Addendum

"Laminar Free Convection Over Two-Dimensional and Axisymmetric Bodies of Arbitrary Contour," by F. N. Lin and B. T. Chao, JOURNAL OF HEAT TRANSFER, TRANS. ASME, Series C, Vol. 96, 1974, pp. 435–442.

In the above referenced paper, we made a comparison of the local heat transfer results calculated by our procedure for isothermal, horizontal circular cylinders in air with those obtained by the Görtler-type series developed by Saville and Churchill.[1] The comparison was not as satisfactory as that obtained for the Blasius-type series. Recently, we re-examined the analysis of Saville and Churchill and discovered two sources of errors that could be held responsible for the discrepancy. It is the purpose of this letter to make these errors known to our readers.

(*a*) Equation (17) of the Saville-Churchill paper should read:

$$K(\xi) = \frac{3}{4} - 2\sqrt{2}\left(\frac{3}{40}\right)\left(\frac{64}{27}\right)^{1/2}\xi^{3/2} + \ldots$$

The factor $2\sqrt{2}$ was inadvertently left out.

(*b*) The expression for $T'(o)$ given on p. 397 should read:

$$T_1'(o) = +0.03226\,K_1$$

instead of

$$T_1'(o) = -0.03226\,K_1.$$

When these errors are corrected, the numerical data listed in Table 1 and under the heading "Görtler-type Series" of our paper become:

ϕ, deg.	1st Term	2nd Term	Sum ($Nu/Gr^{1/4}$)
0	0.4402	0.0000	0.4402
10	0.4396	0.0001	0.4397
20	0.4376	0.0004	0.4380
30	0.4343	0.0008	0.4351
40	0.4295	0.0013	0.4308
50	0.4234	0.0020	0.4254
60	0.4158	0.0029	0.4187
70	0.4068	0.0037	0.4105
80	0.3963	0.0047	0.4010
90	0.3842	0.0056	0.3898
100	0.3703	0.0066	0.3769
110	0.3546	0.0074	0.3620
120	0.3367	0.0082	0.3449
130	0.3163	0.0088	0.3251
140	0.2928	0.0091	0.3019
150	0.2649	0.0091	0.2740

The "2nd Term" results differ from those originally listed not only in magnitude but, more importantly, also in sign. The corrected sum ($Nu/Gr^{1/4}$) now compares more favorably with our result.

[1] Saville, D. A., and Churchill, S. W., "Laminar Free Convection in Boundary Layers Near Horizontal Cylinders and Vertical Axisymmetric Bodies," *Journal of Fluid Mechanics*, Vol. 29, 1967, pp. 391–399.