TABLE 35. DEFLECTIONS AND BENDING MOMENTS IN A UNIFORMLY LOADED RECTANGULAR PLATE WITH BUILT-IN EDGES (FIG. 91)

$\nu = 0.3$

b/a	$(w)_{x=0,y=0}$	$(M_x)_{x=a/2,y=0}$	$(M_y)_{x=0,y=b/2}$	$(M_x)_{x=0,y=0}$	$(M_y)_{x=0,y=0}$
1.0	$0.00126qa^4/D$	$-0.0513qa^2$	$-0.0513qa^2$	$0.0231qa^2$	$0.0231qa^2$
1.1	$0.00150qa^4/D$	$-0.0581qa^2$	$-0.0538qa^2$	$0.0264qa^2$	$0.0231qa^2$
1.2	$0.00172qa^4/D$	$-0.0639qa^2$	$-0.0554qa^2$	$0.0299qa^2$	$0.0228qa^2$
1.3	$0.00191qa^4/D$	$-0.0687qa^2$	$-0.0563qa^2$	$0.0327qa^2$	$0.0222qa^2$
1.4	$0.00207qa^4/D$	$-0.0726qa^2$	$-0.0568qa^2$	$0.0349qa^2$	$0.0212qa^2$
1.5	$0.00220qa^4/D$	$-0.0757qa^2$	$-0.0570qa^2$	$0.0368qa^2$	$0.0203qa^2$
1.6	$0.00230qa^4/D$	$-0.0780qa^2$	$-0.0571qa^2$	$0.0381qa^2$	$0.0193qa^2$
1.7	$0.00238qa^4/D$	$-0.0799qa^2$	$-0.0571qa^2$	$0.0392qa^2$	$0.0182qa^2$
1.8	$0.00245qa^4/D$	$-0.0812qa^2$	$-0.0571qa^2$	$0.0401qa^2$	$0.0174qa^2$
1.9	$0.00249qa^4/D$	$-0.0822qa^2$	$-0.0571qa^2$	$0.0407qa^2$	$0.0165qa^2$
2.0	$0.00254qa^4/D$	$-0.0829qa^2$	$-0.0571qa^2$	$0.0412qa^2$	$0.0158qa^2$
∞	$0.00260qa^4/D$	$-0.0833qa^2$	$-0.0571qa^2$	$0.0417qa^2$	$0.0125qa^2$

the edges $y = \pm b/2$. For the center of the plate ($x = y = 0$) this deflection is

$$(w_1)_{x=y=0} = \frac{a^2}{2\pi^2 D} \sum_{m=1,3,5,\ldots}^{\infty} E_m(-1)^{(m-1)/2} \frac{\alpha_m \tanh \alpha_m}{m^2 \cosh \alpha_m} = -0.00140 \frac{qa^4}{D}$$

Doubling this result, to take into account the action of the moments distributed along the sides $x = \pm a/2$, and adding to the deflection of the simply supported square plate (Table 8), we obtain for the deflection at the center of a uniformly loaded square plate with clamped edges

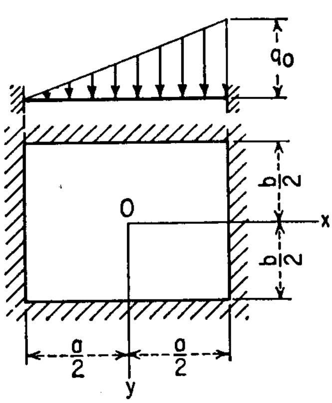

FIG. 92

$$(w)_{\max} = (0.00406 - 0.00280) \frac{qa^4}{D} = 0.00126 \frac{qa^4}{D} \tag{q}$$

Similar calculations can be made for any ratio of the sides of a rectangular plate. The results of these calculations are given in Table 35.[1]

Plates under Hydrostatic Pressure. Representing the intensity of the pressure distributed according to Fig. 92 in the form

[1] The table was calculated by T. H. Evans; see *J. Appl. Mechanics*, vol. 6, p. A-7, 1939.