

File No. 2427-42

Docket No. SA-75

Adopted: June 16, 1943

Released: June 21, 1943

REPORT OF THE CIVIL AERONAUTICS BOARD

On the investigation of an accident involving aircraft of United States registry, NC 18951, DC-3, and Army aircraft 20116, Type C-53, which occurred near Kansas City, Missouri, on November 4, 1942

A mid-air collision involving aircraft of United States registry, a Douglas DC3, NC 18951, and a U. S. Army aircraft, Type C-53,^{1/} No. 20116, occurred at an altitude of between 3500 and 3900 feet about $4\frac{1}{2}$ miles northeast of the Kansas City Range Station and $1\text{-}\frac{3}{4}$ miles north of the "on" course of the northeast leg of the Kansas City Radio Range at approximately 11:49 a.m. (CWT)^{2/} on November 4, 1942. At the time of the accident NC 18951 was operating on a check flight in the vicinity of the Kansas City Municipal Airport as a part of the routine instrument flight instruction of Transcontinental & Western Air, Inc.^{3/} The C-53 was on a non-stop cross-country flight from Indianapolis, Indiana, to Wichita, Kansas, via Kansas City, in the service of the U. S. Army Air Forces.^{4/} The DC3 received major damage from the collision in the air and was demolished by the resultant crash landing in a group of small trees in the vicinity of Linden, Kansas. The C-53 received major damage as a result of the collision but succeeded in landing at the Kansas City Municipal Airport without further damage. The DC3 captain sustained minor injuries. None of the 5 other persons involved was injured.

CONDUCT OF INVESTIGATION

The Kansas City Office of the Civil Aeronautics Board^{5/} received notification of the accident and the Board immediately initiated an investigation in accordance with the provisions of Section 702 (a)(2) of the Civil Aeronautics Act of 1938, as amended. Air safety investigators of the Board proceeded to the scene of the accident and arrived there shortly after noon on November 4, 1942. The wreckage of the DC3 was under guard.

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- 1/ An Army version of the Douglas DC-3.
 - 2/ All times referred to herein are Central War Time.
 - 3/ Hereinafter referred to as "TWA".
 - 4/ Hereinafter referred to as the "Army".
 - 5/ Hereinafter referred to as the "Board".

In connection with the investigation, a hearing was held in Kansas City, Missouri, on November 9 and 10, 1942, with W. K. Andrews, Chief, Investigation Section, Safety Bureau of the Board, acting as Presiding Officer. The following personnel of the Safety Bureau participated in the hearing: R. P. Parshall, Senior Air Safety Investigator; and W. F. Bridgeman and H. G. Boonstra, Air Safety Investigators.

Upon the basis of all the evidence accumulated during the investigation, the Board now makes its report in accordance with the provisions of the Civil Aeronautics Act of 1938, as amended.

SUMMARY AND ANALYSIS OF EVIDENCE

Flight Personnel

The TWA crew consisted of Lawrence Earl Welch, captain, and Maurice Melvin Lipke, first officer. Joseph Urban Goetz, a first officer employed by TWA, was the only other person aboard.

Captain Welch had logged approximately 4488 hours of flying time, of which 2888 were flown in airline operation. He held an airline transport pilot certificate and was rated for multi-engine landplanes of 1000-3000 h.p. His last physical examination, required by the Civil Air Regulations, was taken on July 8, 1942, and a subsequent physical examination was given him by TWA on September 30, 1942. He had been employed by TWA since December 15, 1938.

First Officer Lipke had been employed by TWA since June 2, 1941. He had logged about 1500 flying hours, of which approximately 700 were accumulated while in the employ of TWA. His last physical examination, required by Civil Air Regulations, was taken on December 3, 1941. He held a commercial pilot certificate with instrument and instructor ratings.

It appears from the evidence that the flight crew of the DC3 held the proper certificates, were physically qualified, and by reason of their training and experience were qualified for the flight and equipment involved.

Loyal Tyler Penn, a captain in the U. S. Army Air Forces, stationed at Stout Field, Indianapolis, had formerly held an airline transport pilot certificate issued by the Civil Aeronautics Administration. Previous to entering the Army he had logged approximately 3755 flying hours, about 2600 of which were accumulated in airline operation.

Obert Carlyle Burrell, a second lieutenant in the U. S. Army Air Forces, stationed at Stout Field, Indianapolis, held a pilot's rating in the Army and had logged about 320 solo flying hours.

Philo Henry Whinchart, a sergeant in the U. S. Army Air Forces, was standing in the companionway back of the pilots at the time of the collision.

The Airplanes

Aircraft NC 18951 was a twin-engined Douglas model DC3, manufactured by the Douglas Aircraft Corporation and registered in the name of TWA. The aircraft and its equipment were approved by the Civil Aeronautics Administration for air carrier operation, with a capacity of 21 passengers and a crew of 4.

The Army C-53, No. 20116, a twin-engined aircraft similar to the DC3, was also manufactured by the Douglas Aircraft Corporation.

Facts Preceding the C-53 Flight

The Army pilot, Captain Penn, on the morning of the subject accident, planned his flight from Stout Field, Indianapolis, to Wichita via Terre Haute, Indiana; Effingham, Illinois; and St. Louis, Columbia, and Kansas

City, Missouri. After consulting the Army meteorologist, he filed a flight plan to proceed contact at 2000 feet to Columbia, and from there, he planned to continue on instruments, via Kansas City, in the overcast at 4000 feet.

History of the C-53 Flight

Army C-53 took off from Stout Field at about 9:03 a.m., and, with Lieutenant Burrell at the controls, proceeded at an altitude of approximately 2000 feet to Terre Haute, arriving over Terre Haute at 9:26 a.m., one minute later than the estimated arrival time. The flight passed over Effingham at 9:48 a.m. and over St. Louis at 10:22 a.m., exactly on estimated flight schedule. Prior to arriving over St. Louis, several unsuccessful attempts had been made to contact St. Louis for clearance to Kansas City, and, after passing St. Louis, the St. Louis Station called Army C-53 to relay a clearance from Kansas City Air Traffic Control, as follows: "For Army 20116, Item one, cleared from twenty-five miles east of Columbia over Columbia and Kansas City to the Wichita Range Station. Item two, to cruise two thousand to Columbia, four thousand to Wichita. Item six, to maintain four thousand until further advised. Item sixteen, no delay expected. Special Instructions: Contact Columbia and Kansas City Radio when passing, and contact Wichita Radio for further clearance."

About 4 minutes before arrival over Columbia, C-53 contacted the Columbia Station advising that Kansas City clearance had been received O.K. and that they would be over Columbia in about 3 minutes. Columbia then confirmed the Kansas City clearance C-53 had received, and stated that they (Columbia) would advise Kansas City of the arrival of C-53 over Columbia at 11:01 a.m. and of the flight's estimated arrival time over Kansas City, 11:42 a.m. The Kansas City A.T.C. added two minutes to this estimated arrival time because of adverse winds and estimated it at 11:44 a.m.

At Columbia, Captain Penn took over the controls, climbed to about 4000

feet and proceeded in the overcast on the west leg of the Columbia range until he intersected the northeast leg of the Kansas City beam. In encountering stronger adverse wind at the new altitude, he lost approximately 5 minutes from his estimated arrival time over Kansas City, between Columbia and the point of intersection with the northeast leg of the Kansas City Range over the fan marker at Excelsior Springs. He then made a wide turn, and was proceeding on the northeast leg toward Kansas City at 11:44 a.m. At the same time, 11:44 a.m., Kansas City Air Traffic Control, even though they were aware of the expected arrival over Kansas City of the Army C-53, cleared the TWA DC3 flight to take off from Kansas City and to proceed into the north quadrant. The Army C-53 continued on the northeast leg and at 11:47 was approaching the Kansas City Range Station when Captain Penn told Copilot Burrell that they were already 5 minutes late and to add 3 more minutes to their estimated time of arrival at Wichita. It was during or just after this conversation, as Burrell was preparing to make this report to Kansas City, that there was a lot of noise and the plane swerved violently to the right. Captain Penn stated that he looked out of the right window, saw a definite swirl in the air and knew that another plane had gone by. The Army aircraft, with the right wing well down, turned to the right and began losing altitude. After some difficulty, Captain Penn was able to bring the right wing up and when he had gained partial control, he reported to the Kansas City Range Station that "We just collided with another plane at 4000 feet over the Kansas City Range Station. I want in the clear." He reported that a part of one wing was gone, and requested weather. After descending what he estimated to have been about 1000 feet, he broke out contact at a 215° heading. He then saw two airports - the Fairfax and the Municipal. On account of the damage to the right wing, he decided to land as soon as possible, made a wide right turn, and landed at the Kansas City Municipal Airport.

Facts Preceding the DC3 Flight

In the early forenoon of November 4, 1942, the TWA pilot, Captain Welch, had been operating in the neighborhood of the Kansas City Airport on a flight clearance for instrument instruction to TWA copilots. At 11:16 a.m., during the flight just preceding the one which resulted in the collision, Welch had received from the company radio, and acknowledged, traffic as follows: "Additional traffic westbound Army C-53 estimated to be over Kansas City 11:44 a.m., central, cruising 4000 feet en route St. Louis to Wichita."

Upon landing from this flight, Captain Welch discharged his student, after which First Officer Lipke and Goetz entered the plane. Lipke sat in the pilot's cockpit on the left and Captain Welch occupied the right seat. Goetz was in the passenger compartment. The Kansas City Air Traffic Control Center then gave Welch instructions regarding his clearance for the subject flight as follows: "ATC clears you from Kansas City to the Kansas City Range Station to cruise at 6000, to climb to 6000 feet in the north quadrant Kansas City Range. Request clearance before descent."

History of the TWA DC3 Flight

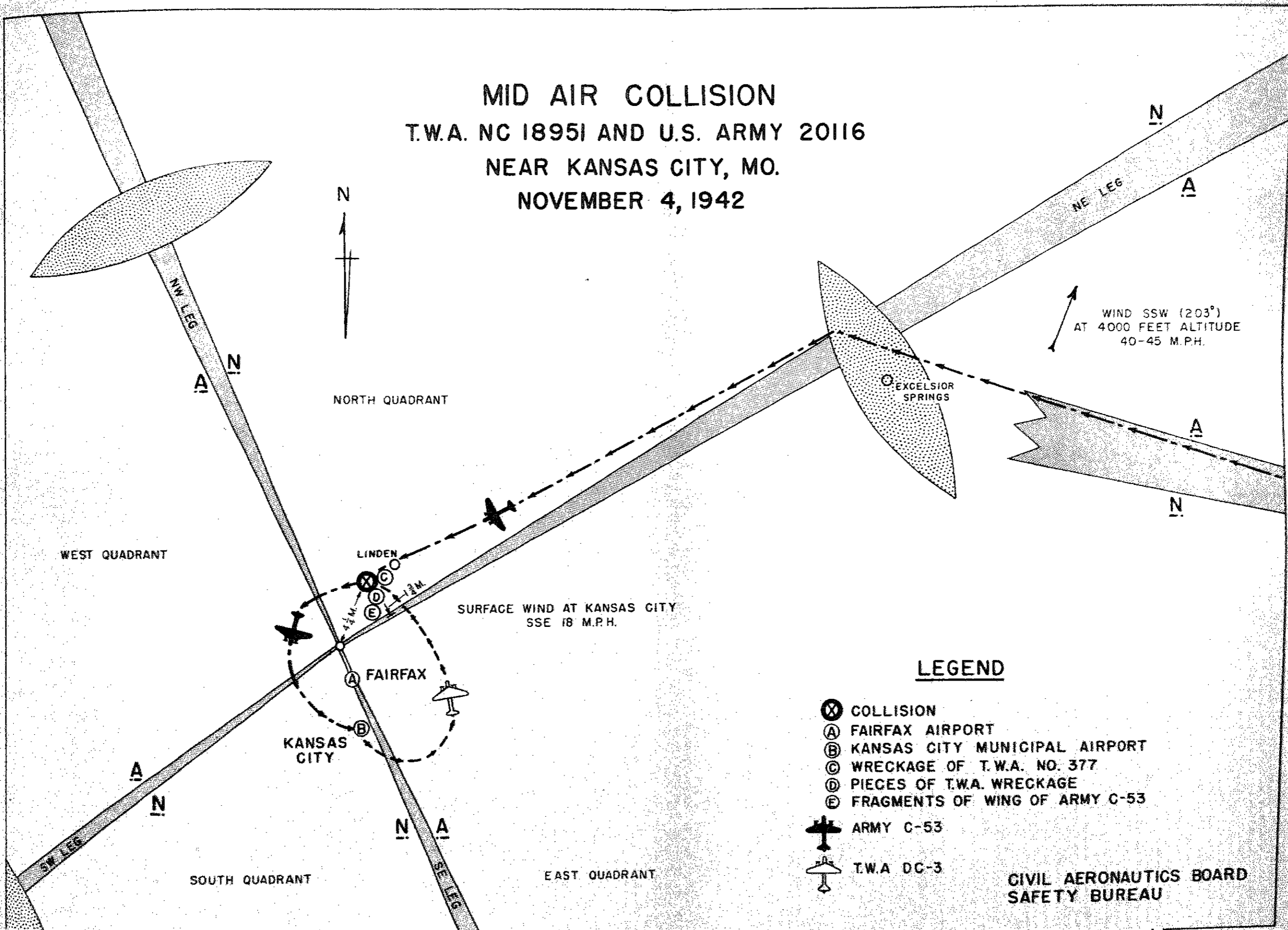
The tower cleared the flight from the north block and, with Lipke at the controls, they took off toward the south at 11:44 a.m. At the same time the Army C-53 was expected over the Kansas City Radio Range but had not yet reported. The TWA DC3 made a left climbing turn around Kansas City, headed north, approaching the northeast leg of the Kansas City Radio Range. Welch and Lipke both stated that they assumed a heading of about 330°. Welch stated that when they reached a point about 2 miles northeast of the range station they crossed the leg just under the overcast "at some altitude between 2500 and 2800 feet" and entered the north quadrant. Captain Welch told Lipke to assume a more northerly heading and to start the climb. They stated that they entered the overcast at about 3000 feet, climbing on a

MID AIR COLLISION

T.W.A. NC 18951 AND U.S. ARMY 20116

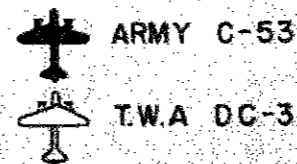
NEAR KANSAS CITY, MO.

NOVEMBER 4, 1942



LEGEND

- ⊗ COLLISION
- Ⓐ FAIRFAX AIRPORT
- Ⓑ KANSAS CITY MUNICIPAL AIRPORT
- Ⓒ WRECKAGE OF T.W.A. NO. 377
- Ⓓ PIECES OF T.W.A. WRECKAGE
- Ⓔ FRAGMENTS OF WING OF ARMY C-53



CIVIL AERONAUTICS BOARD
SAFETY BUREAU

north heading. They continued in the climb, and, upon instructions from Welch, Lipke advanced the manifold pressure from $26\frac{1}{2}$ inches to 28 inches. They stated further that it was immediately after making this adjustment that the collision occurred. The aircraft shuddered violently and the impact threw the nose and left wing down, slowing up the aircraft considerably. Captain Welch then took over the controls. Both pilots knew they had collided with something but did not know what.

The aircraft came out of the overcast, heading southwest, in an attitude described by Welch as "between a tight left spiral and a spin." Captain Welch, in an effort to effect recovery, reduced the power, applied full right rudder and full right aileron, and maneuvered the aircraft in such a manner as to further reduce the speed. He then cut the power completely. Upon finding that this reduced his control he re-applied power and called to Lipke for full flap. He selected one or more fields in which to attempt a crash landing. However, he had very little or no control. When within a short distance of the ground, with the landing gear up, and the airspeed reduced to approximately 60 miles an hour, the aircraft struck several small trees, hit the ground, and swung around to the right about 90° before coming to a stop.

After landing, Captain Welch called TWA on the ship's radio and reported that he had made a crash landing approximately 5 miles north of North Kansas City, near Linden. (See map opposite page.)

Witnesses

There were no witnesses to the collision as it occurred in the overcast. The Army C-53 was observed by the TWA junior radio operator after it came through the base of the overcast, circled very low and landed while still turning. There were two known witnesses to the maneuvers of the DC3 after it came through the overcast and made a crash landing. One was a man

experienced in aviation. He stated that he saw the plane come out of the clouds in a spiral, make about 1-3/4 turns and head for a pasture about one-half or three-fourths of a mile northwest of his home. He did not observe any falling airplane parts. The other witness, who lives about two miles southwest of Linden, noticed the plane from the window of his home and observed it in "kind of a spin losing altitude very fast"; then, at an altitude of approximately 600 or 700 feet, it appeared to him that the aircraft straightened out and leveled off directly over him. Believing it was going to make a landing in an open field across the road from his place, he ran outside and, glancing up, saw several pieces of the aircraft falling. One large piece fell on his property.

Altitude of the Aircraft at Time of Collision

Captain Penn made the first barometric pressure setting on his altimeter before take-off at Indianapolis and his two changes, one at St. Louis and another after leaving Columbia, were made from forecasts given him at Indianapolis at 8:30 a.m. He did not request this information at any time during the trip but stated that he had instructed Copilot Burrell to get "weather" when he reported to Kansas City. It was while Burrell was preparing to report to Kansas City that the collision occurred.

It is evident that there was a discrepancy of .09 inches between the altimeter setting of 29.99 inches on the Army C-53, after landing at Kansas City about 11:55 a.m., and the records of the U. S. Weather Bureau, which show the barometric pressure setting at 12:00 noon to have been 29.90 inches. The difference of .09 inches would indicate that the C-53 was actually flying about 100 feet lower than the indicated altitude when the collision occurred. Lipke stated that just shortly before the collision, upon instructions from Welch, he advanced the manifold pressure from $26\frac{1}{2}$ inches to 28 inches and that while making this adjustment the altimeter recorded 3200 feet. When questioned regarding his altitude he stated that it was "3100 ft."

or minus 50 feet." However, this was slightly before the collision and they were still climbing. There were no barograph records available from either flight, therefore, the exact altitude at which the collision occurred could not be definitely determined, but after consideration of all of the known discrepancies, it appears that it was between 3500 and 3900 feet.

The altimeter of both the DC3 and the C-53 were calibrated after the subject flights and found to have been functioning normally.

Weather Conditions

The U. S. Weather Bureau report, 11:30 a.m. to 12:00 noon, at Kansas City, was: Overcast with lower broken clouds, ceiling 2650 feet to 2750 feet (above sea level).

The wind from Columbia to Kansas City at 2000 feet was 40-45 m.p.h. SSE (174°); at 4000 feet it was 40-45 m.p.h. S to SSW (203°). The difference in wind direction from Columbia to Kansas City at 2000 feet and at 4000 feet would account for the C-53 flight being approximately 7 minutes late on arrival at Kansas City.

Examination of the Wreckage

The DC3 was extensively damaged. Both wings were practically demolished; both propellers were badly damaged; the tail surfaces were totally wrecked; and the fuselage was broken completely in two at a point even with the front side of the main cabin door. Both engines were damaged to a major extent.

The C-53 received major damage when the right wing was severed in the air about $1/3$ of the way inboard from the tip.

Conduct of the Flights

The Army C-53 was properly dispatched, and on course, although about 7 minutes behind its estimated arrival time over its fix at Kansas City. The TWA DC3 took off with proper clearance and proceeded according to instructions.

Findings

1. The collision, which occurred at about 11:49 a.m. on November 4, 1942, between the TWA DC3 and the Army C-53, resulted in minor injuries to the captain of the DC3 and no injuries to the other occupants of either plane. Both aircraft received major damage.

2. Captain Welch and First Officer Lipke of the DC3 were physically qualified and held proper certificates of competency to perform their duties on the subject flight.

Captain Penn, the pilot, and Lieutenant Burrell, the copilot, of the C-53, were assigned by the Army to conduct this flight.

3. The TWA DC3, NC 18951, was certificated as airworthy at the time of the accident.

4. The DC3 was being employed in routine instrument flight instruction. The flight was cleared by Air Traffic Control at Kansas City at 11:42 a.m., and took off at 11:44 a.m., having been dispatched in accordance with company procedure.

The Army C-53 had been dispatched from Indianapolis, Indiana to Wichita, Kansas, on a contact and instrument flight plan which was approved by Airway Traffic Control.

5. The operation of TWA DC3 was normal until it collided with the Army C-53.

6. During a previous flight the captain of the DC3 had received from Air Traffic Control at Kansas City, and acknowledged, the information that the Army C-53 was expected over the radio range at 11:44 a.m. When Captain Welch received clearance from Kansas City Air Traffic Control for take-off at 11:44 a.m. for the subject flight, he assumed, without checking, that the Army C-53 had cleared, and dismissed it from his mind.

Adverse winds encountered between Columbia and Kansas City made the Army C-53 flight about 7 minutes late arriving at Kansas City and the copilot was preparing to so notify the Kansas City Control Tower at the time of the collision.

7. The collision occurred at an altitude of between 3500 and 3900 feet, slightly north of the "on" course of the northeast leg of the Kansas City Radio Range.

8. Both flights were intentional instrument flights and the weather otherwise had no bearing on the accident.

9. There was no evidence of failure or malfunctioning of any part of either aircraft prior to the collision.

CONCLUSIONS

In this instance, Air Traffic Control cleared the TWA DC3 to climb through the overcast, within the limits of the airway along which they knew the Army C-53 was flying, and before the Army flight had reported in over the Kansas City Range Station. Issuance of this clearance authorized the TWA aircraft to pass through the flight altitude and the probable path of the Army aircraft. Until the Army plane had reported as over its fix at Kansas City, Air Traffic Control had no positive assurance that the TWA flight path would not intersect the Army flight path. Therefore, Air Traffic Control should have required the TWA flight to either continue into the north quadrant contact for a distance beyond the confines of the airway before starting its climb, or to remain contact until the Army flight had reported over its fix.

A study of the procedure under these circumstances indicates that it was not an established practice to require an aircraft cleared in a quadrant to proceed a specified distance into the quadrant before starting its climb, so as to clear the airway.

There usually is a lag between the actual time over a fix and the time

such position is reported. However, it appears that the flight at Kansas City was cleared by Kansas City Air Traffic Control on the presumption that the approaching Army flight was within its estimated arrival time, without any attempt to verify that fact.

PROBABLE CAUSE: Error of judgment of the Kansas City Air Traffic Control operator in clearing the TWA DC3 to climb into the overcast, within the limits of a civil airway, when he had knowledge of the expected arrival, in the immediate vicinity, of the Army C-53.

APPROVED:

/s/ L. Welch Pogue
L. Welch Pogue

/s/ Edward Warner
Edward Warner

/s/ Harllee Branch
Harllee Branch

/s/ Oswald Ryan
Oswald Ryan

Lee, Member of the Board, did not take part in the decision.