

The Story of the Famous "Mystery 'S'"

by CHARLES C. BARRENBRUGGE

How the ideas of two progressive engineers worked a revolution in airplane design by presenting the "Mystery S" ship for a race against the Army craft. This airplane is the father of present-day racing planes.

UP to the winter of 1927, building an airplane was rather an experiment for the manufacturer and not a completely pre-designed job to be followed with the utmost precision. An airplane was first built, tested and then re-designed for better performance. It was considered quite impractical to design a ship entirely on paper and expect it to live up to its required specifications.

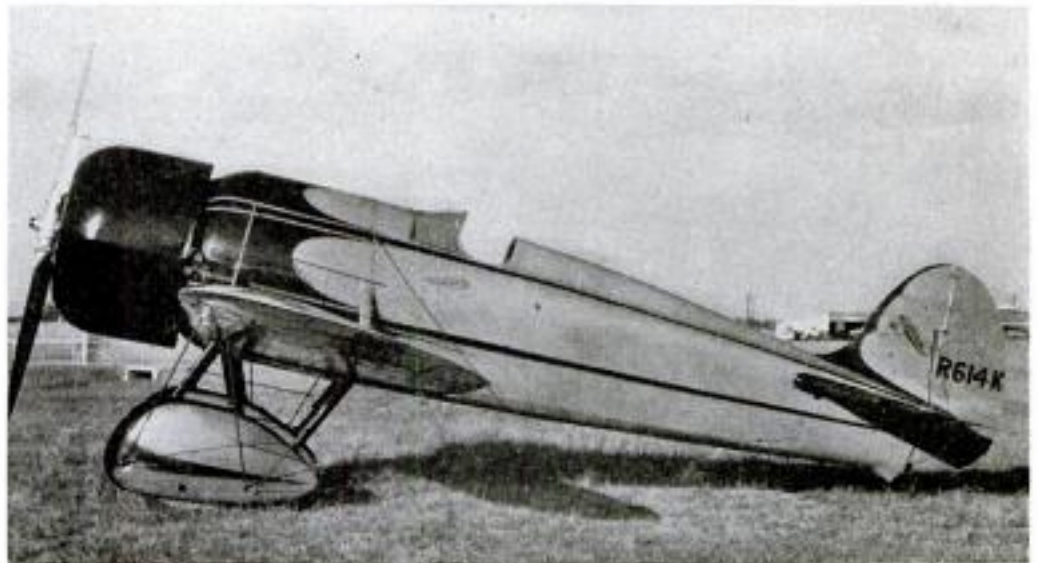
To give the industry a plane completely calculated on paper was one object of Herbert Rawdon and Walter E. Burnham, two very capable engineers. This was the idea in mind when they began their design of what was later to be known as the "Mystery S" ship. The other objective was to build a plane that would outclass the army at the National Air Races.

Previous to this time the army had been carrying away the laurels to such an extent that the races were becoming less interesting every year.

Secretly they worked on this plane until the summer of 1929, when Travel Air decided they would build the ship to carry out the sporting idea for which it was intended by its designers. Secret construction was immediately started and the first plane was finished in August, 1929.

During its construction, newspapers and magazines all over the country were trying to gain information about the ship that was to be a worthy competitor for the army at the National Air Races. Every attempt to gain such data was futile, thus came about its name, the "Mystery Ship".

Its high speed performance was one of the outstanding events of the races.



A side elevation of the "Mystery S" showing the care with which the streamlining was carried out. Note the engine cowling, the "pants" and the tapered symmetrical fuselage.

In the free-for-all-race of September 2, the Mystery S attained a high speed of 194.9 m.p.h. This was several miles an hour better than its military competitor.

During the race, Doug Davis of Atlanta, Georgia, who was piloting the Mystery S, lost his sense of direction as he turned a pylon. Thinking he had cut it short, and not wanting to be disqualified, he turned around, came back and circled the pylon twice. Even then he crossed the finish line ahead of his military competitor.

It was a surprising fact that on its first test flight, the airplane performed in excess of the predictions of the designers. Its top speed of 230 m.p.h. was 15 per cent faster than was calculated. This was due to the neat

design of the N. A. C. A. cowling. It landed at 72 m.p.h.

The original plane was powered with a special Wright R-975, nine cylinder Whirlwind engine developing approximately 400 h.p. at 2,300 r.p.m. The increase in power over the standard 300 h.p. Whirlwind was obtained by augmenting the compression ratio and the speed of the supercharger.

Because of this method of increasing power, a rather surprising fuel consumption economy at cruising speed was observed. According to the manufacturer, the gasoline consumption at 1,550 r.p.m. (150 m.p.h.) was 13 gallons per hour.

THE Mystery S is a typical low wing monoplane having a span of 29 ft. 2 in. and an overall length of 21 ft. 2 in. The weight empty is 1,475 lbs. and the disposal load 465 lbs., giving a gross weight of 1,940 lbs. With the 400 h.p. engine, the power loading is but 4.6 lbs. per h.p. The wing loading is 15.6 lbs. per square foot.

Despite the remarkable performance of this airplane, there is nothing radical in its design. Aerodynamically, it is a conventional low wing monoplane, streamlined to the highest possible degree and embodying practically every known device for the reduction of drag. Tapered wings, wheel fairings, and elliptical fuselage section all contribute to the overall efficiency and even the rudder is so constructed that its lower portion carries the streamlining of the fuselage to a sharp edge at the rear.

External bracing is effected by the use of streamline wires attached to a

(Continued on page 125)



The "Mystery S" under construction, during which time all operations were carefully kept secret and withheld from the press.

rapidly clearing fog showed that we must have been hovering over them the best part of the night, but without a sight of them under the dense atmospheric conditions!

Well, it is said that life is just one durned thing after another, and I can surely second this in connection with sea patrolling by air, for it was not very long before the welcome little morning breeze, which had come to sweep away the fog, gradually developed into a most distressing gale.

Over night, the fleet had been joined by two of the larger non-rigid airships, as well as three more of the "flying pig" type and we were now endeavoring to keep in formation. However, as the wind increased, we gradually became scattered, until the first signs of trouble showed up. One of the larger airships off our port beam had developed engine trouble and was being carried away by the wind. Scarcely had this happened when one of our own type made a nose dive for the sea, and was completely wrecked. Two others practically lost control and took a chance of free ballooning with the wind, finally ending up near an air base on the Yorkshire coast.

WE WERE more fortunate for we were fairly close to our own base. So we quickly turned our course shorewards and managed to keep ahead of the wind sufficiently to gain the coast line in a terrific struggle. We were over the high cliffs, and oh boy!! the fun sure had started when she got a bump from the upward air currents, shot her nose almost perpendicular and then everything screeched, jerked, boomed and moaned. The car looked as if it would tear loose any moment. So we hurriedly tried to lighten her aft, got the elevators hard down and engines whirring with every atom of power possible.

She swooned, rocked, dipped, cork-screwed with us hanging on for life, presently the wind eased unexpectedly, she took a terrific downward dive, and we had the devil's own job keeping her from being smashed to smithereens on the face of the cliffs. We could see our base over the hills, only a few miles away, in our tremendous battle with nature's forces. Shooting up and then diving earthwards, we were nat-

urally losing hydrogen and pressure fast.

We had thrown practically everything overboard in order to gain lifting power and were in a general uproar. However, our efforts did not go unrewarded. I climbed out on the rail, shinnied along to the pilot's side and handled the hydrogen and air valves as we dived, swung and reared in our final attempt at a landing. Hurrah! three cheers! great stuff! The landing party had grabbed our landing tackle and at their first heave she made a final dive, hit the ground with a beautiful wallop and the car turned completely on its side. They managed to steady her again and soon we were safe once again in the great lighter-than-air sheds.

I was looking over the damage to the undercarriage, when I heard a stern voice the other side of the car. "Captain Henson, who the devil ordered you to land?" It was our dear commander, thoroughly annoyed at being disturbed at eighty-thirty in the morning. "You will report to me at eleven o'clock and give a full explanation."

"Yes sir," replied Henson, our pilot, dutifully, but with a look fit to kill. Some say "good old C. O."—some say—well I'll leave this to your own judgment.

* * *

Ja'veer fly a pig? You see I wasn't kidding you. Well, now you know all about it anyway.

END

"Mystery S" (Continued from page 99)

cabane which is concealed beneath the cowling and behind the engine. In order to provide a desirable compromise between cockpit capacity and frontal area the fuselage is made wedge-shaped. Structurally it is conventional in that it is built up of welded steel tubing with an absence of internal wire bracing.

This airplane was widely discussed, following its brilliant performance in the National Air Races of 1929, and undoubtedly was one of the large con-

tributing factors in the trend toward the low wing monoplane which is now apparent. In fact it revived the whole aviation industry. It was the fastest commercial airplane in the country at the time, performing up to its specified qualifications. This ship brought about a new top speed for commercial planes having been streamlined throughout, introducing shoes for the wheels and a special N. A. C. A. cowling which previous to this time were practically unknown to the industry.

THE fastest planes we have in the country today are almost an exact reproduction of the Mystery S. For example, the Gee-Bee supersportster, which won the Thompson trophy race of 1931 at an average speed of 236.23 m.p.h., was powered with a supercharged 535 h.p. Wasp Jr. and landed at a speed of 80 m.p.h. The new Boeing Pursuit, being tested by the army, has a maximum speed of approximately 300 m.p.h., is powered with a 550 h.p. Wasp Sr. supercharged and lands at 110 m.p.h. The new Curtiss Attack plane and many others have been designed very closely to the original Mystery S.

After comparing our more modern type ships with the Mystery plane as to power, and finding that all were equipped with more horsepower, I decided that by getting in touch with one of the designers of the Mystery S, I

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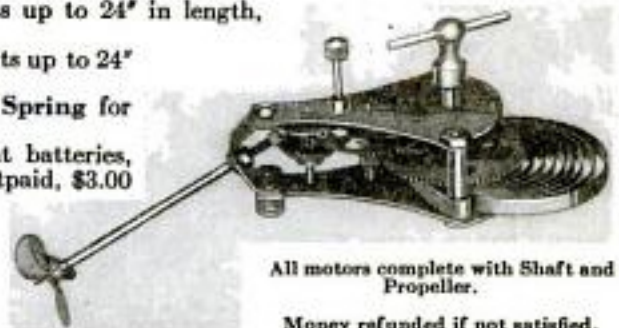
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might relieve a few questions which had been in my mind. So I drove over to Tri-State College at Angola, Indiana, where Walter E. Burnham is a professor in the Aeronautical Engineering Department.

Our conversation began with the topics of the day, but soon led up to the discussion of the Mystery S. After comparing the speed of the more modern type planes to the Mystery plane, I asked him the following question: "Do you think the Mystery S could compete with the new Boeing Pursuit if it had a 550 h.p. Wasp Sr. installed?"

Not hesitating the least, he immediately replied: "I would prefer a supercharged 535 h.p. Wasp Jr. instead, and with it I am sure it could attain a speed of approximately 300 m.p.h. and land at not over 85 m.p.h."

CONFIDENTLY, he continued discussing the achievements of the ship, never in the least hinting that his marvelous ability as a designer was responsible for its success.

As to the future of aviation in this country, he was quite confident that its possibilities depended upon the airworthiness requirements of the U. S. Department of Commerce, stating that there were too many loop-holes being filled by irrational assumptions. He quoted: "The regulations are due for a general shaking up."

"I can't say that I have, but Mr. Rawdon and myself are working on a design which we hope will outclass the Mystery S in every respect. It is only through better design that the standards can be raised."

I did my best to obtain something about this new design, but he was very clever in avoiding any question concerning its details. I am sure the whole country will be anxiously waiting to see if these two brilliant engineers will again revive the aviation industry. **END**

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Hunting

(Continued from page 82)

The following February we had a warm Sunday, fishing weather, that suggested big minnows and a deep winter pool in the bend of some stream. Our best bait fishing in central Indiana is in the late fall and early spring. The water is clear at that time and the bass gather in the deep parts of the river. The fish taken then are almost invariably big fish. The greatest difficulty had been in locating the good pools. This day I noticed the clear water—the bottom being plainly visible even in the deep stretches and immediately started on an up-to-date aerial still hunt for good old time "fishin' holes." I found them too. And they were far away from bridges and disturbing highways.

On the bottom I could see rock ledges and gigantic boulders, as big as piano boxes, that made me whistle through my teeth in sheer delight at the discovery. That isn't the end of the story. I caught fish out of those pools—big fish that took five inch chubs and ran out a hundred feet of line in a manner that is ecstasy to the big minnow fisherman.

At five thousand feet the earth below is an open book. The hawk and the eagle, and to them good hunting means life, discovered that simple truth countless centuries ago. Of course there are aerial charter companies now that have supply caches deep in the northern wilderness and for a price. They will take you to localities heretofore unvisited and unfished. But I see a day not far distant when the private plane, low in price and operating cost, and efficient in the ability to land and take-off from small field and lake, will begin the sporting quest.

The farmer with a hay field beside good fishing water may reap a big parking revenue in 1950. Spots of transcendent beauty, a summer's journey away by canoe or packtrain, may be weekend watering places in 1960. And countless wings are very likely to be reflected from the waters of Canada's countless lakes when those days are reality. **END**

Battling Bootleggers

(Continued from page 93)

tomorrow," said the Chief. "We'll fly up in the morning and be ready for our surprise attack."

MID-AFTERNOON of the following day found us at our camouflaged landing field, several miles inland from the Canadian border, our plans carefully reviewed and our trap ready to be sprung.

I cannot recall a more beautiful moon than that I saw rise over those bleak North Dakota prairies that

night. Perfectly full, a gorgeous jewel set against a background of star-studded blue velvet sky.

At 9:30 o'clock, about half an hour before the transport was expected, the two police planes rolled down the field and took off for their scouting duties. On their special short-wave radios, they kept in continual communication with our field station.

Minutes passed slowly and restlessly as we all tensely waited for our signal. Soon it came from the police ship No. 6: "We have sighted both transport and convoy. They should pass directly over field. Approximate altitude 8,000 feet."

For fifteen minutes, the Boeing's motor had been warming up, ready to leave on an instant's notice. Hargrave and I quickly strapped on our parachutes, climbed into our cockpits and buckled our safety-straps.

Down on the field the powerful searchlight was thrusting its long shaft of light into the sky directly above it. Hargrave climbed in a wide spiral, completely circling the field to avoid the searchlight's beam. We were at 8,500 feet when Hargrave levelled off, gunned the motor a couple of times to attract my attention and pointed to the west of us.

THERE she was . . . a big silver transport, and boy, what a monster! Evidently her pilot mistook the searchlight for an airmail route marker, for he made no attempt to avoid it. No sooner had the big ship passed through the beam than a trim little fighting plane passed close on the transport's tail. Hargrave turned and wig-wagged to me. I answered his signal and we were off in pursuit.

Hargrave was eager and I'm afraid he forgot all about what the Chief told us. Anyway he roared over the transport's convoy, banked steeply directly on top of it and motioned down. Surprised, he looked back at me, and I shook my head. After all, we weren't looking for trouble; we were looking for the landing field of the liquor carriers.

But the enemy didn't seem very well pleased with their reception in the States, for they opened up with a random volley from their machine gun. That was all we wanted, for by this time I was just as eager as Hargrave to get into action. No sooner had I grasped the trigger and guide arm of the Browning than Hargrave zoomed up sharply and we were flying on our back in the direction of the enemy plane.

I was tense and excited, but I knew this maneuver and watched closely for my chance. Directly over the enemy plane, Hargrave began to barrel-roll. Every time that we came into position I let them have a round from the Browning. We made a few good hits in the fuselage of their plane, but not much damage was done before they