methods, is a fertile field for further developments of this type in other problems.

In connection with question (c), while the modulus of foundation used here is an integrated one over the wall thickness and is of different form from that used for thin-walled tubes thus departing somewhat from the simple theory, the general procedure applied is not at all unlike that for the simple bar-on-an-elastic-foundation analysis.

Deflections and Moments of a Rectangular Plate Clamped on all Edges and Under Hydrostatic Pressure[1]

H. D. Conway.[2] The author has presented an interesting study of a problem which has considerable practical importance. This is particularly so in the case of the design of ships, floating docks, and the like.

Although the limitations of the theory are not stated in the paper, the data presented are obtained from the Lagrange differential equation and, as such, neglect the stretching of the plate which will occur as the plate bends. Therefore it is only applicable to cases in which the deflections are very small. A more exact solution using von Kármán's equations would be a much more difficult problem. The practical difficulty of obtaining an edge condition which approaches the theoretical clamped edge should also be borne in mind. It is anticipated by the writer that the work was carried out for plating which was continuous over longitudinal and lateral frames so that the slopes at the middle of the frames would, from symmetry, be zero. While, undoubtedly, this would be so, the frames would have to be of finite width and there would still be slope at what constituted the edge of the plate. Bearing these points in mind and using a considerable amount of discretion, the data should be of very real help to designers.

Young[3] has also investigated the problem for plates in which the ratios of the plates sides are $^1/_2$, $^2/_3$, 1, $1^1/_2$, and ∞. Therefore it is of interest to compare the results obtained by the two investigators for the case of a square plate. The notation of Odley is used and Poisson's ratio assumed to be 0.3:

$M_x(\xi = 0, n = 0.5)$		$M_x(\xi = 1, n = 0.5)$		$M_y(\xi = 0, n = 1)$	
Odley	Young	Odley	Young	Odley	Young
0.0117	0.0115	—0.02719	—0.0257	—0.03942	—0.0334

Moments = coefficients $\times\ q_0a^2$

It is observed that, although the results in the first columns agree very well, there is considerable discrepancy between the other results. Professor Young's results were obtained from the series method and the author's from the Marcus method. The author's statement that the latter method gives the higher moment values is thus borne out.

Author's Closure

The author agrees with Mr. Conway's statement that the practical difficulty of obtaining an edge condition which approaches the clamped edge, should be borne in mind by the designer. Boundary conditions assumed in design are never fully realized in actuality and the designer must always exercise judgment in his assumptions.

[1] By E. G. Odley, published in the December, 1947, issue of the Journal of Applied Mechanics, Trans. ASME, vol. 69, p. A-289.

[2] Associate Professor of Mechanical Engineering, Cornell University, Ithaca, N. Y.

[3] "Analysis of Clamped Rectangular Plates," by Dana Young, Journal of Applied Mechanics, Trans. ASME, vol. 62, 1940, p. A-139.

The Mechanics and Thermodynamics of Steady One-Dimensional Gas Flow[1]

G. M. Dusinberre.[2] There are a few expressions in this excellent paper which seem to the writer to need clarifying.

Gases with the properties prescribed by the authors have long been characterized as "perfect." What distinction is implied in the term "semi-perfect?"

The statement is made: "When the initial Mach number is subsonic, the solution with $\mathsf{M}_2 > 1$ is usually not realizable because it would violate the second law of thermodynamics." This might mean: (a) " . . . . the solution with $\mathsf{M}_2 <|$ would violate the second law of thermodynamics. Hence it is usually not realizable." Or it might mean: (b) ". . . . the solution with $\mathsf{M}_2 > 1$ will usually violate the second law of thermodynamics. In these cases it is not realizable." Which represents the authors' meaning, or is there some third interpretation?

Then there is the statement: " . . . . it is probable that deflagration violates the second law of thermodynamics." If this is to be taken literally, it is a considerably more astonishing conclusion than the authors' estimates of velocity and pressure associated with an atomic explosion.

N. A. Hall.[3] With the unusual increase in engineering need for thorough analysis of gas flow under conditions where a combination of compressibility, friction, and heat-transfer effects occurs, it has been clear that a systematic treatment of one-dimensional flow processes should be available in the literature. This discussion admirably fills the gap. There is no question but that this analysis will become a standard reference for much work in gas dynamics.

It is believed, however, that a few points may be profitably amplified. The authors have deliberately omitted any reference to units and at the same time have omitted the familiar conversion factors g and J. While this is a wholly legitimate procedure, some explanation is in order to avoid the misuse of the formulas by those unaware of the possibility of this technique.

In several places reference is made to stagnation temperature and pressure, but in almost all cases this is done only for constant specific heat and molecular weight. In the case where these quantities are variable, stagnation enthalpy h_0, is defined by

$$h_0 = h + V^2/2$$

stagnation temperature, T_0, by

$$\int_T^{T_0} c_p\, dT = V^2/2$$

and stagnation pressure, P_0, by

$$\int_P^{P_0} \frac{\overline{R}}{W}\frac{dp}{p} = \int_T^{T_0} c_p \frac{dT}{T}$$

These may be applied in the same manner as those used by the authors, and, in fact, the same formulas may be used, provided suitable mean specific heats and molecular weights are obtained.

[1] By A. H. Shapiro and W. R. Hawthorne, published in the December, 1947, issue of the Journal of Applied Mechanics, Trans. ASME, vol. 69, p. A-317.

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