

Prototype of the Pacemakers and the Skyrockets—the Wright-Bellanca WB-1 of 1925. Note the cantilever-arch landing gear with fairings expanded to form wheel pants. The “15” is the WB-1’s number in the 1925 National Air Races. Ford Motor Company photo

■ ■ One of the leading commercial designs of the late 1920s and the early 1930s was the Bellanca CH. The same basic airplane was given two names, depending on the powerplant: *Pacemaker* and *Skyrocket*. While the Bellanca had some detail design features that made it distinctive, one of its most remarkable features was its longevity. Not counting two years during which single prototypes were built, the CH series was in production from 1927 into 1939. Then, at a time when one would expect a design originated in 1925 to be thoroughly obsolete, it was put back into limited production in 1946!

The origins of the CHs are rather involved. Although production began under the Bellanca name in 1927, the immediate prototypes were built by another manufacturer and used a different designating system. The airplanes were designed by a Sicilian, Giuseppe M. Bellanca, who had studied aeronautical engineering in Italy and emigrated to the United States in 1912. He designed and built several small trainer-type airplanes prior to U.S. entry into World War I, and had a small two-seat biplane, the Model CE, in prototype form in 1919. This was built by the Maryland Pressed

*Pacemaker and Skyrocket, noted for longevity of design, were developed by Giuseppe Bellanca in 1925 and actively produced from 1927 to 1939. Attempted revival in 1946 was curtailed by advent of all-metal planes*

### *Yesterday's Wings*

# The Bellanca CH Series

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AOPA 54408

Steel Company of Hagerstown, Md. However, new production models could not compete with cheap war-surplus types, regardless of the performance differential, so the Maryland company's aeronautical effort failed along with the company.

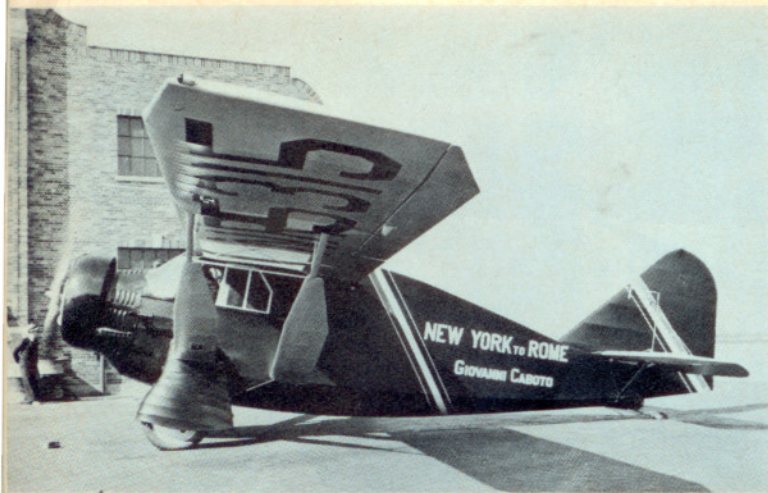
This setback didn't stop Giuseppe. He soon had a new monoplane, the five-place CF, designed. An association was formed to build this at Omaha, Neb., but it ran out of money before the plane was completed. The Omaha Aircraft Company failed, but the project was salvaged by Victor Roos, who formed a new company with Bellanca, the Roos-Bellanca Aircraft Company.

The CF was almost radical for its time—1922. Not only was it a cabin monoplane in the age of biplanes, but it featured a radial engine: a 90 h.p., 10-cylinder, air-cooled French Anzani obtained from war-surplus stocks. With this lightweight powerplant, the CF staged a long series of wins in the various stockplane events at the air races of the time. Good as the CF was, there was still no market for new commercial models as long as war surplus was still available, so Roos-Bellanca also folded and Giuseppe left for new ventures. He then had a short stint in business for

A Bellanca CH Pacemaker with optional “bull-dog” landing gear. Deletion of the lower landing gear fairings was common practice. Note the landing lights hung on the wing struts.

A. U. Schmidt photo





A 1929 CH, modified as a J-special for an unsuccessful nonstop flight from New York to Rome in 1935. This modification is typical of several, with deepened fuselages to carry extra fuel, emergency gear, etc.

Edgar Deigan photo

The last Skyrocket model—a 31-55A built by Northwest Industries, Edmonton, Alberta, Canada, after World War II. This model was designed for full NACA cowling around the Wasp engine. The single-strut landing gear dates from 1934.

A. U. Schmidt photo

himself as the Bellanca Airplane Company with a plant in Council Bluffs, Ia. Unable to sell production CFs, this shop took on modification work for government mail planes.

After this plant burned down, Bellanca formed a new company, the Columbia Aircraft Company, at Farmingdale, L.I., and continued the mailplane work. This was not profitable, and late in 1924 Bellanca went to work for the famous Wright Aeronautical Corporation, a major manufacturer of engines. Wright wanted a modern monoplane design in which to test and demonstrate its Whirlwind line of air-cooled radial engines that was just coming on the commercial market, and Bellanca was put to work designing one. Completed in 1925, this was known as the WB-1, for Wright-Bellanca.

Powered with the Wright J-4 air-cooled radial, the WB-1 crystallized a number of different monoplane design features that had appeared on various prototypes over preceding years into a single configuration that established the "big high-wing monoplane" pattern for years to come. It also incorporated three detail features that were to become Bellanca trademarks: the distinctive humped fuselage that was said to act as an airfoil to generate additional lift, and wide fairings on the lift struts that were also regarded as auxiliary airfoils contributing to the total lift. (The first two are still found on the Bellancas in production today.)

The one feature of the WB-1 that could be considered radical was the cantilever-arch landing gear, which used wide fairings over the structure and wheels to form wheel "pants" that anticipated industry-wide application of these devices by nearly five years. About the only obsolete feature of the WB-1 was the use of wood for the fuselage framework. The wings were also wood frames with fabric cover, but these remained the industry standard until World War II.

The WB-1 was a success from the

start. It won the efficiency event at the 1925 National Air Races and walked away from biplanes of equal power in the stockplane speed events. This inspired an immediate successor, the WB-2 of 1926, which differed mainly in detail refinement, welded steel-tube fuselage construction, and the new 220 h.p. Wright J-5 Whirlwind. This repeated the racing performance of the WB-1, but Wright decided not to produce it. Since the company was principally an engine builder, it didn't want to compete with its own customers. Wright backed out of airplane manufacturing completely, and sold the WB-1 to Bellanca and some associates who formed a new Columbia Aircraft.

The WB-2 missed its chance to become the "Spirit of St. Louis" only because of the stubbornness of its owners, notably Columbia President Charles Levine. When Charles A. Lindbergh approached Columbia in an effort to buy the WB-2 as the St. Louis entry in the New York-to-Paris race, they were anxious to sell. However, Levine insisted that Columbia's own pilot, rather than an unknown airmail pilot, would have

to make the flight. "Lindy" picked another airplane, and the rest is history.

After turning Lindbergh down, Levine entered the WB-2, now named "Columbia," in the Paris race himself. However, there was a lot of wrangling over crew members. While this was going on, Clarence Chamberlin and Bert Acosta set a new world's endurance record of 51 hours 11 minutes, between April 12 and 14, 1927. The "Columbia" did get across the Atlantic, with Chamberlin piloting and Levine as the first transatlantic passenger. However, they were only No. 2, which made quite a difference historically. Since Lindbergh had reached the long-sought Paris goal, the "Columbia" tried for Berlin. It came down a few miles short, but with a new non-stop distance record of 3,905 miles to its credit. This gave it two major world's records to add to designer Bellanca's laurels. After another transatlantic flight in 1930, the "Columbia" was destroyed in a hangar fire in 1934.

The performance of the "Columbia," plus the start of the "Lindbergh Boom" in commercial aviation, made it possible for Bellanca to obtain financing and start a new plant of his own. This was The Bellanca Aircraft Company of America, with its factory on Staten Island. Soon after limited production of an improved WB-2 known as the CH, plus some experimental models, got under way, the firm was refinanced, renamed, and moved to New Castle, Del., as The Bellanca Aircraft Corporation. A variety of models emerged from this plant, but the principal production, almost to World War II, was the basic CH. Wright-powered versions were named *Pacemaker*, while those with Pratt & Whitney Wasp engines were named *Skyrocket*. There were also quite a few minor variants with such special features as longer wings and bigger fuel tanks for distance and endurance flights.

While the WB-1 and WB-2 had the big cabin-monoplane field practically to themselves when they appeared, the production Bellancas of 1927 and on had plenty of competition from other

#### SPECIFICATIONS AND PERFORMANCE

	1927 CH	1937 SENIOR SKYROCKET 31-55
Accommodation	1 pilot, 5 passengers	1 pilot, 5-7 passengers
Span	46 ft. 4 in.	50 ft. 6 in.
Length	27 ft. 9 in.	27 ft. 11 in.
Wing area	273 sq. ft.	359 sq. ft.
Powerplant	Wright J-5 Whirlwind, 220 h.p. at 1,850 r.p.m.	P & W Wasp S3H1, 550 h.p. at 2,200 r.p.m.
Empty weight	1,850 lbs.	3,440 lbs.
Gross weight	3,700 lbs.	5,600 lbs.
High speed	128 m.p.h.	190 m.p.h. at 5,000 ft.
Cruise speed	110 m.p.h.	180 m.p.h. at 12,000 ft.
Service ceiling	13,000 ft.	25,000 ft.
Range	800 mi.	600-1,000 mi.
Price	\$14,500	\$22,700

220 h.p. cabin monoplanes (all using the Wright J-5). The contemporary Stinson *Detroit*, Ryan *Brougham*, and Travel Air 5000 and 6000 models were sufficiently similar in size and general outline to offer a slight recognition problem at first glance. The other main competitors, the Lockheed *Vega*, Fokker *Universal*, and Fairchild FC-2 differed notably from the Bellanca and were not a problem. It took only a second glance to pick out the Bellanca "trademark" features and establish identity.

The WB-2 and the CHs used a more conventional landing gear than the WB-1. However, a refinement of the old WB-1 cantilever-arch gear was offered as an interchangeable option. Because of its peculiar shape when viewed from the front, it was inevitable that this would be nicknamed the "bulldog" gear. Skis or twin pontoons also were available to increase the utility of the CH.

Much has been made in the past of the extra-lift features of the cabin Bellancas. Bellanca was the only designer to make serious use of the wide lifting struts, even to the point of combining two struts into a single wide unit on some models. Others that tried them, notably the Curtiss *Robin*, soon abandoned them.

The lifting-fuselage concept doesn't stand up at all when the fuselage is

analyzed as a wing. First, it has a very negative aspect ratio. Second, because of the same narrowness, the tip losses would be enormous. Third, as an airfoil of that length, the center-of-pressure travel would be expected to present some trim problems.

These remarks are not meant to belittle the merits of the Bellancas. They had lift aplenty, but it came from design features other than these gimmicks. The wing itself was very efficient, with a high-lift airfoil, but it had two other things working for it. Compared to equivalent models, the Bellanca airplanes had a little more wingspan relative to their length. The wing also picked up efficiency, particularly at the low end of the speed range, by virtue of having a somewhat higher aspect ratio. Another beneficial Bellanca feature was the wingtip shape, which incorporated some features of the Hoerner tip some 35 years before Hoerners became popular. Coupled with the extra span-to-length ratio was a horizontal tail with more than average span and again a higher aspect ratio than its contemporaries. Obviously, the overall combination paid off, both in sales and longevity of the design.

The basic CH design grew with the years. When the 300 h.p. Wright J-6-9 Whirlwind replaced the J-5 late in 1929,

the airplane became the CH-300. When 400 h.p. Wasp engines were adopted, it became the CH-400 and was given the name *Skyrocket*. The CH designation was soon dropped in favor of single letters, E, F, and J. These were replaced in the mid-1930s by numbers, *Pacemakers* and *Skyrockets* alike becoming Model 31, further identified by two-digit dash numbers, as 31-40 for the 1934 *Pacemaker Jr.* with the Wright J-6-9. The Model 31 was virtually out of production in 1938 for lack of customers. The factory had other models in production then, but kept the basic 1925 design in the catalog for a couple of years more.

Surprisingly, however, the old bird went back into limited production in 1946-47, when Northern Industries, Ltd., of Edmonton, Alberta, revived the 31-55A for Canadian bush operations. It was seriously considered for a new military career, too, when the U.S. Army held a liaison and utility plane competition in 1950. This was won by the Canadian de Havilland *Beaver*. Bellanca had thought of entering a refurbished *Skyrocket*, which had been the *Beaver* of its day. The company recognized the fact that the age of the iron birds had arrived, and the old "rag and tube" model was left to rest on its considerable laurels and remarkable longevity. □