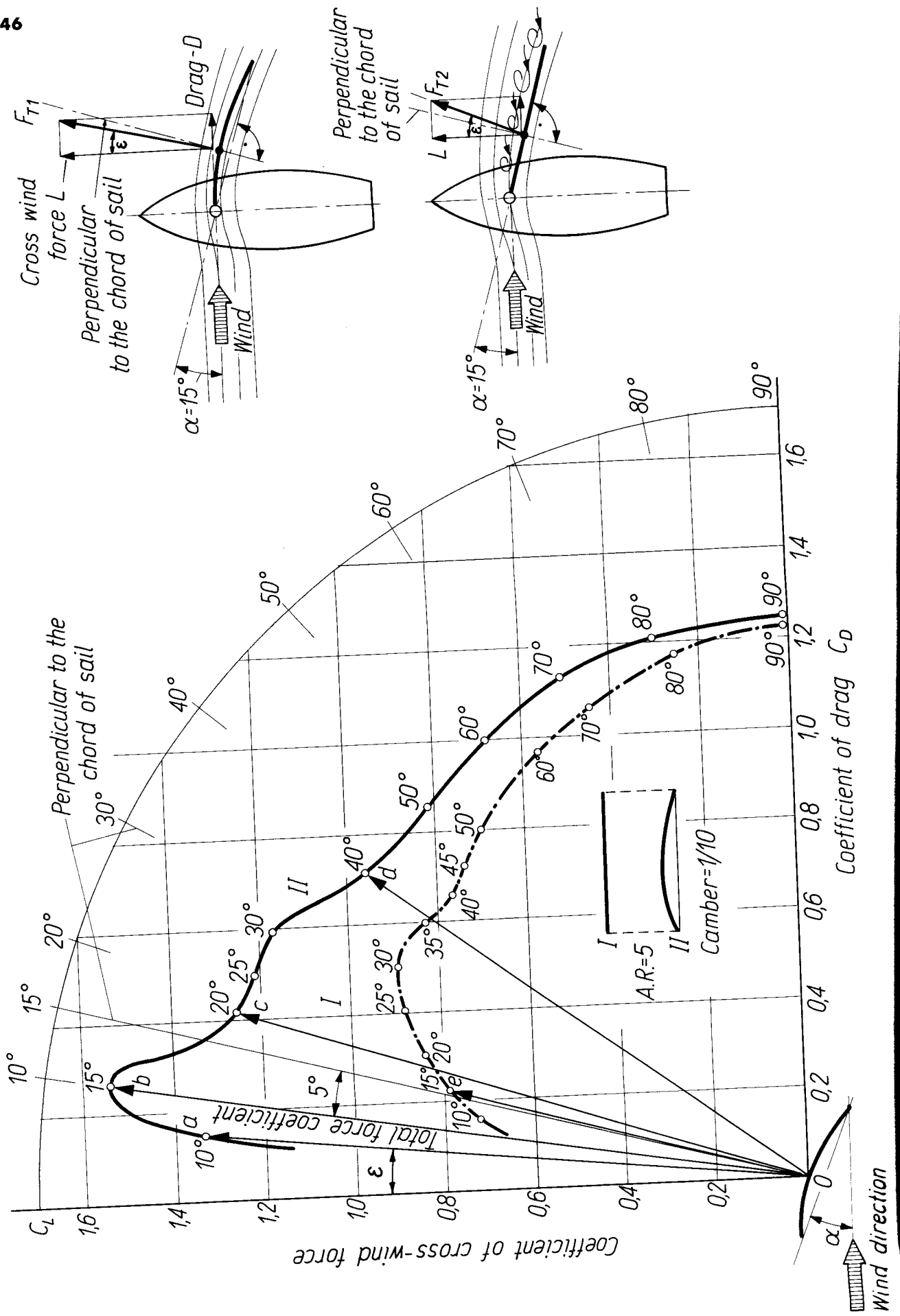


Fig. 46



conveyed in a more concise manner in Fig. 46 by the two lines Ob and Oe. The perpendiculars to the sail chord are drawn as radii from O to the outer circular arc, bearing in mind that the wind direction lies along the horizontal C_D axis.

The great differences between Curves I and II can be largely attributed to the different flows over the leeward sides, as a result of the curvature. With the perfectly flat sail, the flow finds it impossible to travel smoothly round the leading edge of the sail, and so separates, covering the lee side of the sail with eddies. One effect of camber is to introduce the leading edge more gradually into the flow, which in consequence does not separate. Instead, it passes smoothly round the lee side, accelerating as it is constricted, giving rise to a large suction. At greater angles of incidence, when the flow separates over most of the cambered sail also, the differences between the two sails tends to disappear. At an angle of incidence $\alpha = 90^\circ$, corresponding to sailing on a run, the difference is so slight as to be negligible. At this high angle of incidence, the total sail force depends a lot less on the lee-side suction forces than on the lesser angles of incidence. The foregoing remarks explain why a perfectly flat sail is bad. Later the disadvantages of too large a camber will also be explained.

In Fig. 46 we will now consider the total force coefficients Oa, Ob, Oc, and Od at the respective angles of incidence $\alpha = 10^\circ, 15^\circ, 20^\circ,$ and 40° . If these results are translated in terms of actual sailing on a reach, as in Fig. 47, we can clearly

Fig. 47

