



Agricultural Flying

By BRIAN R. BAKER

THE ORIGINS OF AGRICULTURAL AVIATION

The early beginnings of agricultural aviation are relatively obscure. As early as 1911 a German forester applied for a patent covering the use of the airplane in forest pest control, but his efforts did not materialize until fourteen years later.(1) In the United States, conflicting claims exist regarding the first use of the airplane in agriculture. General Franklin Rose is reported to have made tests involving the aerial application of pesticides in the San Francisco Bay region during 1918 and 1919.(2) An official of the State of Nevada even submits a claim that the first airplane dusting was done in his state, but details regarding this are obscure. Since none of these incidents were properly recorded, few accounts of dusting operations during the early nineteen-twenties exist.(3)

The official position taken by the United States Department of Agriculture is that the first dusting experiments were conducted during 1918, but the location and names of the individuals concerned are not mentioned. Their reports indicate that the results of the tests were only partially successful due to a faulty dust-dispensing mechanism which was installed in the aircraft. This equipment appears to have caused an uneven application of dust on the crops. The aircraft used was a Curtiss JN-4 biplane trainer.(4)

The first really documented use of the airplane for agricultural purposes can be claimed jointly by the United States Army Air Service and the Forest Service, an agency of the Department of Agriculture. When Coert du Bois, Regional Forester, U. S. Forest Service, and Major Henry H. Arnold, of the Army Air Service, met accidentally in a San Francisco restaurant, their discussions led to the formation of the world's first aerial forest fire patrols. These were flown from 1919 until halted due to lack of

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THE SURPLUS AIRPLANE IN AGRICULTURAL FLYING

At the end of World War II, American civil aviation experienced a period of unparalleled growth. Part of this increase was the result of the large number of war-surplus airplanes which were sold to civilians. Several types of military training airplanes proved to be especially suitable for agricultural aviation. These were available at very reasonable prices following the end of the war, and many ex-military pilots bought them for conversion to the dusting and spraying role.

The most common of these are the Boeing-Stearman Model 75 and the Navy N3N-3 biplane trainer. The accompanying photographs depict a few of the numerous variations of these aircraft which are still in service throughout the nation. Although several types of new agricultural aircraft are now being manufactured, it is apparent that the war-surplus biplane is going to be around for some time.

PHOTOGRAPH IDENTIFICATIONS

Above, in the title background, an ex-Navy NZN-3 at work on a sugar beet field near Tempe, Ariz. This is a typical sprayer with standard wings and 450 hp Pratt & Whitney R-985-AN-1 engine. N45111, Sanders Aviation.

Opposite: A - One of the few "two-holers" left in the Southwest, N3N-3 operated by San Tan Dusters as a trainer, near Phoenix, Ariz. N9831Z, Lycoming R-680-7 at Deer Valley Airport, B - A duster, modified from the standard N3N-3 by the addition of hoppers and dispensers. This was c/n 2784, N44743(R) with P & W B-985-AN-1, 450 hp, at Mesa, 1959.

C - Wings for this N3N-3 were modified, bringing center section of top wing back to trailing edge, providing more lift. Standard P & W "Wasp Jr." 450 hp. Operated by Sanders Aviation, Tempe, Ariz. 5/66.



A



B



C



D



E



F

D - Modified NSN-3 with long wings and tip plates and center section cutout. N44863(R), BuAer No. 2863 with P & W R-985-AN-3 sprayer operated by Crowl Dusters, at Airhaven Airport, Phoenix, January 1959.

E - N-3N-3 (Modified) N7753 C(R) with P & W R-1340-AN-1 600 hp, Tanker #E-12. Operated by Westair of Rio Vista, Calif. Photo at Susanville, May 1965.

F - N3N-3, Using the R-985—engine but having improved load carrying characteristics by the lower wing extensions which also provided added swath width. Thus the capacity of the R-1340 engine is achieved. N44842 (R), BuAer #1767, at Casa Grande, Arizona, August, 1965, operated by Crowl Dusters, a rare modification.

funds during 1923, using Curtiss JN-4 and de Havilland DH-4 aircraft.(5)

To really appreciate the promise of aerial application of pesticides during this period, some mention of the state of the art in the application of these materials from the ground must be made. Insect control was at best a complex, expensive and semi-effective operation. Liquid materials were sprayed on trees and other forms of foliage by means of engine-driven pumps. Difficult terrain complicated the task, and the use of several thousand feet of hose to cover remote areas was not unusual. Needless to say, equipment and labor costs were considerable.(6)

During August, 1921, a series of tests was conducted to combat an infestation of catalpa Sphinx larvae (caterpillars) which was defoliating a catalpa grove near Dayton, Ohio. Under the direction of C. R. Neillie and J. S. Houser, a Curtiss JN-6H biplane was modified by the installation of lead arsenate dust dispensing equipment. The hopper was located on the right side of the fuselage even with the rear cockpit. The mechanism was operated by the observer, who turned a hand crank which actuated the dust distributing device at the bottom of the hopper.

On 3 August 1921, under what were considered perfect weather conditions, the first actual tests

were made. Lieutenant John A. MacReady, of the Army Air Service, was assigned as pilot. Mr. E. Dormoy, designer of the hopper, went along as observer and operator of the dust dispensing equipment. Captain A. W. Stevens made a remarkable series of photographs of the experiments.

The catalpa grove was situated on level ground and was rectangular in shape. It was 800 feet long and 325 feet wide, comprising approximately six acres. There were 4,815 trees varying from twenty-five to thirty feet in height. The grove was infested with catalpa sphinx larvae.

The Curtiss JN-6H made a total of six passes over the grove at an airspeed of eighty miles per hour and an altitude varying from twenty to thirty-five feet. A total of 175 pounds of dust was dispensed slightly upwind of the grove, allowing a light wind to carry the material over the grove where it settled rapidly. Although some vertical air currents were present, most of the dust reached its intended objective.

When the dust had settled, observers entered the grove to check results. Particles of dust were found on every tree in the grove. The next morning, many of the caterpillars were dead and others were dying. Sheets had been placed under some of the trees to make insect counts easier. One such sheet yielded 100 dead insects on a five square foot area. In the whole grove, less than one percent of the caterpillars remained alive.

This was the first really scientifically controlled and documented test of the aerial application of pesticides. The results were conclusive enough to stimulate a research and development program which led to the design and production of the first airplane especially manufactured for agricultural flying, the Huff-Daland Duster. But this is another story.

REFERENCES

- (1) Kenneth Messenger and W. L. Popham, "From 0 to 5000 in 34 years," Yearbook of Agriculture, 1952, Washington: U.S. Government Printing Office, 1952. p. 250.
- (2) Interview with Martin Kronberg, Director of Training, Agricultural Aviation Academy, Minden, Nevada, June 13, 1964.
- (3) Ibid
- (4) U. S. Federal Aviation Agency, Aircraft in Agriculture 1959, Washington: U. S. Government Printing Office, 1961. p. 1.
- (5) U. S. Department of Agriculture, Forest Service, Air Attack on Forest Fires, Agricultural Information Bulletin, 229, Washington: U.S. Government Printing Office, 1960, pp. 2-3.
- (6) C. R. Neille and J. S. Houser, "Fighting Insects with Airplanes," National Geographic, XLI, March, 1922, pp. 333 to 337.

EAGLE SQUADRON AIRPLANE'S FATE

In 1964 there was published an article on the Eagle Squadrons, RAF (Vol. 9 No. 1, Page 3, "The Eagle Squadrons" by Earl Boebert). It mentioned the case of No. 133 Squadron airplanes running out of fuel over Europe in September, 1942. As was stated, twelve of these and seven other Spitfires of the Biggin Hill Wing failed to return. My colleague, Hans Ring of Munich, historian of the Gemeinschaft der Jagdflieger, has asked me to write the following, which solves the fate of many of these aircraft.

Bruno Stolle was commanding officer of eight Staffel of JG 2 at Brest on 26 September 1942. He reports

"I observed the Spitfires arriving over Brest, and perceived that they must be in error or out of fuel. I ordered my Staffel to prepare for scramble. The Spitfires had their wheels down. I was fascinated by the idea to present a complete squadron of the newest Spitfire-type, and ordered the light flak not to shoot on any account. But the flak unit was not subordinate to me. When the first Spitfire came in to land a hail of intense fire welcomed it. The Spitfires retracted their wheels and escaped. Now my Staffel scrambled and pursued them.

"We shot down eleven of them and another crashed near Brest. The only loss to my Staffel was one shot down by our own flak while sitting behind a Spitfire. Later some of the pilots were brought in and we treated them well. One was Captain Charles A. Cook, Jr., of San Luis Obispo, Calif.

After the war he sent some CARE packets to me. Unfortunately I do not possess his address and would be very interested to hear from him."

If any Member has Captain Cook's address I shall be pleased to pass it on to Herr Stolle. Christofer F. Shores, 104a, Sunningfields Road, Hendon, London, N.W.4, ENGLAND.

SALMSON MARKING EXPLAINED

In reference to Volume 12, No. 2 of the JOURNAL, page 113, the third photo on the left side shows a Salmson with two diagonal fuselage bands.

These bands were required on the Commanding Officer's airplane. Some squadrons complied, others did not, and they did not all comply in the same way. The band was supposed to be a red, white and blue band, duplicated, actually two bands next to each other. Other photos of the 12th Aero Squadron, show them; see Cross & Cookade, Vol. 5, No. 2, inside rear cover. E. L. Leiser, Lt., USN, USS COMSTOCK, LSD-19, FPO San Francisco, California.

NEW ORLEANS MUSEUM DISPLAY

An interesting display of WWI material can be seen in the Louisiana State Museum, located in a famous old building, "The Cabildo", in the French Quarter. Labeled "A Gift from the Republic of France" it includes:

A Salmson 9-cyl. radial water cooled Z-9 engine.
Two small aero bombs, each different, 5-10 lbs.
Two Spandau machine guns, labelled Parabellums.
One German cross on fabric, black on white.
Harvey H. Lippincott, Hebron, Connecticut.