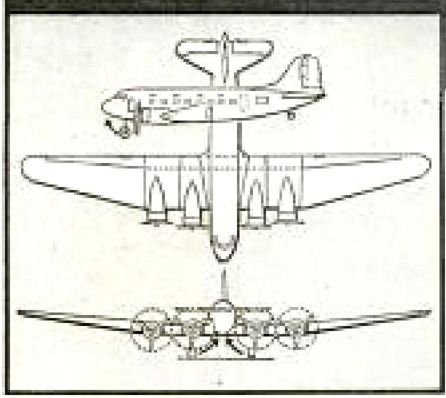
AROUND *the* CORNER

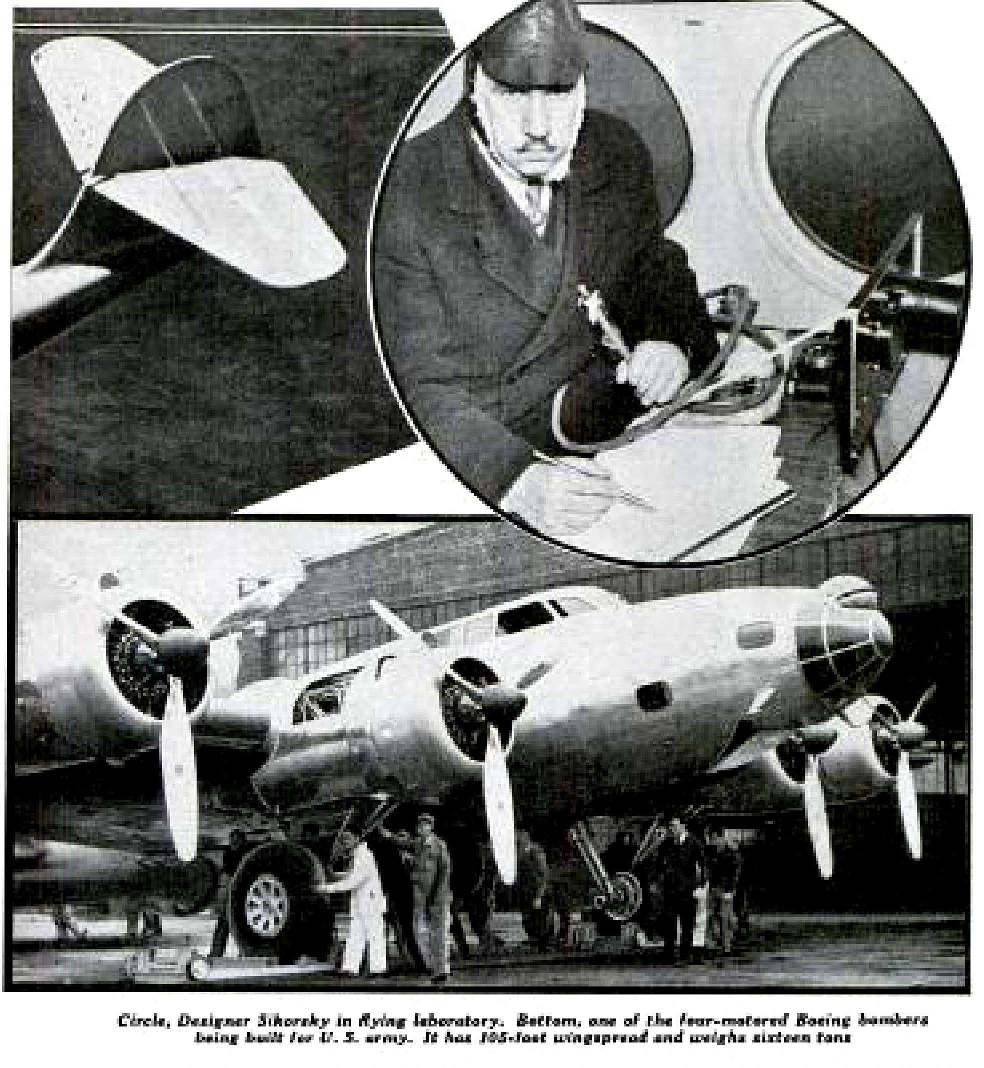


Above, the twenty-five ton "China Clipper." Left, how tomorrow's transport may be expected to look, complete to nose wheel, folding landing gear and smooth under surface.

TOMORROW'S airplane land transport is described by engineers as having a gross weight of about twenty tons, a useful load of about six tons, a flying range of 1,250 miles, and a speed of 225 miles per hour on two engines. For water transport, the principal development is increased size. The two major clipper-ship builders of America, Glenn L. Martin and I. I. Sikorsky, have plans ready for the immediate construction of clipper ships twice as large as the "China Clipper."

Sikorsky declares that he can begin production on a sixty-ton ship with a range of more than 4,500 miles and a speed of not less than 160 miles per hour. This permits a non-stop flight across the Atlantic in about twenty-four hours. She will carry a payload of ten per cent of her gross weight, amounting to 12,000 pounds. This figure compares favorably with the payloads of first-class steamships and railroad

in AVIATION

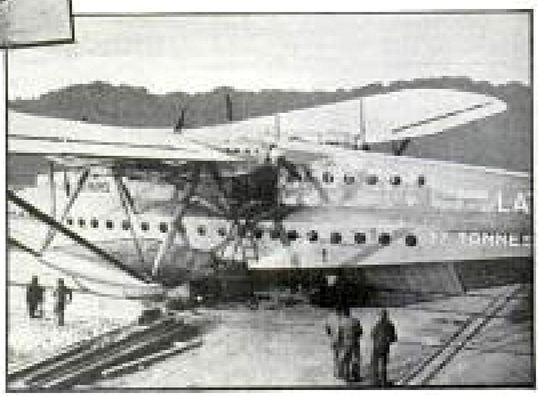


Circle, Designer Sikorsky in flying laboratory. Bottom, one of the four-motored Boeing bombers being built for U. S. army. It has 105-foot wingspread and weighs sixteen tons

trains. Sikorsky's plans provide luxurious accommodations for fifty passengers, including dining saloon, galley, smoking lounge, and luggage space.

Details of the projected superliner have been worked out carefully in Sikorsky's factory. In this double-deck transport, the dining saloon amidships will have seats for twenty people and enough room to spare for a dance floor. From the dining saloon a staircase will lead to a "flying balcony" with a bar and cocktail lounges recessed into the wings, from which one may observe the ground through windows.

One of the prime considerations in building aircraft is the factor called "wing loading." You can figure out the wing loading of an airplane if you divide its gross weight



Top, 300-mile an hour Lockheed transport, of all-metal construction. Center, giant French seaplane "Lieutenant Vaisseau" of Paris. Bottom, another view of the big seaplane, which weighs thirty-six and one-half tons, has six motors and passenger capacity of seventy-two

by its wing area. For example, if you have an airplane with a gross weight of 100,000 pounds and a wing area of 5,000 square feet, its wing loading is equal to twenty pounds per square foot.

Plainly, the weight of an airplane in the air is supported by the wings. Their efficiency depends largely on their shape and area. Naturally, the smaller the wing, the lower the air resistance. Designers have striven for years to reduce the relative dimensions of wings, and thereby increase efficiency. Aside from aerodynamic improvements, higher wing loading increases stability in flight. In other words, wing loading gives an airplane greater protection in rough air and stormy weather. This implies that air-sickness may be banished on the flights of ocean transports.

"An interesting illustration of this super-stability idea may be observed in nature," says Mr. Sikorsky. "The large ocean flying birds have a much heavier wing loading as compared to birds of similar size and weight that live on land. Because of their wing loading, ocean birds have an extraordinary ability to remain in the air for longer periods, even in stormy weather."

To show what progress has been made in wing loading we recall that only a few years ago the wing loading of transport planes was ten pounds per square foot or less. Those transports behaved like bronchos in rough air, and many a passenger came down to earth with a vow of, "Never again!" The present Douglas DC-3 transports have a wing load of twenty-four and three-tenths pounds, which gives them remarkable stability in flight. The Douglas DC-2 had a wing loading of nineteen and four-tenths pounds. The new Douglas DC-4, whose development is sponsored by the five leading American domestic air lines, most probably will have a wing loading greater than twenty-five pounds when

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Around the Corner in Aviation

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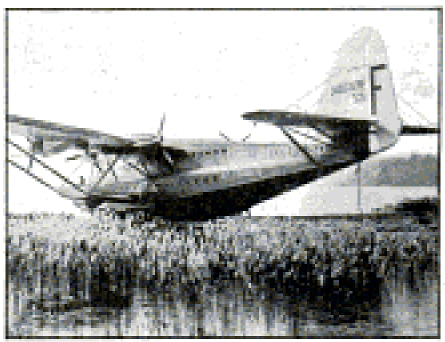
it goes into service before the end of 1937.

Sikorsky, who has done much research in wing loading, foresees that it will soon be raised up to forty pounds per square foot. Tomorrow's fifty-five and 100-ton transports may be expected to be quite stable in stormy weather.

For more than ten years aircraft engineers have been studying the possibilities for larger commercial transports. The multi-engined "DO-X" was a colossus, but did not live up to expectations. For the time being, designers have definitely receded from the idea of having as many as twelve engines. A reduction in the number of engines is now made possible by the recent increase in horsepower. Within the next five years we may see aircraft engines weighing less than one pound per horsepower. Fuel consumption will be reduced to thirty-five hundredths pound per brake horsepower per hour, as compared with fifty hundredths or forty-five hundredths pound at present. Liquid-cooled engines will also be much improved.



France's huge flying boat which is reported able to transport a load of nineteen tons

Besides the "DO-X," which has been retired from active service, another outstanding giant experimental plane was the "Maxim Gorki," built in Russia. It met with disaster when it collided with a small airplane. The largest heavier-than-air craft now operating is the "Lieutenant Vaisseau" of Paris whose gross weight loaded is 81,400 pounds. It weighs thirty-seven tons unloaded. This transport crossed the South Atlantic ocean once and

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flew north to Miami, where she capsized but was salvaged.

What is believed to be the greatest heavier-than-air craft now building is the "DO-20" under construction by the Dornier company, designers of the "DO-X." The "DO-20" is an eight-engined monoplane and will have fifty-eight tons gross weight. It is reported that Pan American Airways has contracted for six forty-one-ton clippers with the Boeing company. These will be about fifteen tons heavier than the "China Clipper," the largest flying boat constructed in America to date.

The famous "Brazilian Clipper," which set numerous flight records, weighs nineteen tons. The Douglas "DC-2" weighs about nine tons loaded.

It appears that present-day transports are pigmies compared to what can now be built with available knowledge and materials. Both Sikorsky and Martin hold that a million-pound, thousand-passenger sky transport could be built. Such a vessel could cross the Atlantic in twenty-four hours. "But," says Sikorsky, "a 500-ton ship would naturally reduce the frequency of schedules. So I do not look for such sizes. I do, however, predict land planes and flying boats of fifty to 100 tons within the next five years."

Sikorsky also foresees the boosting of speeds thirty to fifty miles an hour, establishing an ultimate practical operating speed of 200 miles an hour for flying boats and 250 miles an hour for land planes. Here again practical considerations, rather than engineering limitations, are foremost. At present, there is no good reason to have flying boats that travel five or six times faster than ocean greyhounds, or to have land planes that travel more than three or four times the speed of express trains. After 200 and 250-mile-per-hour speeds have been attained, designers would give attention to more passenger comfort. High-lift devices and smaller engines with less cooling drag will reduce operating costs and increase comfort.

Small diameter engines with wing radiators or blower cooling should enable transports to make the same speed with about thirty per cent less power. The direct operating cost per ton-mile of payload for tomorrow's airplane is figured conservatively at twenty-three cents.