LETTER TO THE EDITOR

To the Editor:

The numerical work of Wang and Andrews (May, 1995, p. 1071) is a very worthwhile addition to the literature on a most difficult fluid-mechanical problem. Several comments, however, may be appropriate and may stimulate a response from the authors that will be helpful to the readers.

- The article failed to reference the comprehensive review by Nandakumar and Masliyah (1986) and thereby overlooked a number of other experimental and computational papers on square helical ducts.

- They credit the derivation of their Eq. 12 to Ward-Smith although it was previously derived by many others as far back as St. Venant (1855).

- λ is defined differently on p. 1076 and in the Notation section.

- The legends of the figures are somewhat difficult to decipher. The captions of Figures 7, 8 and 12 are in part in very small print and in computerese. RCS, RhR, and VPO in Figures 9, 10 and 11 are not defined. The abscissa of Figure 11 is presumably $d\phi/d\theta$ rather than dP/dO. C_s is undefined (except in context) although numerical values are given in the text. One must search through the text to find that 'NUM.DAT' refers to the simulation of the current article, that 'EXP.DAT' refers to the experimental results of Huang and Gu, and that $De = Re\sqrt{\lambda}$, since the latter is not included in Notation. Even then, the definition of λ remains uncertain.

Literature cited

Nandakumar K., and J. H. Masliyah, "Swirling Flow and Heat Transfer in Coiled and Twisted Pipes," *Advances in Thermal Processes*, Vol. IV, A. S. Mujumdar and R. A. Mashelkar, eds., Wiley Eastern, New Delhi, p. 49 (1986).

de Saint-Venant, B., "Mémoire sur la Torsion des Prismes, avec des Considérations sur leur Flexion, ainsi que sur l'Equilibre Intérieur des Solides Élastiques en Genéral, et des Formules Practiques pour le Calcul de leur Résistance a Divers Efforts s'Exercant Simultanement," *Mémoires des Savants Étrangers*, Vol. 14, p. 233, Paris (1855).

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BOOK REVIEWS

Electrochemical Process Engineering

By F. Goodridge and K. Scott, Plenum Press, New York, 1995, 312 pp., $59.50.

A First Course in Electrochemical Engineering

By Frank Walsh, Electrochemical Consultancy, Hants, England, 1993, 381 pp., $45.00.

These two books are both primers in electrochemical engineering, developing from basic principles the tools necessary to design processes that include electrochemical reactors. Both are aimed at technical people who are familiar with typical chemical processing, but totally unskilled in electrochemistry. Both limit the discussion to electrochemical synthesis, deliberately excluding such electrochemical processes as fuel cells, batteries, electrowinning and electromachining. There the similarity ends for the most part.

Electrochemical Process Engineering begins with the caveat that, not being a textbook, it will have little descriptive matter about industrial practice. Yet it is a textbook in that it explores the principles of the subject in its development. The authors point out that electrochemistry is still the "Cinderella" of reaction techniques, not appreciated by the mainstream process engineers. It is well constructed and sticks to its main objective of a systematic procedure for design of processes including an electrochemical step. They stress that mathematical models can be used with a minimum of bench-scale experimentation and comment that: "Many supposedly engineering papers have reported results of synthetic processes using electrolytic cells a few square centimeters in surface area. Such results cannot be safely applied to process design." They propose use of simple glass cells or rotating-disk experiments to find the fundamental kinetic constants and then use reactor models and mass-transfer correlations in the design of pilot-scale equipment. Their plan is outlined in their Figure 1.1. They contrast this plan with one that uses a bench-scale cell with a factorial-type approach of changing process variables.

Chapter 1 contains some basic electrochemistry, the relationship between stoichiometry and current, the components of cell voltage, and the voltage distribution in a simple cell, a useful diagram missing from many other similar texts. The "exchange current density" is introduced here, but without develop-