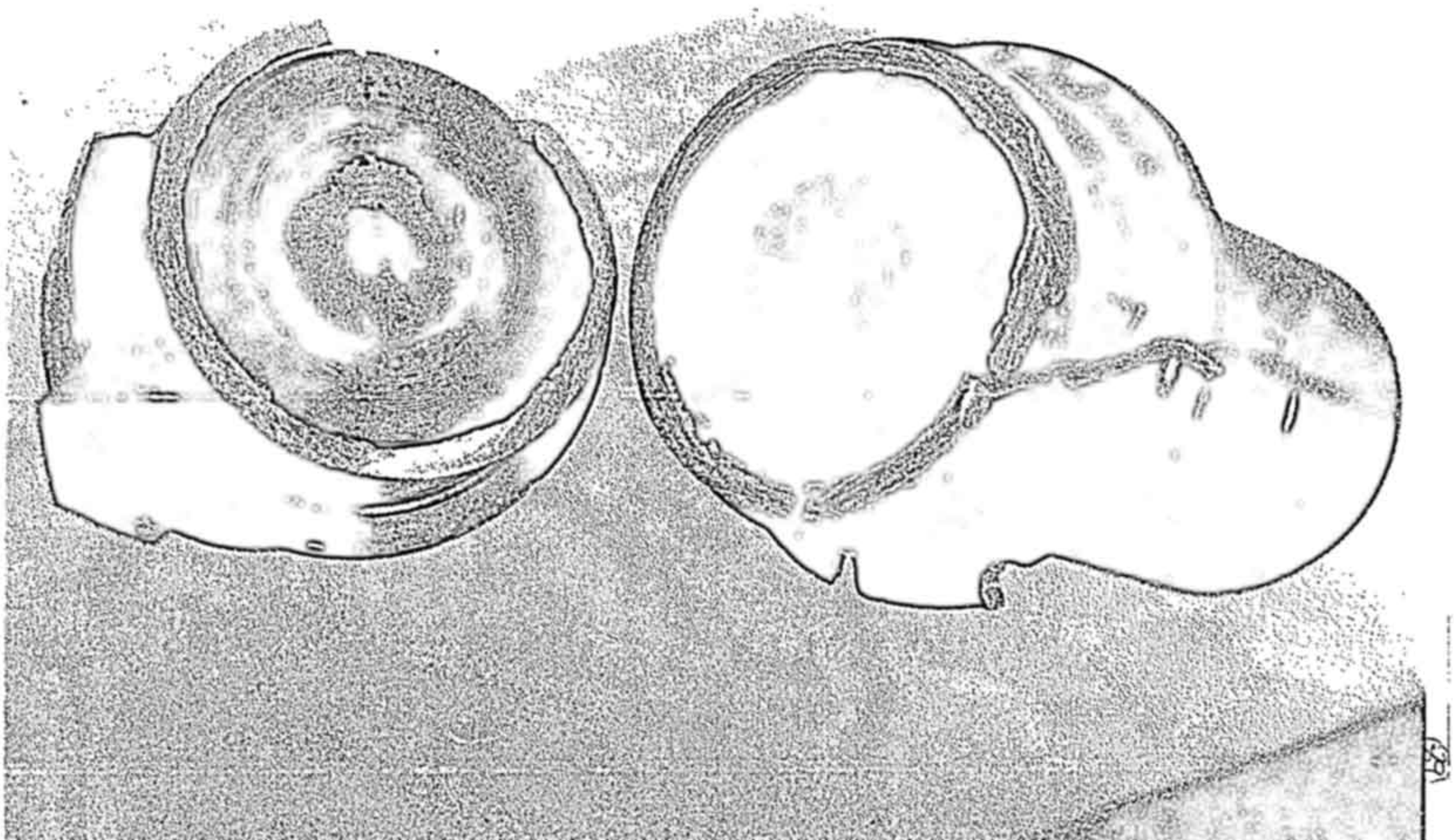
1ST PILOT



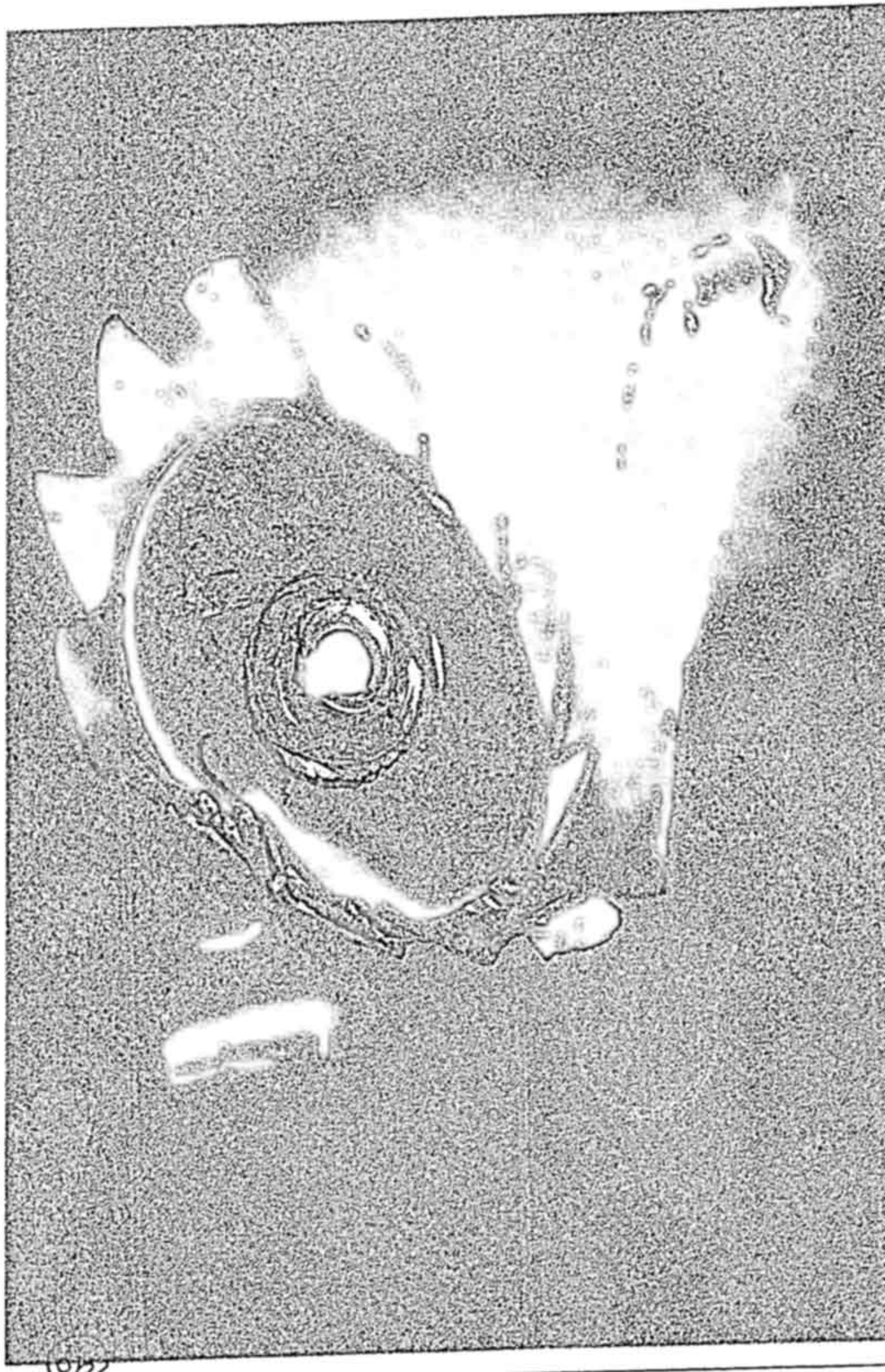
2ND PILOT.

SECOND STAGE CARTRIDGES FROM BOTH PILOTS EJECTOR SEAT GUNS. NONE HAS BEEN FIRED BY PRIMARY CHARGES.









Certified true copy ..... [signature] [illegible]

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R.A.F. FORM 412
(Page 1)
(Revised September, 1958)

ROYAL AIR FORCE

PROCEEDINGS OF A BOARD OF INQUIRY OR UNIT INQUIRY INTO AN AIRCRAFT ACCIDENT

(To be completed in accordance with A.P.3207, Chapter 4, paragraphs 11 to 14)

Assembled on 12th August, 1960 (Date) at Royal Air Force Wittering (Place)

By order of Air Vice Marshal M.H. Dwyer, C.B.E.

Air Officer Commanding, No. 3 Group.

To inquire into the accident involving aircraft Valiant B(K) MK 1 XD 864 (Type and Number) on 12th Aug. 1960 (Date)

1. Composition of Board

Duty	Rank, Initials, Name, Decorations, Number	Branch	Unit
President	Wg. Cdr. K. Ritchley (120794)	GD/P	RAF GAYDON
Members	Sqn.Ldr. H. D. Hughes (50400)	Tech Eng	RAF MARHAM
	Sqn. Ldr. D.S. Collier (163832)	GD/NAV	RAF MARHAM
*In Attendance			

2. Full Terms of Reference

(A.P.3207, chapter 4, paragraph 12 refers)

(a) Investigate the circumstances of an accident to Valiant aircraft No. XD 864 of No. 7 Squadron after take off fromROYAL AIR FORCE WITTERING. at 09.35 Z hrs. on 12th August, 1960

(b) Determine the cause of the accident.

(c) Allocate responsibility.

(d) Assess injury to Service or civilian persons.

(e) Assess the cost of damage to civilian property.

(f) Ascertain whether or not service personnel concerned were on duty.

(g) Ascertain whether or not all relevant orders or instructions were complied with.

(h) Ascertain whether or not the crew attempted to use escape facilities.

(j) Make recommendations.

(93)

3. Index to the Recorded Evidence

Page Number	Witness Numbers (Note 1)*	Rank, Initials, Name and Number	Branch (or Trade) and Service	Unit
1	1	Mr. A. Foster	Civilian	
2	2	Mr. L.E. Golland	Civilian	
3	3	Mrs. B. Dolby	Civilian	
4	4	Mr. T. Wymant	Civilian	
5	5	Mr. G. Dexter	Civilian	
6	6	Flt.Lt. T.E.B. Chambers (583856)	GD/P	RAF Wittering
8	7	Flt. Lt. R.L. Beeson (4102751)	GD/P	RAF Wittering
9	8	Flt.Lt. S.A. Blurton (2221515)	GD/P	RAF Wittering
11.37	9	Sqn. Ldr. J.F. Hobson (501540)	MED	RAF Wittering
12	10	Cpl. L.A. Spence (4184272)	A.F.D.	RAF Wittering
13.34	11	Sqn.Ldr. A.C.W. Spackman (153105)	GD/P	RAF Wittering
14.28	12	Sqn.Ldr. D.A. Perkins (57649)	GD/P	RAF Wittering
15.25	13	Wg. Cdr. B.P. Mugford (128917)	GD/P	RAF Wittering
16	14	Sqn.Ldr. C.R.C. Spencer (58726)	GD/P	RAF Wittering
17	15	Fg. Off. M.P.C. Rea (4203002)	GD/P	RAF Wittering
19	16	Mr. W.H. Ireson	Civilian	RAF Wittering
			Met Off	RAF Wittering
20.35	17	Fg.Off. R.G. Norsworthy (504843)	Tech Eng	RAF Wittering
21.23	18	Ch.Tech. J.C. McCafferty (1387901)	A.S.C.	RAF Wittering
24	19	Flt.Lt. B. Hopla (3512305)	GD/NAV	RAF Wittering
26	20	Flt.Lt. H. Lax (523949)	Tech.S.	RAF Wittering
29	21	M.Sig. M.J. Gillham (576552)	Air SigsA	RAF Wittering
30	22	SAC. I.N. Farrow (3517692)	F.C.W.	RAF Wittering
31	23	Flt.Lt. B.N. Bennett (3502324)	GD/P	RAF Wittering
32	24	LAC. B.D. Stephens (4249700)	I.Mech(G)	RAF Wittering
32	25	Cpl. P.H.J. Bensley (1923152)	I.Fitt(G)	RAF Wittering
36	26	Sqn.Ldr. C.R. Scott-Jackson (59164)	Equip.	RAF Wittering

*4. Material Witnesses whose evidence has not been obtained

Rank, Initials, Name, Number	Unit	How concerned with accident and reasons why evidence could not be obtained
	NONE	

5. List of Appendices

Serial Letter	Description
A	A.I.B. Report
B	Estimation of Speed and Radius of Turn
C	Tests completed in the Valiant Flight Simulator
D	Table of Technical Evidence.
E	Assessment of Damage to Civilian Property.
F	Exhibit 'A' RAF Wittering Air Traffic Control Crash Alarm Check List.
G	Exhibit 'B' F.2919 (ATC Flight Plan) for the Flight.
H	Exhibit 'C' RAF Wittering Briefing/Debriefing Proforma for the Flight.
J	Exhibit 'D' Specimen Valiant Loading Sheet for XD 864 at Fuel WT Recorded in the F.700.
K	Exhibit 'E' Photographic Copy of an Extract No. 7 Sqn. Flight Authorisation Book.
L	Exhibit 'F' Extract from the Flying Order Book (Sec 'C' Order No. 24) Re Undercarriage Malfunction.
M	Exhibit 'G' Details of RAF Wittering Instrument and Visual Circuit Patterns
N	Exhibit 'H' Weather Extracts from the RAF Wittering Meteorological Daily Register
O	Exhibit 'I' Copy of the RAF Wittering Local Area Forecast for the [illegible]
P	Exhibit 'K' [illegible] (Report of Attendance at an Aircraft Fire)
Q	Exhibit 'L' List of Documents Recovered from XD 864
R	Exhibit 'M' List of Flight Checks of No. 7 Squadron Crews.
S	Exhibit 'N' Certified True copies of the Airspeed Correction Cards for XD 864
T	Map/Diagram of the Scene of the Accident Showing the Estimated Flight Path of XD 864
U	Photographs of Scene of Accident and Aircraft Wreckage.
V	Forms 5000 Series and Forms 414 of Flt.Lt. B.J. Wickham and Flt.Lt. W.R. Howard.

Certified true copy [illegible]

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(Revised September, 1958)

6. Details of Aircraft

Category of Damage (Note 2) ~~DAMAGED~~ DESTROYED

Details	Permissible Limits		At time of Take-off	At time of Crash or Landing (estimated)
All-up weight	Max. Take-off	Max. Landing		
	167,000 lbs.	138,000 lbs.	146, 311 lbs.	143,000 lbs
Centre of Gravity	Forward	Aft		
	46.93 ft.	47.97 ft.	47.55 ft. Aft.	47.55 ft. aft.

7. Details of Airframe

Type	Mark	Service Number	Solo or dual fitted	*Total hours flown	*Hours since last major/minor servicing	*Date of manufacture	Category of Damage (Note 3)
Valiant	B(K) MK I.	XD 864	DUAL	1102.40	68.50 S	13 Mar 57	CAT 5 (Scrap

*8. Serial Nos. and classes of relevant airframe modifications embodied and of S.I.'s and S.T.I.'s complied with

Not Applicable

*9. Reasons for non-embodiment of relevant modifications or non-compliance with S.I.'s or S.T.I.'s

Not Applicable

*10. Details of Engines

DETAILS (delete headings as necessary)	1.	Single
	1. Port	
	1. Outer	2. Inner
Type and Mark	Rolls Royce Avon E.C.U. MK 20501	Rolls Royc E.C.U. MK
R.A.F. Number	A 653276	A 649666
Maker's Number	8013	4362
Category of Damage (Note 3)	CAT 5 (SCRAP)	CAT 5 (SC
Date engine last installed	9 Apr. 60	1 Oct. 5
Date new or reconditioned	18 Mar. 60.	6 Apr.
Hours run since new or reconditioned	71.45	277.10
Hours run since last major/minor servicing	68.50	68.50

*11. Serial numbers and classes of relevant engine mo with

Not

*12. Reasons for non-embodiment of relevant

(95)

*13. Rank and Name and duty of person who authorised the flight.

Sqn. Ldr. H.C.W. Spackman 'A' Flight Commander, No. 7 Squadron

14. Purpose of the flight, with pertinent details of briefing. Training "Profile" Flight consisting of 2 Navigation Stages, each of over 800 miles and 4 simulated bombing attacks against U.K. Radar Bomb Score Units. Crew briefed on type and duration of exercise to be carried out by 'A' Flight Commander, who instructed them to "self brief". This is appropriate for this type of routine exercise.

15. Particulars of Flight

Stage	Time (Note 4)	Place or Position	Height A.S.L.
Take-off	09.352	R.A.F. Wittering	245 ft - 275 ft.
Accident			
Crash or Landing	09.382	Spanhoe Airfield (Disused)	350 ft.

*16. Weather Conditions

At the time and place of take-off				At the time and place of the accident			
Cloud Base	2,500 ft.	W/V	350° 16 KT	Cloud Base	2,500 ft.	W/V	350° 16 KT
Visibility	13 N.Ms	Light	Good	Visibility	13 N.MS.	Light	Good
Reg. ~~Q.f.f.~~ Q.N.H	1006 MBS	Q.N.H.	1009 NBS	Reg. Q.N.H.	1006 MBS	Q.N.H.	1009 MBS.

General :— Complex area of low presure [illegible]NAVIA and the LOW COUNTRIES, [illegible]n unstable NORTH - NORTH [illegible]m over the whole of [illegible]ions for take off [illegible]s, 5,000 to [illegible]ood, weather [illegible]pitation.

General :— The same conditions as at R.A.F. Wittering at take off.

[illegible]etails of Fire (Note 5)

Extent to which it developed

[illegible]e ground flash burning over a very [illegible]a. Most of the aircraft was severely [illegible]by ground fire.

the Automatic System

Did extinguisher bottles discharge ?

NO

Certified true copy ... S.O. Stephens ... 19. ... 96

CONFIDENTIAL

R.A.F. FORM 412
(Page 5)
(Revised September, 1958)

19. Flying Experience of Pilot prior to this Flight

Rank	Initials	Name	Number	Branch
FIT. LT.	B.J.	WICKHAM	196536	GD/P

Instructor Category	Instrument Rating	Medical Category	Age	Most recent flying training particulars	
				Unit	Assessment
NIL	M. GREEN	A2 G1	30	2320CU RAF GAYDON	PROFICIENT

		Types of Aircraft	Day plus Night Hours			*Night Hours (for night accidents only)			By Instruments		Flight / ~~Link~~ Trainer
			1st Pilot	*2nd Pilot	*Dual	1st Pilot	*2nd Pilot	*Dual	Act.	Sim.	Simulator
On which the accident occurred	A	VALIANT	155.00						5.45	10.30	14.00
	B		23.20						1.35	.50	2.00
	C		810.05	49.55	19.45				52.15	53.30	93.3
*Similar Types	A										
	B										
	C										
	A										
	B										
	C										
Total (for all aircraft)	A		155.00						5.45	10.30	14.00
	B		23.20						1.35	.50	2.00
	C		2955.10	362.30	329.20				279.05	156.45	93.3

A = Previous 6 months B = Previous 30 days C = Total to date

*20. Flying Experience of other Crew members

Rank, Initials, Name, Number, Branch	Crew duty	Hours on type		Hours on all types	
		Last 6 months	Total	Last 6 months	Total
FLT. LT. W.R. HOWARD (2766512) GD/P	2nd Pilot	96.55	115.55	96.55	408.30
FLT. LT. A.J. IRESON (2540707) GD/NAV	NAV/RADAR	156.45	805.55	156.45	1527.50
FLT.LT. H.G. BULLEN (51039) GD/NAV	NAV/PLOTTER	156.45	856.05	156.45	3256.00
SGT. R.H. JOHNSON (3510412) AIR SIG 'A'	A.E.O.	175.50	805.15	175.50	2210.20

21. Particulars of All Occupants of Aircraft (Note 8)

Rank, Initials, Name, Number	Unit	Duty	Position ~~Pension~~	Extent of Injury (Note 9)
FLT. LT. B.J. WICKHAM (196536)	No.7 Sqn. RAF Wittering	Captain	Left hand Pilots Seat	FATAL
FLT. LT. W.R. HOWARD (2766512)	No. 138 Sqn RAF Wittering	2nd Pilot	Right Hand Pilots Seat	FATAL.
FLT. LT. H.G. BULLEN (51029)	No.7Sqn. RAF Wittering	NAV/PLOTTER	Centre Rear Seat	FATAL.
FLT. LT. A.J. IRESON (2540707)	No.7 Sqn RAF Wittering	NAV/RADAR	Starboard Rear Seat	FATAL.
SGT. R.H. JOHNSON (2510412)	No.7 Sqn RAF Wittering	AIR ELECTRONIC OFFICER	Port Rear Seat	FATAL.

22. Particulars of Non-Occupant Casualties

Rank, Initials, Name, Number	Unit	Duty	Position	Extent of

Board

23. Remarks of Court after examining the following documents:

Document	Remarks
*R.A.F. Form 700 and other servicing certificates	Twenty one (21) signatures for the Before flight servicing carried out for the flight on 12th August, 1960 were signed for on the 11th Aug. 1960. Certain vital items were left unsigned until 12th Aug.1960. Temporary sheets for the replenishment certificate were attached to the F.700
*Airframe, Engine, and/or component log cards	The log cards were examined and the recordings were found to be correct.
*Servicing Schedules	The Servicing schedules were amended up-to date and used in accordance with current practices.
*Technical Order Book	No.7 Sqn. had not been issued with a copy of the RAF Wittering Technical Order Book which is at present being revised. No. 7 Squadron Main party arrived at Wittering on 27th July, 1960.
*Flight Authorisation Book	Times of Take Off had not been detailed and the information on the exercises authorised was often too brief to determine the scope of the exercises.
*Pilot's Flying Log Book	Adequately completed although Squadron Commanders checks, Standardisation checks and instrument rating checks were all recorded as first pilot time.
*Flying Order Book	The Flying Order Book was up to date and had been signed by all crews within the last two months.
*R.A.F. Form 5200	The forms 5200 were correctly maintained. There was no previous history of accidents for either pilot.

24. Material facts found during a visit to the scene of the accident ~~before~~/after the aircraft had been removed (Note 10).

It was apparent that the aircraft had exploded on impact scattering compononts anddebris over a fairly wide area either side of one main direction from the point of first impact. Nearly all the components were on the surface and indications were that the aircraft had crashed at a relatively shallow angle of approach to the ground. Parts of all four engines were identifiable in a condition which suggested that they had been rotating at the time of the crash. The tail unit was complete and positions of trims etc. should be capable of exact measurement. Starboard components had generally travelled further than their port counterparts. Electrical componentswere in a satisfactory state for examination. The cockpit area had been subject to almost complete destruction by fire. Examination of the remains of the canopy showed that the explosive bolts had been fired by heat and had not been electrically detonated before impact.

(98)

employ to break them

CREW OF 5 DIE IN VALIANT CRASH

VILLAGE MISSED

DAILY TELEGRAPH REPORTER

A VICKERS Valiant bomber crashed four minutes after taking off yesterday from R.A.F. Wittering, Northants, killing the crew of five. The plane banked steeply as it crossed the village of Laxton, and fell on Spandoe, a disused airfield less than a mile away.

The V-bomber was on a routine flight. It disintegrated as it hit the airfield, and wreckage cut a huge circle in crops growing on the edge of the runway.

One eyewitness among Laxton's 100 inhabitants was Mrs. R. H. Lambert, wife of a publican. She said she heard the plane making a "funny noise" as it flew overhead.

"Then it banked very steeply, as though to pull away from the village, suddenly spun into the ground and blew up with a terrific roar.

"TWIST IN AIR"

Alan Foster, a farmhand who was working in a field next to the airfield, said: "It seemed to twist in the air before it roared into the ground.

The crew of the Valiant were: Flt.-Lt. P. J. Wickham, 38, captain; Flt.-Lt. W. R. Howard, 29, co-pilot; Flt.-Lt. H. G. Bullen, 40, map plotter; Flt.-Lt. A. J. Ireson, 30, Navigator-radio; Sgt. R. H. Johnson, 26, signaller.

Oldest V-Bomber

OUR AIR CORRESPONDENT writes: The Valiant is the oldest of the R.A.F.'s V-bombers. The prototype made its first flight in 1951.

The fact that the aircraft crashed so soon after leaving the ground may indicate that there was some sudden engine or other mechanical failure during, or immediately after, take-off.

DR. FISHER SEES E. AFRICA PEACE

MP

CONFIDENTIAL

File

(94)

A.I.B. MEMORANDUM S.2985

ACCIDENTS INVESTIGATION BRANCH

Accident to Valiant B(K)1 XD 864 at Spanhoe Airfield
Nr. Wittering on 12th August 1960

1. CIRCUMSTANCES

The aircraft took off at 0935 hrs.Z from Wittering airfield.

The accident occurred shortly after take-off just after the aircraft had turned through 180° to the left when it apparently stalled and struck the ground approximately 7 n.m. from Wittering. The take-off appeared to be normal, the aircraft climbing away rather more steeply than usual and the nosewheel failed to retract. The Captain was aware of this and decided to remain in the local area to correct the fault. At about 6 n.m. from Wittering Airfield the aircraft, in clean condition apart from the nosewheel, started a normal turn to the left. Witnesses have stated that the aircraft came out of the turn but was unsteady and descending rapidly. It recovered into a shallow dive and continued to descend. Additional engine power was applied late in the descent but when just above the ground the port wing dropped sharply, the nose also dropped and the aircraft struck the ground at a slow forward speed but with high engine power. The aircraft exploded, caught fire and all five crew members were killed.

The weather at the time was fine and had no bearing upon this accident.

2. TECHNICAL INVESTIGATION

(i) The aircraft was built by Vickers Armstrongs Limited in March 1957 and had completed a total of 1102 hours. It had been maintained in accordance with the servicing schedule and all relevant modifications had been embodied and S.I's and S.T.I's complied with. Overload wing tanks were fitted. The estimated all-up-weight at the time of the accident was 143,000 lbs. and the C of G was 47.55 feet aft of the datum. These figures are within permissible limits.

(ii) The Captain held a current master green instrument rating and his last flying assessment was "average" as a medium bomber pilot. His total flying hours amounted to 2155 of which 810 hours were as captain in the Valiant aircraft and 50 hours as second pilot.

(iii) Inspection at the scene of the accident showed that the first impact marks made when the aircraft struck the ground were consistent with it having touched the port wing first slewing the aircraft slightly to port and at slow forward speed. The initial depression of the wing in the ground was slight. Evidence of ground flash fire commencing in the region where the port underwing tank struck the ground suggested that compression ignition had taken place in that tank and rupture of all tanks immediately following the first impact spread a ground flash fire over a wide area. Dispersal of the aircraft structure also indicated that an explosion had taken place at the same time. Severe ground fires had continued to burn, notably in the cockpit, wing tank and nosewheel bay areas which were almost entirely consumed. There was no evidence to suggest that a fire had occurred in the air or that the aircraft had suffered any pre-cash structural failure.

/Examination

Examination in the field showed that the aircraft had struck the ground in the "clean" configuration with the exception of the nose-wheel which was extended, i.e. its operating jack ram contracted and the doors opened. Owing to the complete disintegration of the aircraft structure around the nosewheel and of all electrical switch gear in the cockpit no evidence could be found for the reason why the nosewheel remained in the lowered position when the main under-carriage legs were retracted. The main undercarriage was found to be retracted and the doors closed. Evidence from the flap screw jacks indicated that the flaps were UP and from the dive brake screw jacks that these were IN.

Flying Controls. Detailed examination in the field of all flying control surfaces and their operating systems showed that all were properly connected and working in the correct sense prior to impact. This also applied to manual trim tab settings.

Engines. Examination of all four power units revealed that they had been under considerable power at the moment of impact, all compressor and turbine bl.des being either torn off or severely bent in the opposite direction of shaft rotation.

Electrical Equipment. Evidence from circumferential score marks on the commutators of all four generators indicated that they were revolving at the moment of impact. All three Type 350 inverters were recovered and evidence showed that their armatures had been revolving at high speed when the aircraft struck the ground. Further examinations and testing were carried out in the Station Workshops. The following components were check tested and all were found to be working satisfactorily.

1. Flap motor.
2. Aileron elevator and rudder P.F.C.U. electric motors.

It was not possible to run the emergency flap motor as the armature had been torn out on impact, but its condition showed no sign of unserviceability.

From the airspeed section of the calculator 3 of the Navigational Bombing system it was possible to obtain an airspeed setting of 122 Knots (at impact).

Miscellaneous Equipment. None of the methyl-bromide fire extinguisher bottles had been operated electrically but only one base of the inertia switches was recovered and it could not be determined whether it had operated.

Both ejector seats and rails were recovered, the seats in the cockpit area the rails some 80 yards distant. It appears from the evidence on the rails that both seats had been torn away from their rear securing fittings completely in a forward and slightly starboard direction. This probably occurred on impact. The canopy jettison, bolts had not been electrically detonated. Score marks down the sides of the rails showed that they had been fired out of the cockpit area probably when the seats were inverted. Neither sets of rails were damaged by fire but one seat had been almost entirely consumed and the centre part of the other severely damaged by the cockpit ground fire, both seats being recovered in this small area. It was established that both ejector seat gun primary charges had been detonated by the withdrawal of their respective sears but in both cases neither of the secondary charges had fired. The port seat drogue gun cartridge had been fired by extreme heat and the starboard seat drogue gun by withdrawal of the sear.

/3.....

(101)

3. CONCLUSIONS

No evidence came to light to suggest any unserviceability of the aircraft with the exception of the nosewheel failing to retract. This in itself should not be catastrophic, but may, in this instance have caused a distraction. There was no evidence of fire in the air or of structural failure prior to impact.

4. OPINION

This accident was due to loss of control probably caused by entering a turn with insufficient speed.

Examination of the wreckage has not revealed any contributory mechanical failure in the aircraft.

E. NEWTON

Chief Investigating Officer
for Chief Inspector of Accidents.

Accidents Investigation Branch,
Ministry of Aviation.

8th November, 1960.

Circulation:

D.F.S. Air Ministry - 15 copies
R.D.A. Defects - 3 copies
R.A.E. Structures (Accidents Section)

Copies despatched as per circulation. 17.11.60

MOA.1649N

REVISION OF 1 - 47 - Record of Investigation

Inspector's responsibility

1. C. of R., Aircraft type and Mark No., registration marks, registered owner, operators or Service Unit.

2. C. of A., Number of Certificate, dates of issue and last renewal, aircraft classification.

3. Date and time of accident.

4. Exact location of accident.

5. Nature of flight, whether Public transport, scheduled - non-scheduled, freight, aerial work, positioning, experimental, private, etc.

6. History of flight.

7. Weather conditions, forecast and actual, how forecast was obtained, conditions of light.

8. Captain's history, licences and experience (proforma to be used), injuries (proforma to be used).

9. Crew's history, licences and experience (proforma to be used), injuries (proforma to be used).

10. Passenger(s), injuries (proforma to be used).

11. Loading and C.G. position, details of Load Sheet, calculated C.G. and weight for take-off and landing, estimated C.G. and weight at time of impact.

12. Airborne navigational aids and/or special equipment carried, including maps, charts, navigation documents and route manuals.

13. Ground aids available and ground aids used.

14. Control logs and/or transcript of voice recording.

15. Witnesses' statements.

16. Infringement of Regulations and/or Control instructions, operator's weather minima.

17. Date and time of Coroner's Inquest and findings.

18. Service investigation.

19. Rescue and fire services, action taken and by what Authority.

Investigating Officer's responsibility

20. Airframe history.

21. Power unit(s), type, Mark and history.

22. Propeller(s), type, Mark and history.

23. Distribution of wreckage, diagram and photographs.

24. Fuselage, to include passenger safety aspect, i.e. seats, straps, emergency exits, etc.

25. Centreplane.

26. Port mainplane.

27. Starboard mainplane.

28. Ailerons or elevons.

29. Aileron or elevon tabs.

30. Flaps, air brakes, spoilers or slats.

31. Fin(s).

32. Rudder(s).

33. Rudder tab(s).

34. Tailplane.

35. Elevator.

36. Elevator tabs.

37. Flying controls. (a) Power assisted control mechanism.
(b) Automatic pilot.

38. Main undercarriage, nose and tailwheel.

39. Crew compartment. (a) All control settings as found.
(b) Flying instruments including energising system.
(c) Seats and straps.

40. Oxygen, pressurisation, cabin heater, de-icing equipment, etc.

41. Power unit(s).

42. Installation. (a) Fuel and oil cock settings at cocks,
(b) Fuel and oil contents.
(c) Specification of fuel and oil.

43. Fire in (a) air or (b) ground. Type of fire extinguisher system.
(a) Warning - Action by crew - operation/non of extinguisher system.
(b) Pre-crash action - operation/non of crash switch and associated circuits.
An appreciation of cause of fire or reason for no fire.

44. Safety equipment, lifebelts, dinghies.

45. Defects, S.T.I.'s, S.I.'s, etc.

46. Miscellaneous.

Civil Accidents - Damage to property in accordance with Standing Order No. 6.

47. Interference with wreckage.

Signatures of Inspector(s) and/or Investigating Officer(s)

ACCIDENTS INVESTIGATION BRANCH

Form 1 - 47

1. Aircraft type and Mark No., registration marks, Service Unit

Valiant B(K) Mk.1 XD 864, R.A.F. Wittering.

2. Aircraft documentation

Forms 700 and 701. Modification record sheets in order.

3. Date and time of accident

12th August, 1960, at 0938Z.

4. Exact location of accident

Spanhoe Airfield (Disused).

5. Nature of flight

No detail in the authorisation book with regard to exercise but Board of Inquiry established that this was to be a routine flight for aircrew training.

6. History of Flight

The aircraft took off at 0935Z and climbed away slightly more steeply than usual. The nosewheel undercarriage failed to retract. The captain was informed of this by R/T and decided to remain in the vicinity to clear this fault. The aircraft then levelled out at approximately circuit height and about six miles from the airfield the aircraft, in clean condition, apart from the nosewheel but with a low engine power setting started a normal turn to the left. In coming out of the turn witnesses state that the aircraft was unsteady and sinking rapidly. A recovery was made into a shallow dive and the aircraft continued descending. Witnesses also gave evidence that engine power appeared to have been applied late in the descent but when just above the ground the port wing and nose dropped sharply and the aircraft hit the ground at slow forward speed but with high engine power. The aircraft exploded, a large ground fire developed and all five crew members were killed.

7. Weather Conditions

The weather was bright and sunny, visibility very good, i.e. 13 n.m. Local conditions for take-off 5/8ths cumulus base 2500 feet, tops 5000 - 6000 feet. ~~which~~ It is considered that the weather had no bearing on this accident.

8. Captain's History

F/Lt. B. J. Wickham. This officer started to fly on 1st April, 1943. He left the Service at the end of the ~~year~~ war and re-joined on 1st March, 1951. His total flying hours amounted to 2955. He had flown in Valiant aircraft for 810 hours as captain, 50 hours second pilot and 19 hours 45 minutes dual. He was 38 years of age. His medical category was A2 G1 and he held a current master green instrument rating. His last flying assessment was "average" as a medium bomber pilot.

9. Crew's History

Second pilot - F/Lt. W. R. Howard. This officer commenced flying on 7th November, 1957. His total flying hours amounted to 408, of which 116 had been flown in Valiant aircraft. His last flying assessment on 3rd March, 1960, was "proficient" at the O.C.U.

Nav. Radar - F/Lt. A. J. Ireson. This officer had flown for a total of 1528 hours, of which 806 had been flown in Valiant aircraft.

Nav. Plotter - F/Lt. H. G. Bullen. This officer had flown for a total of 3256 hours, of which 846 were in Valiant aircraft.

Head Signaller - Sgt. R. H. Johnson. He had flown 2210 hours, of which 805 had been in Valiant aircraft.

10. Passengers

Not applicable

11. Loading and C.G. position

At the time of the accident the calculated all-up weight was estimated to be 143,000 lbs. The maximum permissible landing weight for the aircraft in this configuration, i.e. with underwing tanks fitted is 138,000 lbs. The maximum take-off weight allowed is 167,000 lbs. The aircraft took off at a maximum all-up weight of 146,311 lbs. The estimated position of the centre of gravity at the time of the accident was 47.55 feet aft of the datum. All these figures are within the permissible limit and have no bearing on this accident.

12. Airborne Navigational Aids and/or Special Equipment carried

Green satin.Gee N.B.S. 20 channel VHF, STR 18.

13. Ground aids available and ground aids used

All normal services. 20 Channel VHF only used.

14. Control logs and/or transcript of voice recording

Contained in the Board of Inquiry proceedings.

15. Witnesses' statements

Contained in the Board of Inquiry proceedings.

16. Infringement of Regulations

Not applicable.

17. Date and time of Coroner's Inquest and findings

15th August, 1960, 1400 hours. Verdict: accidental death.

18. Service Investigation

R.A.F. Board of Inquiry. President: Wing Commender K. Ritchley.

19. Rescue and fire services

R.A.F. Wittering and National Fire Service, Stamford.

20. Airfreme History

This aircraft was built by Vickers Armstrongs Limited in March 1957, under Contract No. 6/AK/9446/CB6(a) and had completed a total of 1102 hours 40 minutes. It had completed 68 hours 50 minutes since the last minor servicing and 277 hours 40 minutes since the last major. At this time Nos. 2, 3 and 4 engines were changed and No. 1 engine was changed at 1030.55 airframe hours. Perusal of the relevant documents showed that the aircraft had not suffered any major unserviceability throughout its service life.

21. Power Units, type, Mark and History

Port outer. (Engine No.1) Rolls Royce Avon E.C.U. Mk. 20501 No. 8013/A 653276. This engine was reconditioned and converted by Rolls Royce Ltd., East Kilbride, under contract Nos. KG/F/042/CB 13(a) and KG/F/043/CB 13(a) and completed on 18th March, 1960. It was installed on

9th April, 1960, and had run for 71 hours 45 minutes since. No major unserviceability had been experienced with this engine since installation.

Port inner. (Engine No.2) Rolls Royce Avon E.C.U. Mk. 20501 No. 4362/A 649666. This engine was converted by Rolls Royce Ltd., East Kilbride under Contract Nos. KG/F/05/CB 13(a) and KG/F/04/CB 13(a). This was completed on 6th April, 1959, and it was installed on 1st October, 1959, in this aircraft. Its total hours since installation amounted to 277 hours 40 minutes. No major unserviceability had been experienced.

Starboard inner. (Engine No.3) Rolls Royce Avon E.C.U. Mk. 20501 No. 6817/A 656078. This engine was converted by Rolls Royce Ltd., East Kilbride, from a Mk. 204 under Contract Nos. KG/F/05/CB 13(a) and KG/F/04/CB 13(a). This was completed on 18th March, 1959, and the engine was installed on 1st October, 1959. It had completed 277 hours 40 minutes running time without incident.

Starboard outer. (Engine No.4) Rolls Royce Avon E.C.U. Mk. 20501 No. 8040/A 653303. This engine had been converted by Rolls Royce Ltd., East Kilbride, under the same Contract numbers as Nos.2 and 3 and was completed on 26th February, 1959. It was also installed on 1st October, 1959, and had had 277 hours 40 minutes trouble free running time.

22. Propellers, type, Mark and history

Not applicable.

23. Distribution of wreckage, diagram and photographs

The aircraft had struck the ground with the port wing first, red navigation glass being found at this point on a heading of 44° magnetic, and had subsequently continued in a direction of 109° magnetic. This ~~switch~~ can be accounted for by the fact that the port wing struck the ground first. Compression ignition had then taken place in the port underwing overload fuel tank and at the same time all the port wing main fuel tanks had ruptured. By this time the aircraft had been travelling almost sideways and the force of the explosion blew the tail off to starboard and the starboard undercarriage some 150 yards down the line of flight together with the remains of all four engines. The remains of the cockpit and front fuselage had come to rest burning furiously some 100 yards from the point of first impact on the same magnetic heading. Severe ground fire had almost entirely destroyed the nose-wheel bay cockpit area and all the fuel tank areas. Twenty feet of the starboard mainplane from the tip inboard had become detatched and was found 200 yards beyond the area of the flash fire together with part of the starboard aileron. Photographs are attached behind this report showing disposition of the wreckage and the severity of break up and the ground fire.

24. Fuselage

Apart from the forward fuselage which was contained in one area the remainder of the fuselage had been completely disintegrated over a distance of 150 yards and a width of approximately 70 yards.

25. Centreplane

This had disrupted about its centre line but the forward part was contained with the front fuselage. The centreplane main spar had been fractured inboard of the main wing attachment bolts.

26. Port Mainplane

Completely disintegrated on impact.

27. Starboard Mainplane

Apart from the tip end referred to in paragraph 23 the root end of this mainplane was attached to a small piece of centreplane and still contained remains of the dive brake and flap screw jacks. It was also severely burnt by ground fire.

28. Ailerons or elevons

Remains of both sets of ailerons were attached at their hinge points to the remains of their mainplanes and although in most cases the hinges were fractured there was no evidence to show any pre-crash failure or mechanical functioning of this service.

29. Aileron or elevon tabs

The aileron balance tab was established as being in the neutral position as was also the manual trim tab.

30. Flaps, air brakes, spoilers or slats

It was established from the screw jack settings that the flaps were in the normal UP position and this was confirmed by the cam setting in the flap cam selector box, i.e. the last selection of flap before the accident had been the normal UP position. It was confirmed by electrical testing that both the airbrake and flap motors were in working condition. The airbrakes were established to have been in the CLOSED position.

31. Fins

Top Fin. This was still attached to the fixed part of the tailplane ahead of the movable tailplane.

Bottom Fin. Still attached to the rear fuselage.

32. Rudder

Still attached to the fin top and bottom and apart from slight crushing of the starboard shroud was still attached and working in its normal sense.

33. Rudder tabs

Still attached to the rudder and in the neutral position.

34. Tailplane

The tailplane was still attached to the fin and the incidence setting showed - .75 of a division aircraft nose up. This was confirmed on the tailplane actuator motor jack.

35. Elevator

This was still attached to the tailplane.

36. Elevator tabs

Attached to the elevator and showed .75 of a division nosedown.

37. Flying controls

(a) Power assisted control mechanism. Detailed examination so far as was possible in view of the degree of disintegration showed that all were properly connected and working in their correct sense prior to impact. The rudder and elevator feel unit catches were found to be engaged in their respective plates. The aileron feel unit ~~plate~~ release mechanism was not recovered, but the extension of the feel unit piston shaft was similar to those of both the elevator and rudder and in consequence it is felt that the aileron feel unit was probably in operation.

(b) Automatic pilot. No trace could be found of the auto pilot Mk. 10 controller or amplifier unit. All 3 Servo-motors were recovered but no relevant evidence could be extracted from them. It is felt that had the auto pilot been selected to ON the torque limit switches in the Servo-motors would have probably operated due to the shock load imposed by impact. In this case the evidence, if any, shown by the gyros would have indicated that

the unit was either on STANDBY or ON. The same conditions apply to the rudder stabiliser.

38. Main undercarriage, nose and tailwheel

It was established that the main undercarriage was UP and locked at the moment of impact and that the nosewheel was DOWN and locked. The severity of the ground fire in both the nosewheel area and cockpit effectively destroyed any evidence to show why the nosewheel had not retracted immediately after take-off.

39. Crew compartment

This area was entirely destroyed by fire and had also been severely disintegrated by the force of impact. It was evident that all the crew members were strapped in.

40. Oxygen, pressurisation, cabin heater, de-ising equipment, etc.

Not applicable.

41. Power Units

All four power units showed unmistakable evidence of being under a high degree of power when the aircraft struck the ground. There was no evidence of any pre-crash fire.

42. Installation

As all four engines had been torn away from the aircraft and the installation disintegrated and severely damaged by ground fire no useful relevant evidence could be obtained from these items.

43. Fire in (a) air or (b) ground

Flash fire on the ground initiated by compression ignition of the port underwing overload tank and disruption of the main wing tanks. It was evident that the way in which the aircraft crashed precluded the inertia switches operating in the normal manner. All the fire extinguisher bottles were recovered and none had been operated electrically.

44. Safety equipment

Both Martin Baker ejector seats had been operated after they had been torn away from the mountings due to the break-up of the aircraft and the rails had been ejected from the cockpit area leaving the seats and their occupants in the remains of the cockpit.

45. Defects, S.T.I's, S.I's, etc.

None.

46. Miscellaneous

No comments.

47. Interference with wreckage

Nil.

R. Clarke

Senior Investigating Officer.

Accidents Investigation Branch,
Ministry of Aviation.

3/(

DH

M E S S A G E

67064

(RECEIVED AUGUST 12th 1960)

FROM: WITTERING

TO: AM LONDON = HQ 41 GP = 71 MU BICESTER
NO 1 WORKS AREA = IPTM = RECORDS
HQBC = HQ 3 GP

PRIORITY UNCLASSIFIED

FS53

ATTN No 1 WORKS AREA FOR AMDGW SUPERINTENDING ENGINEER CMM DIM HOUSE CMM ELMER ST CMM GRANTHAM PD AIR MINISTRY FOR DFS PD ACCIDENT SIGNAL PD

(A) (1) VALIANT BK1 XD864 (2) RR AVON 20401 No 1 8103/A653276 No 2 4362/A649666 No 3 6817/A65078 No 4 8040/A653303
(B) WITTERING No 7 SQUADRON
(C) (1) 5234N 0038W (2) N/A (3) N/A
(D) (1) 12 AUG 1038A (2) DAY (3) 2/8 SC BASE 2500 TOPS 5000 VISIBILITY 13 NM SURFACE WIND N 15 KNOTS VMC
(E) NAVIGATION EXERCISE AND SIMULATED BOMBING
(F) (1) NOSE WHEEL FAILED TO RETRACT PD ACCIDENT OCCURRED WHILE CAPTAIN INVESTIGATED NOSE WHEEL FAILURE IN LOCAL AREA PD IN FLIGHT PD THREE MINUTES AFTER TAKE OFF PD
(2) CAUSE UNKNOWN
(G) (1) YES (2) UNUSUAL OR OBSCURE FEATURES OF A TECHNICAL NATURE
(H) (1) MAJOR CRASH CAT 5 (2) YES (3) NO
(J) (1) 196536 FLT LT WICKHAM BJ KILLED AIRCRAFT CAPTAIN SQUADRON 1st PILOT
(2) 2766512 FLT LT WR HOWARD CO-PILOT KILLED
2540707 FLT LT IRESON AJ NAV RADAR KILLED
51039 FLT LT BULLEN HG NAV RADAR KILLED
3510412 ST JOHNSON RH AIR SIGNALLER KILLED
(3) (4) N/A (5) FIVE
(K) (1) FIVE AT KETTERING GENERAL HOSPITAL (2) N/A
(L) (1) KINFORMED PD MRS IRESON BY TELEGRAM RECEIPT NOT CONFIRMED
(2) FLT LT WICKHAM N OF K WICKHAM JM WIFE CMM 32 TUDOR WALK CMM HONINGTON CMM SUFFOLK PD
FLT LT HOWARD N OF K HOWARD WILLIAM FATHER CMM 82 SOUTH BANK RD CMM SOUTHPORT PD HOWARD MYFANWY LLOYD WIFE CMM OFFICERS CARAVAN SITE CMM RAF LANGTOFT CMM PETERBOROUGH PD
FLT LT IRESON N OF K IRESON M WIFE 17 LANDSDOWN AVE BEXLEY HEATH KENT PD MRS IRESON MOTHER 15 DIARSIE ROAD CMM ELTHAM CMM SE9 PD
FLT LT BULLEN N OF K BULLEN CAROLINE WIFE 20 TUDOR WALK CMM HONINGTON CMM SUFFOLK PD SGT JOHNSON N OF K JOHNSON MRS WIFE CARAVAN SITE CMM RAF LANGTOFT CMM PETERBOROUGH PD JOHNSON C FATHER PD 63 MINCHERY ROAD CMM LITTLEMORE CMM OXFORD PD
(M) DAMAGE TO GROWING CROPS CMM OWNER UNKNOWN
(N) NIL
(O) NO
(P) N/A
(Q) FURTHER SIGNAL NO

DATE TIME GROUP: 121350/Z

S/L Beckett.
S/L Beadle
EXT 167
HQBC.

CRASH CIRCULATION F.A.1.
+ S.11b. + P.4
RESIDENT CLERK (ADVANCE COPY)

A.R.9.(CAS) (9 copies)

16 AUG 1960

Notified by HQBC 1130 hrs - A, B yes. M'Clarke proceeded pm. FRIDAY 12 hrs.

Thurso, A.F. Glasgow re engines

(108)

WITT/C.1904/69/P.1

Royal Air Force,
Wittering,
Peterborough,
Northants

27th August, 1960

Sir,

Procedings of Board of Inquiry into Aircraft
Accident to Valiant XD 864 on
12th August, 1960

1. Herewith enclosed is a copy of R.A.F. Form 412A ommitted from the above procedings forwarded under cover of this stations letter of even reference dated 26th August, 1960.

2. Two (2) copies of R.A.F. Form 412A are enclosed for Headquarters No. 3 Group one each for the final and advance copies of the procedings.

I.O. Stephens

(A.O. STEPHENS)
Flight Lieutenant,
for Officer Commanding
Royal Air Force, Wittering

The Under-Secretary of State for Air,
Air Ministry, (Attn. Directorate of Flight Safety),
Whitehall,
London, W.C.1

Headquarters Bomber Command,
Royal Air Force,
High Wycombe,
Naphill,
Bucks.

Headquarters No. 3 Group,
Royal Air Force,
Mildenhall,
~~Surrey~~ SUFFOLK.

Chief Inspector of Accidents,
Ministry of Civil Aviation,
Berkely Square House,
Berkely Square,
London

(109)

Reference.....

Phone fr S/L Beckett 1130hrs on 12/8/60.

Valiant XD864. (1096 dn SOUTHOE)

crashed 6 miles fr Wittering ~~S~~ (disused aerfield)

5 killed. (all occupants).

Weather good.

Nose wheel did not come up on T/off.
Tower called A/C + A/C replied. Then flew into ground.

No survivors

Pilot elected to remain local.

S/L Beadle 167. Bomb Comd.

Predicted.

A.I.B. Yes.

W/C Richley (Gaydon)

5

Vickers will help if required

Philip Stanbury Vickers Weybridge 5555

Church Farm
Laxton
Corby
Northants.

Mr Kemble 3 more. reps shelter

Mr Clarke.

CONFIDENTIAL

Board of Inquiry Assembled at Royal Air Force Wittering on 12th August, 1960

Certified true copy.

Diary of Action

12th August, 1960

1.	15.30 hours.Z	Board assembled.
2.	16.00 hours Z	Left Wittering for scene of accident.
3.	19.30 hours Z	Board returned and adjourned for dinner.
4.	20.30 hours Z	Board re-assembled and contacted various police stations, obtaining details of witnesses and telephoning witnesses.
5.	22.00 hours Z	Board adjourned.

13th August, 1960

6.	07.00 hours Z	Board assembled, telephoned civilian witness.
7.	07.20 hours Z	Left Wittering to interview civilian witness.
8.	07.40 hours Z	Interviewed witness, statement not taken.
9.	08.20 hours Z	Mr. Foster first witness contacted, taken to scene of accident, statement taken.
10.	09.40 hours Z	Mr. Golland, second witness contacted and statement taken.
11.	10.55 hours Z	Visited place where Mr. Golland saw aircraft.
12.	11.25 hours Z	Mrs. Dolby interviewed, taken to position where she saw the aircraft and statement taken.
13.	12.15 hours Z	Gretton police station visited.
14.	12.40 hours Z	Board returned to Wittering.
15.	13.20 hours Z	Arranging for various witnesses to be available late evening.
16.	13.30 hours Z	Left Wittering for Gretton.
17.	13.55 hours Z	Arrived Gretton police station.
18.	14.05 hours Z	Left Gretton Police station.
19.	14.20 hours Z	Visited Corby police station and read various civilian statements to decide which would provide best evidence.
20.	15.00 hours Z	Left Corby Police station.
21.	15.10 hours Z	Mr. Wymant, fourth witness interviewed.
22.	16.10 hours Z	Left Mr. Wymant's house.
23.	16.35 hours Z	Visited place where Mr. Wymant saw aircraft.
24.	16.45 hours Z	Visited scene of accident for discussion with A.I.B. representative.
25.	17.00 hours Z	Left to contact Mr. Dexter.
26.	17.30 hours Z	Mr. Dexter, fifth witness, interviewed.
27.	18.25 hours Z	Mr. Dexter's statement completed.
28.	18.50 hours Z	Board returned to Wittering, adjourned for dinner.
29.	19.45 hours Z	Board re-assembled, discussed the A.I.B. representative's findings to date. Arranged for certain specific facts to be determined by the A.I.B. representative.
30.	20.20 hours Z	Sqn. Ldr. Spackman interviewed.
31.	21.00 hours Z	Wg. Cdr. Mugford interviewed.
32.	21.30 hours Z	Documents examined and a plan of action decided for the next day.
33.	22.59 hours Z	Board adjourned.

14th August, 1960

34.	07.30 hours Z	Board re-assembled.
35.	08.30 hours Z	Flight Lieutenant Chambers, sixth witness, interviewed.
36.	09.30 hours Z	Flight Lieutenant, Beacon, seventh witness interviewed.
37.	10.15 hours Z	[illegible] tenant Blurton, eighth witness interviewed.
38.	11.40 hours Z	Squadron Leader Hobson, ninth witness, interviewed.
39.	12.30 hours Z	Board adjourned for lunch.
40.	13.15 hours Z	Board re-assembled. N.B.S. calculators given to O.C. Signals Sqn. for investigation to attempt to find an air speed setting.
41.	13.25 hours Z	Cpl. Spence, tenth witness, interviewed.

42.	14.15 hours Z	Sqn. Ldr. Spackman, eleventh witness interviewed.
43.	15.35 hours Z	Sqn. Ldr. Perkins, twelth witness, interviewed.
44.	16.20 hours Z	Wg. Cdr. Thomas interviewed, and given the dive breake gearbox to investigate and determine the position of the extreme limit stop gear nut.
45.	17.00 hours Z	Left Wittering for the scene of the accident for discussion with the A.I.B. representative. Detail examination of the engines, ejection seat parts and other particles of the aircraft that had been identified. Recovered the N.B.S. Control Units Type 585 and 595 for investigation by O.C. Signals Sqn.
46.	19.10 hours Z	Adjourned for dinner.
47.	20.00 hours Z	Board re assembled.
48.	20.10 hours Z	Wg. Cdr. Mugford, 13th Witness, interviewed.
49.	21.25 hours Z	Board determined plan of action for the following day.
50.	21.55 hours Z	Board adjourned.

15th August, 1960

51.	07.00 hours Z	Board re-assembled.
52.	07.30 hours Z	Fg. Off. Rea interviewed.
53.	07.45 hours Z	Sqn. Ldr. Spencer, 14th witness interviewed.
54.	08.50 hours Z	Board gave further instructions to technical personnel on investigation of items.
55.	09.15 hours Z	Telephoning Cottesmore and N. Luffenham re. possble. witnesses which they had been asked to investigate.
56.	09.20 hours Z	Fg. Off. Rea, 15th Witness, interviewed.
57.	10.15 hours Z	Interviewed airmen from Cottesmore and N. Luffenham. Evidence was not reliable enough to include as a statement.
58.	11.50 hours Z	Board adjourned.
59.	12.45 hours Z	Board re-assembled.
60.	12.50 hours Z	Mr. Ireson, 16th witness, interviewed.
61.	14.35 hours Z	Examination of F. 700's and servicing documents. Arranging for preliminary flights to be carried out in the Flight Simulator at Gaydon.
62.	15.00 hours Z	Fg. Off. Norsworthy, 17th witness, interviewed.
63.	16.20 hours Z	Board visited Electronics Centre to see the condition of the Calculator 3 from whcih an air speed setting had been obtained.
64.	16.50 hours Z	Obtaining details of the simulated flights carried out at R.A.F. Gaydon and arranging for further flights to be carried out.
65.	17.00 hours Z	Chief Tech. McCafferty, 18th witness, interviewed, statement taken and witness recalled.
66.	18.55 hours Z	Board adjourned.
67.	20.00 hours Z	Board re-assembled and deliberated.
68.	22.15 hours Z	Board adjourned.

16th August, 1960

69.	07.00 hours Z	Board re assembled. Telephone calls re. further civilian witnesses statements which had been obtained by the civilian police. Consideration of and arranging for Board to carry out Simulator Tests at R.A.F. Marham. Inspection of modification, S.T.I. and S.I. records. Inspection of servicing schedules.
70.	12.00 hours Z	Board adjourned.
71.	13.00 hours Z	Board re-assembled, interviewed the Fire Section N.C.O. on details required for the F. 2888.
72.	14.00 hours Z	Board flew to R.A.F. Marham to conduct Flight Simulator trials.
73.	17. 55 hoursZ	Board arrived back from R.A.F. Marham.
74.	18.00 hours Z	Examined inverter with Sqn. Ldr. Beskett Bomber Command Accident Investigation Officer.

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75.	19.10 hours Z	Board adjourned.
76.	20.05 hours Z	Board re-assembled. Examined evidence, prepared the final list of witnesses and decided further evidence required.
77.	22.00 hours Z	Board adjourned.

17th August, 1960

78.	07.00 hours Z	Board deliberated and prepared a map to be included as an Appendix.
79.	08.00 hours Z	Flt. Lt. Hopla, 19th witness, interviewed.
80.	10.30 hours Z	A.I.B. representative interviewed to obtain latest facts and request further information.
81.	12.10 hours Z	Board adjourned.
82.	13.00 hours Z	Board visited an aircraft with the A.I.B. representative to clarify information.
83.	14.00 hours Z	Forwarded a number of electrical motors to be tested by The Electrical Section.
84.	15.00 hours Z	Board examined Air and Technical Orders.
85.	15.30 hours Z	A.I.B. representative interviewed to discuss all technical matters relating to the inquiry.
86.	19.00 hours Z	Board adjourned.
87.	20.00 hours Z	Board re-assembled. Wg. Cdr. Mugford 13th witness recalled.
88.	21.55 hours Z	Board adjourned.

18th August, 1960

89.	07.00 hours Z	Board re-assembled.
90.	07.45 hours Z	Flt. Lt. Lax, 20th witness, interviewed.
91.	09.00 hours Z	Sqn. Ldr. Perkins, 12th witness recalled.
92.	10.00 hours Z	A.I.B. representative consulted.
93.	10.45 hours Z	M. Sig. Gillham, 21st witness, interviewed.
94.	11.20 hours Z	Board examined documents.
95.	11.30 hours Z	S.A.C. Farrow, 22nd witness, interviewed.
96.	12.00 hours Z	Board adjourned.
97.	13.00 hours Z	Board re-assembled.
98.	13.10 hours Z	A.I.B. representative submitted his statement. Statement discussed.
99.	14.10 hours Z	Flt. Lt. Bennett, 23rd witness, interviewed.
100.	15.45 hours Z	L.A.C. Stephens, 24th witness, interviewed.
101.	16.25 hours Z	Cpl. Bensley, 25th witness, interviewed.
102.	17.10 hours Z	Board adjourned.
103.	19.50 hours Z	Board re-assembled. Board deliberated and considered preliminary findings.
104.	21.50 hours Z	Board adjourned.

19th August, 1960

105.	07.00 hours Z	Board assembled and reconsidered findings in relation to evidence of witnesses.
106.	08.30 hours Z	Sqn. Ldr. Spackman, 11th witness, recalled.
107.	10.00 hours Z	Fg. Off. Norsworthy, 17th witness, recalled.
108.	11.30 hours Z	Board adjourned.

22nd August, 1960

109.	09.00 hours Z	Board re-assembled. Board continues preparation of findings and compilation of Appendicies to For, 412.
110.	12.00 hours Z	Board adjourned.
111.	12.50 hours Z	Board re-assembled. Further inspection of a Valiant aircraft. Arranged for photographs to be produced for inclusion in Appendicies.
112.	13.00 hours Z	Sqn. Ldr. Scott-Jackson, 26th Witness, interviewed.

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113.	14.30 hours Z	Sqn. Ldr. Hobson, 9th witness recalled.
114.	15.30 hours Z	Board drafts final version of findings.
115.	18.30 hours Z	Board adjourned.
116.	19.30 hours Z	Board re-assembled, continued drafting of findings.
117.	21. 45 hours Z	Board adjourned.

23rd August, 1960

118.	07.00 hours Z	Board re-assembled. Board continued drafting of findings.
119.	11. 45 hours Z	Board adjourned.
120.	12.45 hours Z	Board re-assembled.
121.	13.00 hours Z	Board paid final visit to scene of accident and to R.A.F. Polbrook to check the progress of salvage operations.
122.	15.45 hours.Z	Board returned to R.A.F. Wittering and completed Form 412
123.	19.00 hours Z	Board adjourned.
124.	20.00 hours Z	Board re-assembled, and completed final check of all proceedings.
125.	21.45 hours Z	Board adjourned.

24th August, 1960

126.	10.30 hours Z	President handed proceedings to he Station Commander , Royal Air Force Wittering

SEVERITY	D	M	Y	AIRCRAFT TYPE	MK.	A/C NUMBER	CMD.	GRP.	UNIT	BASE ATTACHED	YEAR
FATAL W.O.	12	8	60	VALIANT	8K1	XD 864	B	3	7 SQN.	WITTERING	1960

PHASE	TYPE OF ACCIDENT	P. CAUSE	OTHER AIRCRAFT	
FL	QC	494		

CASUALTY	NO. OF A/C	DES.	CREW				(47)

The nosewheel failed to retract following a normal take off. The P was advised by A.T.C and got himself into a flying attitude to touch-port and after this time it was [illegible] and allowed [illegible] The [illegible] main wings were levelled after this and A started a [illegible] in this position the A drifted to the [illegible] wing and struck the ground. Shortly before impact, a sudden increase in E power was heard. On impact the A enveloped, caught fire and all the occupants were killed.

Board found primary cause of accident was that P in control (assumed C.o.P.) entered the [illegible] with insufficient speed and/or E power to maintain an adequate safety margin or stalling speed for the relevant flight configuration. Contributory causes were (a) The failure of the nosewheel to retract. (b) Power in [illegible] after [illegible] Failure completely retraction of U/C contrary to procedure as laid down in A.P. 1275 (NAVIGATION AND SIMULATED [illegible])

The Visiting pilot's notes. When was unclear as to show that the flight [illegible] for the flight was limited. A.O.C.in-C states this accident was due to [illegible]

PILOTING CAT. R.F. JOHNSON AIR/SIG (K) received an unsatisfactory [illegible]

CAPT. FLT. LT. ANDERSON NAV/RAD (K). SIGS FLT LT. H.G. ELLEN NAV/RAD (K)

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