

Safety Aim of Guggenheim Contest

Aviation

By THOMAS CARROLL

Thomas Carroll was formerly chief test pilot for the National Advisory Committee for Aeronautics. He is one of the pilots who is flying the contest entries in the tests at Mitchel Field.

To prove to the public that airplanes can be made safe is the object of the Daniel Guggenheim Safe Aircraft competition sponsored by the Daniel Guggenheim Fund for the Promotion of Aeronautics. A demonstration of aircraft, striving to fulfill rigid specifications for aircraft that can be regarded as safe, was conceived as the method of stimulating progressive design on the part of the manufacturers and confidence on the part of the public. Prizes totalling \$150,000 made the competition financially attractive. It had been humorously expressed that a safe airplane was like a good Indian. It was the task of the competition to prove differently.

The delineation of what might be considered a safe airplane, a very difficult task, was accomplished by laying out most comprehensive and intelligent specifications.

A safe aircraft which was not of obvious usefulness would not be a step forward. The first specification provided that the craft under test should be useful. To demonstrate utility, it was specified that it must carry a useful load of at least five pounds per horsepower of its engine, and that it must further satisfy a speed requirement of carrying at least a pilot and one passenger at a minimum high speed of 110 miles per hour. It must also demonstrate its ability to climb in order to get in and out of fields, and the minimum requirement in this regard was that it should be able to climb at least 400 feet per minute from the ground.

With these as basic requirements, safety tests are next applied. The ability to fly under full control at low speeds was considered of absolute importance and therefore the figure of 35 miles per hour was set as low speed maximum for flight under power, and 38 miles per hour as the low maximum gliding speed without power.

The aircraft must also be capable of coming to rest not more than 100 feet from the point at which it first met the ground, and in taking off, it must be able to leave the ground in a run totalling not more than 300 feet. Incidentally, it must be capable of taking off in that fashion and clear-

ing an obstruction of 35 feet in height, located at not more than 200 feet from the end of the landing run prescribed.

Its stability and maneuverability are also required to be demonstrated. It must be stable in nearly all ordinary conditions of flight and maneuverability. As a final point, if through any misplacement of the controls by the pilot, or from any extraneous cause, the airplane should be thrown into an unusual position, it must be capable of being brought out of it by a skillful pilot without more than a 250 foot loss of altitude. Without any attention of the pilot, through its own inherent stability, the plane must be able to recover itself in not more than 500 feet.

There is no limitation upon the means by which the desired performance can be attained. The design may be either evolutionary or revolutionary. It may be accomplished by a skillful refinement and improvement of airplanes as we know them. On the other hand, it is entirely permissible, so long as the aircraft is heavier than air, to attain the ends by a radical departure from any generally used aircraft.

Practically the entire entry list of the Daniel Guggenheim Safe Aircraft Competition was submitted within two or three days of the closing of the contest. When this contest to develop and discover safer airplanes was announced in 1927, it was little expected that no serious competitors would be received for test prior to the final week of the contest.

There seems to have been a reluctance on the part of the designers, both foreign and domestic, to submit half-hatched ideas in this somewhat revolutionary aeronautical contest. It is on that account that entries have been withheld, and only at this late date is it possible to give a list of the competitors.

Formal entry of twenty-seven various types of aircraft has been made during the past two years, but these entries merely filled out the form. All but less than a dozen have at this time either withdrawn or have failed to complete their entry by submitting an airplane for test.

Neither could it have been foreseen that the last two or three days of the competition would be fog-bound, rainy days, with flying a prac-

tical impossibility, which has necessitated several of the entries being brought in by truck.

At the close of the competition the complete entry list appears to comprise the Burnelli, the Command-aire, the Cunningham-Hall, the Curtiss, the Fleet, Handley Page, the Leigh Safety Wing (which is a modified Brunner & Winkle Bird), the Schroeder Wentworth and the Taylor. The Alfaro and the stock Brunner & Winkle Bird were submitted "in person," but were withdrawn.

These airplanes, together with the large number which have been worked out but have failed of actual entry, have at least developed a tremendous amount of thought in the industry toward the goal of safer aircraft. From this standpoint the competition can be considered a complete success.

Some of the entries have already been flown, and their performances are so completely different from what airplanes were when the contest was conceived over two years ago that the object of the competition, which is to make flying safer, is sure to be accomplished.

Handley Page

The first airplane to be received in a condition which would permit of its being tested in the Guggenheim Safe Aircraft Competition, was the Handley Page entry, of British origin.

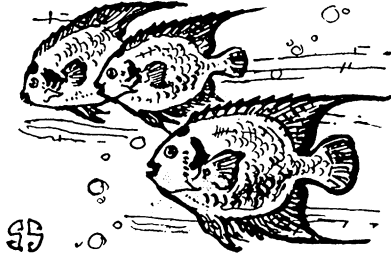
This little airplane does not look to the lay eye much different from many planes which are customarily seen in the air. It is a small, two-seater biplane, equipped with a five-cylinder Armstrong Sidley engine. To all outward appearances it is quite normal.

It does, however, fulfill the minimum requirements of being capable of carrying the specified load at the minimum top speed of 110 miles per hour, or better. Very complete and intelligent application, however, has been made to the problem of slow speed, and this has been accomplished by a combination of the Handley Page slot, together with so-called flap gears.

The slot is formed by the moving forward of a small wing, which normally, in the high-speed condition, lies flush upon the surface of the entering edge of the main wing. The flap is a movable portion of the rear of the wing hinged similarly to an aileron, and the slot and flap are geared together in such a fashion that the movement of one actuates the (*Turn to next page*)

NATURE RAMBLINGS

By FRANK THONE



Angel-Fish

The calm, warm water over the coral reefs that shelter tropical atolls and lagoons must be for the creatures that can breathe it a fair equivalent of the calm, warm, languorous air that washes over the islands above. These isles of the southern seas are as near as the fallen sons of Adam shall ever see of the earthly paradise. At least, so say novelists, writers of steamship circulars, and other romancers.

For aught we know, they may be telling the truth. One may be excused, perhaps, for preferring to substitute tropical birds for dusky but often overstuffed maidens, in the role of angels in this paradise. And for the twin paradise beneath the surface of the mirrored waters, need we seek beyond the angel-fish?

An angel-fish is just as useless as a humming-bird or a trogon—and just as much of an unceasing delight to look upon. School after school of them will flash beside your boat, or even better, before your diving helmet if you go down to visit them. They are not swift swimmers, but the deliberate grace of their movements makes you ready to believe the fine old legends of angels that dance on the clouds or among the stars.

There are many species of them, far more than the traditional seven choirs of angels allowed by Hebrew and Christian theology. Though their body-shapes all follow more or less the same pattern, their color designs are varied and striking. Some of them are so daring and different that one might well imagine the Creator as throwing down a thoroughly discomfiting challenge to even the most modern of artists and designers.

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Guggenheim Contest Entries—Continued

other. In flight, as a high angle of attack is reached, the air forces upon the forward part of the wing are such as to displace the small wing forward, leaving an opening between it and the main wing through which the flow of air is actuated. Then being connected with the flap, the forward opening of the slot airfoil automatically moves the flap in a downward direction, increasing the camber and the effectual angle of attack.

The application of this slot and flap changes the lift factor of the whole wing to an extent which permits of its being flown at a very much greater angle of attack than with ordinary wings, and a greater lifting force is developed.

The airplane is equipped with wheel brakes, which appear to be a necessity to cope with the short landing requirements. It would hardly call for comment if they were upon an American machine, but the use of wheel brakes upon British planes is only now becoming standard.

The preliminary performances of the Handley Page entry have demonstrated that it must be considered a very serious contender in the competition, and the results of the actual tests will be most interesting not alone to the aeronautical industry, but to the public as well.

Curtiss "Tanager"

The "Tanager," which has arrived at Mitchel Field to fly in the Daniel Guggenheim Safe Aircraft Competition, is the Curtiss entry and was constructed at Garden City, Long Island.

Prior to its submission it was tested by the Curtiss test pilot, Paul Boyd, whose terse comment upon its performance is: "We believe that it will meet the requirements of the competition."

The airplane is of cabin type, carrying a pilot and passenger in tandem within the enclosure. It is a rather large biplane, equipped with the Curtiss "Challenger" engine, the engine which recently carried O'Brien and Jackson to the world's endurance record.

The wings are equipped with a modification of the Handley Page slot. In addition, flaps, the hinged rear portion of the wings, are independently and manually operated, allowing their position to be fixed by means of a chain gear in any position at the will of the pilot.

The landing gear is the familiar combination of rubber in compression,

and a long travel oleo gear which permits of a landing gear travel of more than one foot. It is, of course, equipped with wheel brakes operated by individual pedal gear.

An interesting innovation in its landing gear design is that the travel of the shock absorbers is restricted in taking off in order to assure the landing gear's leaving the ground in the shortest possible distance, rather than trailing along the ground due to extension as the load is reduced. The gear is placed in full action before landing in order that the full use of the shock absorber may be had.

A most unusual and interesting feature is the full floating ailerons. These are of the wing tip design, similar in many ways to the old Curtiss interplane ailerons which were placed, in that earlier case, between the wings, but which in this particular application, are placed at the tips of the lower wings. These are floating, and in the free position, trail at a zero angle with the relative wind. They are, however, independently operated in the usual aileron fashion around this trailing position. An aileron control is provided which is entirely independent of the wings, and which, whether the wings might be stalled or not, are never in a stalling condition, though always being displaced from the zero angle of attack position for lateral control. This provides an unusual control at high angles of attack and low speeds.

The fineness of the design and the power of the engine assures a satisfactory high speed performance. The Tanager, whether it wins the competition or not, will be certain to put up a most excellent showing toward the ideal of a safe and simple airplane.

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American mosquito-eating fish are to be introduced into Syria.

There is less than one per cent. of illiteracy in Scandinavia.

It is likely that dogs suffer more from decayed teeth than men do.

The ancient Egyptians first acquired silver and iron from the Hittites.

The mountain beaver of the Pacific coast is not a true beaver, and resembles in size and appearance a tailless muskrat.