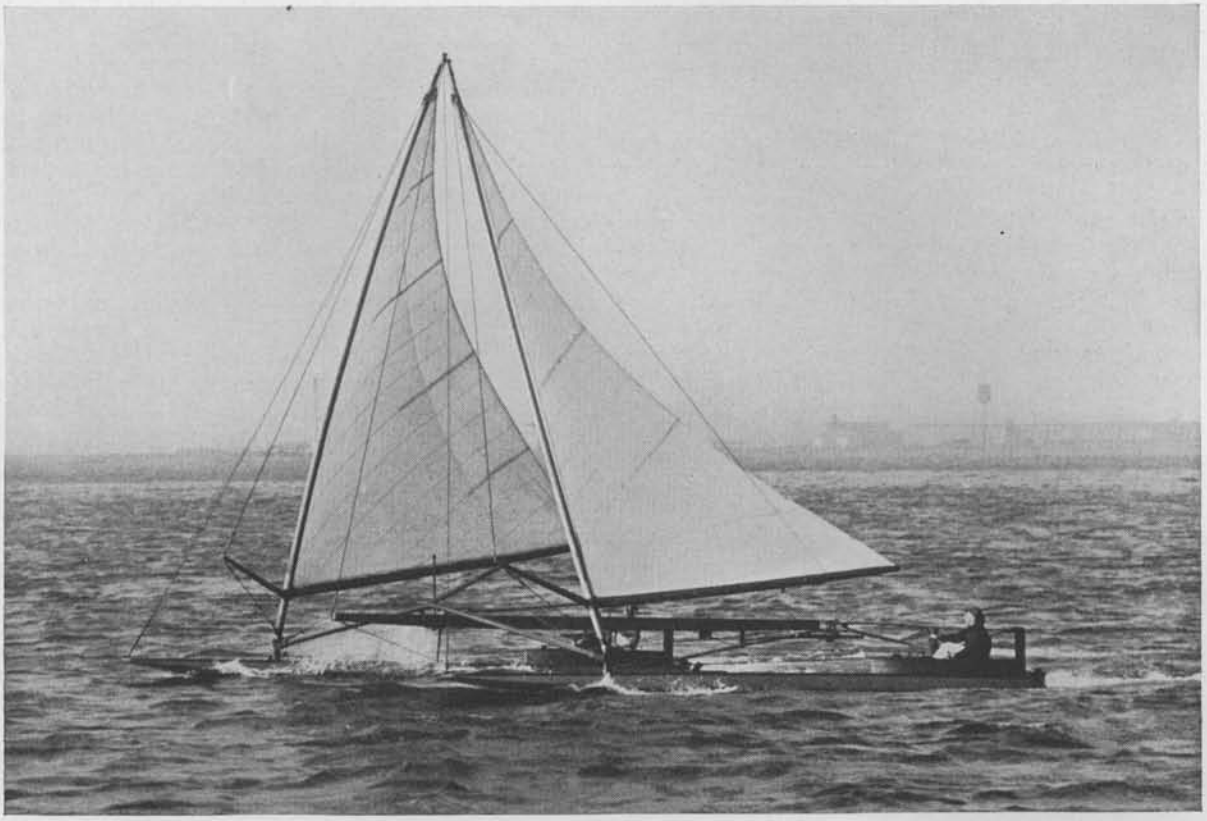

Something new in sailing craft. The Sailplane, developed by The Elco Works. She has attained a speed of better than 20 knots

The Sailplane

By

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IN the issue of YACHTING for November, 1920, an article appeared which carried this same title. The following paragraph is quoted from it: "A great deal of time, brains and money have been spent in trying to perfect and develop the heavy-ballasted type of racing boat; but are they so much better now than they were in the beginning? A little faster, perhaps, . . . We believe that these boats have been developed about to the limit, and that something new in principle and radical in design will have to be gotten up to get really high speed under sail on the water."

During the past thirteen years Marconi rigs have grown taller, Genoa jibs larger, and parachute spinnakers have blossomed and ballooned out, increasing somewhat the efficiency of the sail plan, or power plant. Hulls have been "leaned out" and refined, but our old fat friend Lead Ballast is just as heavy as he used to be, and he will always maintain the old rule-of-thumb formula, "the maximum speed equals one and one-half times the square root of the water line length." So let us back off the keel bolt nuts and let Old Man Ballast sink to Davy Jones' locker.

Quoting again from the article, "The ideal theoretical fast sailboat should be one that will stand upright and carry her sail in any breeze, have no ballast in any form and only enough displacement to float comfortably the crew, sails and rig. At first glance a catamaran would seem to answer these requirements. But we designed, built, sailed, capsized and nose-dived three different types of catamarans during a number of years, trying to make them work, even after they had been abandoned, years before, by our forefathers. They were fast reaching under certain conditions, but it was only the weight of the windward boat and the platform acting as ballast that tended to keep them from capsizing. When driven hard they would lift, catapult the crew overboard and quit for the day, with the top of the mast headed for China. It took an acre lot to tack them or to jibe in."

The boat described in that article was a 34-foot hull having beam of only about two feet at the water line, with low Marconi rig and no ballast. Lateral resistance and complete stability were obtained by planes held out on both sides by long outriggers. The planes were inclined in and down at 45 degrees, the windward plane holding down and the lee plane lifting to counteract automatically the overturning force of the wind.

This boat proved the theory that this overturning force could be counteracted by the water pressure on properly placed angled planes. With a strong beam wind and smooth water, the first Sailplane was fast, but the planes were difficult to hold in alignment and they cavitated at the surface of the water, making them very hard to drive in a seaway.

My friends and neighbors of The Elco Works, in Bayonne, were much interested in my efforts, and with their assistance another form of Sailplane was designed and built. This was a light, skimming-dish hull, with a vertical centerboard and a sail held out to leeward at an angle of 45 degrees. This sail lifted like a kite and was so placed as to cause no overturning moment; but being at such a flat angle it lifted as much as it drove the boat and was not efficient in light airs. The necessary spars to hold out the foot of the sail were cumbersome and the complicated rig necessary to shift over the sail when tacking or jibing finally caused the abandonment of the experiment.

Scrap baskets were filled with drawings and figures, and many sailing models were built and junked before the Elco-Twin-Sailplane illustrated in this article was finally perfected. This craft has two long, light hulls, each with its own sail inclined towards the center at about 30 degrees from vertical, the trucks of the two masts being joined. Each hull has a centerboard which is inclined so that it is approximately parallel to the mast of the other boat and there is *no ballast*. The two hulls are held in parallel alignment by two cross struts of equal length. These are pivoted so that either hull can be moved ahead of the other, like a parallel rule, for different points of sailing. The hulls are shifted, or skewed, by two skew lines leading diagonally, which are wound on a drum and controlled by a hand wheel (See Fig. 1).

The booms are fixed at right angles to the forward cross strut by rigid links. On the wind, the lee hull is moved ahead a little, swinging the booms to leeward to their correct trim, close hauled. When keeping-off, the lee hull is skewed further ahead until the correct trim of the sails is obtained. When sailing with the wind more than two or three points abaft the beam the lee sail commences to be blanketed by the weather sail and both booms are then swung forward nearly parallel to the forward cross strut and held by means of fixed sheets. The booms are kept in this position for a broad reach or before the wind, and the sails, acting like a squaresail, are not jibed when going from one free reach to the other. When the sails are in this running position their angle is about 10 degrees from vertical, so there is a substantial lift on the bow. When running before the wind the centerboards are raised as their stabilizing effect is not then required.

When tacking, jibing or changing course, the sails are trimmed entirely by turning the "skew wheel" and practically no effort is required. When luffing from a beam wind to by-the-wind, the helm is put down a little and no power is needed on the skew wheel to drop back the lee hull and so trim the sails. There are no backstays, sheets, etc., to handle except the fixed sheets which are used when the booms are "winged out."

In this boat the centers of effort and inclination of the sails, the center of lateral resistance and inclination of centerboards, and the distance apart of the two hulls, have all been figured to give complete stability without consideration of the hull's displacement (See Fig. 2). There is no tendency to lift the weather hull or bury the lee hull. In other words, the wind pressure on the inclined sails is exactly balanced by the water pressure on the inclined centerboards for all points of sailing except when the wind is aft, and the only function of the hulls is to hold and float the centerboards, the rig and the crew.

The cross struts are pivoted to the hulls in such a way as to prevent the hulls from rolling and still allow them individually to pitch freely. When sailing in a seaway there is very little motion to the spars and rig, as they take the average motion of the two hulls.

The comments of those who have sailed this Elco-Twin were interesting. Each one has remarked, first, on the thrill of real speed — well over 20 miles having actually been logged. Second, they speak of the ease of handling the craft — a little helm, a turn on the skew drum, and she's about, each hull turning on its own center. "Not at all," they say, "like a catamaran which has to turn on the common center of the two hulls!" Then they always exclaim over the fact that her way can be stopped and you can sail her astern without changing her heading. The fixed booms are, of course, the explanation of this fact. And last, they always comment on the boat's very apparent seaworthiness. When other sailboats are lying over on their beam ends, burying, rooting and griping in a strong breeze, the Sailplane *moves*, straight ahead, stands upright and "takes it" without any of these faults. It would seem that her only limitations are the strength of the rig and the force of the wind.

While it is difficult to forecast the ultimate use to which this new principle may be put, it seems obvious that the speed, safety and handiness of the Sailplane should make it ideal for a small racing class, and we may soon hear the call of "Ready about!" entirely drowned out by a chorus of "Hard askew!" from a fleet of hard-driven Sailplanes.

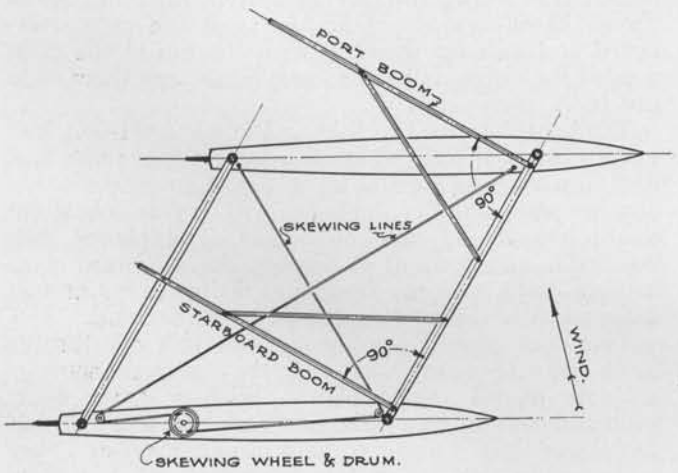

Figure 1. Showing method of trimming sails

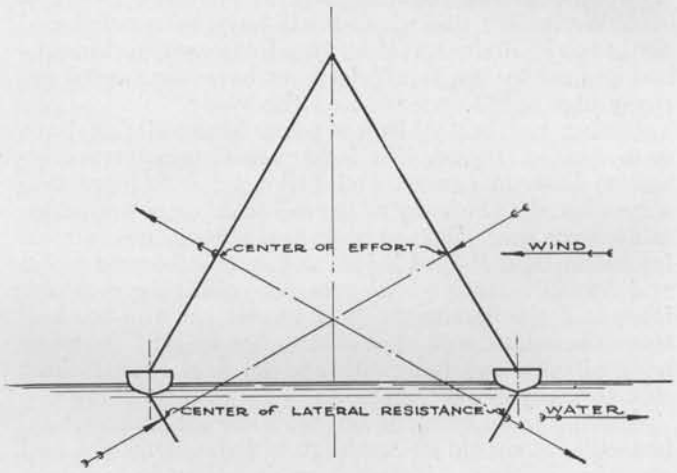

Figure 2. Principle of the Sailplane