Solving the Problem of Airplane Takeoffs

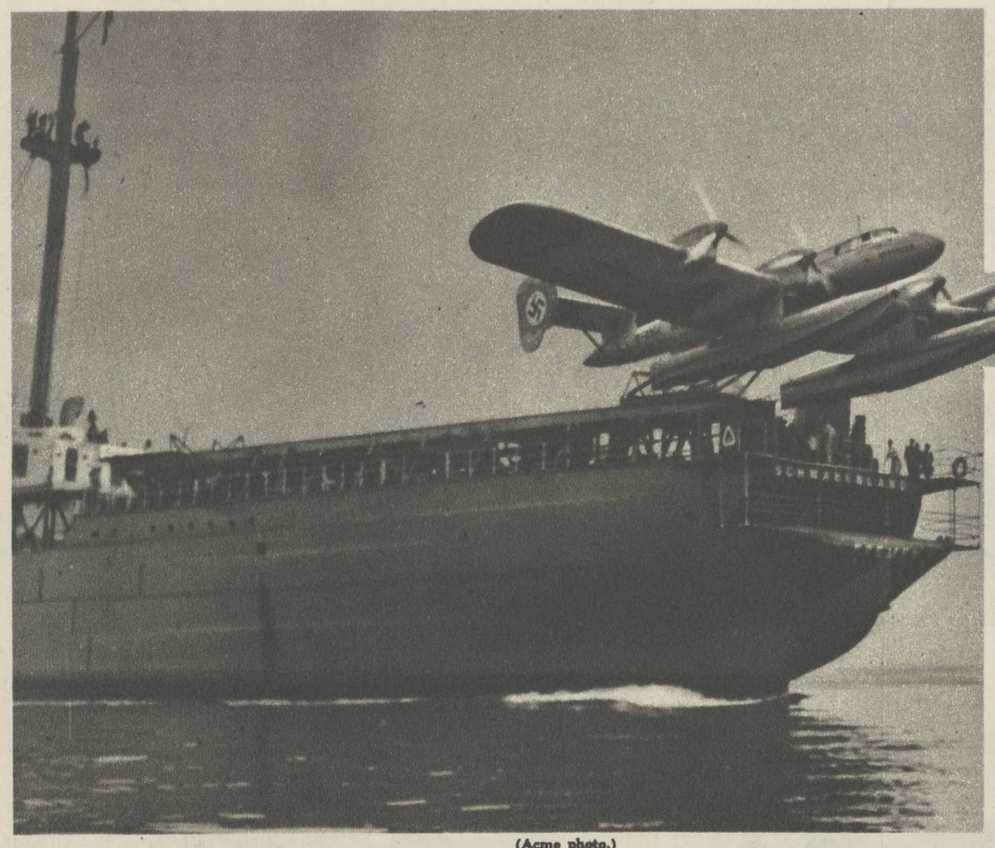
Catapulting Is Gaining in Favor

By WAYNE THOMIS

ANY airplane can fly—once it is in the air—with a heavier load than it would be able to drag off the ground or off water by its own power. This fact is causing commercial and military air officials of the world some thought.

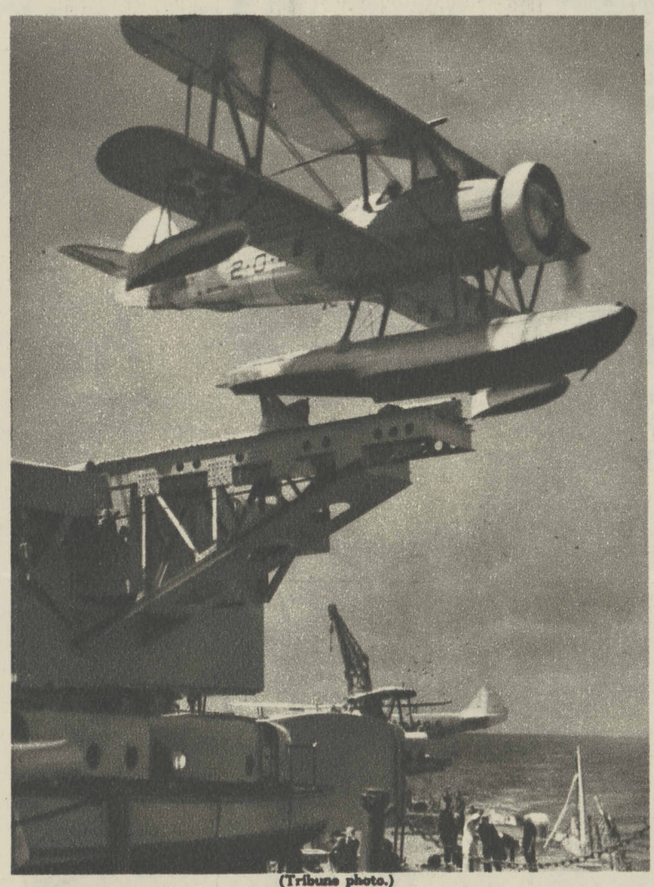
All of them are considering schemes through which an airplane loaded beyond its takeoff weight may be safely launched or through which it may be possible to load a ship, once it is in the air, with more weight of fuel or freight than it would be able to take aboard while on the ground.

Although in the last decade refueling in flight has proved successful in dozens of experimental and practical contacts between machines, most authorities believe it safer and more logical to provide some boosting force on the ground for aiding an airplane's own power plants in getting it into the air.



(Acme photo.)

Largest plane now using the catapult take-off, the German flying ship Nordmeer is launched from a base ship off Long Island.



(Tribune photo.)

Catapulting has been used for years to launch light navy planes. Here one takes off from the U. S. S. Oklahoma.

Suggestions for the boosting element have taken many forms, all of which, of course, are variations of the catapult idea. Military airplanes of relatively small size and weight have for years been shot out along a small track from the decks of cruisers and batteships. The force for this propulsion from a standstill into flight speeds within sixty feet has been compressed air.

This type of catapult, however, seems hardly practical when the size and weight of new transport planes of both land and sea types are considered. These vast ships will weigh between 60,000 and 80,000 pounds, and naturally the forces necessary to overcome inertia and drive them into motion at speeds approaching those of flight must be enormous.

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Nevertheless there are a number of engineers working on this problem at this moment, and it is to be expected that commercial passengers as well as the crews of military airplanes will in the future come to accept catapult takeoffs as merely another incident in air transportation.

Already, however, catapults for long-range commercial airplanes are in operation. The best and most conventional example of their use is found in the German Lufthansa flights across both the North and South Atlantic oceans. The Germans start all their ocean-flying boats from catapults aboard specially built mother ships stationed along the flying routes.

For the North Atlantic flights two of these steamships have been in use, one being stationed near the Azores and the other at New York City. Both the steamers are equipped with giant catapults consisting of a boom on top of which is a tiny car. The flying boat or the seaplane to be launched is placed on the car and locked there.

The boom is swung outboard or pointed over the stern of the steamer and directly into the wind. Then at a prearranged signal from the pilot, denoting that all the crew in the flying machine is prepared for the surge of power incident to the takeoff, a blast of compressed air is loosed from a tank, forcing the tiny cart and the plane from a standing start to a speed of 90 miles an hour in approximately 90 feet.

The airplane leaves the cart with its own engines at full throttle and with a speed of 90 miles an hour already gained. It is in flight, and, properly piloted, continues on to climb to its cruising altitude and begin its scheduled journey.

An idea of the size of such a catapult can be gained when it is known that the two trans-Atlantic seaplanes used by the Lufthansa pilots each weigh 18½ tons when loaded for catapulting. This is a weight of 37,000 pounds, almost that of the Sikorsky S-42 flying boats which conducted the pioneering flights across both the Pacific and Atlantic oceans.

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Why, you ask, should it be necessary for an airplane of this size to have a special boost to get into the air? Why should it not take off the water on its own power, especially since in water takeoffs the machine can run for long distances gradually gaining speed?

The economics of the thing are simple. Carrying a pay load of 880 pounds, the German seaplanes—the Nordmeer and the Nordwind—are capable of getting off the water in 30 seconds with a load of fuel corresponding to a flying range of 2,180 miles.

When they are catapulted they get into the air in about two seconds with the same pay load and a fuel load that enables them to cover 3,100 miles at a cruising speed of 156 miles an hour. The difference in the two methods of takeoff amounts to 1,000 miles in range.

Here you see the proof of the assertion that an airplane can fly with a larger load than it can pull off water. Furthermore, by using the catapult the Germans are eliminating the difficulties and dangers of a rough-water takeoff. If the seas are rough their big seaplanes can be catapulted into flight from within a harbor, where the mother steamer is in sheltered, quiet waters that may be amply large for a steamer anchorage but so cramped as to be impossible for an airplane takeoff.

On the debit side of the ledger is the fact that the machines must be made exceptionally strong to withstand the strains imposed by the sudden acceleration of catapulting. Furthermore, the seaplanes are not self-sufficient units.

For long-range operations the steamers, with their crews and the special catapult equipment, must be maintained. This represents a large investment and operations cost which is not and cannot be revenue-producing.

England's Odd "Pick-a-Back" System Makes Ocean Plane a Hitch-Hiker

The English, particularly Imperial Airways, envision an entirely different sort of catapult. Maj. R. H. Mayo, a renowned aeronautical engineer, has designed a composite aircraft which really consists of two machines to accomplish the catapult takeoff.

The Mayo craft has been dubbed the "pick-a-back" airplane, inasmuch as a large flying boat is used as the mother craft and a smaller, faster seaplane is locked on top of it. The small machine is loaded with fuel until its weight is greater than it would be able to pull off water.

The larger craft, capable of carrying a great useful load, is empty save for enough fuel to enable it to take off, climb to 5,000 feet and return to its moorings.

Locked together then, and with the pilots of the two machines communicating by telephone, the engines of each are opened up. While the motors of the smaller plane could not pull it off the water alone, aided by those of the larger plane there should be no difficulty in getting into the air.

Major Mayo plans to have the two craft stay locked together as one machine until they have climbed to 5,000 feet. Then throttling back until their speed is 100 miles an hour, the two machines are to part.

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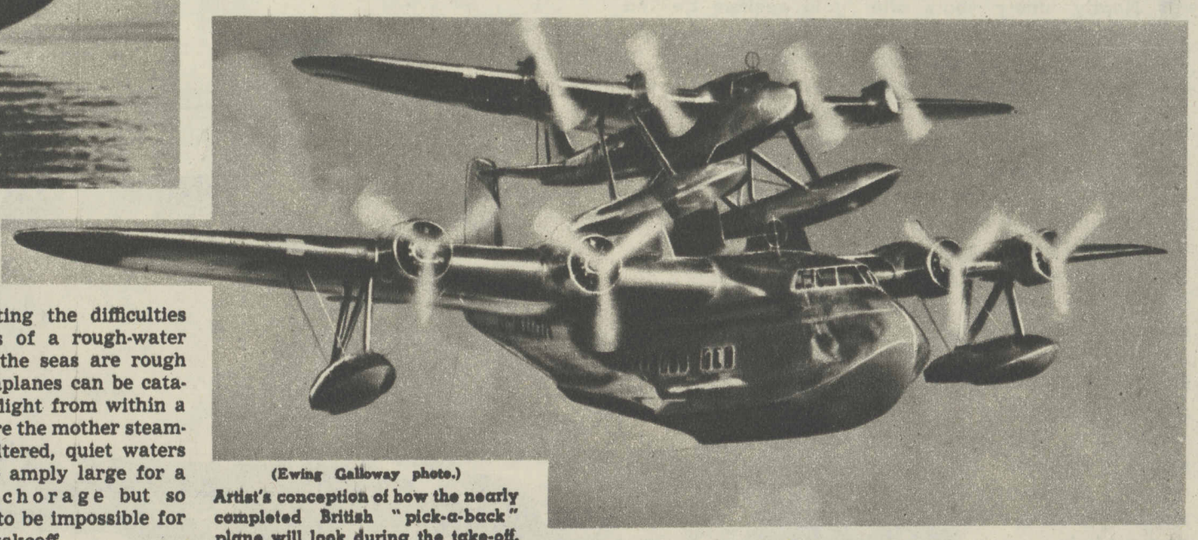
This composite craft may solve the catapult problem for the English, although there are many problems involved in its operation. There is considerable danger at the moment the two machines are parted, but Major Mayo and those employed on the project insist that they have found a way to separate them instantaneously and put a wide enough gap between them to prevent any collision after the two units are apart.



(Ewing Galloway photo.)

Artist's conception of how the nearly completed British "pick-a-back" plane will look during the take-off.

The little seaplane, as may be seen in the photograph, has four 400 horse power 16 cylinder air-cooled engines and a beautifully smooth fuselage and wings which seem to denote speed. It was designed to carry 1,000 pounds of mail or express for 3,500 miles nonstop.

Its maximum range with a direct takeoff on water probably would be less than 1,500 miles—again demonstrating the advantages to be gained from catapult takeoff. Preliminary flights indicate that its cruising speed will be 170 miles an hour at 60 per cent of full power. Top speed should be about 220 miles an hour.

Operators of American air transport lines are following carefully certain experiments being conducted by the National Advisory Committee for Aeronautics in connection with catapult takeoffs for very large land planes.

The problem with this type of ship is its relatively slow acceleration at takeoff. The N. A. C. A. has been asked to suggest some means of speeding this so that the 60,000 pound ships which are less than a year away will be able to take off out of moderate sized airports.

With this type of equipment the problem is not so much of landing them as it is of takeoff, especially out of fields with short runways. If they can be given an initial boost their own motors will carry them on to flying speed in a short time.

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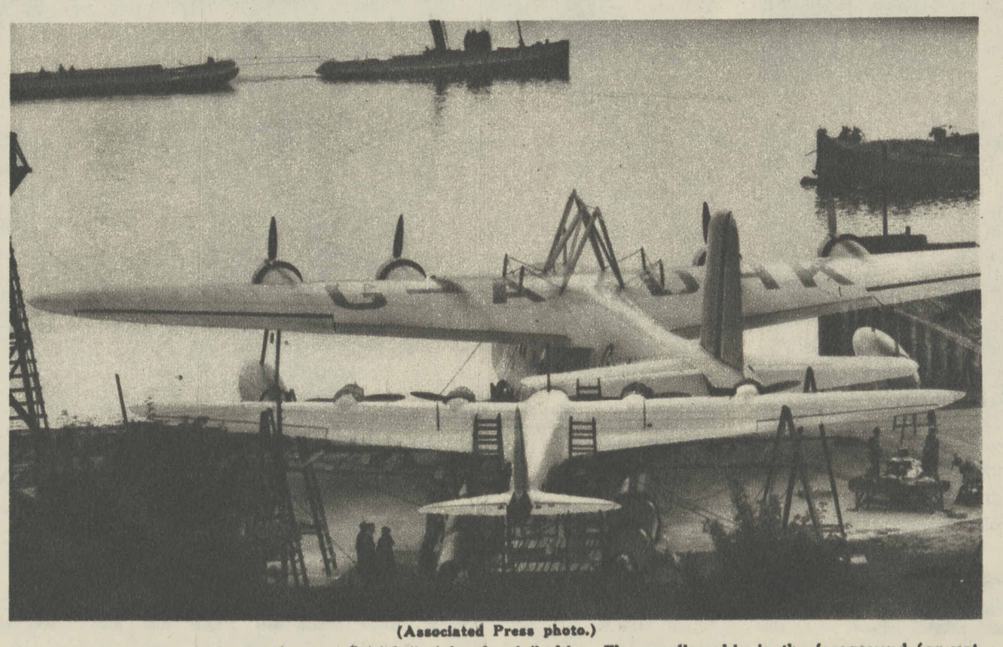
It was suggested that a small car with a powerful motor be used to help the ship on its way. The motor driven cart would help the engines of the ship, but the cart would be left behind on the ground as the big plane lifted off. It also has been suggested that an enormous flywheel which could be sunk into the ground would do the job.

A relatively small motor could gradually build up revolutions on this wheel and then the stored up energy in it could be loosened in one instant to help a large airplane get moving. The chief points of this scheme are that it would not be costly in installation or operation. If the big ships could be brought from zero to 60 miles an hour within 100 feet their own engines would carry them off the ground soon thereafter.



(Associated Press photo.)

The two planes that make up the new British "pick-a-back" ship. The smaller ship in the foreground (as yet unfinished) will ride on the framework atop the larger plane until it is 5,000 feet in the air.

(Acme photo.)

Closeup of the Nordmeer poised on the catapult, showing the construction of the launching mechanism.

The Amazing Samurai Code That Still Guides Japan

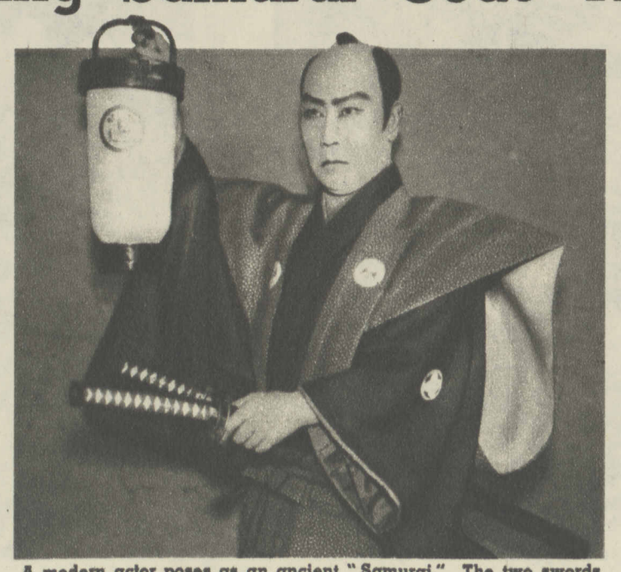
(Continued from page three.)

commits his soul and spirit into the forging and tempering of the steel."

According to an authority on the subject, "every swing of the sledge, every plunge into water, every friction on the grindstone is a religious act of no slight importance."

The courage to take life—particularly one's own—ranks extraordinarily high in Japanese public esteem. Harakiri has sometimes been translated "the happy dispatch," but the original Japanese is less euphemistic. It means "belly-cutting," and that is what the operation actually consists of. In feudal times only samurai were given the honor of committing harakiri.

There were two kinds of harakiri, obligatory and voluntary. The former was a boon granted by the government which graciously permitted criminals of the samurai class to destroy themselves instead of being beheaded by the common executioner. By thus taking his life a samurai saved his honor.



A modern actor poses as an ancient "Samurai." The two swords were the mark of that feudal class, the shorter one being for the purpose of committing "harakiri."

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Voluntary harakiri was practiced by men in hopeless trouble, or out of loyalty to a dead superior, or as a protest against what one felt to be the erroneous conduct of a superior. With rare exceptions harakiri is no longer practiced except as a form of protest, and even in this case few succeed in inflicting more than a skin wound.

Women never commit harakiri. They sometimes take their lives, but in this case it is called "junshi," which is done by cutting an artery in the throat.

The reason why harakiri is regarded as an honorable way of dying seems to be based on the theory that the spirit of man dwells in that region of the stomach rather than in the heart.

Harakiri, according to the late Dr. Inazo Nitobe, was an institution, legal and ceremonial. It was a process by which warriors could expiate their crimes, apologize for errors, escape disgrace, redeem their friends, or prove their sincerity.

The glorification of harakiri naturally offered no small temptation for its unwarranted committal. For causes entirely incompatible with reason and for reasons entirely undeserving of death, hot headed youths rushed into the act as moths fly into the flame.