



The Nicholas-Beazley Airplane Company

"The Garage That Grew Wings!"

(Research Project No. 7909) by Jack Kennedy

Part II 1928-1929

1928

Due to the imminent production of the new airplane, all production facilities, processes and static-testing of aircraft components had to be inspected and approved under requirements of the 1926 Air Commerce Act. Early in January, Richard H. Lees, Jr., Supervisor of Inspectors for the Air Regulations Division, Aeronautics Branch, U.S. Dept. of Commerce, visited the makeshift N-B shop. He usually visited Marshall every three to four weeks to check progress of the initial test airplane and witness various static tests. He frequently flew from Kansas City in his Buhl *Airster*, but bad weather on this first trip of the year forced him to take the train.

It was not until the end of February when the new Barling monoplane made its first test flight. Almost a year had elapsed since the signing of the contract and the airplane was now a reality. In keeping with the engine limitation imposed by Barling, a six-cylinder, air-cooled French Anzani engine of 60 horsepower was installed. The first three production aircraft were fitted initially with this engine, but LeBlond 60s were installed on the majority of the first 20 airplanes. A Velie engine was also installed briefly on one airplane.

Four test flights were made the first day and all flying qualities appeared to be satisfactory.¹ Claude Sterling was listed as Chief Test Pilot during this period. "Barney" Zimmerley and Charlie



Gatschet also participated in the test flights. Additional flights were planned to test both the airplane and different engine combinations. Due to the unique design innovations incorporated by Barling into this airplane, a thorough flight test program was set up in order to qualify for an Approved Type Certificate. N-B was also slowly accumulating a number of handmade parts and assemblies for use in the static-test program.

There were indications of early difficulties surfacing in this initial testing. The Department of Commerce was required under the 1926 Act to certify stress analysis of the design and ensure that specified safety factors were also incorporated in both the test units and production aircraft. One participant of that period remembered,

. . . [that] apparently Mr. Barling posed a problem in relations with the Dept. of Commerce inspectors who had to certify the structural design of the plane. I suspect that Barling knew considerably more about structures than the Dept. of Commerce people did and that made for bad relations. . . ?

The low-wing, three-place, open-cockpit monoplane was distinctive, but the wing was Barling's unique design. It not only had dihedral in the outer-wing sections, but it was able to perform quite well with the small engines installed on several different models. The fuselage of the NB-3 was a modern steel-tube, state-of-the-art framework which was rapidly replacing the old wooden structures. Welded chrome molybdenum steel tubing was used in the fuselage and the patented wing structure was built up from duralumin sheets and tubing. The wings, fuselage and all control surfaces were fabric covered. Barling used one of his own airfoil designs (Barling 90-A) on the wing.

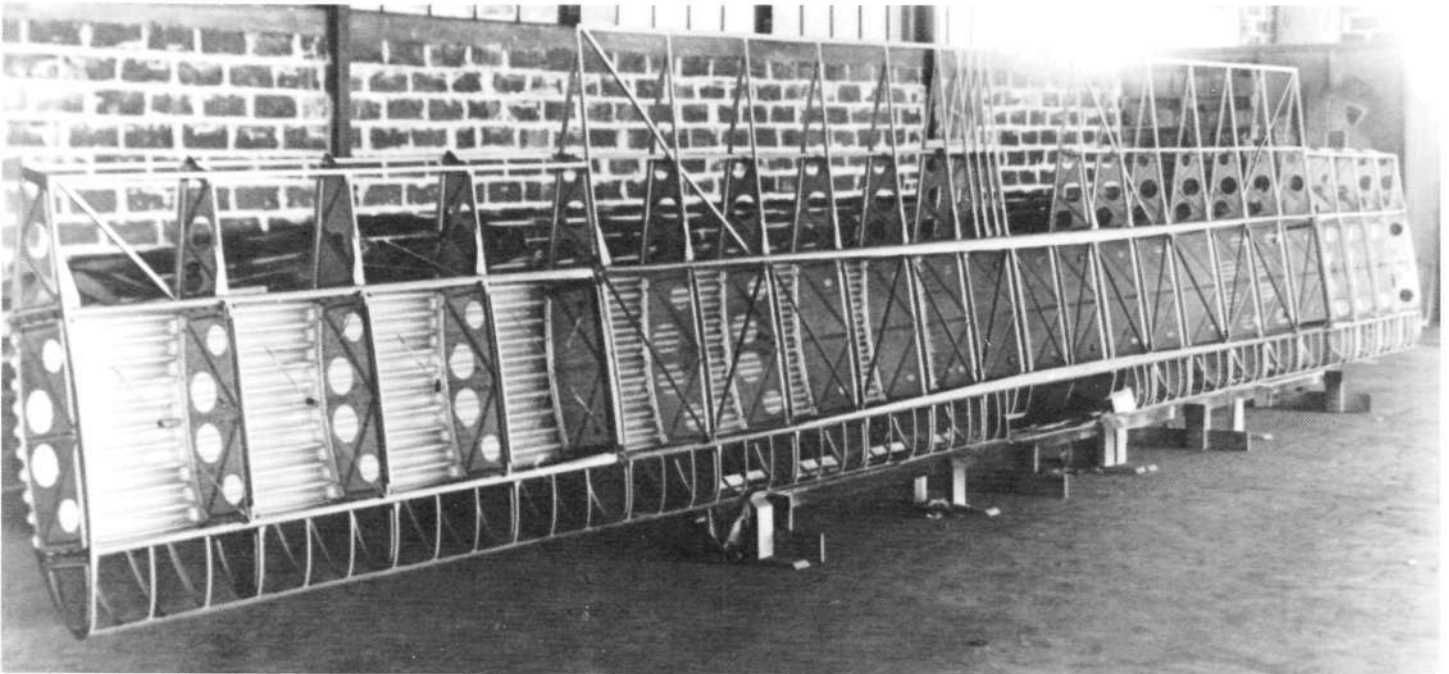
The patented wing design was the culmination of many years of study and testing by Barling. The wing was fully cantilever and entirely void of external braces or struts. Although the wing structure weighed only 148 pounds, it was capable of supporting six and a half times the weight of the entire airplane without evidence of structural failure.

NB-3 No. 1 with the original Anzani engine used in the first test flights. Charlie Gatschet is in the cockpit; Jack Olsen is ready to spin the prop; L.E. "Murph" Shedenhelm is holding his hand over the air scoop to prime the engine and Ervin Whitlock is the observer on the left. Shedenhelm and Whitlock were both MFS students. (L.E. Shedenhelm via R.B. Nicholas)

The wing was a relatively early example of a built-up fabricated metal wing structure which required designing special machinery and heavy steel assembly jigs. Great care had to be taken in the wing assembly jigs to obtain the necessary rigidity required in that operation. After fabrication was completed, realignment of the wing was impossible. A special machine was designed to cut the thrust tubes on the end of the main box spar to the exact angle required. The thrust tubes formed the point of attachment of the wingtip to the wing center section. Extra precautions were then required for installation of the tip to preserve the five degrees of dihedral in those sections. In theory, each wingtip could be interchanged with any other, but minor variations in the wings on different models limited that option. Manufacturing differences also affected the interchangeability.

The wing was designed to be 100 percent inspectable. Both ends of every rivet (more than 4,000) were visible for inspection at all times. Due to special design features built into the wing by Barling, individual damaged portions of the wing could be realigned or replaced without affecting the entire structure.³ Repair or maintenance could be performed without tearing down the wing as was frequently the case with wooden wings. Attachment and rigging of dihedral in the wingtip was easily accomplished through installation of wires and turnbuckles within the wingtips.

Seven different thicknesses of duralumin sheeting were used in fabrication of the wing. The wing was divided into a center section 20 feet long with two wingtips each six feet in length. The basic wing structure was made up of one principal "U"-shaped box spar of stamped duralumin parts riveted together.⁴ Metal ribs were clamped firmly in place within the rigid steel assembly jig and a zigzag (Warren truss) strut or welded chrome molybdenum tubing was installed. Corrugated duralu-



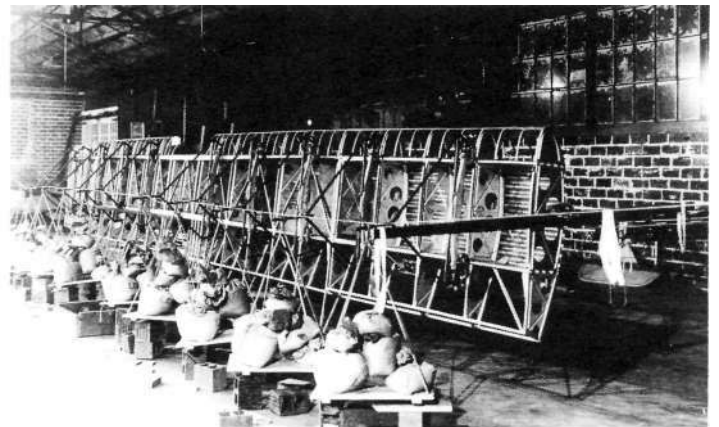
The patented Barling wing used on the NB-3. This wing is propped up for display in a portion of the original wing shop in N-B Building No. 2. This photo was eventually used to illustrate several N-B sales brochures for both the NB-3 and NB-4. (R.B. Nicholas)

min sheeting was placed in the jig and the entire structure riveted together.

In corrugating the duralumin sheeting, an exact fit at the ends of each sheet were required to ensure maximum strength. The pitch and depth of the corrugations was different on each sheet thickness. A single die setting was tried, but it did not work satisfactorily and an adjustable die appeared to be required. The problem of constructing special machinery to corrugate the different thicknesses was referred to machinery manufacturers. After their experts evaluated the problem and made exhaustive trial efforts, they advised N-B the desired results "might" be obtained with four dies, but an adjustable die was impractical. All these trials took time. The net result was that continuous production could not begin until the slow hand-forming operations could be replaced by some method of duplicating parts more rapidly.

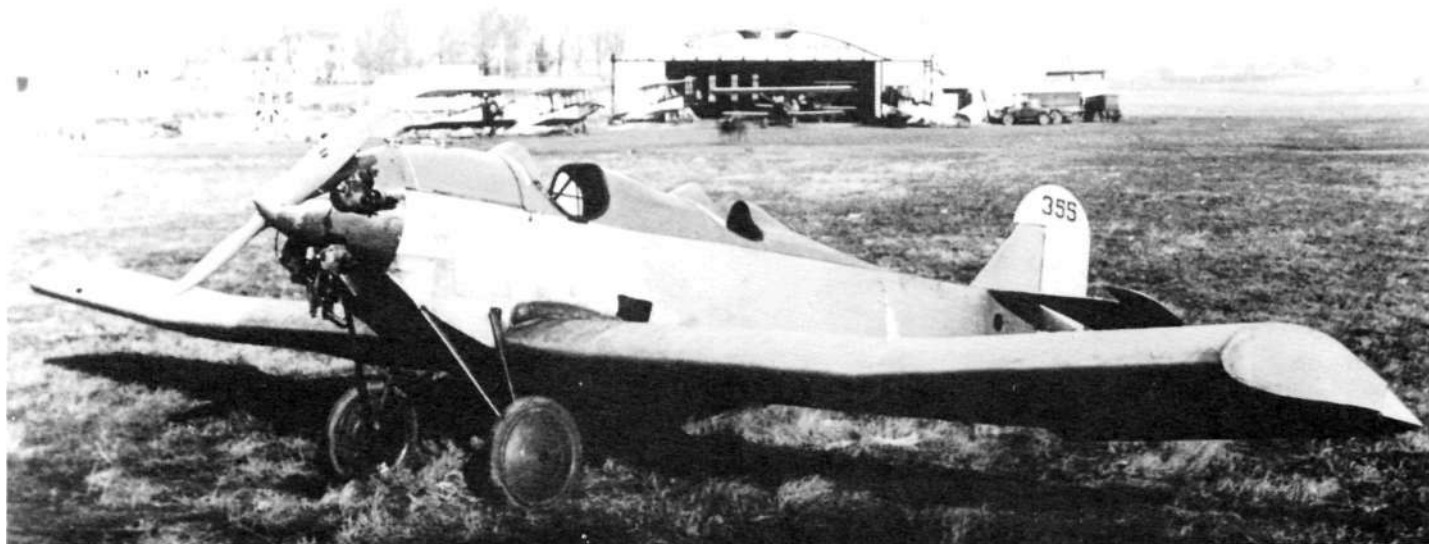
Fortunately, N-B had a very capable person who was able to disprove the machinery experts. P.O. Gibson, N-B manufacturing division foreman, worked out an adjustable die which wasn't supposed to work, but did. It could be adjusted both in width and depth. His new die was eventually proven on a variable press after several months of experimentation. A new double-action toggle press was ordered which was capable of corrugating sheets for 100 airplanes in one day. Machines capable of stamping out center ribs as well as nose and trailing edge ribs were also on order.

The fuselage was similarly constructed in special jigs. Chrome molybdenum steel tubing was cut to length and stored in racks convenient to the assembly jigs. After preliminary tack-welding of the tubing in the jig, the jig was opened, the partial fuselage assembly removed and placed in a special revolving jig for the final welding process. The turtle-back section of the fuselage was also built in a jig and welded to the basic fuselage framework to complete that portion of the structure.



One of the static tests for Barling's patented wing on the NB-3. These tests were set up and supervised by Walter H. Barling to accumulate data for the ATC application on the NB-3. The majority of the data was accepted, but portions were rejected which created considerable problems. The rejection of the data marked a watershed in relations between Barling, Nicholas and Beazley. (C. Buckner, Jr.)

Oil treatment of the welded steel fuselage was performed in a unique machine also designed by Gibson. Previously a time-consuming and essentially dirty job, his cylindrical oil treatment booth accomplished a 45-minute job in about 45 seconds. Not only was there a time savings, but his machine used less than 50 percent of the oil previously used. Dipping welded tube fuselages to inhibit rust usually left large amounts of oil within the tubing where it seeped in through pinholes. The residual oil leaking out over a period of time stained and weakened the fabric. With his new method, the fuselage framework was suspended on cables from an overhead trolley so the cables could pass through a slot in the top of the booth. As the fuselage passed through the oil-treatment booth, oil under pressure from a pump sprayed through nearly circular perforated pipes which coated all surfaces of the steel tubing to prevent corrosion. It was possible to regulate the pressure and the coating to obtain maximum coating without excess oil. After passing through the booth, the fuselage remained suspended over a drainage area where surplus oil was accumulated and returned to the tank for



reuse. The next stages were covering with fabric, doping, installation of instruments and the engine.

The initial Barling monoplane was essentially hand-built. A substantial amount of trial and effort was involved in producing the first airplane. It required longer than the nine months stipulated in the Barling/N-B contract since the wing design was complex for that era. It was an additional lengthy period of time before the first true production airplane was completed. The design, testing and proving of materials, static-testing of assembled components, installation of production machinery and training of employees all took more time than originally anticipated. The flight of the first airplane appeared to prove that Barling's theories and patented wing would work in a practical application.

During the period when the new monoplane was first produced and advertised, it was identified as the Barling NB-3. This gave prominence to Barling's association with N-B. However, the airplane was also designated as the *Nicholas-Beazley* (airplane) #3. There is some speculation that #1 may have been the rebuilt Standards which first established N-B in the aircraft business and #2 was the *Commercial*, or "Clipped Wing," derivation of the Standard which was only built at Marshall.

After the first series of flights testing the NB-3, it was soon evident N-B did not require the full 90 days allowed in the contract to decide upon further production. Just two weeks after the first flight, N-B announced plans for construction of a second new factory building to be erected west of the building completed less than a year previously. The second building would be used exclusively for production of the NB-3. Nicholas was quoted as saying five additional ships were to be built and used for tests. They would not be sold, but would be assigned to the Marshall Flying School. Students there would have the advantage of access to the most up-to-date aircraft for study and flight.

Machinery and equipment were ordered for installation in the new factory. N-B expected to have new monoplanes ready for 100

NB-3 No. 1 on the N-B/MFS flying field south of Marshall. The Anzani engine has been replaced by a LeBlond 60. The Department of Commerce No. (355) has finally been assigned which permitted commercial flights. Demonstration flights of the early NB-3s were severely restricted since several portions of the static-test data submitted for the Approved Type Certificate had been rejected by the D/Comm. Several "Clipped Wing" Standards and a Waco used by the MFS are in front of the hangar. (C. Buckner, Jr.)

sale within 10 to 12 months after completion of this second building and installation of the new machinery. Possible production of an air-cooled engine by N-B for use in the NB-3 was mentioned by Nicholas in an interview. A complete N-B airplane and engine combination was supposedly under consideration. If the engine was successful, they could be produced by the thousands. There is no record of N-B designing, manufacturing or installing any engines under their name. The initial NB-3 and all subsequent aircraft produced by N-B were equipped with commercially manufactured engines which they purchased and installed. The N-B engine announcement was a relatively typical publicity release in the aviation industry during the late 1920s. A "pipe dream" mentioned in casual conversation to reporters was frequently publicized simply as a means of keeping a company's name in the newspapers. Accuracy and modesty were everyday casualties in aviation announcements of the day.

By May most of the machinery was delivered and installed in the latest factory building. Some production of the five additional test airplanes was completed, but with many untrained employees, new machinery continually being installed, difficulties in assembling partially handcrafted and machine-produced parts, actual production schedules were necessarily slow. About the middle of June the giant new double-toggle press arrived. A steam engine and rollers were used to drag the press into the new building. The press could handle sheets of metal 12 feet wide and had a capacity of 100 tons. It replaced Barling's 50-ton press which could not handle the longer sheets required in the wing assembly.

Early September 1928 brought more construction. The "old" and new buildings were not considered large enough for produc-

tion schedules now under consideration. The remaining sheds in the hitchyard next door were torn down. The latest addition was constructed south of the first two factory buildings and extended the full width of the block. It was two stories in front where the previous buildings were one story. The second story provided space for the engineering and manufacturing department offices. This made the entire ground floor in the third building available for production use. Jutting out from the second story inside the building was a balcony where visitors could view construction of aircraft below them without getting in the way of production lines stretching the length of the building.

A special feature of this newest building was an explosion-proof room for manufacturing acetylene gas used in the welding shop. A sprinkler system was also installed throughout the three buildings due to storage of solvents, dope, etc., in the adjoining building and the recent consolidation of the office, parts and shipping departments into the first of the new buildings.

The production line designed by Gibson was to be similar to those currently in use in the automotive industry. A continuous flow of materials and elimination of extra handling was required for the production volumes under consideration. The ultimate plan envisioned was 40 airplanes per week within six months after completion of the building and installation of all machinery.

While the major emphasis was on completion of production facilities and tooling during the past several months, the N-B parts and supply business was not neglected. Their move into the first building made a much more practical arrangement. Many parts and supplies were still scattered all over town, but operations worked more smoothly under the new setup. N-B's three stenographers were responsible for the several hundred letters and orders received each day. Twelve men in the shipping department handled between 60 and 100 individual shipments per day. N-B used two different advertising slogans which had proven effective. "Ship the same day" and "We will be here tomorrow" were stressed throughout their sales effort. It was a source of pride that orders received in the morning went out the same day unless they were completely out of stock and an acknowledgment of that fact was sent instead. A record 148 shipments in one day was indicative of the tremendous increase in sales generated by the latest catalogs and advertisements.

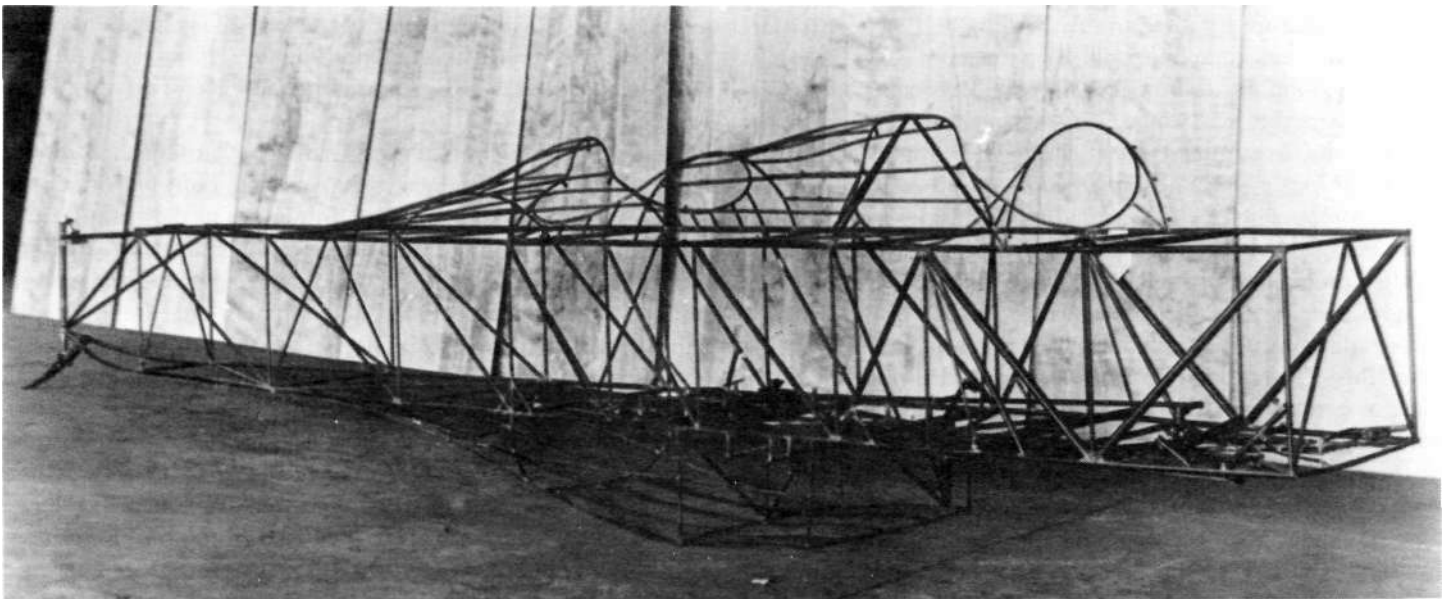
The mailing list for catalogs was kept up to date in a roster of between 12,000-15,000 names. N-B felt that not only promptness of service contributed to their business, but having the lowest possible prices were factors in the increasing volume of business. They started with surplus items purchased for pennies on the dollar, made a modest markup and tried to maintain that approach even when prices on new replacement parts increased.

A large number of commercial aircraft manufacturers in the U.S. were purchasing from N-B, particularly OX-5 engines. The roster of names included: Advanced Aircraft Co. (*Travel-air*); Alexander Industries (*Eaglerock*); Hess Aircraft Co. (*Hess Bluebird*); American Eagle Airplane Co. (*American Eagle*); Pitcairn Aviation Co. (*Pitcairn*); Swallow Airplane Mfg. Co. (*Swallow*); Lincoln-Standard Airplane Co.; Kentucky Aircraft Co. (*Cardinal*); Pheasant Aircraft Co. (*Pheasant*); Birdwing Airplane Co. and several others. In addition, the majority of engines used at the Marshall Flying School, the Kansas City Sweeney School of Aviation and other flying schools in the Midwest came from N-B. N-B also required OX-5s for their Standards and "Clipped Wing" aircraft still available for sale.

Eventually the large quantities of OX-5 engines previously available were almost gone and it became harder to fill orders. When the OX-5 engines N-B purchased through the Aero Motor Sales Co. from Dodge began to thin out, some 200-300 engines were assembled from the tons of spare parts included in that Air Service sale. It was one way N-B was able to keep engines in inventory when new engines became otherwise impossible to obtain. An example of another company keeping sufficient engines in stock to maintain production was the Robertson Aircraft Corp. They sold 1,142 *used* OX-5s to the Curtiss Aeroplane Co. for \$400,000 (\$350.26 each).⁵ The Robertsons then contracted with Curtiss to rebuild the engines over the next two years for installation in the Curtiss-Robertson *Robin* and other aircraft built by the two companies.

By this time, substantial quantities of the original surplus parts purchased by N-B over the past four years had been sold. Replacement parts were ordered to refill the parts bins. N-B

A complete welded-steel tubing fuselage for the NB-3. Installation of controls, instruments, covering and doping will follow. This photo was frequently used in N-B sales brochures to illustrate the modern design of NB-3. (R.B. Nicholas)





bought 20,000 OX pistons at a cost of \$33,000 from the W.B. Huber Co. of Los Angeles, \$100,000 worth of other OX engine parts, large quantities of spark plugs, magnetos, fabric, dope, flying suits and turnbuckles in order to fill the orders which arrived each day. N-B also became the exclusive representative for many companies. The N-B catalog advertised Skullly Airmail Helmets (made of imported glove leather), Hi-Lab Safety Belts, goggles and the numerous other items needed to build, maintain or fly an airplane.

N-B's parts business not only purchased items throughout the country, but was directly responsible for several companies moving to Marshall. The Airplane Parts Co., owned by A.E. Stewart, installed some \$6,000 worth of machinery and equipment in a building just east of the N-B plant. Brass and aluminum aircraft parts were their specialty. They were the only plant in the Midwest producing custom-design aluminum gas tanks.⁶ The fuel tanks Barling designed for the NB-3 were mounted on top of the fuselage just behind the engine. They helped form the upper fuselage shape under a removable cowl and were manufactured by this new company for N-B on a custom basis. The company was soon in full operation and Marshall became accustomed to the loud thumps and bangs as their machinery stamped out streamlined wheel covers and propeller spinners. The noise meant jobs and most people didn't complain. Valve action components for OX-5 engines were one of the largest items sold by N-B from this company.

With production of the NB-3 not too far off, it is interesting to note that the test aircraft were taken to the N-B/MFS field three miles south of Marshall in much the same way as with the Standards. The tailskid of the NB-3s were tied with a rope to the back of a truck and the fuselage towed tail-first to the field. Some wings were shipped completely assembled, but many were in the three separate sections. Once at the field, the wingtips were attached to the center-wing section. Barling's design incorporated a quick assembly technique for attaching the wing to the fuselage. The tail was raised upon a sawhorse, the light rigid wing walked into place and lifted into position. Four nickel-steel

View of the complete N-B factory. The one-story buildings in the foreground were completed first and the two-story addition was built when production of 40 aircraft per week was anticipated. The \$40,000 dope and covering building is in the right background by the water tower. Shadows of buildings in the street to the left are from some of the original garage buildings in which Nicholas' aviation dream first flourished. The N-B factory buildings are currently occupied by a company which processes and manufactures frozen meat pies.

(C. Buckner, Jr.)

bolts were inserted into threaded retainers and securely fastened. Installation or removal of the wing took only 10 minutes. Since there were no wires, struts or rigging to adjust, the airplane was ready for flight immediately—and stayed that way.

NB-3 No. 1, which first flew in February, was joined by two more test aircraft of the same basic design. The Anzani model was completely hand-built and differed substantially from those that followed.⁷ It was not used for any of the static-test data, but simply to prove Barling's design was capable of production and flight. Its construction indicated several changes were required in the production aircraft which they hoped to build before too long. Airplanes No. 2 and No. 3 were powered by a LeBlond and a Velie engine. Although most of the first 20 aircraft were eventually equipped with the LeBlond engine, the majority of the static-test data was based upon the airplane with the Velie engine.

Following completion of the latest factory building and installation of the new machinery, test parts were built both to check the equipment and to train N-B employees in the manufacturing techniques required for this radically different airplane. During the late fall months, a total of six complete wings were built to provide experience to N-B shop personnel and to supply wings as well as related components for the various static tests. N-B used a variety of different materials and gauges in the initial testing. It was partly by choice and partly due to necessity. Aluminum manufacturers in those days had limited production capacities and their markets were relatively small. It was not unusual for shipments to take from three to six months following placement of an order. Original N-B aluminum inventories appear to have been meager because the stress tests were incomplete and changes in the aircraft were already becoming appar-

ent. Barling's wing was built in several different versions to verify differences between the theoretical and actual stress values.

Wing static tests began on December 14 and continued through the 16th. The nosedive, inverted load and low incidence programs were completed without problems. However, on the high incidence test, the test-jig holding the wing collapsed. Vertical wooden posts sheared under the 6,000-pound load and when the wingtips touched part of the test structure, the whole mass crashed to the floor. Needless to say, the destruction of the wing before the test was completed created a problem. Particularly as the damaged wing was the only one of the six "practice" wings constructed of materials and gauges which conformed to ATC static-test specifications.

A replacement wing made earlier (with smaller diameter tubing in the zigzag strut) was erected in a rebuilt test-jig. New tests began in the hope this substitute wing would be accepted. It was noted as such in the static-test report. N-B did not have enough of the required materials on hand to build a new wing and it was estimated replacement materials could not be obtained any sooner than 2-3 months. The delay might have led to the loss of the recently trained shop crew since no other work was available. N-B took a chance and tried to go ahead with admittedly non-standard materials.

Test data was accumulated from many sources. One was a compilation of individual weights for different portions of the NB-3 to establish a gross weight condition. The Velie-equipped airplane was used in this project. Each component was weighed as follows:

Velie Engine	241 lb.	Wings	160 lb.
Fuselage	163 lb.	Ailerons	10.6 lb.
Landing Gear	56.25 lb.	Cowl	5 lb.
Tail Assembly	18.3 lb.	Throttle	3.5 lb.
Seat Belts	2.5 lb.	Prop and Spinner	20 lb.
Upholstered Seat	3 lb.	Fuel (25 gal.)	150 lb.
Baggage Basket	1.3 lb.	Oil (3 gal. 1 pt.)	24.2 lb.
Fuel Tank Straps	2 lb.		

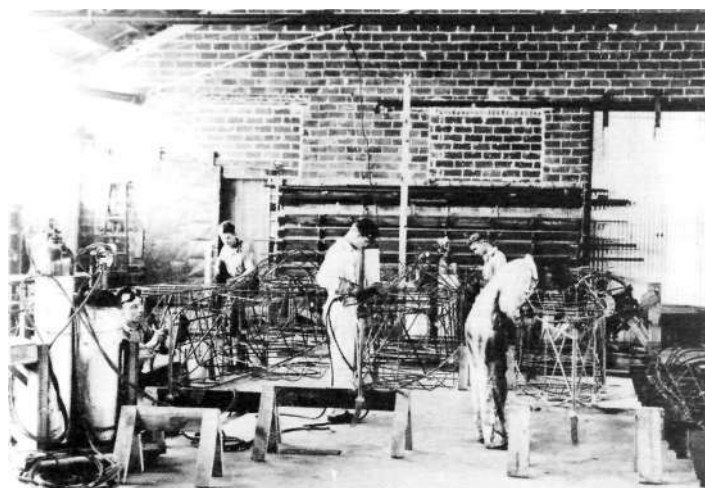
The total weight of the NB-3 without passengers and pilot was listed as 688.45 pounds. The fuel capacity of 25 gallons is of particular interest. ATC capacity was 18 gallons. N-B and the Department of Commerce had a continuing series of discussions on this matter which will be mentioned later.

The passengers and pilot's weight were not included in the previous data. For test purposes, the D/Comm. assumed a standard weight of 170 lbs. for the pilot. Barney Zimmerley only weighed 136 lbs. N-B loaded his pockets with 24 lbs. of solder to obtain a more 'realistic' weight of 160 lbs. Charles Buckner, Sr. (weight 145 lbs.) and an unnamed upholstering man (seats) were loaded into the front cockpit to act as passengers. The upholsterer weighed 171.5 lbs. so they filled one of his pockets with 3.5 lbs. of nuts (probably inedible) to obtain a total pilot-passenger load of 320 lbs. The fuel and oil tanks were filled and the entire airplane weighed to establish an official gross weight.

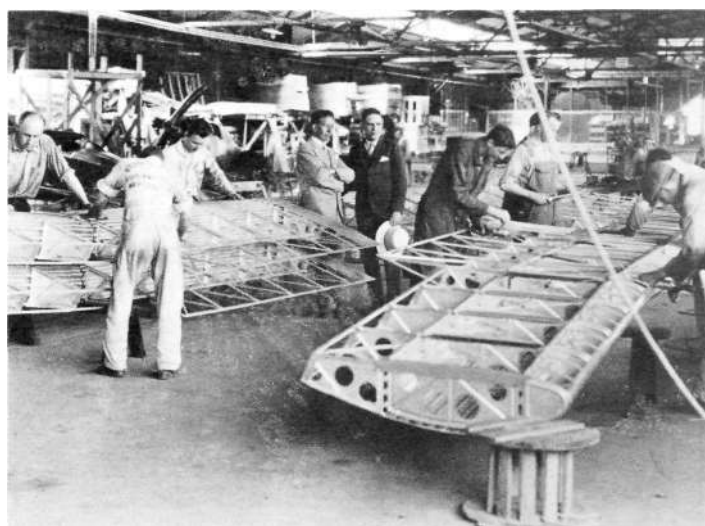
Tests of one kind or another continued through December to complete the accumulation of data. Barling eventually compiled 83 pages of data or explanatory information to be forwarded to the D/Comm. on the NB-3. Two complete sets of drawings on the various detail and assembly items for the airplane were also forwarded to Washington, D.C. These were for review with the test data. If everything was acceptable, the D/Comm. would



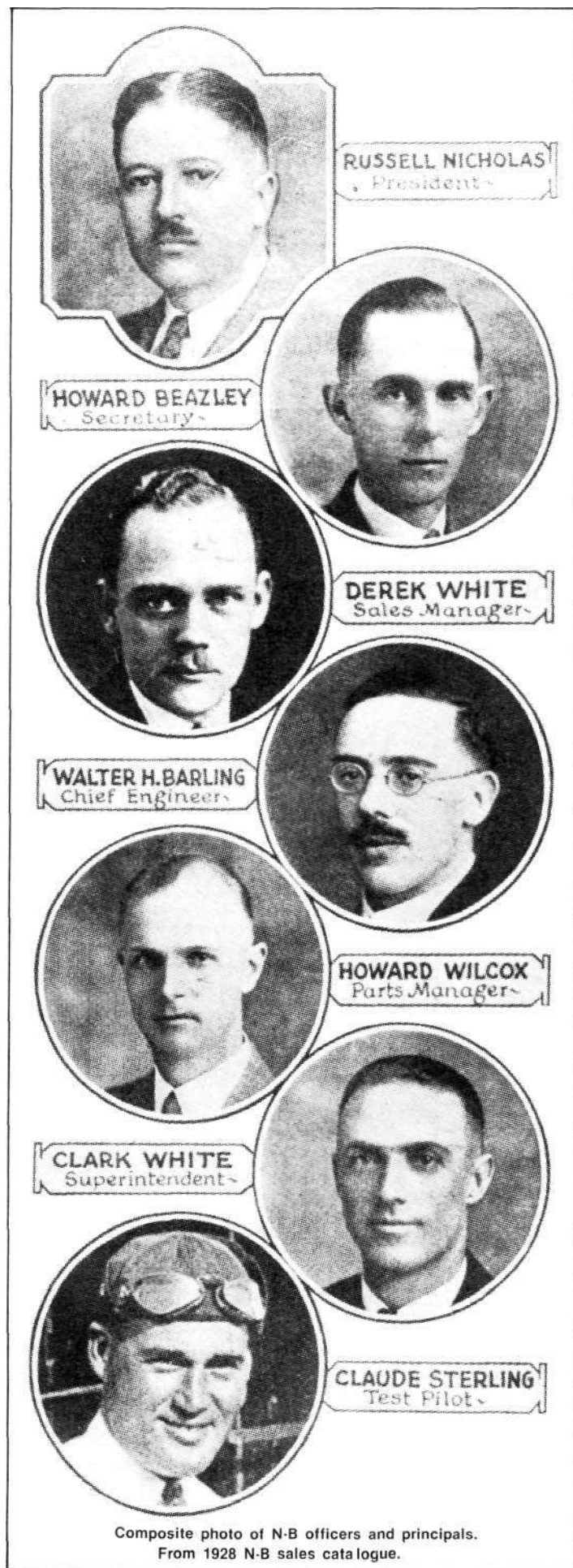
A composite photograph showing N-B Buildings No. 1 (to the left front) and No. 2 (to the right rear extending beyond the firewall). The gate and remaining lattice fence at the far left are a remainder of the old Wingfield Hitchyard. The light-colored area immediately above the fence is the roof of those sheds. (C. Buckner, Jr.)



The original fuselage welding shop at the west end of N-B Building No. 1. The portable tanks on the left indicate this photo was taken prior to construction of the special acetylene generating plant in N-B Building No. 3. The use of the low wooden sawhorses also points to an early production time frame. The racks on the back wall contained steel tubing cut to length ready for use in the fuselages. Each rack was identified by a chalk label on the wall. A fuselage turtle-back is at the right on the floor. It appears to have been built in a wooden jig. Photographs of Barling's special rigid steel jigs for the wing and fuselage have not been found to date. (C. Buckner, Jr.)



N-B Building No. 3 prior to installation of the production line. This was a temporary arrangement of the wing production shop. The two wings stacked on each other in the left foreground illustrate the light weight and strength of Barling's patented wing. The wing tips have been attached to the center section with cables and turnbuckles to ensure the correct dihedral angle. Workmen are finishing the riveting which previously could not be completed in the assembly jig. The men are unidentified. (C. Buckner, Jr.)



emboss their seal on one set of drawings and return them to N-B. The second set would be maintained on file in Washington for reference. Once the drawings were 'sealed', they could not be changed without approval from the D/Comm. They also were the final authority for the D/Comm. inspector in issuing or withholding licenses for production aircraft.⁸ All the drawings, test data and other supporting information were sent to Washington, D.C., about the end of 1928. With three airplanes flying and the majority of flight tests also completed, the technical aspects of the new N-B monoplane appeared to be well in hand.

As 1928 drew to a close, Barling was reported to have designed and perfected a laminated wooden propeller for use with OX-5 engines. It incorporated a new airfoil design which he created. (His early training was with propellers.) The propeller was unconventional in that the wide thin blades embodied a pronounced angle and camber continuing through the hub to each tip. The blades also had forward curving tips which made them quite distinctive in appearance. Performance claims were for slightly higher speeds and faster rates of climb with less engine revolutions in comparison with commercially available propellers.⁹ There is no evidence N-B installed them on any of the Standards they were rebuilding or listed them for sale in the N-B catalogs. Other than an experimental trial or two, it is doubtful if N-B seriously considered having them manufactured at Marshall.

Although production of the new airplane could not start until approval of all the material submitted to the D/Comm., the parts and supply portion of the business continued to add new wrinkles to their sales effort. Stationed at the N-B/MFS field was a Waco 10 which was held exclusively available as a service ship for emergency or priority orders. A mechanic was always handy to fly in the front cockpit for customer assistance wherever that might be. In one instance, a stranded flier called in long distance for engine parts. Within 20 minutes the items were removed from parts bins, loaded into the Waco and were on their way to the customer.

Financially, N-B had another very successful year. In 1927 profits jumped dramatically from a modest figure indicative of the part-time nature of Nicholas' business. It reflected the tremendous changes which took place—both in Marshall and in aviation as a whole. Percentage-wise, N-B was not able to obtain a five-fold increase similar to 1927, but doubling 1927's income still resulted in a very satisfying \$224,304 for 1928. Not only did N-B have a profitable year of sales to look back on, but the books showed that all of the inventory, the new production buildings, the remaining surplus Standards and parts as well as other assets were entirely paid for and only the usual accounts receivable were due.¹⁰ Nicholas' aviation sideline started less than 10 years previously was in a very healthy condition!

1929

Nineteen twenty-nine appeared to start off as a year full of promise for N-B. Their new airplane had successfully passed all flight tests. New factory buildings were almost complete and ready for full-scale production schedules. The general aviation markets were beginning to look with interest at the Barling NB-3. The parts business had never been better and all indications pointed to another prosperous year. Yet, on January 1st occurred one of those casual situations which was the first in a



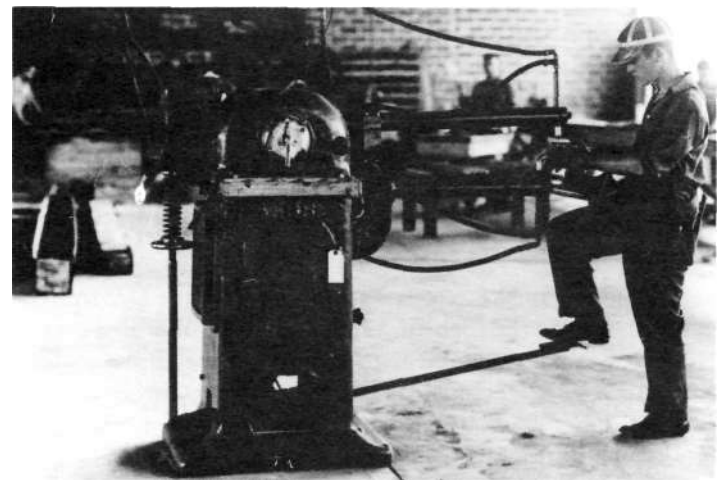
West end of Sec. No. 3 (300'x75') showing clear span roof construction and ventilation sash. A portion of the wing shop was moved to this building. The NB-3 on the right facing away is D/Comm. No. 2834 (No. 12) with a LeBlond engine. The first NB-3 facing the right wall is D/Comm. No. 358 (No. 4) with a Superior Radial engine. The men are unidentified. (C. Buckner, Jr.)

series of episodes with far-reaching consequences.

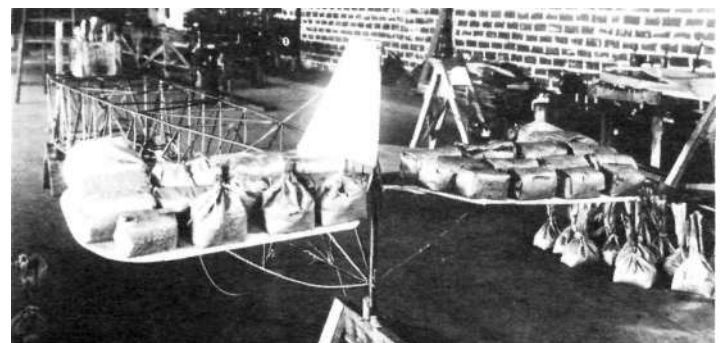
Hayden Campbell of St. Joseph, Mo., came to Marshall for a demonstration of the NB-3. He had been a flier during WWI and was President of the St. Joseph Chapter of the National Aeronautics Association (NAA). St. Joseph was a hotbed of aviation enthusiasm and Campbell was active in promoting that interest, especially if it were to his hometown's advantage. During the visit he had a chance to meet and talk with Barling. Barling mentioned he had designed a 5-6 place cabin airplane which he planned to build. "Where are you going to build the plane?" asked Campbell. "I have not decided, but will let you know when I want to build one," replied Barling.¹

There is no evidence the Barling cabin monoplane was ever offered to N-B for construction, or if offered, what their response was under the circumstances. With construction just underway for the NB-3, the expense of new factories, material inventories and machinery to produce it, a totally different *additional* airplane very probably would have been beyond both the physical and financial abilities of N-B.

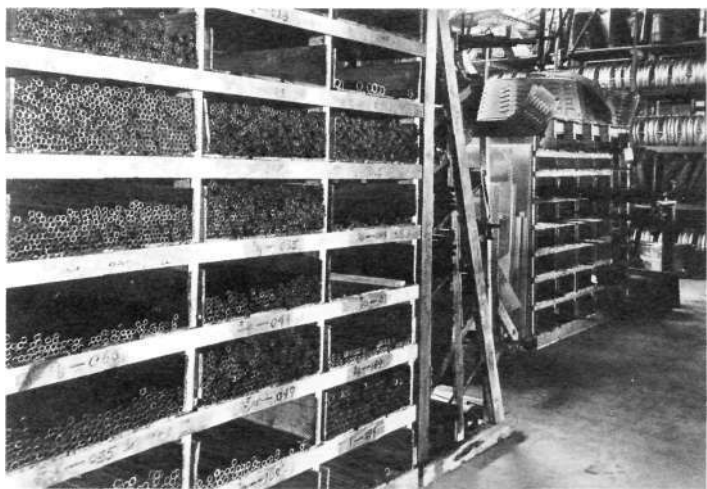
Two points might be mentioned in regard to Barling's relationship with N-B at this time. One is that Barling reportedly kept the N-B Engineering Department locked and refused to permit Nicholas to enter for any reason. Whether Barling was designing the cabin monoplane at the time and wanted to keep it secret or there was a personality conflict which was beginning to manifest itself in that manner is not known.² The second point is the Barling/N-B contract. Once production of the NB-3



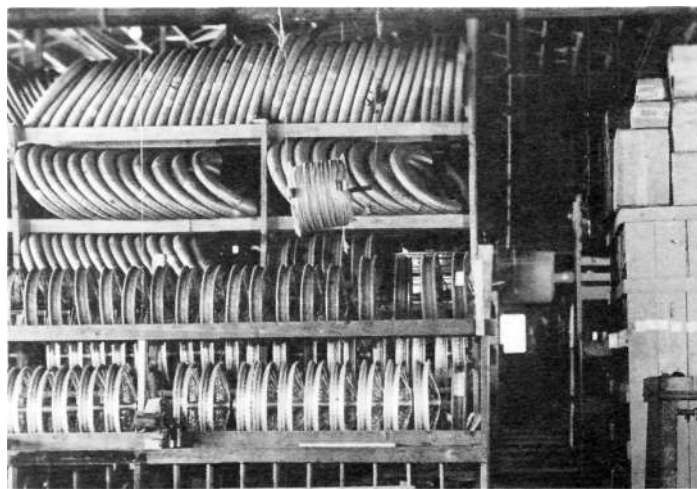
Spot welder used on the NB-3. This was reported to have been one of the first welding machines installed in an aircraft plant in the midwest. (R.B. Nicholas)



Additional views of static tests conducted on portions of the NB-3. These tests were viewed by representatives of the Dept. of Commerce to verify adherence to approved procedures under the Air Commerce Act of 1926. The large bags are 96-pound sacks of cement and the smaller bags were filled with measured amounts of sand. The wings in the photos are some of the "practice" wings built by N-B shop personnel. They were to provide training for the workers, verify the design concepts of Barling and provide test specimens for the static test. The liberal use of wooden sawhorses and "C" clamps indicates the state-of-the-art in static testing during this stage. (R.B. Nicholas and C. Buckner, Jr.)



Raw material storage of parts for the NB-3. Louvered engine cowlings are stacked on top of the parts bin in the background. Part of the tubing in the racks to the left were also inventory used by N-B catalogue sales. (C. Buckner, Jr.)



Tires and wheels for Standards and the NB-3 in an N-B parts warehouse. This is a portion of just one of the eight warehouses used by N-B in their parts inventory over a number of years. (C. Buckner, Jr.)

began, Barling was legally able to pick and choose the extent of his daily involvement at N-B. Back in 1926 when Al Mooney was hired to design an airplane for the Marshall Aircraft Co., his contract stipulated he would work full time on the airplane, *would not consult or perform employment for anyone else and all designs drawn during the period would be the sole property of the company employing him.* Those were typical contract terms of that era—and today.³ Except Barling's contract was written to provide maximum flexibility on his behalf, but specific restrictions where N-B was involved. The pot had not yet begun to boil, but the stew was on the stove.

Late in January N-B received a response from the Department of Commerce on the flight and static-test data submitted for the NB-3. It was not the immediate approval of the airplane which N-B and Barling anticipated. On the contrary, the D/Comm. said Barling's static-test report, "... contained numerous errors, obscurities and deviations from the Department's requirements. ..." This undoubtedly was not well received by Barling since it adversely reflected upon his professional integrity. Nonetheless, N-B requested the D/Comm. furnish information on the 'deviations, etc.' and the data required to satisfactorily complete the report. A several page item-by-item reply was sent to N-B for review and correction.

The three wing tests completed prior to failure of the test structure were considered satisfactory, but the substitute wing test was disapproved. In addition to a wealth of detail information to be revised, a redesign of the forward portion of the bottom fuselage truss was required. The Supreme wooden propeller manufactured by the new Marshall propeller company used on the first three airplanes was not an approved design and "... is of the type that cannot be approved. ..." Many letters and telegrams crisscrossed between Marshall and Washington, D.C., in an attempt to unravel the problems the D/Comm. found with Barling's design. Most could be worked out, but it took time which N-B had not planned on.

With several airplanes in the air and new production facilities taking shape, finances for the projected production schedules assumed greater significance. A certificate of amendment to the original N-B incorporation papers was filed on February 16, 1929, to change the board of directors from five to seven shareholders and increase the amount of capital stock. N-B was origi-



An N-B publicity shot used in NB-3 brochures illustrating the load-carrying capacity of the Barling wing. (R.B. Nicholas)

nally incorporated in 1926 with \$25,000 worth of capital stock. Due to the tremendous growth of the company and the new manufacturing requirements of the NB-3, additional capital was necessary to finance future operations. Capitalization was increased to \$1,500,000 and up to 300,000 shares of stock could be issued.⁵ The additional shares of stock authorized were for current stockholders and a restricted offering to the public which could greatly ease problems in raising money for N-B.

Since the NB-3 was approved for production (by N-B, but not by the D/Comm.), Barling's share under terms of his contract with N-B was 20 percent of the shares outstanding. He had some curious restrictions in his contract which dealt with this stock in addition to all those previously mentioned. Although his contract was with N-B, he required that the stock be issued by the N-B stockholders and not the corporation. His second stock stipulation was that if N-B moved to another location, sold out to another company and any financial inducements were involved, that he would receive his pro-rata share in addition to the amount he received from N-B.

Sale of the new stock to the general public was scheduled and 40,000 shares were listed on the St. Louis Stock Exchange. The stock was released for sale on February 26th at 10:00 A.M. at \$20.50 per share. By noon, orders for 53,000 shares were received.⁶ The oversubscription was typical of the public's confidence, not only in the surging aviation markets of the day, but also in the optimistic predictions for the future. Many of the

buyers were Marshall townspeople and N-B employees. They saw the company grow from a small garage operation into one of the most glamorous businesses in town and a major factor in Midwest aviation markets.

Almost immediately on the heels of the N-B stock sale came an announcement of orders for 35 Barling NB-3 aircraft. At the \$3,600 listed price, the sale represented \$126,000 for an airplane which was not yet authorized for production. Only portions of five states were included in this sale and prospects looked extremely favorable. The projected production schedule of 40 aircraft per week within six months was under strong consideration. Material orders were placed for "a considerable quantity and variety of supplies." Sufficient duralumin sheets for 100 airplanes were ordered from the Aluminum Co. of America, New Kensington, Pa., since aluminum shipments to N-B were extremely slow due to limited capacities at the manufacturers.

N-B was forging ahead in many areas during this new year. There was only one small problem on the horizon: The NB-3 was still in limbo. An exchange of letters between N-B and the D/Comm. tells the story. Nicholas wrote:

"We are placed, at the present time, in a very embarrassing position. We have spent over one hundred thousand dollars for the past two years developing the Barling NB-3 monoplane. We have thoroughly tested it and have over 400 hours flying time and have [had] no trouble or difficulty or breakages of any kind and are now ready for production, but due to the fact we have not the approved type certificate, cannot even demonstrate the ship out of the state. Is there anything in the world that can be done for us in this matter?

"We have no fear or even suspicion that we will not eventually receive the approved type certificate as soon as all the details and engineering data have been completed. However at the present time our factory is in a dead standstill and at a tremendous expense we are holding over about 25-30 employees whom we obtained in the past year and we cannot afford to release and are keeping them here in Marshall so when we are ready for production they will be available.

"... We have over 500 applications for dealerships and distributorships all over the U.S., but in accordance with the law we are afraid to take our ships which are ready to go out on demonstration tours to even show people our plane. ..."

If Nicholas' letter was somewhat plaintive, the D/Comm. reply was decidedly to the point. They wrote:

"... [we are aware of the] awkward position in which you find yourself in having contracted dealerships and general distribution of an airplane which is not yet approved . . . but, if we may be so blunt, have you not put the cart before the horse . . . with elaborate distribution plans and in advertising a plane which is a radical departure from present accepted practice before even submitting the necessary information? We fully understand and sympathize with you for the predicament into which you have gotten yourself, but it is something over which you alone have control. . . ."⁷

By the middle of February so many letters and telegrams were passing back and forth between Marshall and Washington, D.C., that a D/Comm. official suggested perhaps Barling could come to Washington and meet personally with them to unravel the numerous problems. N-B advised the D/Comm. that Barling was sick and unable to make the trip unless absolutely necessary. Correspondence continued to carry the burden of



NB-3 D/Comm. No. 356 (No. 2) showing the early nose configuration as designed by Barling. Note the location of the oil and fuel tanks immediately behind the engine. This led to some instability problems. (R.B. Nicholas)

resolving the technical 'deviations'.

In spite of technical problems with test data, N-B continued to anticipate approval of the airplane. New equipment was installed such as a special furnace built to heat-treat landing gear tubing. The tempering furnace was specifically equipped to temper selected chrome molybdenum tubing to a tensile strength of 160,000 lb./sq. in. However, N-B soon found that heat-treating was a skilled job which required highly qualified workers. N-B did not have sufficient production to justify this equipment (then or later). A few landing gears were made at N-B, but the majority were purchased as complete assemblies from other manufacturers.

Although production of the NB-3 was curtailed due to lack of approval by the D/Comm., other N-B departments were able to expand. The refinancing by N-B through the sale of stock permitted the parts and supply portion of the business to explore many new possibilities. R.B. Van Zant, sales manager, was involved in establishing N-B parts depots or sales representatives at:

B.W. Deane and Co., Ltd., Montreal, Quebec, Canada;
Cia Suriana Del White, S.A., Mexico, D.F. Mexico;
Wheeler-Halm Co., Inc., Los Angeles, Calif.;
Western Aviation Co., Inc., San Francisco, Calif.;
Bredouw-Hilliard Aircraft Co., Kansas City, Mo.;
Ireland Aircraft Co., Garden City, L.I., New York.

Negotiations were also underway for additional sales depots at Wichita, Dallas, Billings, Chicago, Pittsburgh, Atlanta and Tampa. All buying and parts storage was the responsibility of the Marshall office. Individual shipments were made to the various representative facilities for maintenance of stock as they filled orders.

Somewhat concurrent with the sale of stock to the public, N-B and Barling completed negotiations for a second contract covering the proposed production of the NB-3s. Much of the legal language repeated portions of the first contract, but Barling added a new stipulation. Item No. 10 created considerable correspondence, disagreement as to intent, more legal problems for N-B and eventually may have been crucial insofar as Barling's tenure with N-B was concerned.

The second Barling/N-B contract continued the royalty pay-



NB-3 C-9319 (No. 21) with a modified and more streamlined nose configuration. The louvered nose cowl and the location of the oil and fuel tanks further aft is significant. It helped some on the instability problems associated with the NB-3, but did not completely solve them. It is not clear if this design change was completed by Barling, Gazley and LaSha or Tom Kirkup. Barling took all (his) records on the NB-3 when he left and it was a while before Kirkup was able to reconstruct some of the basic information files on the NB-3. Gazley and LaSha probably were instrumental in providing N-B with the engineering support required in some of these changes. (R.B. Nicholas)



upheld. A number of the original patents issued to Glenn Curtiss were contained within the MAA cross-licensing agreement. The original Wright patent expired in 1923 which resolved extensive litigation throughout the industry, but Curtiss' patents continued in force and were part of MAA demands upon N-B.

Under the cross-licensing agreement, the Curtiss Aeroplane Co. was to receive a maximum of \$2,000,000. The U.S. Government established that amount as the value of the various patents Curtiss was required to transfer to MAA under pressure of the war effort. As of May 1, 1923, the Curtiss Co. had received a total of \$434,580. They were to continue to receive 2 percent of every manufacturer's unit cost (or \$175) for each airplane manu-

ment of \$100 per airplane for each aircraft produced beyond the first test unit. Barling's new stipulation,

"... hereby gives and grants to [N-B], full right and authority to protect from infringement the use of the patent right hereby granted to it; and if deemed necessary, to enjoin and sue in the name of [Barling] . . . [N-B] agreeing to indemnify [Barling] for any and all damages or litigating or other expenses that [Barling] may be compelled to incur by reason of [N-B] protecting their rights against any such infringement. . . ." [Emphasis added.]⁶

This contract was signed on February 5th. Shortly thereafter N-B began receiving a series of letters from the Manufacturers Aircraft Association (MAA) in New York City. The MAA letters were not a result of the Barling/N-B contract, but their demand upon N-B for royalty payments led to extensive correspondence about patent rights during the next several years. These apparent challenges to Barling's patent and his restrictive covenants in the two contracts added fuel to the fire between Barling and N-B. Things were really beginning to cook now!

The MAA was formed in 1917 at the direction of the U.S. Government to cross-license airplane patents at reasonable rates of royalty among the various aircraft companies. It also was to prevent legal disputes from interfering with production of aircraft and aviation materials during the war years. MAA eventually became a clearing-house for aviation technical information acquired during the war. It also amassed a collection of data which formed the basis for a library used by the aircraft industry in patent searches, reviews of licensing agreements, engineering and specifications research as well as many other activities.

During the years immediately following WWI, few commercial aircraft were produced and patent royalties were generally waived. However, in the middle 1920s commercial aircraft production for the first time became significant. Royalty payments were again demanded under provisions of the existing patent rights. The legality of MAA administering the patents and collection of royalties for the patent owners was tested in court and

factured in the U.S. until 1933 or the total amount of \$2,000,000 was received, whichever came first.⁹ Curtiss in 1929 was one of the few companies which received aircraft royalties and their receipts were among the largest. Most other pioneer aircraft patent owners were either effectively out of aviation altogether or had merged into the Curtiss organization.

It was in this context that N-B during March began receiving letters from MAA (under persistent prodding by the Curtiss-Wright Aeroplane Co.) demanding royalty payments. Membership in MAA was offered to N-B *after* royalty payments were made and N-B signed and consented to additional payments and reports required under the cross-licensing agreement. If N-B did join, they would be permitted to use the approximately 315 U.S. patents (of which some 200 were Curtiss') contained in the agreement at reduced rates of royalty. For instance, MAA membership by N-B would reduce the total royalty payable to MAA on each NB-3 from \$175 to about \$40. N-B would still have to pay Barling \$100 for each airplane in addition to the MAA royalty and thereby hangs part of the problem.

These first few months in 1929 were busy. The expansion of N-B into big-time aviation and foreign markets brought all kinds of visitors to Marshall. The large metropolitan newspapers sent staff correspondents to the spacious new N-B offices for interviews with Nicholas, Beazley and Barling. In March the three were interviewed by a reporter from the *St. Louis Post-Dispatch* eager to hear all the details of the two young men and their almost Horatio Alger-type story. Nicholas, as was the custom, spoke for the company and detailed the extensive information requested. During a pause in the interview, he looked out the office window at his new 1929 8-cylinder automobile which was of an undeniably bright yellow color. It was parked next to the small 25 by 50-foot brick garage in which his aviation dream first flourished. Beazley, typically, did not have much to say. Barling was also interviewed, but technical data did not make interesting copy and his comments received only limited coverage.

Promotion of N-B and their new airplane was still of vital concern even though production was delayed due to lack of approval by the D/Comm. Experimental licenses were finally obtained which permitted test aircraft to be flown to different parts of the country on demonstration flights. A tour of seven Midwestern cities was one such attempt. Various airport operators, aircraft dealers and qualified pilots were given an opportunity to fly and evaluate the NB-3. "Barney" Zimmerley said he frequently flew into an airfield and almost before he could get out of the cockpit, fliers would crowd around asking questions and wanting a ride. Some days all he did was hang around the field while different pilots made test flights. A sales organization was being formed by H.A. Speer, N-B Sales Representative at Marshall, and inquiries for dealerships soon began to trickle into his office. (Nicholas' estimate of 500 requests was a 'trifle' high and an attempt to exert some 'gentle' pressure on D/Comm.)

Sometime in April Barling wrote Campbell in St. Joseph and they met several times in Kansas City. The meetings were preliminary steps in exploring a proposal whereby Barling might organize a company to build his cabin monoplane at St. Joseph. His contract with N-B permitted him to work part time at Marshall and also to become involved in other aviation activities. Nothing in his contract prevented him from competing with

N-B if that came to pass. It stated specifically that "... [Barling] would not be required to remain continuously in the employ of [N-B], but shall cooperate ... in the capacity of consultation . . . from time to time. ..."

April was also the month in which the NB-3 was to have its formal presentation to the aviation world and the general public. The National Aviation Show was held in Detroit during the week of April 6th and five NB-3s were flown there to participate. One aircraft was placed on display in the exhibition hall and the other four were based at the local airport for demonstration flights.

This was the first national aircraft show in which N-B had an airplane as well as examples of their catalog sales items. R.B. Nicholas, Harold A. Speer, Ray B. Van Zant, Howard Beazley, "Barney" Zimmerley, L.H. Rhiner, T.B. Webber, Lynn Shepard, "Tex" McLaughlin, Clarke White, J.H. Nickerson, Russell Merchant, Frank Houston, R.J. Potts and W.F. Potter were there to fly the aircraft, sell parts and represent the company.¹⁰ Barling was notable by his absence. At least he was not *openly* associated with N-B representatives at the show. Whether he attended on an individual basis is not known, but a well-known aircraft designer such as he was would generally have received a mention somewhere in current aviation journals. Despite the fact he had labored for over 14 years in perfecting his design, the fruit of those efforts was now on display at a national aviation show and, hopefully, soon available for sale, Barling chose to go to Kansas City instead. Not only was the stew on the stove, it had begun to bubble!

The NB-3 also was scheduled to be in aircraft exhibitions at St. Louis, Cleveland and Kansas City. Full-page advertisements in major aviation publications preceded the Detroit show. They announced the "New Day" airplane had arrived! It claimed a new concept in safety and performance along with a statement that a flier did not have to be an experienced pilot to fly it because of the patented wing construction and the advanced method of applying the wing dihedral angle. Hands-off flying with perfect ease—even in rough air—"is no feat at all in an NB-3."

The new airplane was reaping all the publicity the advertising department could conceivably promote at various air shows and exhibitions. How were things back at the office? In four words, both good and bad. The good news was the steadily increasing numbers of parts orders and the shipments made throughout the country and overseas. The bad news was rumors that Barling may be leaving N-B. Gossip among members of the aviation fraternity traveled very quickly and Barling's trips to Kansas City and St. Joseph did not stay secret very long. Since no official announcement was made by either N-B or Barling, the best that could be said of the situation was that it was uncomfortable.

Back to the good news. N-B stressed in early advertisements selling surplus parts that shipments would be made the same day the order was received. The reputation earned during the past several years was now paying off in almost literal dividends. Letters, wires and telephone calls arrived at the N-B offices ordering parts. In addition to the parts and supply business in the U.S., an export division was formed to handle orders from foreign countries.

W.F. Potter, N-B Export Manager, offered an example of a typical day's mail to a casual visitor. Carefully sorted and stacked on his desk was mail from China, Turkey, Germany, Hawaii,



Japan, Cuba, Uruguay, the Netherlands and Australia. And that was not all. A telegram from the Washington (D.C.) Polish Legation sought quotations on large quantities of *Scarab* engines. A cablegram from Brazil wanted prices for amounts of aircraft materials for use by the Brazilian militia which was estimated to total \$10,000-\$15,000 worth of parts.¹¹

N-B also acquired the entire export business of the *Swallow* aircraft manufactured at Wichita, Kansas, *Command-Aire* planes from Little Rock, Arkansas, and was negotiating for export rights to the Buhl cabin aircraft. Those aircraft, along with the NB-3, would give N-B a complete line of aircraft at a range of prices to enter foreign markets and offer stiff competition to European aircraft manufacturers. N-B was also the exclusive representative for the well-known Warner *Scarab* engine, Consolidated Instruments and Kendall Oil Co. in export markets.¹²

Letters from MAA continued to arrive at the N-B office demanding royalty payments. On May 20th, Nicholas wrote MAA stating he did not think N-B was eligible to become a party to the cross-licensing agreement.

"... [since] in the first place we are not owners of any patents pertaining to aircraft. The Barling NB-3 which we are building has [a] patented wing construction, however, the patent is owned by Mr. Walter Barling and we operate simply under franchise from him, and we are not owners of the patent. ..."

The tremendous growth of N-B was typical of aviation throughout the country during the past few years. An investment trust—the St. Louis Aviation Corp.—was formed with the purpose of buying, selling, holding and trading in aviation stocks. Nicholas became a member of the Technical Committee along with a number of aviation executives from St. Louis. The corporation was a reflection of an increasing interest in acquiring financial stakes in the industry without becoming directly involved in production/manufacturing aspects.

Orders for NB-3s came from unexpected places. The Oakland

Probably the roll-out of the first NB-3 constructed in N-B Building No. 3. Shop and office personnel surround the airplane in front of the open double door. P.O. Gibson in a white shirt and tie is kneeling at the left in the front row. The N-B engineering department and executive offices are on the second floor. (C. Buckner, Jr.)

Police Aeronautical Club composed of five officers bought one sight unseen on recommendations of N-B friends in California. The police officers bought it for their own use and planned to teach other officers to fly. Another possible use mentioned was for pursuit and apprehension of criminals, "when necessary."

Authorization to start production of the NB-3 still had not been received by N-B. All of Barling's "errors and deviations, etc.," were not fully resolved, but progress was being made. There was one disturbing flight characteristic that was not mentioned in the official reports on the NB-3. It occurred periodically and was a potentially dangerous problem. In certain instances, the NB-3 became longitudinally unstable. This was generally observed when only small amounts of fuel were in the gas tank. The location of the fuel and oil tanks immediately behind the engine appeared to create a changing center of gravity as the full fuel tank gradually emptied. N-B repeatedly tried to increase the fuel capacity of the NB-3 and just as repeatedly their request was rejected by the D/Comm. No reasons for the rejection were given.

E.L. Yuravich was temporarily assigned to Marshall as the resident D/Comm. inspector at N-B. While Yuravich was away from N-B on other business, a D/Comm. Engineering Section official visited N-B and discovered some unauthorized experimenting was taking place. Richard Lees (D/Comm. Supervising Inspector at Kansas City) wrote Yuravich that Ed Fox had recently visited the N-B plant,

"... and advises that your friends up there are trying a lot of trick ideas to make the Barling Bomber [sic—this appears to be a derogatory reference aimed at Barling] do its stuff for you when

you go back. One of the stunts he told about was loading the flippers [elevators] with about one-half pound of lead in each. He also [said] they are trying different size stabilizers and any number of odds and ends to make the ship fly better. This is for your information so please leave this letter in a safe place, or tear it up. . . ."¹³

While N-B was introducing the NB-3 at Detroit, they also were investigating the possibility of entering it in a series of light plane world record flights. Barographs and watches were ordered. Arrangements were also made for representatives of the National Aeronautics Association to provide official observers when record attempts were made.

The first record attempt of significance was an altitude flight made by Zimmerley as part of the St. Louis Aviation Show held between May 25 and June 1. Zimmerley flew a stock NB-3 to St. Louis where it was used for both display and demonstration flights. The only non-standard equipment on the plane was an 80-gallon oxygen tank for use at high altitude. An unofficial altitude flight had already been attempted at Marshall in mid-winter. It easily reached 19,400 feet with a wooden propeller, but was halted due to the extremely cold weather and lack of adequate oxygen supplies.

The world's altitude record of 22,250 feet was then held by Paul W. Baumer of Germany for single-seat aircraft weighing less than 881 pounds. The Barling's net weight was 690 pounds. The N-B monoplane was painted in the standard colors of bright orange-colored wings and fuselage trimmed in black. The engine and airplane were checked over carefully on May 28th by mechanic "Tex" McLaughlin and the sealed barograph was placed in the front cockpit by B. Russell Shaw, N.A.A. chief official observer. Zimmerley replaced the straw hat he had worn all morning with a fleece-lined flying helmet, climbed into a fleece-lined flying suit and carefully warmed up the engine. His takeoff had to be timed between arrivals of other aircraft participating in the Gardner Cup elimination flights.¹⁴ He circled Parks Airport in East St. Louis gaining altitude.

Two hours and 44 minutes later he landed. The sealed barograph was removed and sent to the Bureau of Standards to be calibrated. Zimmerley's altimeter had shown 24,600 feet above the field. Adding the 400 feet in elevation of Parks Airport to

that of his altimeter, it appeared to be a new world's record of 25,000 feet. Barney felt he could have gone higher, but he ran out of oxygen. The NAA office in Washington, D.C., reported the corrected barograph reading recorded an altitude of 20,820 feet. Not a world's record, but good enough for a new U.S. record. Disappointed, N-B and Zimmerley ordered two more barographs and announced the second in their series of record attempts would soon be made.

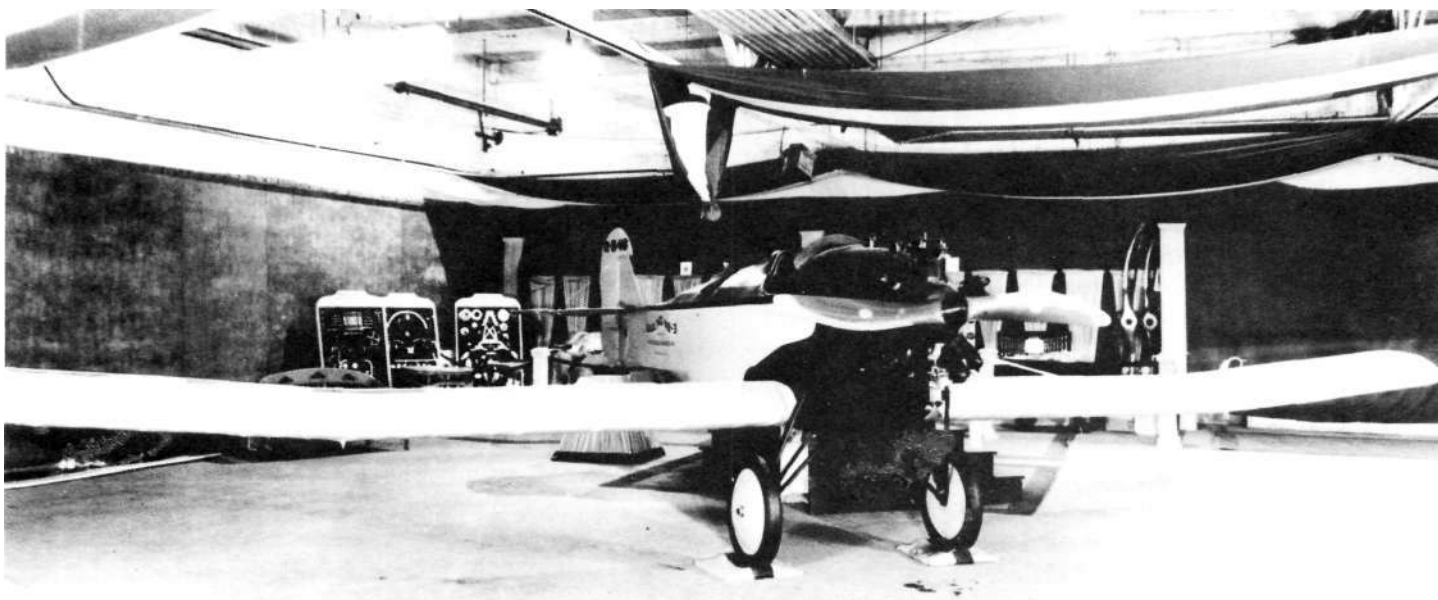
The second attempt would try to establish a new world's record for the longest nonstop flight for an airplane under 771 pounds. The existing record (then) was 1,247 miles flown by Capt. A. Vichereck of Czechoslovakia on October 5, 1928.

N-B modified one of the production NB-3s for Zimmerley by replacing the front cockpit with a large multi-section fuel tank holding 100 gallons in place of the standard 20-gallon tank. Additional oil capacity and a special arrangement to force-feed lubrication to the engine rocker-arms in flight from the rear cockpit were also installed. The flight Zimmerley planned was from Brownsville, Texas, to Winnipeg, Canada, a distance of approximately 1,600 miles.

On his way south to Brownsville from Marshall, Barney was twice forced to land due to dirt in his carburetor. Although the entire fuel system was carefully checked before he left, he spent two full days cleaning out the carburetor, the fuel tanks and lines, rechecking the LeBlond 60 and other major components of the airplane. Special weather reports were phoned in to Barney from all along his route in an effort to select the best possible weather conditions. He was hoping for a wind from the south to help him in the early portion of the flight when he was overloaded. Fully loaded, the NB-3 carried 100 gallons of fuel and 10 gallons of oil for a total weight of 815 pounds (including Barney) or 125 pounds more than the net weight of the airplane. To conserve weight, Zimmerley used a mixture of 10 percent benzene and 90 percent gasoline for his fuel.

He originally planned to leave Brownsville on Saturday, July 6th, but the barographs did not arrive in time. The weather was

NB-3 NR-546 (No. 6) on exhibition. This may have been at the 1929 Detroit National Aviation Show. It is more probable that it is one of the several other aviation shows in which N-B participated during that inaugural year for the NB-3.
(RB. Nicholas)





An N-B dealer reported to have been on the U.S. East Coast. Barling's name received prominence, but N-B's name did not since they were not as well known as a manufacturer of aircraft for a number of years. The airplane on the roof certainly could be expected to attract attention. Perhaps it was just a pilot in a hurry to buy a few badly needed repair parts and looking for an N-B bargain. (R.B. Nicholas)

not very good either, but the weather bureau felt the forecast for Sunday morning was the best that could be expected for two weeks. John Ward Beretta, NAA Governor of the Texas District, arrived in Brownsville to be the official observer for the flight. Zimmerley was up until 11 P.M. Saturday night waiting for the weather forecasts. Deciding to make the flight, he went to bed at midnight, got an hour's sleep, woke up at 1 A.M. and drove to the Brownsville Airport. Harry Munn of the NAA Brownsville Chapter placed the barograph in the airplane at 2:15 A.M. and they then waited the necessary half hour for it to register. At 2:45 A.M., Sunday, July 7th, he took off into fog and darkness heading southeast into Mexico and over the Gulf to gain altitude and then gradually turned north. The engine ran rough for the first several minutes, but finally smoothed out. For the first five hours he flew in total darkness. His illuminated compass was his only visible instrument. Even his wingtips could not be seen in the misty rain and darkness. When daylight began to appear, he saw his first glimpse of the ground: Wilson, Oklahoma. Flying due north entirely by feel above lightning-streaked clouds, he was exactly on course.

Most of the time he flew at an altitude of about 3,000 feet, but twice he dropped lower. Once was to drop a message at his old home of Cogswell, North Dakota, and later at his wife's parents home. Soon thereafter, he turned a little east of north and flew to Stevensons Field at Winnipeg, Canada. He landed at 6:45 P.M., exactly 16 hours from his takeoff at Brownsville. He flew the 1,650 miles at a steady 105 miles per hour. There was still enough fuel left for a couple more hours of flight, but he had achieved his goal. J.A. Sulley, President of the Winnipeg Flying Club and the NAA representative, removed the barograph and sent it to Washington, D.C., for calibration. This time there was no problem. The flight not only established a new U.S. long-distance flight, but also a new world's record. Zimmerley was royally treated all along the way beginning with his arrival in Winnipeg. His lack of sleep and the rain-soaked flight had resulted in a good cold. Surely on his way home he would be able to get a little rest and sleep, but his hosts at each stop arranged banquets, speeches and brass bands. Somehow Zimmerley bore up under all the good wishes and finally arrived back in Marshall.

Marshall was no exception in honoring Barney. N-B turned

out for a dinner and the inevitable speeches. H.A. Speer made a typical sales manager's speech. He pointed out the use of N-B's light plane in making a flight of such distance would potentially open up all of the southern portion of the U.S. to flights from Canada. Barling added a touch of humor to the occasion when he said he would rather design a half-dozen planes than fly the plane Zimmerley did that morning from Brownsville. He appreciated the reflected glory to himself as designer of the airplane, but he considered the flight showed the skill of Barney when he took off under the most unfavorable conditions. "Most such flights are made only when conditions are favorable, a mile-square field has been prepared and the weather is ideal, he said, but not Barney. Barney took off in a strange place, took off in fog and clouds in utter darkness and it was five hours before it was light enough to check his course. Such a flight under those circumstances merits the deepest admiration we can give him. When we consider that from Newfoundland to Iceland it is only 1,850 miles, Zimmerley's flight is comparable to some of the early transatlantic flights of the earlier planes."¹⁵

A curious sequel became associated with the plane Barney used in his Brownsville flight. The plane was purchased by U.F. Diteman of Billings, Montana, named the *GOLDEN HIND*, and eventually flown to Harbour Grace, Newfoundland. Diteman was a licensed pilot and had flown for several years, but he was better known as a cattleman. After selling a herd of cattle in Kansas City, he purchased the NB-3 there and flew it home. Prior to his purchase, the LeBlond engine was replaced by a Warner *Scarab*. Diteman further modified the NB-3 at Billings by increasing the fuel capacity to 165 gallons and tuning the engine to conserve fuel. Diteman visited Harbour Grace in September ostensibly to look up family records of Sir Francis Drake. On October 22nd he took off from Harbour Grace at 12:15 A.M. with a full load of fuel. It was not until he had been in the air some 15 minutes that his letter to airport officials was opened. In the letter he announced his attempt to fly to London, England. Only his wife was aware of his plans. Diteman was so sure of his success that he did not carry lifesaving equipment of any kind. He was never seen again. An unidentified ship which did not indicate its position radioed that orange and black fragments were sighted in the water. Without some indication of where the wreckage was seen, no rescue efforts could be organized.¹⁶

Almost before he had a chance to draw a deep breath, Zimmerley was off again. Des Moines, Iowa, hosted an aeronautical exposition near the end of July with \$1,000 first prize to the most efficient airplane in a flight from St. Louis, Mo., to Des Moines. Barney entered a production NB-3 and flew the 273 miles in two hours and 41 minutes, averaging 101.3 mph. The efficiency test was measured by the load-carrying capacity of each aircraft. Many fliers watching Barney land at Des Moines laughed at seeing his small plane enter a contest already crowded with several large multi-engine aircraft. However, when he started unloading his airplane, the laughs gradually died away. First he unloaded a series of sandbags from the front cockpit until there was a total of 500 pounds stacked on the ground. Then he reached in and removed an additional 30.5 pounds of baggage, entered his own weight of 129 pounds and registered a weight of 659.5 pounds, exclusive of fuel and oil. The NB-3 won the contest with an efficiency rating of 223 percent to his closest competitor's rating of 192 percent. Barney also won second prize in the balloon-busting contest. His prize of \$50 was awarded for

breaking three balloons in flight with his propeller in one minute 52 seconds.

July was a month of magic for N-B because the D/Comm. finally issued Approved Type Certificate No. 174 on the NB-3.¹⁷ Production of the Barling monoplane could legally begin. Early test models of the aircraft used a variety of engines such as Anzani, Velie and LeBlond. The ATC only authorized installation of the LeBlond 60, but work was already underway to provide an option of different engines on future models.

With production soon to become a reality, additional facilities were added to N-B's manufacturing capabilities. One of the most modern covering and doping buildings was completed for N-B. The \$40,000 building on the corner of Ellsworth and West North St. was the most expensive to date for the new airplane. Built to insurance company specifications, it was entirely protected by a sprinkler system and ventilation fans. The air could be changed completely every two minutes and the heavy, potentially explosive fumes vented safely outside. A detached heating plant built adjacent to the new dope building kept the temperature at the required 80 degrees winter and summer. The temperature could be maintained in spite of the continual changing of the air and there was enough capacity to provide heat to all the other buildings N-B was currently using for production of the NB-3.

With official approval of the NB-3 now a matter of record, Nicholas left on a six-week trip to Europe. Four weeks were spent inspecting aircraft factories and government airlines in England, France, Belgium, Germany and Holland. He brought back some observations of those visits. He felt British workmanship was superior to that in the U.S., but their unit costs were too high. Two other comments were of note: first, the U.S. and not Europe had the most potential for growth in aviation markets and, secondly, the unique ability of the average person in the U.S. to own and fly their individual aircraft in contrast to the European system. Most European aircraft were owned collectively through flying clubs although there were limited numbers of aircraft owned by individuals.¹⁸ European aviation was also more strictly regulated (in spite of recent U.S. laws) which had an inhibiting effect, both on aircraft production and the casual use of aircraft.

One unannounced purpose of Nicholas' trip was to hire a replacement for Barling.¹⁹ Although there was no specific (public) information released by either Barling or N-B at the time, there were a number of clues available for those who could read between the lines. Barling was away from Marshall for several trips to Kansas City and St. Joseph. Engineering problems and decisions could sometimes wait until he returned, but there was an uncertainty both as to when that would be and his willingness to perform the duties as Chief Engineer. Although Barling finally did complete the static-test data for the NB-3 and the ATC was issued, plans for future models required preparation and submission of additional data. Barling did not do it. N-B very quietly hired the Washington, D.C., aeronautical consulting firm of Gazley and LaSha (G&L).

The British Armstrong-Siddely *Genet* engine was believed to be ideal for an airplane such as the NB-3 and that static-test data was compiled by G&L and forwarded to the D/Comm. on August 9, 1929 (while Nicholas was still on his European trip). They also provided several detail drawings of various parts of the NB-3 during the latter part of 1929. There is an indication that



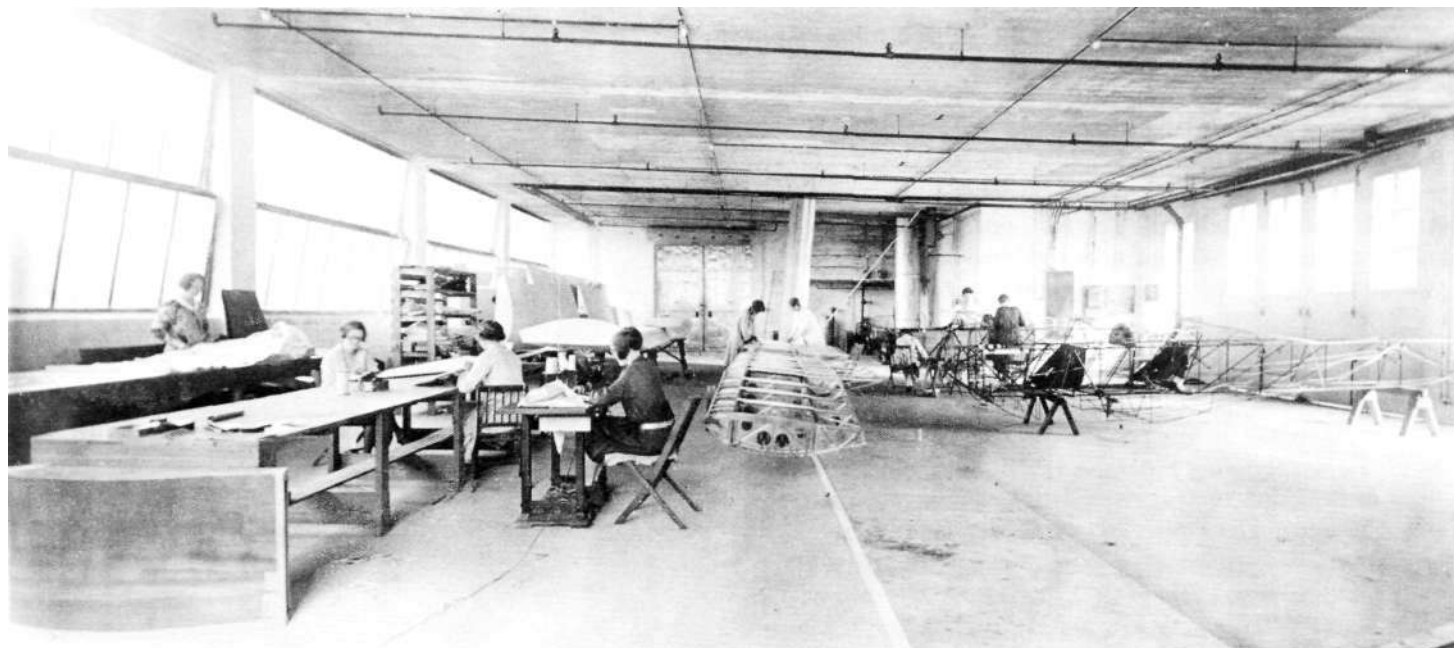
"Barney" Zimmerley with the modified NB-3 used in his 1,600-mile, nonstop flight from Brownsville, Texas, to Winnipeg, Canada. The front cockpit was replaced by an additional fuel tank. The front filler is for an enlarged oil tank. The middle and aft caps are for fuel tanks. The LeBlond engine was later replaced with a Warner Scarab by U.F. Diteman when he purchased this airplane for his ill-fated attempt to fly across the North Atlantic. (R.B. Nicholas)

the firm designed a complete airplane (NB-7) for N-B, but it never was considered for production.

Whether or not there were problems among the principals at N-B, the business of making and selling airplanes continued. The National Air Races in Cleveland during August 24-September 2 was another chance to show off the Barling NB-3. N-B parts and aircraft were there. A railroad carload of aviation material was shipped to Cleveland to fill N-B's 300 square feet of space reserved for the parts display and 1,012 square feet were used for aircraft on exhibit. Several aircraft were entered in various flying events and the Barlings placed first, second or third in each event they entered.

There were slight differences in the first three NB-3s. Some of Barling's original static-test data involving the Velie engine were used in a request for a separate ATC on aircraft equipped with that engine. On September 18, ATC's No. 230 and No. 231 were issued by the D/Comm. for NB-3s with a Velie or a Genet engine.²⁰ A new standard engine mount was designed and installed which permitted the interchange of a LeBlond, Velie or Genet on any NB-3. The LeBlond and Velie were priced at \$3,600 each while the Genet model was \$3,900 due to higher performances with that engine.

A standing offer of \$100 that the Barling NB-3 could not be held in a spin for more than one turn was promoted as a sales gimmick by the Dawson-Babcock Aircraft Corp., N-B distribu-



Interior of the N-B dope building. The angled explosion-relief windows and the sprinkler system illustrate the hazards of dealing with flammable dope fumes on fabric-covered aircraft. The form on the floor to the left is used to check the fit of the fabric 'slipcovers' for a wing section before it was sewn into place. (C. Buckner, Jr.)



Exterior view of the \$40,000 N-B dope building. The special windows on the left are hinged at the top of each frame. If dope fumes inside the building exploded, the entire window frame could pivot outwards to relieve the pressure. The windows would then fall back into their normal position. The chimney and heating plant for the entire N-B complex are behind the dope building. (C. Buckner, Jr.)

tor at Bettis Field, Pittsburgh, Pa. N-B referred several times in their sales promotion items to the inability of the NB-3 to spin, but there is no record whether the offer ever had to be paid. Some NB-3s *did* spin as will be seen before too long.

Another new industry moved to Marshall to share a portion of N-B's aviation markets. J. W. Carroll, President of the California Propeller Co., Los Angeles, Calif., opened temporary quarters in Marshall to manufacture laminated propellers from imported Japanese birch. Within days the company was turning out one 'prop' per day while waiting for the majority of their equipment to arrive and a permanent manufacturing space to be completed.²¹ N-B was to handle their propellers on an exclusive basis, but again problems reared their ugly head. The propellers were not acceptable to the D/Comm.

Their regulations required that licensed aircraft be equipped with Approved Type Propellers. Nicholas wrote asking for information on how to get them approved. At first the D/Comm. permitted use of the locally made propellers, but a broken tip

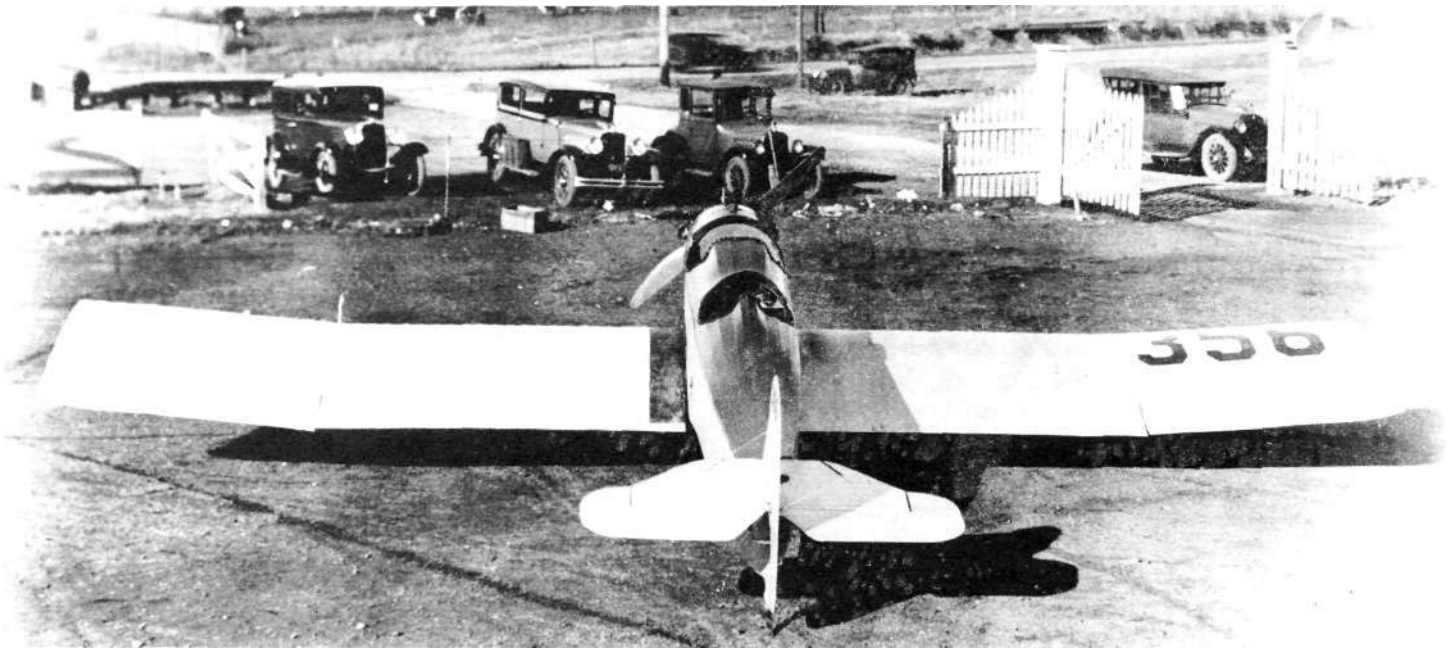
and an accident later resulted in a D/Comm. order not to permit installation of the unapproved prop on any production NB-3s. There is no clear indication whether the company continued to make propellers for N-B or ceased business. The company is not mentioned in any later N-B sales catalogs or news releases.

Events finally brought out into the open the situation between Barling and N-B. Barling was definitely leaving. He had been meeting with a number of people in St. Joseph during the past six months to set up financing of his own aircraft company. In addition, Barling and Hayden Campbell made an extensive trip through the east visiting various aircraft companies on a general tour. Barling was offered the use of factory buildings, flying fields and financing if he would build his cabin monoplane back east. Two other midwestern cities were also reported as offering facilities. He declined them all since the St. Joseph group offered inducements and all the facilities he might need in St. Joseph.²² Financing was completed in September and legal papers were drawn up incorporating the Barling Aircraft Corp. in both the state of Delaware and at St. Joseph, Mo.

While Barling was off on his organizing and inspection trips, the NB-3 was finally entering the new N-B production lines. There is a certain irony that NB-3 production began at almost the same time Barling was putting the finishing touches on the legal papers for his new company. Output was one airplane per day. Twenty-four aircraft were built in October—without his assistance or supervision (which may be significant within a few months' time).

Barling's activities leading up to the formation of his own company had to have a negative effect both on sales of the NB-3 and the aviation industry's image of N-B. He was leaving just as the fruits of his many years of research were starting production. An internationally known aeronautical engineer such as Barling quitting as he did and starting a competitive aircraft company left many questions unanswered.

Nicholas was a promoter of aviation on a broad scale as has



No. 2 NB-3 with Anzani 60-hp engine. (Courtesy G.H. Balzer)

already been seen through the numerous companies he was instrumental in establishing at Marshall. He has been described as innovative and "generally three steps ahead of his business associates." That didn't always work out to their mutual advantage, but he was responsible for many bold strokes when others were frequently hesitant.

Barling was a quiet, precise engineer from a totally different social and educational environment. His past history of aircraft designs was mostly with extremely large aircraft: the Tarrant *Tabor* which crashed on its first takeoff; the Barling Bomber which just barely flew and was the product of a misguided policy; and a giant double-decked Lawson Airliner which was never produced. All his aircraft "broke" new ground, but none previously had indicated any potential financial success until the advent of the NB-3. When the D/Comm. questioned his technical competence on the static-test data, the MAA raised questions concerning the validity of portions of his patent rights, the possible rejection of N-B building his cabin monoplane, etc., Barling took advantage of his contract with N-B and effectively withdrew from further active involvement with the NB-3.

The limited material available and comments from participants all indicate varying degrees of conflict between the personalities of Nicholas, Beazley and Barling. It was ultimately resolved with Barling and his wife leaving Marshall on October 8th and moving to St. Joseph. Even prior to his leaving, Barling had ordered machinery, materials and parts for his new company and arranged to have them shipped to St. Joseph.

Although Barling was now gone, N-B already had his replacement on the way to Marshall. Tom A. Kirkup arrived in the U.S. from England at almost the same time Barling was packing his bags in Marshall. The position of Chief Engineer at N-B was not vacant for very long. Kirkup's wide aeronautical background included work on the British dirigible R-101 and as chief of the experimental stress department for Vickers, Ltd.²³ He was not as well known as Barling, but he fulfilled a need at N-B. Nicholas' recruiting efforts on his European trip had borne fruit.

Because Barling previously had been gone for extended periods of time and Kirkup was not yet settled in, N-B again

farmed out engineering work to Gazley and LaSha. One of the first assignments given to Kirkup was to improve the view from the pilot's cockpit and to redesign the seats which proved to be quite flimsy and easily damaged when entering the cockpit. However, Kirkup was handicapped in his initial efforts. In examining the N-B files, he found that "all traces of Barling's written work had vanished."²⁴ Barling may have considered that all the work he performed while at N-B were his personal papers. N-B consequently had to rebuild some of their files for reference purposes.

While Kirkup was reconstructing data for the NB-3, Gazley and LaSha were submitting another proposal for increased fuel capacity on the NB-3. The latest effort was for installation of a 30-gallon tank to provide greater operating ranges. It was rejected. G&L also submitted a revised landing gear stress analysis report on October 23 which was approved. Kirkup's first technical report to the D/Comm. was for a proposed revision to some fuselage cross-braces on November 11.

Simultaneous with Kirkup's arrival in Marshall occurred a problem neither he nor anyone else in the aviation industry would fully solve—the stock market crash. Much has been written about the various reasons the financial market suffered such a setback, but N-B was just one of the many facing the same problem. In some respects, N-B was in a much better financial position than many competitors during the initial stages of the crisis. N-B's expansion was largely financed internally from sales of Standards, parts, etc., which were purchased cheaply from surplus stocks, marked up conservatively in price and resold profitably. Nicholas, Beazley and others reinvested a considerable amount of their early profits back into the firm. The company was debt free when the successful stock sale was held earlier in the year. With the new production buildings, inventories, etc., paid for and money from the stock sale and advance deposits on NB-3 sales already in the bank, N-B was in an enviable position during the latter part of 1929.

It was the paper profits which were lost in the stock market crash. The tangible assets were on the shelves, in the parts bins and on the production lines. There were negative factors which would steadily erode N-B's position, but they did not become

visible until later. N-B still had good products—the NB-3—the reliable parts business—and competitive prices. The critical question was whether aviation markets would buy in sufficient quantities to maintain production and inventories without leading to sustained losses.

Notwithstanding the sudden drop in financial markets, orders for NB-3s continued to arrive. Distribution agreements for sales in Canada were completed in November between N-B and the Aeronautical Corp. of Canada, Ltd., for 20 aircraft. They were to be equipped with skis for winter flying and two airplanes were shipped immediately. N-B's West Coast distributor at Los Angeles was shipped two railroad carloads of NBs, the last one containing two Velie-, two LeBlond- and one Genet-equipped aircraft. The SEBA Aircraft Co. of St. Joseph, Mo., contracted for 12 airplanes, four more were sold in Texas, 12 in Montgomery, Ala., and several individual sales to various flying schools. Total orders were approximately 100 airplanes and a winter production schedule of two airplanes per week was anticipated.

Two NB-3s fresh off the production lines met different fates. George Lightner, a cattleman from Sheridan, Wyo., purchased an NB-3 and planned to fly it home. He got as far as Liberty, Mo., when he ran into a heavy rainstorm. Rain got in his eyes and he couldn't see to fly. As he came lower and lower looking for a landing field, he suddenly found his airplane had landed in a tree! He climbed down and went for help. Two farmers in the area agreed to help retrieve the plane after the storm passed. However, when they tried to lower the airplane with ropes, it slipped, breaking it in half. The rescue was more damaging than the crash. Lightner made arrangements to have his new airplane (his for less than three hours) shipped to Marshall.²⁵ There he was to decide if the airplane could be repaired or to buy a replacement.

Another NB-3 was purchased by *Popular Mechanics* magazine for use in a test to determine the effect of lightning on an all-metal frame aircraft. The plane was flown to a landing field adjacent to the Ohio Insulator Co. at Barberton, Ohio. The Barling monoplane was erected at the laboratory in flying position with the engine running to observe effects on the airframe, the engine and the electrical system. No records of these tests have been obtained or the eventual disposition of the airplane.

The original NB-3 was entirely handmade and the five additional test units were largely handcrafted in the limited production facilities available at the beginning. The NB-3 production line designed by Gibson required time to achieve an efficient production flow. Once it was in operation and orders accumulated at Marshall, the long preparation time began to show results. One of the N-B documents eventually forwarded to the Manufacturers Aircraft Assoc. provides a glimpse of the production schedules for the first year and a half. An extract of that report indicates:

	No. of Planes	Total Sales*
2nd Qtr. 1929	8	\$14,184.59
3rd Qtr. 1929	21	38,930.92
4th Qtr. 1929	23	37,501.13
5th Qtr. 1929 (sic)	12	19,837.51
6th Qtr. 1929 (sic)	18	33,168.08

*Dollar amounts are the *unit manufacturing cost* and are not indicative of the individual sales price to the retail customer.

Unit costs of the aircraft varied widely dependent on the type of engines, instruments, paint schemes, etc., specified by the customer. As an example, the five NB-3s "sold" to the Marshall Flying School were listed at the following unit manufacturing prices: \$797.35; \$615.03; \$797.77; \$1,155.53; and \$692.53.

The MAA letters which N-B first received in March continued to arrive intermittently through the remainder of the year. Although Barling was gone, MAA still viewed N-B as the source of royalties. Nicholas' letter to MAA the previous May noted that Barling owned the patent on the wing and N-B was only operating in a licensed franchise authority. MAA continued to demand royalty payments. Essentially MAA's position was the Wright and Curtiss patents predated the Barling patent; Barling's patent was only a refinement of the original concept. One of the basic problems between N-B and MAA was an understanding of the stipulations in the Barling/N-B contracts as they pertained to the Wright and Curtiss patents. MAA cited three patents in their demand for royalties: 1,122,348 (Wright); 1,584,466; and 1,622,799. *The Wright patent expired in 1923 and the last two were not original Curtiss patents*] They had been issued to H.C. Mummert in 1926 and 1927.²⁶ So much for the infringement of the Curtiss patents although the Curtiss Aeroplane Co. continued to be the protagonist behind MAA in royalty demands.

It is interesting to look back at the Curtiss Company's comments on patents in their 1923 Annual Stockholders' Report which stated:

"... In our industry there is no patent, copyright or trademark protection to the creator of airplanes. Patent protection was surrendered during the war for the nation's benefit and at the request of the government, and any builder whether or not he ever owned a patent or evolved an improvement, can and does use all the important basic patents on practically the same basis as the inventor. . . ." [Emphasis added.]²⁷

Those comments were made by Curtiss at the same time they were publicly withdrawing their advertising from *Aviation* and other aeronautical publications. Aircraft manufacturing was in the doldrums during 1920-1924, but it is instructive to note Curtiss' revival of patent rights (and royalties) when the aviation industry emerged from a period of 'feeling puny' to apparent robust health.²⁸ In 1929 and for the next two decades, Curtiss was for all practical purposes one of the dominant aviation companies. It also was among the few which survived relatively intact from cancellation of the WWI contracts. N-B was not the only aircraft manufacturer which faced the problem of royalties. All of Curtiss' competition (both military and commercial) who were not members of MAA also received similar letters from MAA.

When Nicholas left on his European trip the previous July the MAA matter was held in abeyance. After his return the situation continued as status quo without any specific results beyond a further exchange of letters. Part of the reason no action may have been taken was that while Barling was still with N-B, his patent and/or licensing of the patent could (in theory) be discussed and the problem resolved. With Barling gone, that opportunity was diminished.

Nicholas wrote to a number of other aircraft companies such as Davis Aircraft Co., B.F. Sturtevant Co., Command-Aire Co., and Consolidated Aircraft Co. He sought their opinion as to the validity of the MAA royalty claims and the legality of the patents

cited. In most cases, they advised him they had joined MAA and did not begrudge the royalty payments. Eventually Nicholas wrote MAA on November 26 asking for more information:

"... While certain features of the plane we manufacture are covered by patents, presumably valid, we have no ownership therein but a manufacturing right. In other words, while we are in a sense tied in with some current patents, we have or control nothing that we could turn in to the association. . . . Where does this leave us. . . ?"

His reference to turning items in to MAA is that as a new member, N-B *must* make available to all other members any patents, rights or proprietary information which N-B *owned*. Each MAA member had full rights to all patents covered by the cross-licensing agreement, but no member would become individually liable for legal actions against them for using any of those patents. N-B had only a contract which contained authority to build Barling's patented wing, but it also contained several specific restrictions. Barling had retained the *sole right* to determine under what circumstances and *to whom* he would authorize use of his patent. N-B was also contractually involved with an exclusive royalty payment to Barling on each airplane built—by anyone—using his patented wing. N-B's position was that since they did not own any patents, they did not have anything to turn over to MAA. MAA did not agree.

In a later letter, Nicholas mentioned the limitations in the Barling/N-B contracts and noted, ". . . It takes . . . more than one party to a contract to change it or make rearrangements as apparently an agreement with [MAA] would necessitate. . . ." MAA's reply acknowledged that ". . . it seems your [Barling/N-B] contract is at least somewhat unusual . . ." and requested a copy of the contract to study. The copies were not sent and the exchange of letters continued.

Financially—at least on paper—N-B appeared to have enjoyed another good year. Total income increased from 1928's \$224,304 to \$324,269, of which \$162,660 was from the sale of aircraft. Inventory increased from \$372,409 to a robust \$432,484, but after all the bills were paid, N-B had only a net addition to surplus for 1929 of \$10,732. Incidentally, their federal tax reserve for the year was \$700.²⁹

The stock market crash late in October and the winter weather slowed the momentum of N-B's operation, but did not stop it. As a final chapter to 1929, the D/Comm. assigned a permanent inspector to N-B since the NB-3 had been approved and current production schedules indicated continuous licensing requirements for the aircraft. William A. Lamkey, the new D/Comm. inspector, was licensed as a pilot in January 1912 by F.A.I. (No. 183). He once flew for Pancho Villa, but returned to the U.S. during WWI. He had extensive experience on the dirigibles R-38 and *Shenandoah* as well as three years involved with aviation in Europe.³⁰

Lamkey's arrival in Marshall was official recognition by the D/Comm. that N-B was an approved aircraft manufacturer. However, D/Comm. warned him,

"... that [N-B] is very smooth and you will have to be on your toes constantly in order to check them so they do not slip something over on you. . . ." [He also was advised to] ". . . bear down hard at first in order that they will know that you really mean to inspect the airplane after they are built . . . [then] . . . ease up a bit and do all you can to help them out of any difficulty they may have. . . ."

One of Lamkey's first discoveries was that N-B did not have a 'sealed' official drawing indicating the size of the ATC fuel tank.³¹ The year which started so full of promise was ending far differently than anyone could have imagined.

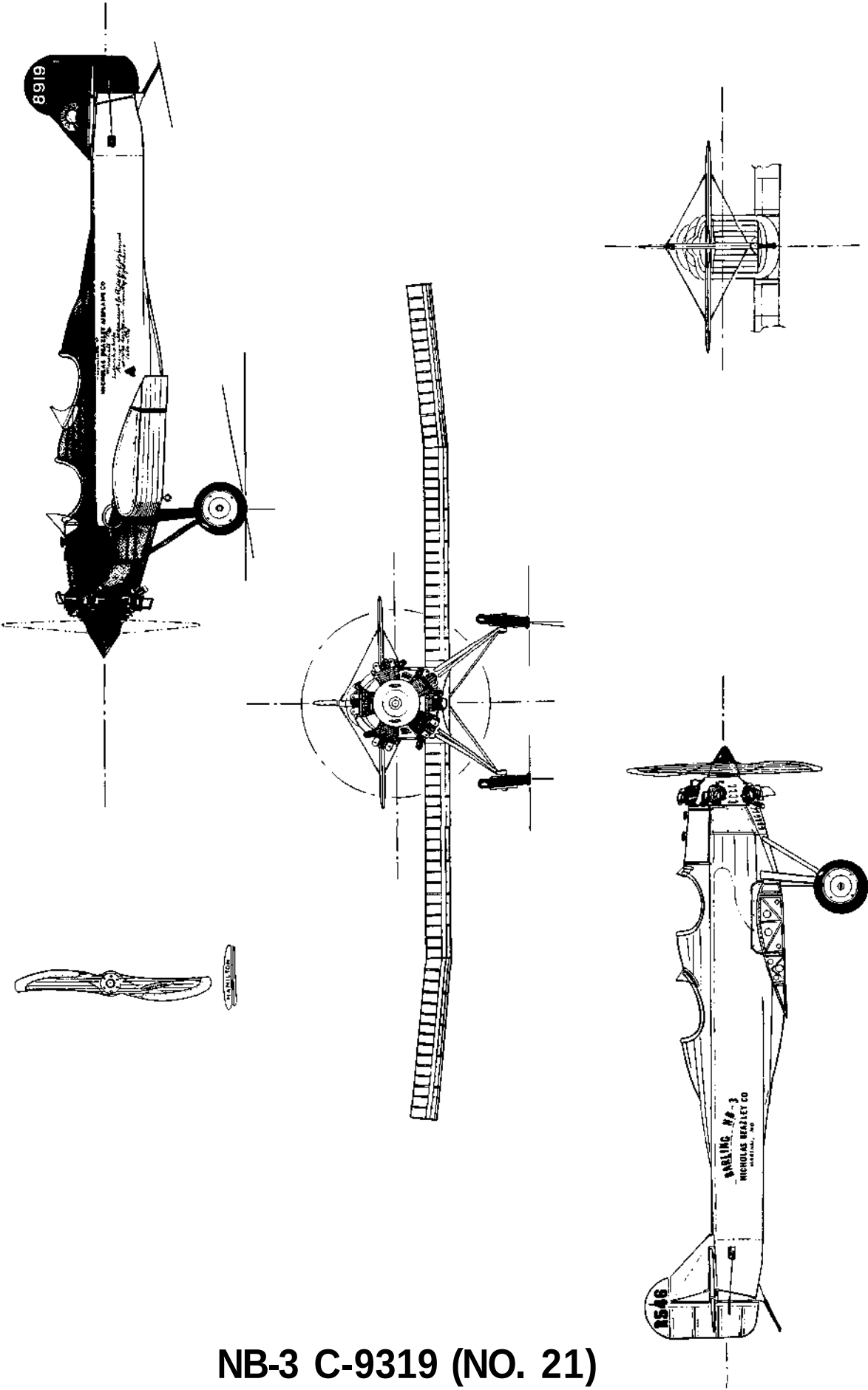
REFERENCES AND FOOTNOTES

1928

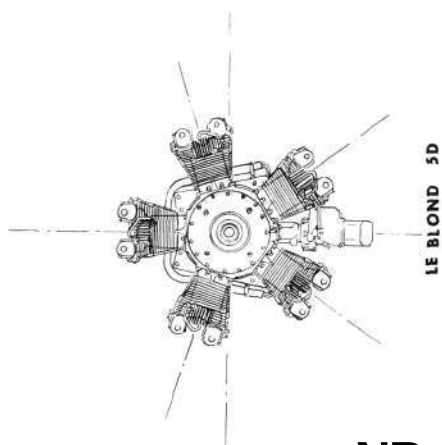
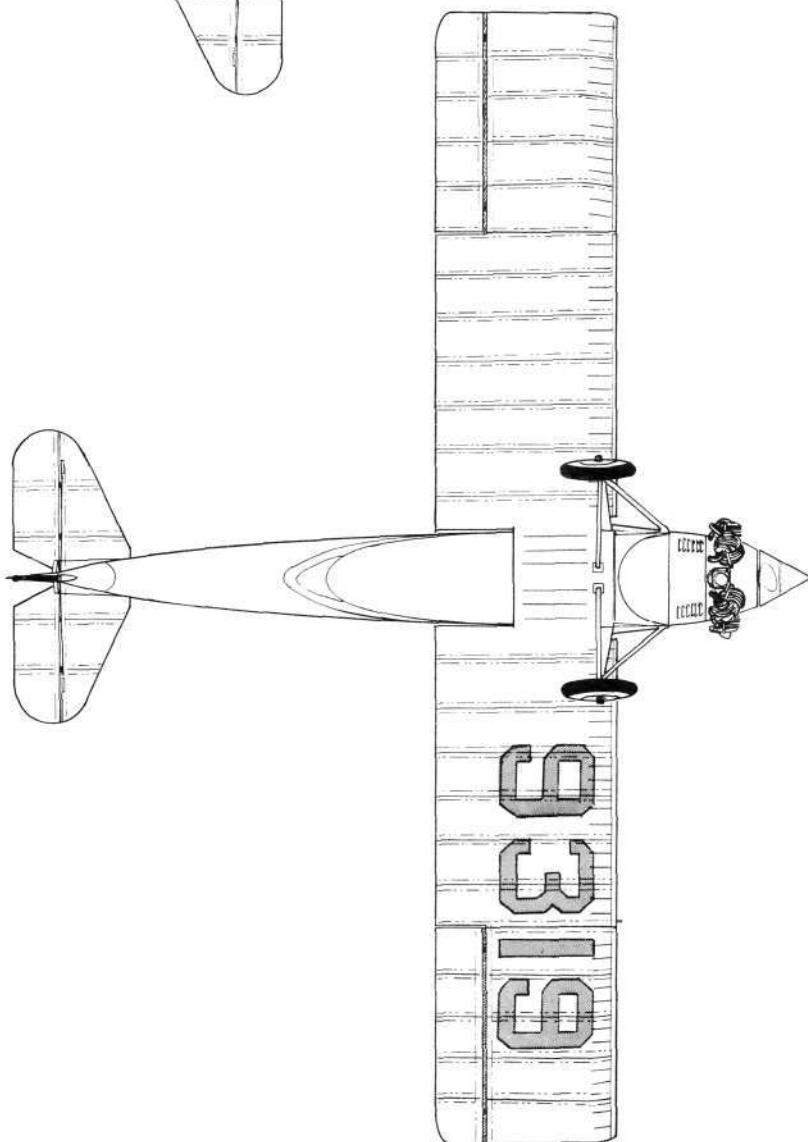
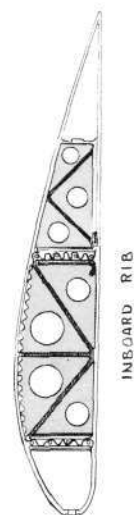
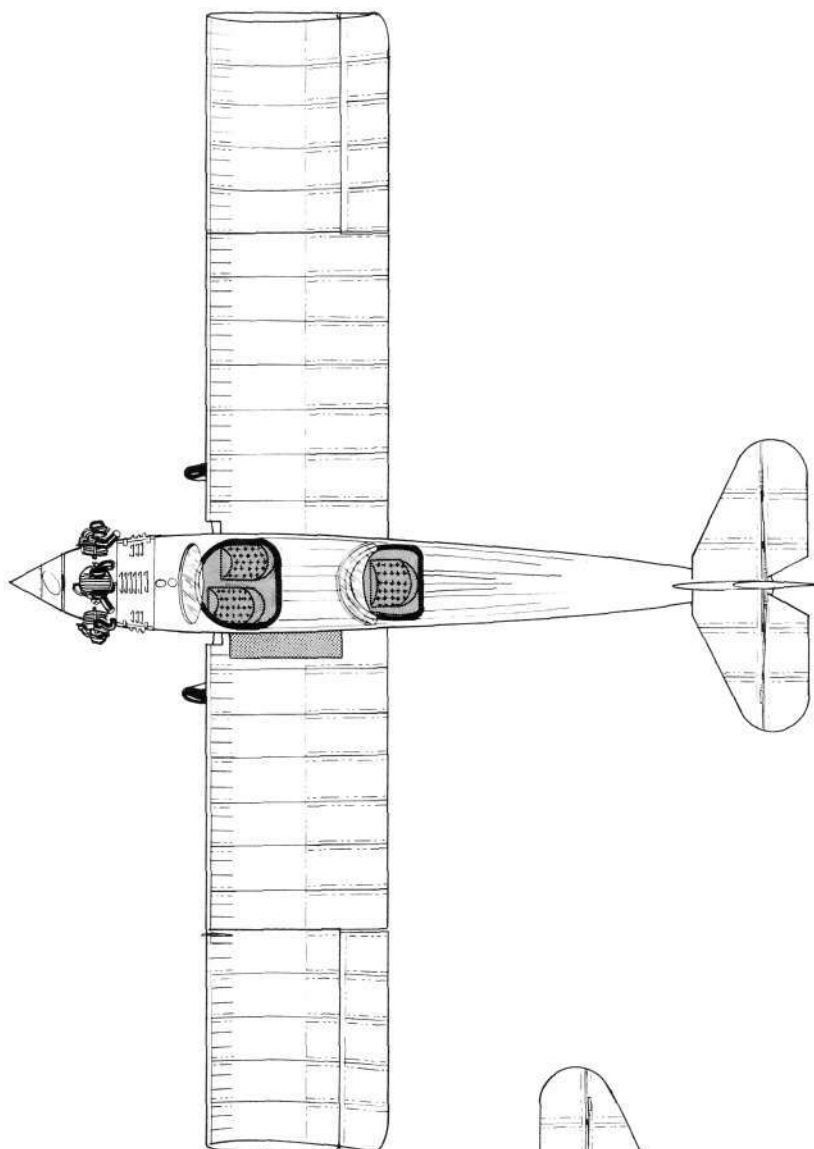
1. "... (the) NB-3 was very light (in comparison) to a Standard or JN-4, really very nice. . . ." D.S. Zimmerley; tape interview, May 12, 1979.
2. R.T. Jones; letter to author, Jan. 28, 1975.
3. An NB-3G shipped to Canada was badly burned when the engine backfired during a cold weather start (they tried to stuff a gas-soaked rag into the carburetor inlet as a choke). The gas tank exploded, flaming gas spilled onto the wing and melted a portion of the wing structure. Corrugated aluminum dural was hand-riveted into place, inspected and approved by the Canadian I.A.D. Douglas F. Froebe; ltr. to author Mar. 12, 1981.
4. "... I would like to state . . . that the wing box was an extremely good design and easy to manufacture. . . ." Interview of Tom Kirkup by John Underwood; Feb. 3, 1965. p. 3, copy furnished by John Underwood.
5. *Aviation*; Feb. 27, 1928, p. 541.
6. *Marshall Weekly Democrat-News*; Nov. 8, 1928, p. 2.
7. Static-test data compiled by W.H. Barling; D/Comm. microfilm on NB-3 Barling/3 POLMATC 174, Dept. of Transportation, F.A.A., Wichita, Kansas.
8. Airworthiness Requirements for Aircraft, U.S. D/Comm., Aeronautics Bulletin No. 7-A, U.S.G.P.O.: 1934
9. *Aero Digest*; Dec. 1 1928, p. 1150.
10. Stock prospectus prepared by Paul Brown and Co., St. Louis, Mo.; Poor's "Industrials": 1929, p. 2723.

1929

1. *St. Joseph News-Press*; Oct. 8, 1929, pp. 1-2.
2. D.S. Zimmerley tape interview; May 12, 1979. "... [I] had no problems with Barling, but I understood Nicholas and Beazley had lots of arguments with [Barling] about different things. . . ."
3. Al W. Mooney, letter to author; July 29, 1981. "... Most of my contracts were on a handshake basis and I can't remember why this contract was formalized . . . it probably wasn't legal anyway, I wasn't 21. . . ." Copy of contract from M.L. Montague, Jr.
4. Letter D/Comm. to N-B; Jan. 29, 1929. D/Comm. microfilm on NB-3, Dept. of Trans., FAA, Wichita, Ks.
5. N-B Airplane Co.; File No. 46588. Office of Sec. of State, State of Missouri.
6. *Marshall Weekly Democrat-News*; Feb. 28, 1929, p. 1.
7. Letter N-B to D/Comm.; Feb. 9, 1929. D/Comm. microfilm, FAA, Wichita, Ks.
8. Contract between N-B and W.H. Barling; Feb. 5, 1929. MAA Files, Trans. Hist. Foundation, Univ. of Wyo., Laramie, Wyo.
9. *Aviation*; Mar. 26, 1923, pp. 342-343.
10. *Airway Age*; Apr. 1929, p. 484.
11. *Marshall Weekly Democrat-News*; May 9, 1929, p. 1.
12. *Aero Digest*. June 1929, p. 206; and *Aviation*, May 4, 1929, p. 1515.
13. Letter R.H. Lees, Jr., to E.L. Yuravich; June 17, 1929; D/Comm. files, FAA, Wichita, Ks.
14. *Marshall Weekly Democrat-News*; June 6, 1929, p. 5.
15. *Marshall Weekly Democrat-News*; July 18, 1929, p. 1.
16. *St. Joseph News-Press*; Oct. 22, 1929, p. 1 and Oct. 24, 1929, p. 1.
17. *U.S. Civil Aircraft*. A.T.C. No. 101-200, Vol. 2, by Joseph P. Juptner, pp. 212-214.
18. Newspaper clipping dated 1929 and "The Marshall Flyer" (publ. by and for Marshall Flying School students); Sept. 1 1929, pp. 1 and 2. Both in R.B. Nicholas collection.
19. Tom A. Kirkup interview by John Underwood; Feb. 3, 1965, p. 2.
20. *U.S. Civil Aircraft*, A.T.C. No. 201-300, Vol. 3, by Joseph P. Juptner, pp. 92-93, 94-96.
21. *Marshall Weekly Democrat-News*; Sept. 5, 1929, p. 1.
22. *St. Joseph News-Press*; Oct. 8, 1929, pp. 1-2.
23. Tom A. Kirkup interview by John Underwood; Feb. 3, 1965, p. 1.
24. *Ibid.*, p. 3.
25. *Marshall Weekly Democrat-News*; Oct. 17, 1929, p. 4.
26. U.S. Patent Office, Washington, DC. (No. 1,584,466 is a patent on a split-axle, shock-absorbing landing gear assigned to the Curtiss Aeroplane & Motor Co. No. 1,622,799 is a variation of the same and was assigned to the Aerial Service Corp. of N.Y.)
27. *Aviation*; Mar. 17, 1924, p. 282.
28. "... For a number of years [Curtiss] made no attempt to force commercial manufacturers to either recognize or pay any royalty whatsoever under either the Curtiss or Wright patents. The commercial development, however, during the past few years has grown to such an extent that it is now the major activity in the industry. . . . More than forty manufacturers are now licensed under the [MAA] patents. . . ." Letter W.R. Root (Curtiss Assets Corp.) to N-B, Oct. 17, 1929. MAA files, Trans. Hist. Found., Univ. of Wyo.
29. *Moody's Manual of Investments*; 1930, p. 1019.
30. *Marshall Weekly Democrat-News*; Nov. 28, 1929, p. 1.
31. "... Lamkey asked to see a sealed drawing of our gas tank. . . [but] we found we had no sealed drawing of our standard gas tank . . ." Letter G.F. Burnett (N-B Chief Draftsman) to Lane, D/Comm.; Dec. 2, 1929. D/Comm. microfilm, FAA, Wichita, Ks.



NB-3 C-9319 (NO. 21)



NB-3 C-9319 (NO. 21)

Drawn for AAHS by R. Hirsch