

AVIATION

# Giant Flying Clipper Boats Can "Make Turn on a Dime"

## Engineers' Meeting Hears Advantages of Scale Model In Rushing Production; "In-Line" Engine Discussed

**A** SOBER picture of the performance characteristics of the giant trans-oceanic clipper flying boats that have excited the admiration of the entire world was presented to the national aeronautic meeting of the Society of Automotive Engineers by William K. Ebel, engineer of the Glenn L. Martin Company, builders of the Pacific and Soviet clippers.

The great metal birds can figuratively turn on a dime even when taxiing at high speed preparatory to taking off, Mr. Ebel told his audience. Should an obstruction appear on the water lane down which the boat is roaring for the take-off, the pilot can cut two motors on one side and swing his rudder at the same time, taking the boat quickly and safely out of harm's way.

"This maneuver represents an extreme condition and is recommended for emergency use only, as it is quite certain that unless passengers have their belts securely fastened they will be thrown from their seats."

So adjusted that a skilled pilot who knows his ship can maneuver it in a crowded harbor by using his engines and taking advantage of drift and wind conditions, the boat is nevertheless seaworthy in the extreme, he indicated.

Quite naturally one of these large planes, it was explained, is not quite so maneuverable as smaller flying ships, but it is nevertheless easy to control in flight.

### Test Model

Aiding the Martin Company in their development of still larger flying vessels, Mr. Ebel reported, is the development of a quarter scale model for actual flight of the plane they expect to build. This model, large enough for a pilot and observer, is an addition to the towing tests carried out on a model of the hull and to the windtunnel tests carried out on a small model.

Use of the model, on which changes indicated by test results are made prior to building of the full size plane results in great savings, he declared, not only of money but of time also.

Prior to the development of this scheme, a prototype plane had to be built before mass production of a given type was started. Development of the prototype plane and carrying out tests on it requires a year, thus slowing production and making the plane, when it is finally manufactured in quantity, that much out of date.

### Growing Interest

"In-line" engines, whose cylinders are lined up one behind the other and which have small cross-sections and therefore less wind resistance, are attracting increasing attention, R. M. Hazen and O. V. Montieth of the Allison Engineering Company, told their colleagues, "particularly in the larger powers," for the larger present-day engines present serious streamlining problems.

Such engines as Mr. Hazen and Mr. Montieth discussed are of growing importance to military aviation, particularly for use in small speedy pursuit planes. European engineers have made considerable advances during recent years while America has just lately become interested. The two engineers read a report on vibration studies made on the new engine.

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ENGINEERING

## Modern Defense Towers Like Ancient Refuges

**N**EWEST device for the protection of civilian populations against air raids is a strong, windowless tower of concrete nine stories high, in which 400 persons can find shelter for the duration of any raid. This air defense tower has been developed by the Draegerwerk, Luebeck, Germany, manufacturers of gas masks and respirators for industrial as well as military use.

The tower is bombproof as well as gasproof. Small in area as seen from the air, it presents an almost impossible target under even the most favorable bombing conditions. Moreover, its conical top is sheathed in stout steel, to deflect any



ANCIENT



MODERN

*Separated in time by nearly a thousand years from the new German air defense tower is this famous Ardmore round tower in County Waterford, Ireland (left). It also was intended for defense against military attack. The new Draegerwerk air defense tower in Luebeck, Germany, is similar in purpose as well as external appearance to ancient military towers.*

accidental direct hit. Its concrete walls are calculated to withstand a blast pressure equivalent to 100 tons per square yard from any explosives falling alongside. Its round shape and wide base give it great stability.

The top floor is intended to house the ventilating machinery, and the remaining eight floors are for the people. Entrances are by two outside staircases, to the second and third floors respectively, and a series of stairs at the center connects the floors.

It is planned to set up one of these towers for each 400 persons in an industrial plant, or in closely built up urban residence areas. The people could take shelter in them when the raid warning is sounded, remaining until after the hostile planes have flown away. The towers may be incorporated into other

building units, or even sunk into the earth.

New though the Draegerwerk tower is, it nevertheless re-emphasizes the old, old aphorism of Ecclesiastes, that there is no new thing under the sun. For nearly a thousand years ago in Ireland, when raiding Vikings harried the coasts and even made incursions inland, towers that look strangely like the new German structures were built alongside the churches.

These round towers of stone, of which examples still stand in perfect condition, were used as refuges during raids, by both clergy and people, who also brought their more portable valuables. The Vikings were never equipped for siege warfare, so that these simple "keeps" were safe enough until the marauders went back to their ships.

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#### AVIATION

## Shenandoah Designer Calls Proposed Airship Necessary

By PROF. J. C. HUNSAKER, of the Massachusetts Institute of Technology

**T**HE replacement of the Los Angeles as provided by the pending naval appropriation bill is the necessary step to revive the airship art in this country.

We attempted in the past to go too fast in catching up with the Germans. Nevertheless, we did create adequate building facilities and the beginning of a skilled engineering and operating organization.

The discouragement following the loss of the Akron and Macon has stopped all progress and if continued will virtually hand over to the Germans our exclusive helium resources on the grounds that they can operate zeppelins successfully but we cannot.

A new Los Angeles will hold our building industry together and train American naval personnel in the use of a scouting vehicle of enormous potential value over the wide spaces of the Pacific. The helium-filled airship, especially when carrying airplanes, is of great utility for strategic scouting and surveillance.

The art of flight in a lighter-than-air vehicle is an important branch of aeronautics that should not be neglected by the country having a natural monopoly of helium. While heavier-than-air ve-

hicles are rapidly advancing in reliability and safety, I believe comparable progress is possible with airships.

Their most important service should be as commercial passenger carriers. The Los Angeles replacement would put this country in a position to go ahead on a sound program of commercial airship development, making use of the lessons of our past mistakes.

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#### AVIATION

## Sikorsky Foresees High Speed Planes

**L**OOKING into the future clear past the giant seaplanes now building and contemplated by the airlines, Igor I. Sikorsky, noted airplane designer, foresees the possibility of building 1,000-ton flying clippers capable of carrying thousands of passengers.

One-hundred-ton seaplanes will be crossing the Atlantic in 20 hours on regularly scheduled lines within the next few years, Mr. Sikorsky, credited with designing the first successful multi-motored aircraft, told an audience attending the fourteenth annual Steinmetz Memorial Lecture, in Schenectady, N. Y.

Planes in the thousand-ton class, although well within the range of engi-

neering possibility, he asserted, may not, however, be the most economical. Sufficient traffic to fill them would be difficult to find. But engineers can build them and may yet do so.

"Limit in the size of aircraft in the future will be dictated not by engineering possibilities, but by economical factors and traffic requirements," he explained in recalling the erroneous opinion held during the early days of aviation that, with increase in size, airplanes would lose load carrying efficiency and finally would even be unable to fly.

Predicting practical limits to aeronautical operations, he stated that "it is probable that an altitude of 75,000 to 90,000 feet and a speed of from 500 to 600 miles per hour will not be exceeded until a new source of energy giving greater power per unit of weight, combined with a new method of propulsion becomes available."

Such a new method may well be found, he declared, citing the possibility of developing a method of producing and handling liquid hydrogen for use as a fuel. "Such a development would make possible the circumnavigation of the earth along the Equator in a non-stop flight without refueling."

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#### GENETICS

## Methuselah Mice Show How Disease Can Be Cut Down

**I**F MEN and women knew as much about their own heredity as science knows about that of mice, humanity could hope for a future free of disease. This appears to be the conclusion of studies which Dr. Maud Slye, University of Chicago scientist, described to members of the Women's National Press Club in Washington, D. C.

Cancer is not the only disease from which Dr. Slye can protect her mice. In the mouse paradise she provides for them they are protected from all the other ills to which mice are heir. They live to be Methuselah mice, dying peacefully at an age which, if mice were men, would give a life span of 720 years.

Dr. Slye urged laymen and medical men to keep human heredity records such as those she has kept for 165,000 mice during the last 30 years. Such records give the knowledge on which the Methuselah race of mice has been built and might lead to a similarly long-lived, healthy human race.

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Evaporated goat milk is now a commercial product.