Docket No. SA-93 File No. 2667-44

CIVIL AERONAUTICS BOARD

ACCIDENT INVESTIGATION REPORT

Adopted: April 6, 1945 Released: April 11, 1945

PAN AMERICAN, LATIN AMERICAN DIVISION - August 8, 1944

Flight 218 of Pan American's Latin American Division, while on regular Caribbean schedule en route from San Juan to Miami, crashed in an attempted take-off at Antilla, Cuba. Seventeen passengers were killed, nine of the passengers and all the five crew members survived. The accident occurred about 1:20 p.m. EWT, August 8, 1944, approximately 1/2 mile southeast of Antilla, in Nipe Bay.

The plane, a Sikorsky S42 flying boat, made its take-off run, attained flying speed and became airborne. Immediately following this, the plane made two further contacts with the water. Upon leaving the surface the third time it gained an altitude of approximately 25 feet, then dived steeply into the water. The force of impact completely destroyed the airplane.

From the evidence revealed by the investigation, the Board concluded that there was no mechanical failure of any part of the airplane but that the accident was caused by the faulty technique employed by the pilot, and that such faulty technique was due largely to his limited experience on the particular type of airplane flown.

This report was prepared from the facts revealed by the Board's investigation and the hearing which was held at Miami, Florida, August 22, 23 and 24, 1944.

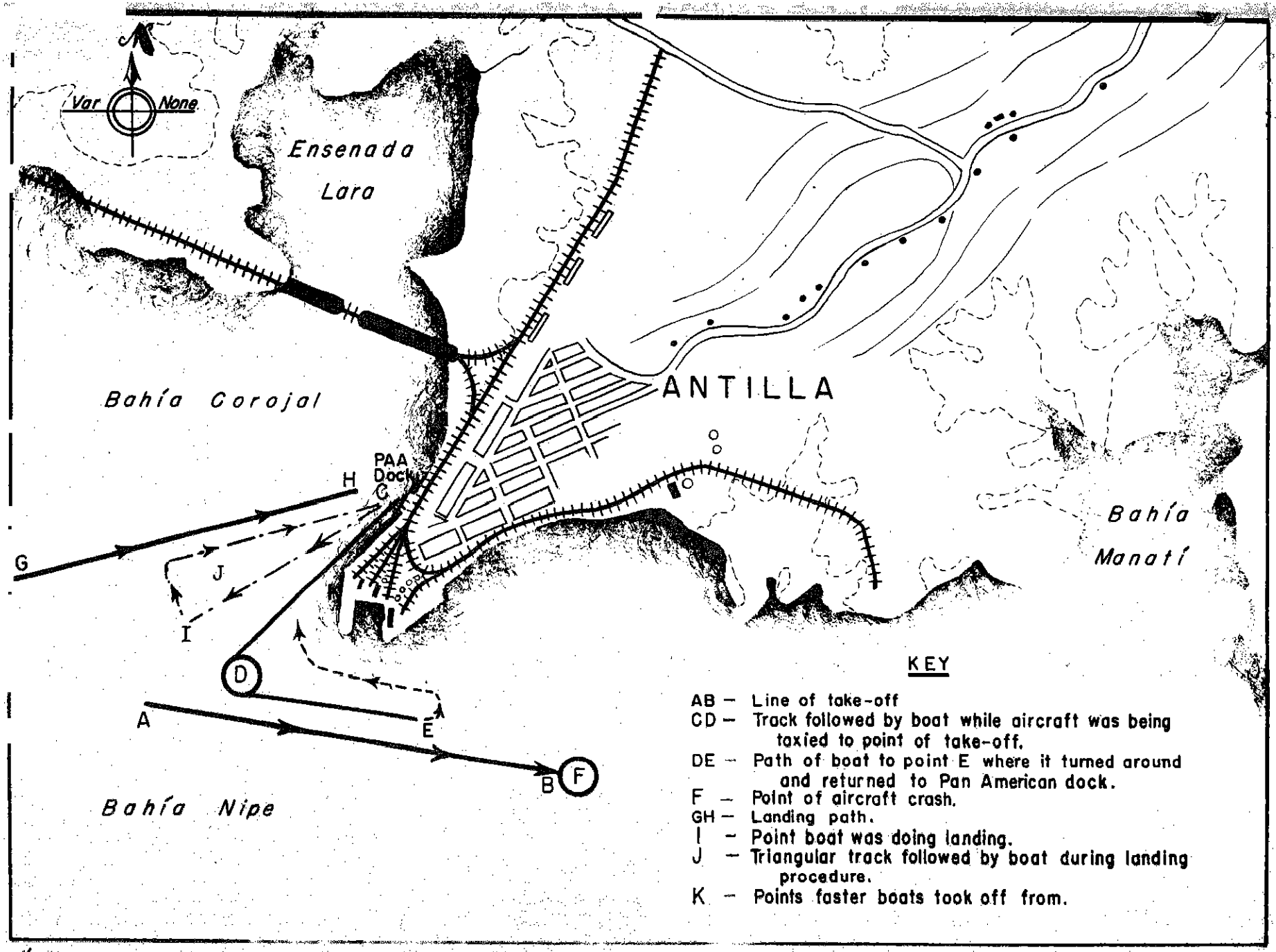
NARRATIVE DESCRIPTION OF THE FLIGHT AND THE ACCIDENT

NC 823M left Miami for San Juan on August 7, designated as Flight 219, and was scheduled to return to Miami on the following day, designated as Flight 218. The flight was made via Antilla and Port au Prince with Captain Marion K. Williams in command and with the same crew serving on both legs of the trip. The return trip from San Juan on August 8 made the intermediate stop at Port au Prince without incident. The plane arrived at Antilla at 12:43 p.m. and after a routine lay-over of 27 minutes, left the dock at 1:10 p.m., carrying 26 passengers and the five crew members.

The clearance records indicated that the aircraft was loaded to 17,090 kilos (37,683 lbs.) at the time of take-off, which was within the allowable weight limits. A check of the distribution of load revealed that the c.g. position of 31.8% M.A.C. was also within the permissible limits. This was slightly at variance with the c.g. position of 30.5% M.A.C. which the captain had expected inasmuch as he had assumed that Compartments B, C and D would be occupied by eight persons each and Compartment A by two persons. The steward, not being aware of this, allowed four passengers to sit in the rearmost compartment (A) leaving two vacant seats in the foremost compartment (D). This condition might have required a slightly greater nose-down position of the stabilizer but would not affect the take-off.

At about 1:18 p.m., the pilot taxied to the take-off position. The weather was clear and the ceiling unlimited with a wind estimated to be 20 knots from approximately 100°. The water was choppy with no ground swells. With a gradual opening of the throttles to 33½ inches of manifold pressure, the plane appeared to go on the step normally and was making approximately 75 knots. The captain then requested an increase in manifold pressure from 33½ inches to 35 inches and upon attaining a speed estimated as between 78 and 80 knots, the plane left the surface of the water. Captain Williams stated that as the plane rose into the air to a height of 10 or 12 feet, he relaxed back pressure slightly, in order to gain speed, whereupon the plane seemed to want to go back on the water so he pulled back on the yoke. When it became obvious to him that the plane was going to go back on the water anyway, he dropped the nose quickly to "flatten out." After striking, bow first, the plane left the water in a slightly nose-high attitude, rose higher than previously, then returned to the water at a much steeper angle. The third time, the plane rose out of control to a height of approximately 25 feet, and in a steeper angle of climb than previously. It then nosed down at a sharp angle and struck the water violently.

The nose of the plane struck the water with such force as to cause the hull to fracture and completely separate at a point just aft of the pilot's compartment. The after portion of the plane, which included passenger compartments A, B, C, and D, pitched forward and came to rest in a nearly inverted position with the forward portion fully submerged.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KEY
AB – Line of take-off
CD – Track followed by boat while aircraft was being taxied to point of take-off.
DE – Path of boat to point E where it turned around and returned to Pan American dock.
F – Point of aircraft crash.
GH – Landing path.
I – Point boat was doing landing.
J – Triangular track followed by boat during landing procedure.
K – Points faster boats took off from.

As it will be noted in the inserted harbor diagram, the station manager's view of the take-off was obscured by the dock. When he failed to receive an "off the water" radio report from the plane, he attempted to contact the flight but was unsuccessful. Shortly thereafter, an observer from the shore informed him by telephone that the plane was down in the Bay. The station manager immediately called the captain of the port for aid and two Peruvian torpedo boats proceeded to the rescue. A slow speed, non-radio equipped launch, temporarily being used by Pan American in place of the regular boat which had been undergoing repair for approximately the past six months, started to the scene of the accident. When it became apparent to the pilot of the launch that the larger and faster Peruvian boats were under way, he turned back to the Pan American dock to take aboard additional help.

The crew, including the steward, who was with the others in the pilot's compartment at the time of the crash, escaped through the break in the hull and proceeded to help the passengers out of the wreckage. Of the six persons in the extreme forward compartment (D), four were rescued, although one of these succumbed a few minutes after being taken ashore. None of the eight passengers in Compartment C survived. Compartment B was occupied by eight passengers, three of whom survived the crash. The rearmost compartment (A) was occupied by four passengers, three of whom were rescued through the entrance hatch on the top of the hull. With the aircraft floating in an upside down position, this hatch was submerged in the water and in order to escape from the cabin it was necessary to go down into the water, through the hatch and up on the outside to the surface. The steward, an expert swimmer, entered the cabin through this hatch and was instrumental in bringing up the surviving passengers.

THE BOARD'S INVESTIGATION

Investigation Initiated

The Washington Office of the Civil Aeronautics Board received notification of the accident about 3:55 p.m., August 8, 1944, and immediately initiated an investigation in accordance with the provisions of Section 702 (a) (2) of the Civil Aeronautics Act of 1938, as amended. Fred G. Powell, Senior Air Safety Investigator in charge of the Atlanta, Georgia Office of the Board, arrived at Antilla at 3:30 p.m., August 9 and found that the wreckage had been towed to shallow water near the Antilla dock and that the bodies of the victims had been removed. On August 10 salvage operations began and the wreckage was removed from the water to the dock, placed upon railway flat cars and transported to the Pan American Base in Antilla, where it was placed under guard awaiting later examination. On August 12, William K. Andrews, Chief, Investigation Section, and W. E. Koneczny, Aircraft Specialist, both of the Safety Bureau of the Board, arrived from Washington, D. C. to assist Powell in making the investigation.

Hearing

The Board ordered a public hearing which was held August 22 to 24, inclusive, at the Dade County Courthouse, Miami, Florida, with W. K. Andrews as presiding officer. In addition, the following members of the Safety Bureau's staff participated: J. W. Lankford, Director of the Safety Bureau; J. K. Fenno, Chief, Investigation Division; F. G. Powell, W. E. Koneczny, and R. P. Parshall, a Senior Air Safety Investigator of the Board's Kansas City Office.

SUMMARY AND ANALYSIS OF THE EVIDENCE

Air Carrier Certification Status

At the time of the accident Pan American Airways, a New York corporation, was operating as an air carrier under a certificate of public convenience and necessity and an air carrier operating certificate, both issued pursuant to the Civil Aeronautics Act of 1938, as amended. These certificates authorized the corporation to engage in transporting by air, passengers, property and mail between the United States, its territories, and foreign countries, including Miami, Florida; Antilla, Cuba; Port au Prince, Haiti; and San Juan, Puerto Rico.

Flight Personnel

The crew of Flight 218 consisted of Marion Koonce Williams, captain; Robert Bertram Publicker, first officer; Elijah W. Beasley, flight engineer Lipscomb L. Chapman, radio operator; and Raymond D. Whitmarsh, Jr., steward

Captain Williams, age 27, of Miami, held an airline transport pilot certificate, with a multi-engine sea, 650-4500 h.p. rating. At the time of the accident he had accumulated as a student, first officer and captain a total of 1523 hours of flying time, of which 1017 hours were boat time. His time as a boat captain was 661 hours of which 82 hours were on S42 flying boats. His last physical examination, required by the Civil Air Regulations, was accomplished February 10, 1944. He had been employed by Pan American for three years. He was route checked in an S42 in May 1944 and made his first trip in command of an S42 on June 3, 1944, approximately two months before the time of the accident.

First Officer Publicker, age 22, of Miami Florida, had been employed by Pan American for one year. He held a commercial pilot certificate with single-engine land and sea, 90-270 h.p. and instrument ratings, and had logged about 380 hours. His experience included 45½ hours on S42's. The subject trip was his first with Captain Williams. His last physical examination, required by the Civil Air Regulations, was accomplished April 18, 1944.

Flight Mechanic Beasley, age 30, of Miami, held an aircraft and engine mechanic certificate, and had been employed by Pan American since February 1942. He made his first trip as flight engineer on an S42 on June 10, 1944.

Radio Operator Chapman, age 19, of Coconut Grove, Florida, held a second class radiotelephone and second class radiotelegraph operator's certificate. He had been with Pan American for two years.

Steward Whitmarsh, age 31, of Miami, had been in the employ of Pan American since May 1943. He had previously been a Red Cross life saving examiner.

The Aircraft

NC 823M, a 34-place Sikorsky S42 flying boat, serial number 4201, was manufactured in 1934 and had been flown a total of 12,389 hours. It had seats for six crew members and 28 passengers. It was equipped with four Pratt & Whitney S1E-G Hornet engines. Its rated cargo capacity was 3546 kilos (7820 lbs.), useful load 6240 kilos (12,848 lbs.) and maximum authorized landing weight 17,237 kilos (38,000 lbs). A 150-hour check had been made on the plane August 6, 1944.

Examination of the Wreckage

The examination of the wreckage was made by W. E. Koneczny and Fred G. Powell of the Board's Safety Bureau. They were assisted by Paul Reimer, Assistant Division Engineer for Pan American in Miami; Jerome Annis, Senior Air Carrier Maintenance Inspector of the Civil Aeronautics Administration; and Captain H. J. Chase from Pan American's New York headquarters.

Ninety-five percent of the airplane wreckage was estimated to have been recovered from the Bay. After a thorough examination of all the parts, no evidence was found to indicate any mechanical failure of the aircraft prior to impact, which could conceivably have been responsible for the accident.

The hull was found in two sections, the larger consisting of the portion from the stern to and including the rear wing strut attachment station; the smaller section consisting of the bow and extending back as far as the aft bulkhead of the pilot's compartment. The area between these two sections of the hull, comprised mainly of the mail compartment, was badly broken up and parts of the structure were missing completely. The deformation of the bottom and the bulkheads in this area indicated the bow and the stern had been forced upward with relation to the point of fracture and separation. The sections of the hull were held together in the water by numerous cables which subsequently had to be cut in order to facilitate salvage operations.

The wing failed at a point between the tower (cabane) and the starboard inboard engine. This section of the wing separated completely from the main part of the wreckage and remained relatively intact with its two engines attached. Some question arose during the investigation regarding the amount of flap used during the take-off, therefore the flaps were given exhaustive study. Portions of the flap surface were attached to their respective portions of the wing. The starboard part of the flap was free to move but the port side was jammed in the full-up position. This in itself is not significant inasmuch as in all probability the hydraulic lines would be severed on impact, allowing the flaps to change their original position. Examination of the contacting surfaces of the flap and the wing proper did not reveal, with any degree of certainty, the position of the flap at the time of the accident.

In order to obtain a more thorough examination of the hydraulic flap rams, these parts were forwarded to the National Bureau of Standards. The tests conducted by the Bureau of Standards, for the purpose of establishing from local distortions, the position of the pistons, did not result in a positive determination of the flap position. It might appear from the way the airplane is said to have performed that the flap was retracted at the time of take-off; however, in view of the lack of evidence to the contrary, it must be assumed that it was properly extended and functioned normally at the time of the accident.

The tail assembly, although damaged considerably, appeared to have received most of its damage through salvage operations. Consideration was given to the possibility of an erroneous setting of the stabilizer by either of the pilots. Although it was not possible to establish the position of the stabilizer at the time of the accident, with any degree of accuracy, inasmuch as the adjustment and the indicator mechanism probably was affected by impact forces, all evidence indicates that the stabilizer was set at a slightly nose-down position, which would have been normal in this instance. An examination of the stabilizer mechanism revealed that there had been a slight maladjustment of the stops which limited its extreme nose-down position and could have allowed the worm strut to bind at its upper end. This condition, however, is not believed to have affected the proper control of the plane at the time of the accident.

Statements

According to the testimony of Captain Williams, everything functioned normally during his taxiing out to the take-off area with the exception of the inboard engines which tended to heat. This was corrected by use of the outboard engines. While taxiing to the take-off position the captain asked for and received an indicated 10° of flap.

Upon reaching the take-off area the plane was headed into the wind and the take-off was started. After applying 33½ inches of manifold pressure the throttles were turned over to the flight engineer. The plane came up on the step in a normal manner and had attained a speed of 75 knots, but due to the choppy condition of the water, the captain asked for and

received 35 inches of manifold pressure. The airspeed immediately increased to between 78 and 80 knots, at which time he applied back pressure and the plane became airborne. He stated that he did not "pull the plane off" but "merely helped it off." Then in order to gain airspeed he released the back pressure on the yoke, whereupon the plane seemed to want to go back on the water, so he pulled back on the yoke. Seeing that the plane was going to settle on the water in spite of the back pressure, he quickly attempted to "flatten it out" by a slight forward pressure on the yoke. After contact with the water the plane came off but was not in an extremely nose-high postion. However, the airspeed had dropped to 75 knots. After reaching the peak of this bounce, the plane started back on the water and this time he pulled the yoke all the way back. The plane hit the water in a slightly nose-down attitude, at which time, according to the captain, he had lost all control of the airplane. It left the water a third time and after attaining an altitude of 25 feet, dived steeply and struck the water violently. The throttles were not cut at any time.

The testimony of the other crew members was almost identical in every respect with that of the captain. None of the crew had observed the wing to note the actual flap position. They stated that during the successive contacts with the water the wing remained lateral and that they had no particular apprehension even after the second bounce.

The captain and the first officer testified that they had gone through the cockpit check-off list individually instead of calling it out verbally, as required by company procedure.

The passengers' testimony was in full agreement with that of the crew and revealed no additional facts.

It was stated by qualified pilot personnel that the airplane having attained an airspeed of 80 knots, was fully airborne when it first left the water and that even had it been pulled off the water, at a somewhat lower speed, its flight characteristics would not have been critical. Further testimony brought out that the best recommended procedure for recovery from maneuvers, such as the airplane was experiencing, is to "cut the power at such time as the aircraft is on the water, in order that a stable angle of trim may be resumed as quickly as possible. Normally this is attained by full reduction of power at the time the aircraft touches the water."

FINDINGS

On the basis of all the evidence available to the Board at this time, the facts relating to the accident are as follows:

1. The aircraft was being operated under proper certification and had been adequately maintained, with the minor exception of the stabilizer adjustment, according to CAA requirements at the time of the accident.

2. There was no evidence of mechanical failure of any part of the aircraft prior to impact.

3. The captain asked for and received the proper flap setting prior to the attempted take-off.

4. The aircraft had attained flying speed and become airborne.

5. After the plane became airborne, it was allowed to settle back on the water and after two bounces, the pilot completely lost control.

6. Captain Williams held proper CAA certificates and had more than the necessary experience to meet general minimum requirements; however, it is evident from his record that his experience as captain on this size and type of aircraft was extremely limited. First Officer Publicker and Flight Engineer Beasley also were relatively inexperienced on S42 equipment.

7. The patrol launch being used at the time of the accident was not of a suitable type nor was it properly equipped.

DISCUSSION AND CONCLUSIONS

This investigation revealed nothing in the conduct of the flight from the time it left Miami until the time of the plane's leaving the water in the attempted take-off from Antilla, which would indicate a probable cause of the accident.

It appears that a degree of laxity characterized this flight as was evidenced by the crew's failure to comply with the proper cockpit check procedure and by the lack of an understanding between the crew members regarding the seating arrangement of the passengers. However, as previously stated, these items are not believed to have contributed to the cause of the accident.

Considerable significance must be attached to Captain Williams' own description of his handling of the flight and engine controls during the attempted take-off and subsequent maneuvers of the aircraft. Therefore, in summing up the findings of this investigation, it appears that the pilot failed to keep the airplane airborne after it had attained flying speed and left the water and that a safe recovery might have been effected at the time the airplane first returned to the water had the pilot used proper technique. These errors in all probability were due largely to the pilot's limited experience in handling S42's.

File No. 2667-44

PROBABLE CAUSE

Based on the evidence produced through this investigation, loss of control during take-off was found to be the probable cause of the accident.

BY THE CIVIL AERONAUTICS BOARD:

/s/ L. Welch Pogue
L. Welch Pogue

/s/ Edward Warner
Edward Warner

/s/ Harllee Branch
Harllee Branch

/s/ Oswald Ryan
Oswald Ryan

/s/ Josh Lee
Josh Lee