For a rectangular section 4in. × 2in., loaded diagonally, the worst stress is across a plane at 17° to the axis, and is about 5% higher than the stress across the narrowest way. For any direction of loading, there is one plane of no shear stress, which does not coincide with the plane of loading unless it is an axis or a diagonal.

For a square section loaded diagonally, the worst stress is at 23° to the other diagonal and is about 6% higher than the stress across the narrowest way.

For the upright I section, 4in. × 2in., web and flanges ½in., with small values of the inclination α of the shear force to the vertical, the worst stress is very nearly the same as that across the middle of the web. As α increases, there is also considerable shear tending to cut off one flange at the root. The maxima of the two types are equal with $\alpha = 33°$. For a given shear force the worst possible shear stress is with $\alpha = 76°$, and occurs across the flange at $7\frac{1}{2}°$ to the vertical. It is 11% higher than that across the web in vertical loading and 4% higher than that across the flange in horizontal loading.

For the aeroplane wing considered, the component shears at any point are

$$-dM_y/dx, \quad -dM_z/dx,$$

which are found to be at A,

$$R'_A, \quad r'_A(1 - P^2/I_yI_z) + R'_AP/I_z,$$

omitting terms due to difference of fixing moments, we have the approximations

$$R'_A = W'l, \quad r'_A = \tfrac{1}{2}w'l.$$

Taking into account only the lift on the front spar, then with solid staggered spars the worst shear stress is 9% higher than for the rectangular section and occurs at $23\frac{1}{2}°$ to the horizontal. For the spindled section the corresponding figures are 16% and $32\frac{1}{2}°$. The shear across the flange is not considerable for normal conditions of loading.

The author's thanks are due to Miss H. M. Lyon, who has kindly verified these results.

CORRESPONDENCE.

To the Editor of the AERONAUTICAL JOURNAL.

SIR,—In Mr. Ritchie's interesting article on the effect of atmospheric pressure and density, there is one statement which requires correction.

It occurs on page 449, and is to the effect that the boiling point of water falls off approximately 5° F. for each 8,000ft. increase in height. It decreases very much faster than this, the actual rate being 1° F. in 535.5ft.

For further details see my "Notes on the Variation of Atmospheric Conditions with Altitude," published by the Munitions Inventions Department in 1919, and obtainable at H.M. Stationery Office for the modest sum of 6d.—Yours faithfully,

C. F. DENDY MARSHALL.