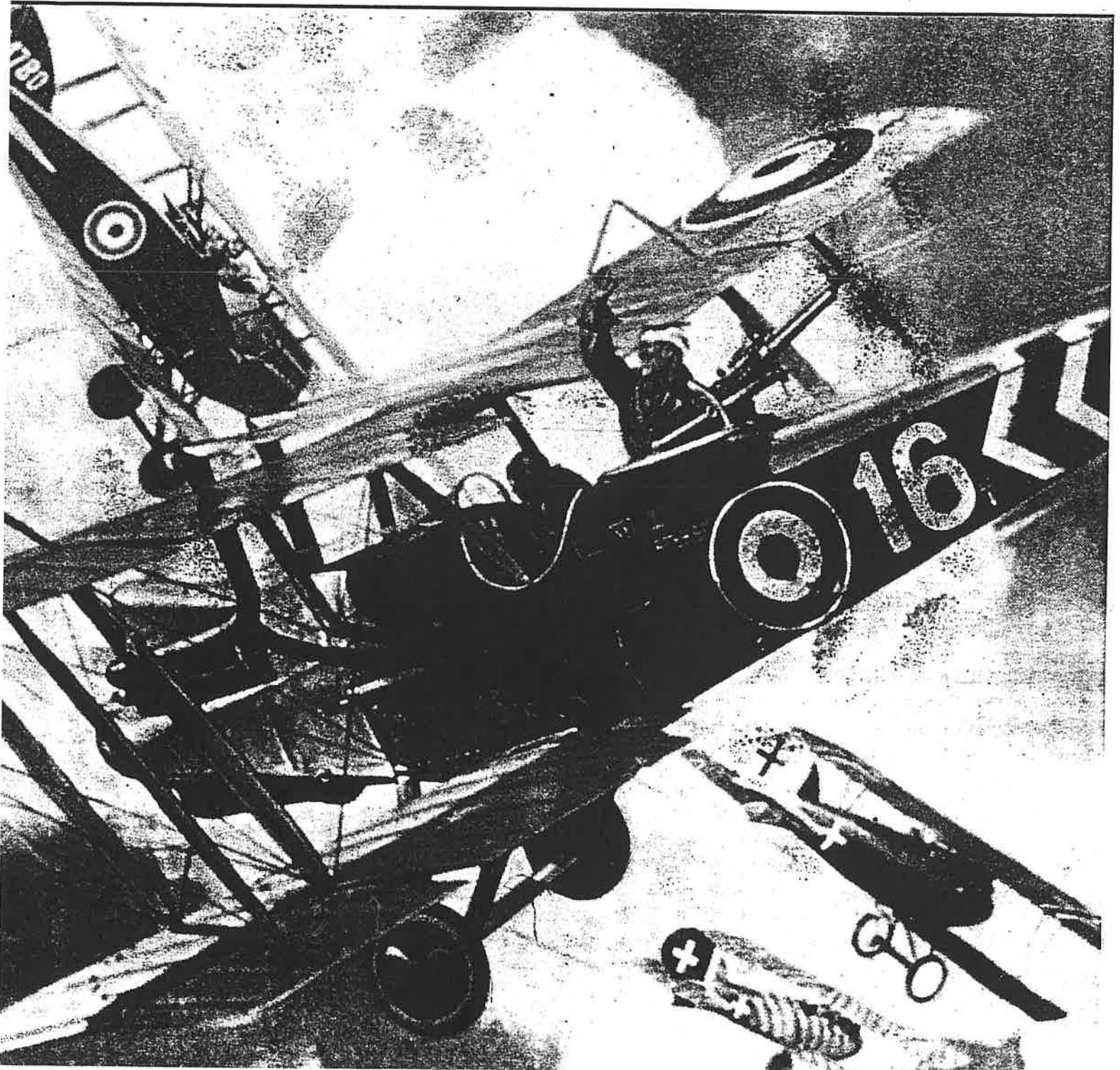


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# AAHS JOURNAL

American Aviation Historical Society





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RETURN TO  
MAL HAZEL  
945-3216

**FRONT COVER**—A Bristol F2B fighter comes to the rescue of an embattled RE-8 in this *War Birds* cover painted in 1931 by Rudy Belarski. This was the last original painting owned by Belarski and was photographed in 1959 in a parking lot by member William D. Feeny.

**BACK COVER**—Its controls shot away and in heavy turbulence over the Appennine Mountains, Medal of Honor aviator 1st Lt. Raymond Knight plunges to his death. It is April 25, 1945, and Lt. Knight is returning from his 82nd combat mission. Another excellent painting by William S. Warren.

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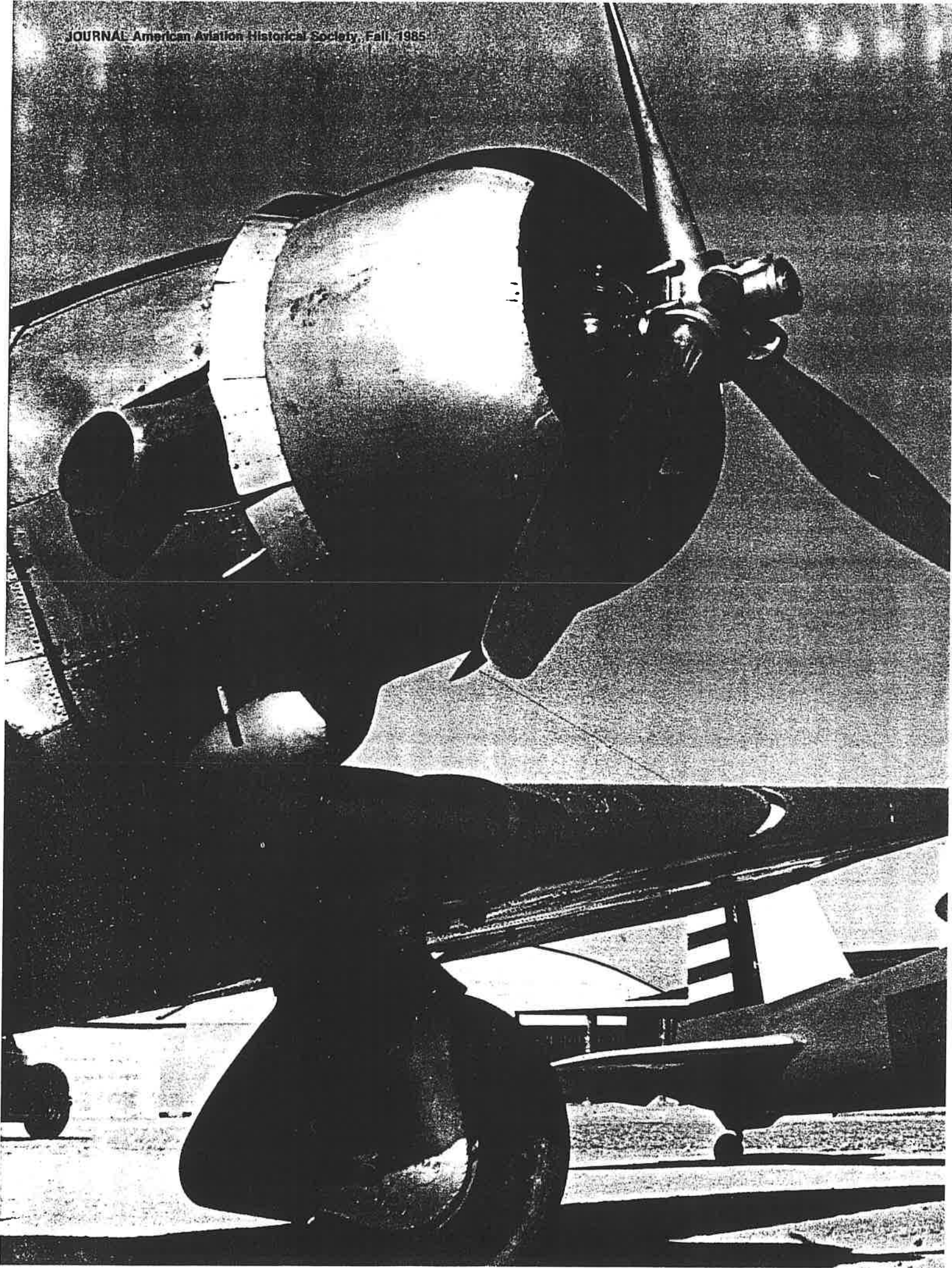
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To gain a quick referral among editorial committee, it is suggested one or more Xerox copies be included: Also please include *brief author's blurb* written in third person, together with *author's photo*.





# THUNDERBIRDS IN THE SOUTHWEST DESERT

By Charles F. Hyer

*Before beginning research on this story I went over to the former site of Thunderbird Field No. 2, which is only a 10-minute drive from my home. I wanted to see if I could recapture some of the feeling of those days when Stearman biplanes filled the skies over the Phoenix Valley of the Sun. The big hangars sat in the oppressive heat, their paint oxidized and peeling. They looked old and tired. Insects droned and an occasional dust devil swirled by. Overhead a Cessna 150 let down on final at nearby Scottsdale Airport. Looking around, there was no way to tell that at one time this had been a bustling wartime training center. The whine of merino starters and the bark of radial engines had long since died away. Forty years had gone by quickly.* —Author

Northrop A-17 and Vultee BT-13

(Southwest Airways Photo)

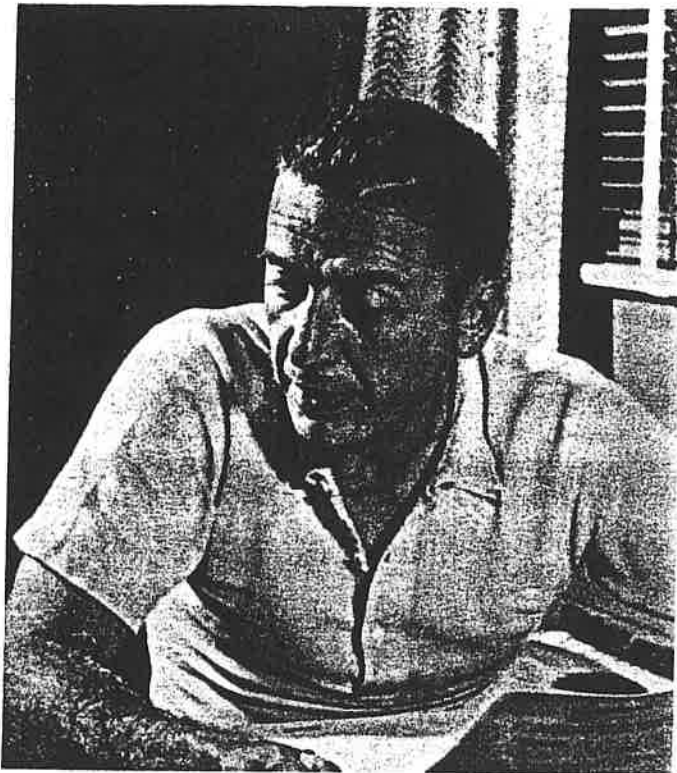
Everything must have a starting point and the beginning of the Southwest operation was the flight in August 1946 that John H. "Jack" Connelly and Leona Hayward had dinner in a posh Beverly Hills restaurant with their pilots. Connelly had been an Army Air Service pilot in the early twenties and later an engineering test pilot for the CVA. He had been involved in aircraft sales and flight training in and around Roosevelt Field, N.Y., in the thirties and, so the story goes, became acquainted with Hayward when he talked him out of buying an airplane that he, Connelly, was selling.

Hayward earned a private pilot license and had been on the board of TWA. Though involved in many diversified endeavors, he was deeply interested in aviation and its future.

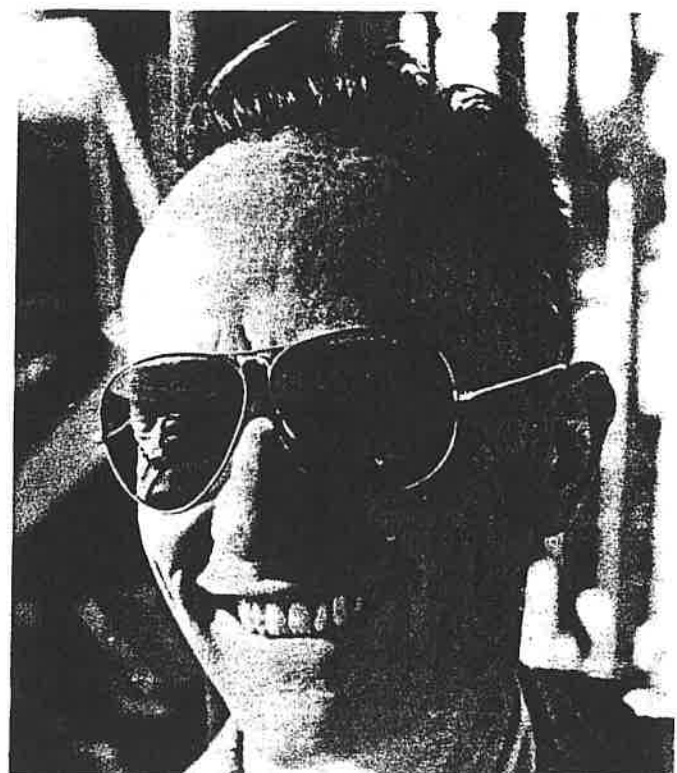
The talk turned to the war in Europe and the possibility of the U.S. being drawn into the conflict. Both men agreed that







Leland Hayward was a Hollywood producer and agent when he joined John Connelly to start the Southwest Airways training operation. He was agent to over 150 stars including Fred Astaire, Gene Kelly, Henry Fonda, Greta Garbo, Ginger Rogers, Judy Garland and Gregory Peck. (Author's Collection)



John H. "Jack" Connelly, former Air Corps pilot and CAA engineering test pilot. After the war, Connelly formed the scheduled local service airline "Southwest Airways" from experience gained in the operation of the training fields and the cargo line. (Southwest Airways Photo)

the army was going to need thousands of pilots. "We ought to start a training school," Hayward offered. Connelly replied that he knew of a likely place for such a school.

Two months passed. One day Leland Hayward's telephone rang. "Leland? Jack Connelly. I just bought that school of ours."<sup>3</sup>

Connelly and Hayward were to forge an association, called Southwest Airways, that was to last through the war years and well into the postwar era of the new feeder airlines. In a way, it is strange that it worked as well as it did. They were quite different—Hayward, the urbane confidant to movie stars, authors and playwrights, and Connelly, the sarcastic street-wise banty rooster from New York. However, they were alike in other important ways. They both loved flying and were hard working. They were patriotic and fiercely dedicated to the project. Hayward, due to his diversified interests, did not become as completely enmeshed in Thunderbird operations as did Connelly. But, when the hard decisions had to be made, he was there.

Hayward, a producer and agent, was well known in Hollywood and New York. When Southwest was formed, many celebrities were induced by Hayward to invest in the new company. Among the first to do so were James Stewart, Robert Taylor, Henry Fonda and Cary Grant.<sup>4</sup>

During the war years, Hayward managed to balance his career in the entertainment world with the responsibility of helping to run a vast training complex, which he shared with Jack Connelly. Taught to fly by his first wife, Lola Gibbs, Hayward was to marry four more times. His wife during the Thunderbird days was acclaimed Hollywood star Margaret Sullavan. During the late forties and fifties, Hayward produced a string of blockbusters which stunned Broadway and

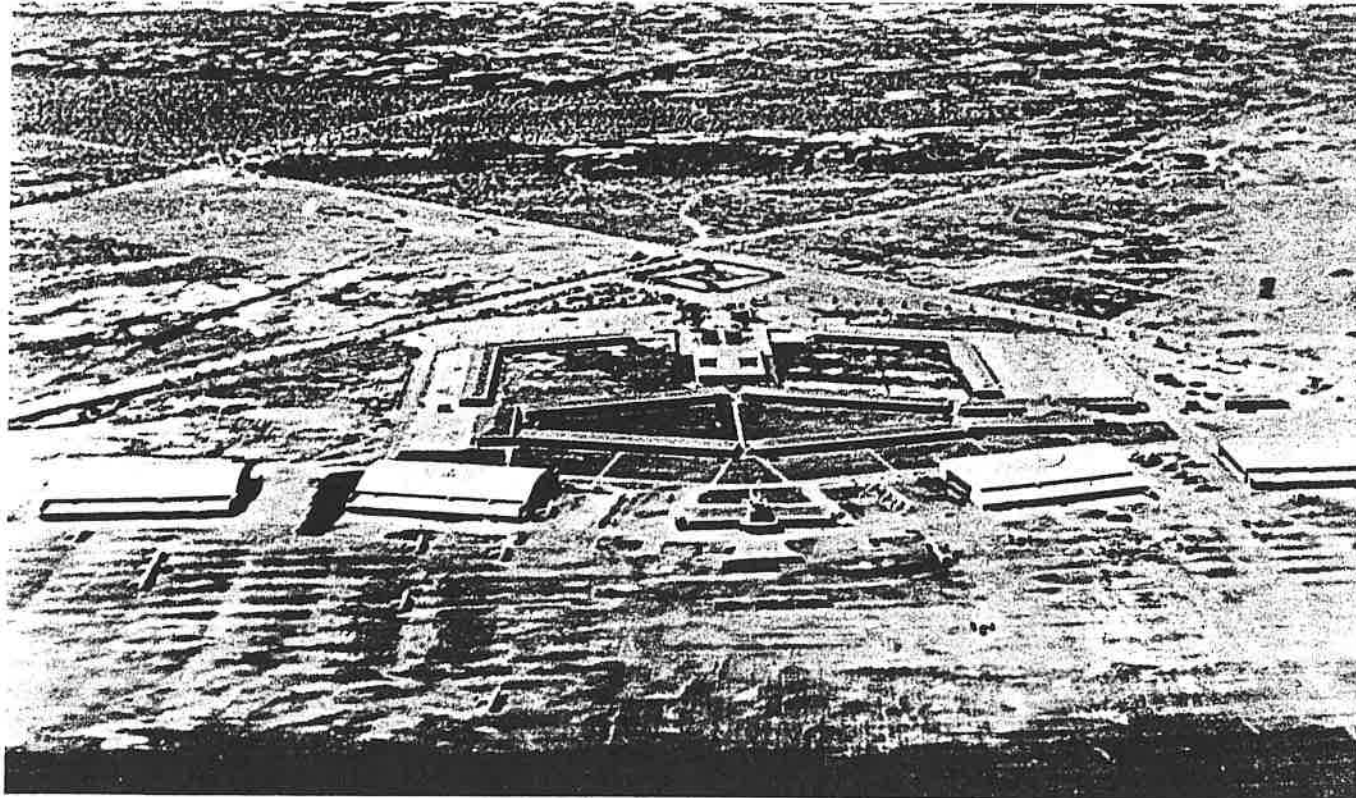
Hollywood. The list included *Mr. Roberts*, *State of the Union*, *Bell for Adano*, *South Pacific*, *Call Me Madam* and the James Stewart classic, *Spirit of St. Louis*.<sup>5</sup>

John Howard Connelly, who was born in New York City in 1900, joined the Army Air Service in 1918. He attended the air service school at the University of Texas. During the twenties he was in the securities business. In the thirties he returned to aviation. Connelly was self-employed at Roosevelt Field, New York, where he was engaged in flight training and the sale of used aircraft. He went to work for the CAA (later FAA) at Santa Monica in 1937 as an aeronautical engineering inspector. During his two-year tenure with that organization he checked out and qualified in just about every new aircraft being built on the West Coast.<sup>6</sup>

The third man involved in the early beginnings of the company was John Swope. He was secretary-treasurer and later became field manager at Thunderbird II. Well known as a photographer, Swope photographed the book *Bombs Away* in collaboration with author John Steinbeck. Swope held a commercial license and had experience as a flight instructor. During the war, he married film star Dorothy McGuire, well known at the time for the play and movie *Claudia*.<sup>7</sup>

In 1940 the purchase of Carl "Pappy" Kniers' civilian pilot training school at Phoenix Sky Harbor launched the Southwest Airways venture. The important thing was that having the CPT certification made SWA eligible to apply for a contract to train Army pilots.

The government had earlier set up the CPT program to get the ball rolling with regard to building a reserve of trained pilots in case they were needed in a national emergency. Air Corps General Hap Arnold went even further and proposed establishment of civilian operated training schools to train Air



Corps cadets. The idea was scoffed at and ridiculed in some quarters but was ultimately adopted. It was to prove eminently successful.

In the meantime, civilian pilot training operations were started at Sky Harbor with three instructors, a capital of \$15,000 and about 50 students. Aviation up to that point had been in a 10-year doldrums. Pilots, mechanics and manufacturers had been practically starving, but they all sensed that big things were imminent.<sup>8</sup>

In late 1940 Southwest was informed that they had been chosen as one of the civilian contractors to train Army pilots. They were to provide the airfield, hangars, living and eating facilities for the cadets and maintenance for the aircraft. They even had to provide fire truck and ambulance crews for the ramp (though this was later taken over by Air Corps personnel). The Army was to provide the airplanes and the fuel to power them.

On January 2, 1941, ground was broken for Thunderbird Field. The facility, consisting of 640 acres (over 1,000 with auxiliary fields) was carved out of the desert a few miles north and west of Phoenix in the town of Glendale, Arizona. Designed by architect Millard Sheets, the field was laid out to resemble a Thunderbird. Incredibly, it was constructed in about three months.<sup>9</sup> The cost of the field and training facilities was initially estimated at \$300,000 but because of expanded programs by the Army, the end result would be four times that amount.

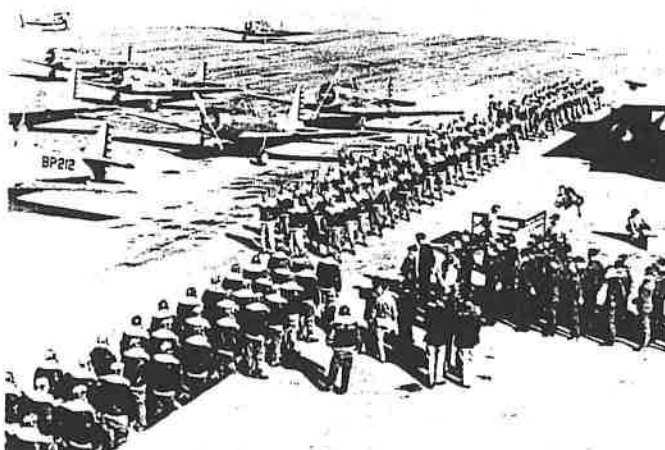
Connelly knew many people in aviation circles as did Hayward. Soon a nucleus of 14 flight instructors was hired with more and more signing up. Aircraft maintenance crews were recruited by newspaper ads from all over the country. And soon they began arriving by bus, car and train from all points of the compass. Locals, mostly Pima Indians, were hired to work the line. It took a special person to crank an inertia starter under a brutal 114° sun, though not much mechanical ability. Cooks, bakers, messmen, groundskeepers,

Thunderbird Field was constructed in three months. Designed by architect Millard Sheets, it was laid out to resemble its thunderbird namesake. Over 10,000 cadets received training here. (Southwest Airways Photo)

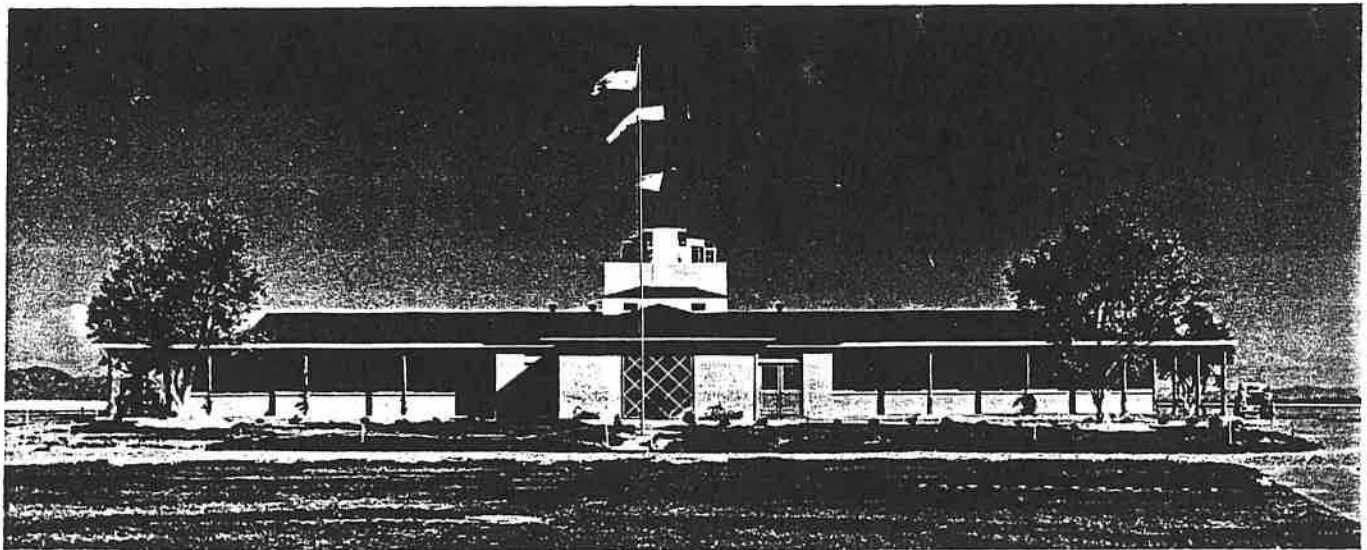
clerks, typists, welders, machinists, parachute riggers, mechanics, photographers, maintenance men, supply clerks, truck drivers, electricians and all manner of miscellaneous jobs were filled. In the Salt River Valley the Great Depression was drawing to a close.

Typical of those to reply to a newspaper ad was Marvin Meier who was to work for the company and its successors for a total of 40 years! He answered an ad in a Pontiac, Mich., newspaper and was surprised to get a letter in reply a few days later. He was hired and instructed to proceed to Phoenix, Arizona, forthwith. The wage was 75¢ per hour.<sup>10</sup>

Meier, whose total aircraft experience consisted of a home study course in aviation, boarded a bus with \$40 in his pocket. On his arrival, he was put to work maintaining Stearmans on swing shift, the shift when most of the daily maintenance



Chinese, British and American fliers line up for a scene in the movie, *The Thunderbirds*, which was filmed at Thunderbird Field. It starred Preston Foster, Jack Holt, Gene Tierney and Reginald Denny. BP on aircraft relates to "British Program." (Southwest Airways Photo)



Operations building at Thunderbird I.

(John Swope Photo)

work was done. His first job, as he recalls, was repacking tail wheel bearings.<sup>11</sup>

"Every night we jacked up the rear of each Stearman, pulled the tail wheel and cleaned out the sand and old grease and repacked the tail wheel bearings." This was done to every aircraft each night. In addition all the engine valves were reset. This was usually done with a team of one man and two women. They would go down the line, the women with speed wrenches, pulling the rocker box covers and the man setting the rocker arm clearance.<sup>12</sup> Other typical maintenance functions which were performed were checking brakes and tires (the results of heavy-footed cadets) repairing dragged wing-tips, oil changes and changing spark plugs. A small shop was available for some work, though most was done on the ramp.

Flight operations began on March 22, 1941, under extremely difficult conditions. The field was still in an unfinished condition. It would be many months before the lawns, trees and swimming pools would be in place. In the beginning, the cadets had a very primitive existence at Thunderbird. It was a long time before black top was laid down and morning takeoffs were something to see with the lead plane taxiing in clear air while all the others took off in a blinding man-made dust storm.<sup>13</sup>

As mentioned, the field and facilities were in very rough condition when operations started. Cadets helped out in their spare time by assisting the carpenters and plumbers when not occupied by their studies. Thunderbird Field was to go on to become a beautiful training facility. Eventually over 400 shade trees were planted and the grounds were landscaped with over a thousand flowering plants, vines and shrubs.<sup>14</sup> In addition, two swimming pools would be constructed for the use of flying personnel. Within a few months the desert had been tamed and Southwest Airways was busy turning out pilots.

The first class consisted of 59 cadets. Later classes would be as large as 150. In the first ground schools, students sat on boxes, barrels or boards while construction went on around them. Flying started with 15 spanking new Stearman PT-17s. This compared to over 100 in use during mid-1943.<sup>15</sup>

The rugged Stearman biplane was perfectly suited for its role as trainer in the desert operations. The 220-hp Continental was a good reliable engine and the pilots felt confident

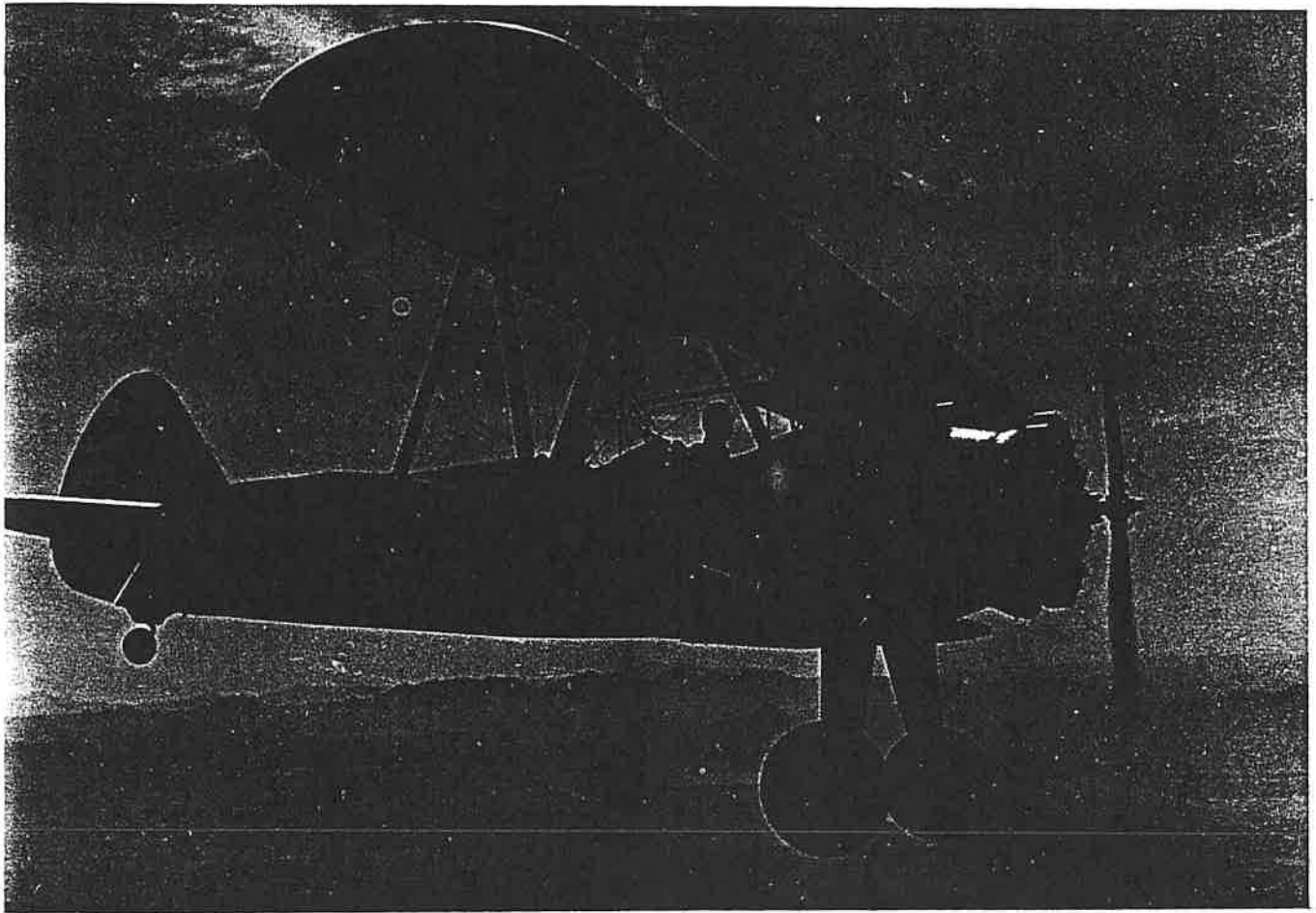
with it. It was not unusual for an instructor to plead with the maintenance department not to change an engine even though it was out of time.<sup>16</sup> A new engine always had a few bugs to be worked out, while a well broken-in engine which was still performing smoothly and up to standards was much preferable. Pilots liked and trusted the PT-17. The only bad habit it possessed was its tendency to ground loop, due to the close coupled landing gear. It should be noted that some PT-13s were used in limited quantities. The PT-13 used the Lycoming R-680, rather than the Continental R-670. Both versions were good but the Lycoming was somewhat sloppier than the Continental, though some preferred the smoother running Lycoming.<sup>17</sup>

After several months the "monsoon" season arrived and to add to the teething problems, Thunderbird was beset by torrential rains. The combination of rain and fine powdery dust resulted in a 1000-acre quagmire. The dampness caused bed slats to warp and it was common for a cadet to lay back in his bed and fall through to the floor. Everyone used two pairs of shoes. One pair for inside and a mud pair for outside.<sup>18</sup> Operations ground to a halt as everyone waited for the storms to move on and the desert to dry out. But the desert recovers fast and soon flight operations were proceeding at an accelerated pace.

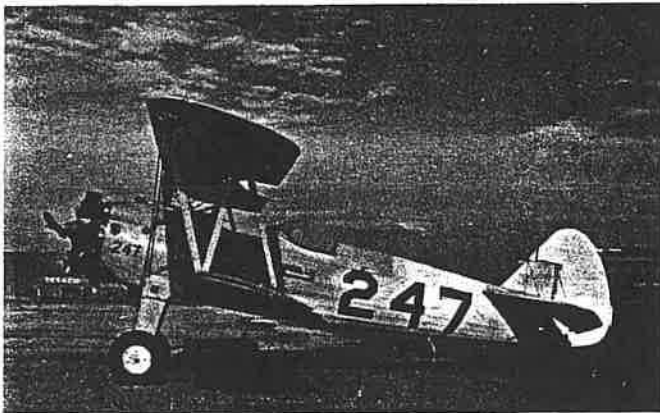
An occasional monsoon to the contrary, it was soon realized that, for the most part, Arizona weather was ideal for flight training. When the flying field got into full swing, the average flight hours per day was 850, with a record high of 1136 hours for one day. Later a record of 673 consecutive flying days would be set!<sup>19</sup>

Training started at Thunderbird Field with 14 flight instructors. Instructors, like maintenance personnel and other employees, came from all over, though many were locals. Some instructors received their training at the Sky Harbor facility and many were supplied to the various fields from that source. Some had 130 to 150 hours in Cubs when hired to train cadets.<sup>20</sup> At least one was as young as 18 and another was old enough to have been a fighter pilot in World War I. He was Jerry Bacon, who had been in the 84th Squadron of the Royal Flying Corps. The average age of instructors, how-

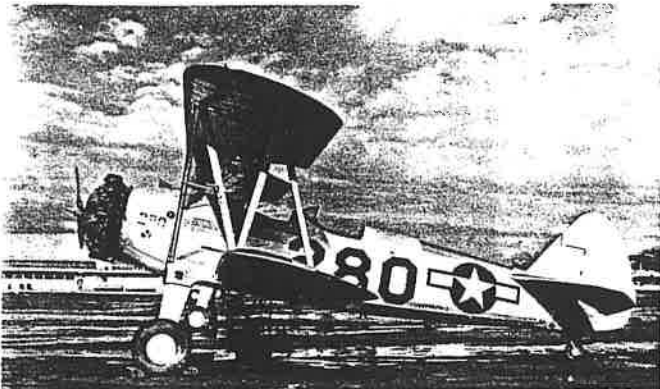




PT-17 flying in the dusty skies over Thunderbird Field. Some PT-13s were also used. The PT-13 used the Lycoming engine. Most were converted to -17s at overhaul. (Bob Markow Photo)



The Stearman PT-27 shown here at Thunderbird differed little from the other models of the Kaydet. More PT-17s were used than the other models with fewer PT-13s. (Bob Markow Photo)



Stearman PT-13D used the Lycoming R-680 engine. Some pilots preferred the somewhat smoother Lycoming to the Continental. (Bob Markow Photo)



Cadets practice formation flying. These airplanes appear to be yellow and carry no national insignia on the fuselage. (Bob Markow Photo)



Instructor Leonard Pemberton and Chinese cadet prepare for flight. The Chinese came in groups of 50 from Chunking and Kunming to India via the Burma Road and then by ship to the U.S. Fifteen classes of Chinese trained at Thunderbird. (Southwest Airways Photo)

ever, was around 29.<sup>21</sup>

The cadet's life at Thunderbird Field was a busy one. In the nine weeks it took to complete primary training, he spent 45 hours on engine and propellers, 20 hours on theory of flight, construction and care of aircraft, 25 hours on navigation and cross-country, 14 hours on aircraft identification and six hours on code.<sup>22</sup> When not engaged in ground school or flying, the cadet engaged in sports, physical education and military drill. Much of his spare time was taken up with studies.

The cadet's daily flying progress was carefully charted and recorded by his instructor. Judgments were made and grades were given as to his aptitude with regard to the type of aircraft he would fly later, a fighter or bomber, or in fact, whether he would continue to fly at all. Other factors used to determine his ability were grades in temperament, judgment, personality and ability to perform aerobatics.

On the first day of training, the cadet and the instructor went over the airplane. Together they checked out such things as use of the parachute, using the instruments, the purpose of the flight controls and local flight regulations. He was shown how to start and stop the engine, check magnetoes, check the gas gauge and how to fill out flight forms.<sup>23</sup>

The instructor kept careful records on "grade slips" of the student's daily progress on the following subjects: effect of control, straight and level flight, turns, coordination, climbs and climbing turns, glides and gliding turns, esses, rectangular course, taxiing, takeoffs and landings, stalls, spins, spirals, simulated forced landings, steep turns, eights, lazy eights, chandelles and judgment. The grading was as follows: "A" superior, "B" excellent, "C" very satisfactory, "D" satisfactory, "E" unsatisfactory and "F" failing.<sup>24</sup>

Every day that he flew (and it was six days a week) he was graded on the above criteria. The instructor entered any pertinent comments on the weekly "elementary phase report" so that any failings could be spotted early. The student was never permitted to know his grades. He received five check

rides during his primary flight training. After two weeks of dual, the student was usually ready to solo. He had, by that time, received nine hours of dual instructions, which included 40 landings and 15 spins. However, before the student did solo, he was given a final pre-solo check flight by his instructor or by the flight commander to assure his proficiency.<sup>25</sup>

After soloing, the cadet was kept busy with both solo and dual flights. His progress was carefully checked and graded to turn up any weak points. If he incurred a failing grade in any segment of training a pink slip was issued. The next day the student was checked out on the particular phase in which he was deficient. If the error was cleared up, the "Pinkie" was lifted. If not, another pink slip was issued. Three pink slips resulted in a check ride with Army or civilian supervisory personnel. If the student performed well, his record was again cleared.<sup>26</sup>

The next major hurdle was the solo cross-country and after that dual or solo crosswind. After his final check the cadet was through with primary and ready to leave for another field and basic training. Most cadets from Thunderbird went to Marana in southern Arizona for basic, then back to Luke Field for advanced training and their wings. All his grade slips and flight history became a permanent part of his military record.

Southwest Airways trained pilots from over 30 countries. Besides the United Kingdom, Canada and most of the countries of Central and South America, also included were Finland, India, Syria, Belgium and many others. Thunderbird I was the only field in the U.S. or elsewhere to train Chinese cadets. They were the cream of the crop and most were the sons of wealthy Chinese families. They made the long journey from Chunking over the Burma Road to India and then the long sea voyage to the United States. The average age was between 18 and 21 years. There are many stories of the strict discipline to which the Chinese were subjected. If a cadet was found guilty of a serious transgression he would very likely be sent home in disgrace. Many dark, unfounded rumors of what happened to those unfortunates who were shipped back to China were circulated.<sup>27</sup> Most of the whispered allegations suggested death before a firing squad. None of these stories was ever proven true.

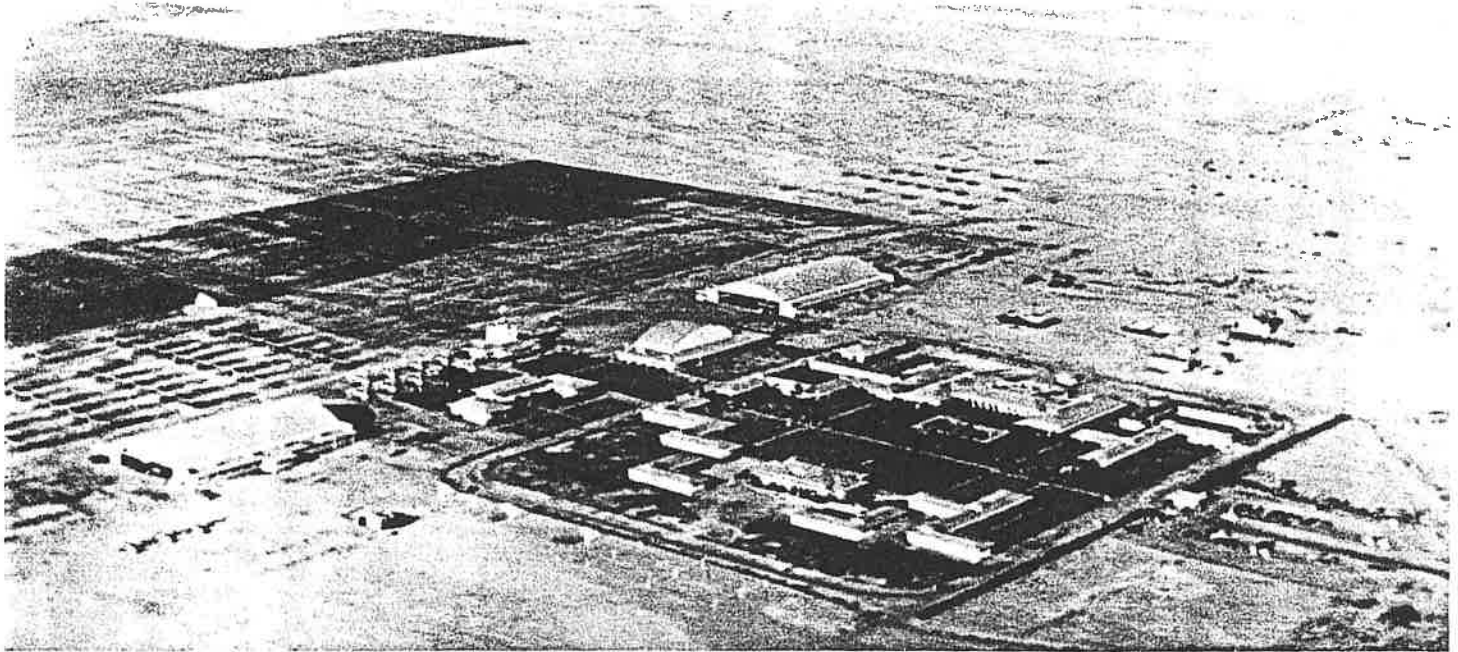
The Chinese were good students and took to the training quite well despite the language barrier. One out of 10 was supposed to speak and understand English but, in some cases, the ability was quite primitive.

Training continued at a frenetic pace and the young company was learning much about teaching the art of flying to young men from vastly different backgrounds. It wasn't long until Connelly and Hayward began thinking of expanding the operation to other flying fields.

## THUNDERBIRD FIELD II

On June 22, 1942, due to the expanded needs of the Army Air Force, Thunderbird II was opened for flight training. John Swope was field manager, Ernest Pelton chief pilot and Mike Des Marais director of training. Located in the town of Scottsdale, Arizona, flight operations started with 28 flight instructors. This would grow to over one hundred.<sup>28</sup>

Similar to the other fields of Southwest Airways, Thunderbird II was hacked out of the desert and was plagued with all the teething problems common to Thunderbird I and Falcon



Field. Mike Des Marais remembers those early days. Many buildings were incomplete. Everything was ankle deep in yellow dust. There was no cooling in the barracks or mess hall. Electrical installations were primitive. Water was available in GI cans and cold lunches were the order of the day. Everyone competed with carpenters, electricians, bricklayers and truck drivers to perform their daily tasks.

Des Marais had been an instructor at Thunderbird I before being tagged as director of training at the new field. One of the original three pilots hired by Southwest, he learned to fly at Brooks Field, Texas, in PT-3s. Des Marais had been working in the Ryan Aviation Primary Training Program at San Diego before going to Arizona.<sup>29</sup> He still operates a maintenance shop at Phoenix Sky Harbor Airport.

Thunderbird II was to be in operation for two years, three months and 24 days. During that time more than 5,500

Thunderbird Field No. 2 was located in north Scottsdale and is now surrounded by homes and light industry. More than 5500 students were graduated from this facility. McDowell Mountains are in the background. (Southwest Airways Photo)

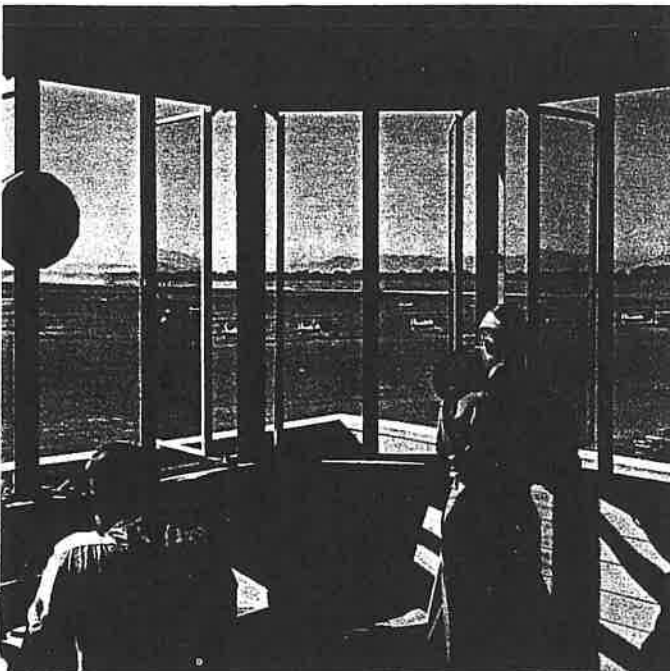
students were graduated and over 26,500,000 miles had been flown in the primary training operation. The peak month was November 1943 when more than 600 cadets were in training. A sign of the times was the size of the payroll in 1944. The monthly payroll was around \$115,000 which works out to an average monthly salary of around \$225. Instructors received about \$350.<sup>30</sup>

Instructors at Thunderbird II had formerly been everything from musicians and paperhangers to lumber workers, druggists and bulldozer operators. They came from 30 different states and *four foreign countries* and their ages ranged from 21 to 44 years. The "cranking operations" on the line were run by 30 Pima Indians.

One of the few interruptions in training operations occurred on August 3, 1943, when torrential rains washed out Scottsdale Road and flooded the runways. Some employees were marooned at the field but cadets celebrated a most welcome holiday. Flying was resumed on the following day.<sup>31</sup>

Most of the Stearmans operated were painted all silver, rather than the old-style Army blue and yellow. Tail stripes were eliminated. Maintenance was performed at night so that the trainers were ready for the morning flights. Mike Des Marais' practice was to jump on his motorcycle about dawn and ride through the hangars counting the airplanes that weren't ready for flight. Then he would "raise hell with the maintenance people."<sup>32</sup>

Despite the accelerated training program and the frantic schedules to produce more and more pilots, Thunderbird II enjoyed a fine reputation for the high caliber of the cadets it turned out. By the time the field closed in late 1944 the great surge for pilots had finally slowed down. Of the 64 Army primary schools throughout the country, only 15 were still in operation. They had truly done their job well.<sup>33</sup>

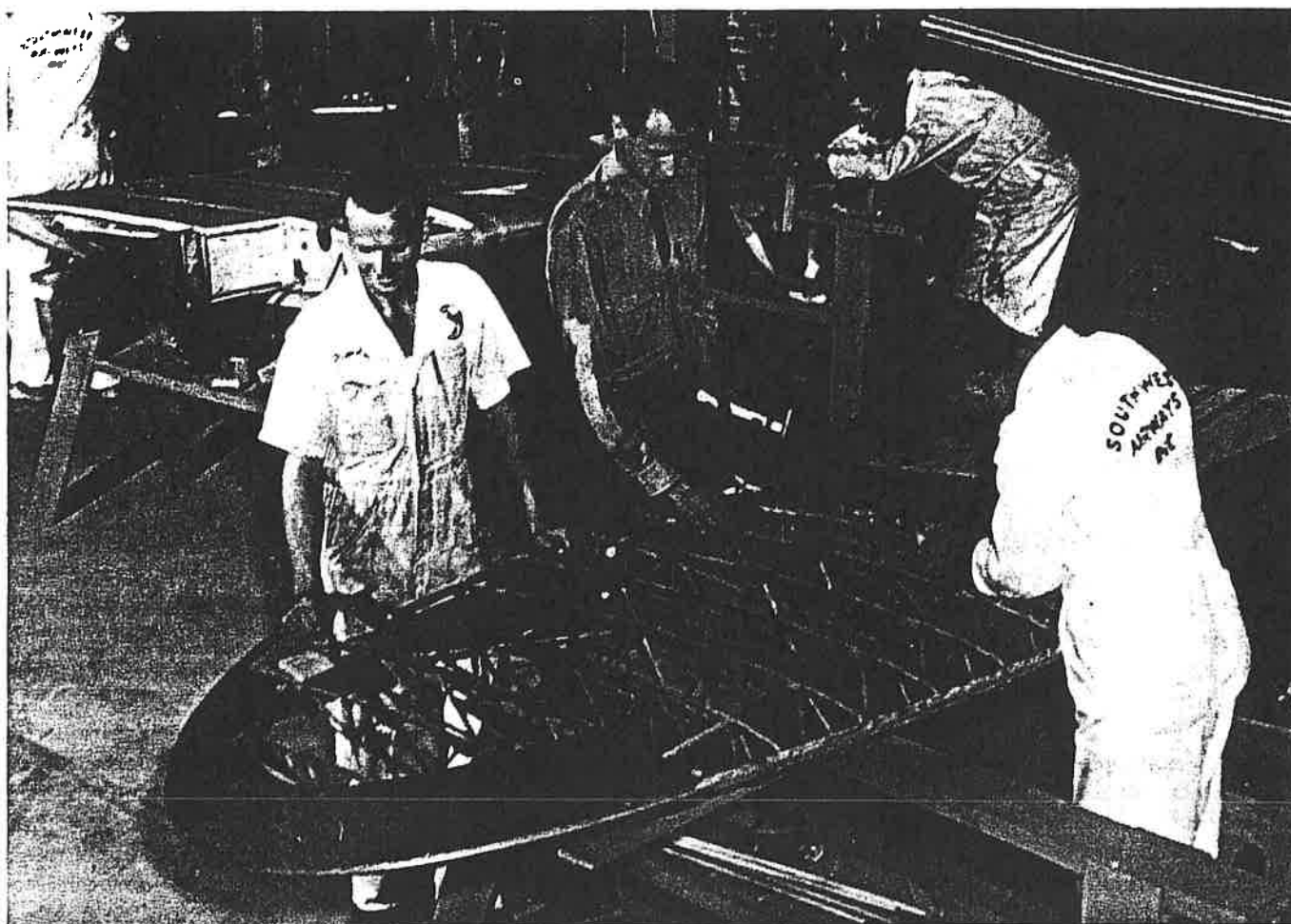


Mike Des Marais directs traffic from the "Stage House" at Thunderbird Field with light gun. Airplanes had eight directions to take off in and both left and right patterns were used. Des Marais was later director of training at Thunderbird II. (John Swope Photo)

## OVERHAUL DIVISION

By the end of 1941, Thunderbird Field was in full operation and nearing the saturation point. It became obvious that





the demands for replacement engines and airframes would seriously hamper the operation unless steps were taken to provide those replacements. On July 1, 1942, contracts were signed with the Air Force to overhaul aircraft and engines for the vast training program which was taking shape in the Phoenix Valley of the Sun. The Overhaul Division was established at Thunderbird Field and after several months of tooling up, production got underway in November 1942.

Only Stearmans were overhauled and though occasionally other engine types were overhauled, for the most part only Continental R-670s were rebuilt. When in full operation, one PT-17 and three Continentals a day were turned out. Over 1000 of these engines plus several hundred others for War Training Service, Air Transport Command and commercial aviation were produced before the Air Force contract ended.<sup>34</sup>

The Overhaul Division ultimately took over hangars 2 and 3 at Thunderbird plus other newly constructed buildings, including a test cell. The airplanes, which were completely stripped down to the steel tubing, were totally rebuilt. The end result, with all the latest service bulletins and mods complied with, was actually a better product than the original airplane. Aircraft were overhauled when they either had 1500 hours' flight time or were crash victims.<sup>35</sup>

Many women were employed in the Overhaul Division, as could be expected. They were used, not only in the dope and fabric shop, but in all phases of the operation. Some had even earned their A and E licenses, which even by today's standards is rare. Other shops which were utilized were welding, rigging and propeller overhaul.<sup>36</sup>

Mechanics working on what appears to be a Waco wing in the maintenance shop. Waco C-72s were used in the cargo operation. (Southwest Airways Photo)



Line maintenance being performed on aircraft BP 15. The "BP" stood for British Program and was displayed on all aircraft used by the British. This photo was taken on April 29, 1942, at Thunderbird before Falcon Field had opened. (John Swope Photo)