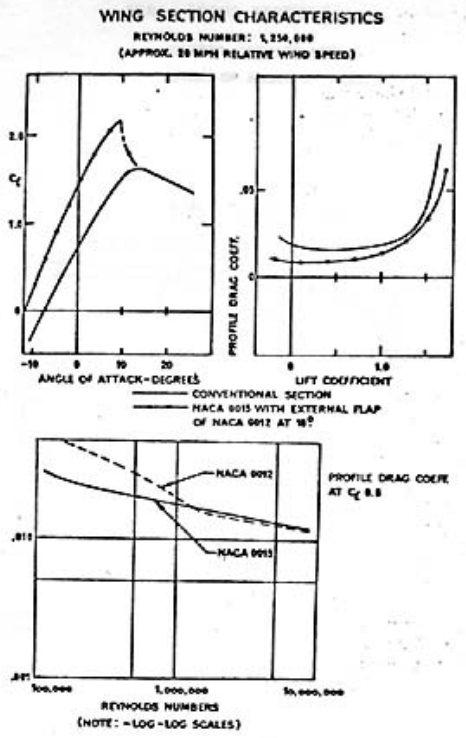

Fig. 6

reach. It should be particularly noted that the maximum lift coefficient of a simple aerofoil is about 1.8, regardless of cross section or camber.

It is very good at the low speed end of the scale but does not increase as the wind speed increases. For windward work this is not a serious problem as the total lift that can be developed is proportional to the square of the wind speed and hence the actual forces on the rig soon increase to more than the crew can handle anyway, but it is a limiting factor in the ultimate performance of this type of rig off the wind. However, the potential of the type of section with the external aerofoil flap, is obvious from the curves showing the lift available with different flap deflections. Quite obviously this type of aerofoil has far more potential for high racing performance in wind speeds of 16 km/h (10 mph) and over, but there is a range between 6.4 and 13 km (4 and 8 mph) in which the flap angle setting of the Miss Nylex type of rig is very critical. Not only that, the tendency of the main wing section to stall is so pronounced at these very low speeds that if the air flow is disturbed when the boat moves around in a choppy water, early stall can be precipitated. This is the characteristic of a boat which has been widely discussed and was particularly evident during the 1976 match against America. It is at least rewarding to us to know that we were able to foresee it so long ago.

HULL DESIGN

The hulls are relatively conventional for a 'C' class catamaran and it is therefore unnecesarry to spend too much time in describing how they were designed, but to illustrate the state of the art in this area we shall look at two illustrations. In (Fig. 8) I have shown the wetted surface area of different types of hull section. These are taken through the hull at the point of maximum fullness. I have chosen to illustrate the wetted surface area as a primary requirement because in the main range of sailing speeds the hydrodynamic friction on the hull causes about 2/3rds of the total resistance. Wave making resistance accounts for about 1/3rd of the total. When a catamaran is sailing over a wide range of wind speeds, its attitude on the water can vary from having both hulls almost equally immersed, to having one hull completely clear of the water and the whole of the weight of the boat carried on the other hull. As can be seen from these curves there is a big difference in the wetted surface area between different sections. Sections 1, 2 and 3 have wetted surface areas

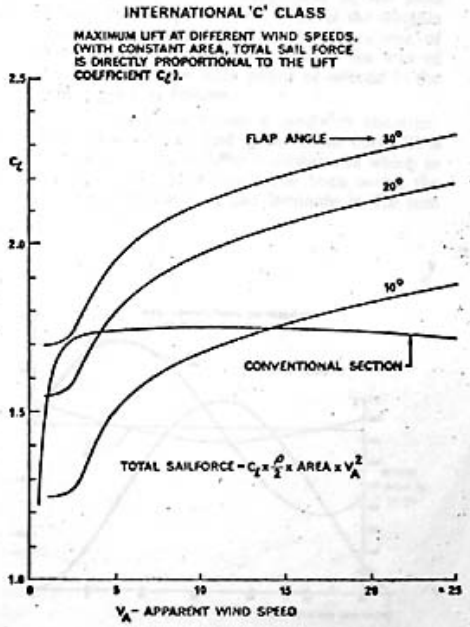

Fig. 7