c. Problem and solution.

(1) *Problem.*—An airship of 195,000-cubic-foot capacity is to be equipped with two engines developing a total of 300 horsepower. What speed can be expected using the following data?

(*a*) Standard atmospheric density.

(*b*) Shape coefficient, C_D is 0.0136.

(*c*) Propeller efficiency, E, is 60 percent.

(*d*) Envelope resistance is 40 percent of total resistance of completely rigged airship.

(2) *Solution.*—Using Prandtl coefficient.

$$v=\left(\frac{300\times550\times0.60\times0.40}{0.0136\times0.00237\times3{,}376.4}\right)^{0.85}$$

$$=88.4 \text{ feet per second}=60.3 \text{ miles per hour.}$$

d. Experience has shown the lower figure, as determined by Prandtl coefficients, to be more generally correct than the higher figure as determined by the Burgess formula.

21. Summary.—*a.* From study of the formulas it appears that the speed of an airship is proportional to the cube root of the horsepower, or vice versa the horsepower varies directly as the cube of the speed. Since power plant weights vary directly as the horsepower, the weight of the power plant varies also as the cube of the speed. A point is readily reached therefore beyond which it is not economical to increase the speed due to the excessive weights involved.

b. In still air the higher the speed the less economical the fuel consumption and the shorter the radius of action. This is not true when the airship is traveling against adverse winds. The study of just which air speed is the most economical will not be discussed in this manual as it properly belongs to the subject of navigation.

SECTION IV

STABILITY

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