CEP Chemical Engineering Progress

AIChE American Institute of Chemical Engineers

Three Park Avenue
New York, NY
10016-5991
www.aiche.org

EDITOR-IN-CHIEF
Cynthia F. Mascone
(212) 591-7343
cyntm@aiche.org

SENIOR EDITOR
Joanna Ziemlewski
(212) 591-7206
joanz@aiche.org

ASSISTANT EDITORS
Gordon Ellis
(212) 591-7107
gorde@aiche.org
Matt McKeon-Slattery
(212) 591-7317
mattm@aiche.org

CONTRIBUTING EDITORS
Suzanne Shelley
suzanneashelley@yahoo.com
Terry McMahon
mcmahontec135@aol.com
William A. Shirley
envtllaw@charter.net
M. Henry Heines
mhheines@townsend.com

PRODUCTION COORDINATOR
Karen Simpson
(212) 591-7337
kares@aiche.org

ART & DESIGN
Paula Angarita
(212) 591-7069
paula@aiche.org

BPA INTERNATIONAL

AIChE
GENERAL INQUIRIES
1-800-AIChemE
(1-800-242-4363)
MEETINGS & EXPOSITIONS
(212) 591-7324
MEMBER ACTIVITIES & SERVICES
(212) 591-7329

EXECUTIVE DIRECTOR
John A. Sofranko
johns@aiche.org

GROUP PUBLISHER
Stephen R. Smith
steps@aiche.org

EDITORIAL ADVISORY BOARD
Joseph S. Alford
Automation Consulting Services
Andre Da Costa
Chevron
David E. Gushee
Congressional Research Service (ret.)
Dennis C. Hendershot
CCPS Consultant
Loraine A. Huchler
MarTech Systems
Marc Karell
Environmental Resources Management
Michael J. Misovich
Hope College
May Shek
Shell
Gavin P. Towler
UOP LLC
Bruce Vaughen
Cabot Corp.

One is Ag and the Other's Au

When I was a Girl Scout, we sang a song called "Make New Friends" that went like this:

Make new friends
But keep the old
One is silver
And the other's gold.

As children, we thought of friends as people, or perhaps a pet or an imaginary companion. As adult baby-boomers, when we get a new camera phone or GPS system or laptop with Vista, we might be heard muttering the tongue-in-cheek mantra "technology is my friend."

As engineers, technology is indeed our friend. This issue of *CEP* can help you make new technology friends while keeping in touch with the old.

The cover story deals with a technology that's older than chemical engineering itself — distillation. In "Effects of Design on Tray Efficiency in Commercial Towers" (pp. 39–47), Henry Kister presents an analysis of data recently released by Fractionation Research, Inc., and quantitatively defines the effects of tower geometry — flow path length, fractional hole area, hole diameter, and weir height — on overall tray efficiency.

For as long as chemical engineers have been specifying process equipment, we have been concerned with materials of construction — from metals forged from natural ores to synthetic plastics and advanced composites. "Choose the Right Elastomer," by William M. Stahl (pp. 49–52), offers advice on selecting the best elastomer — of which there are 20 classes, each with unique properties and performance that can be modified by the inclusion of other ingredients — for a particular application.

Process control is another perennial responsibility for chemical engineers — one that continues to grow more sophisticated with advances in computing power and sensing technologies. Robert Rice and Douglas J. Cooper, in their article "Improve Control of Liquid Level Loops" (pp. 54–61), discuss the challenge of controlling an integrating, or non-self-regulating, process, such as level control in the surge tank for a single-valve beer-kegging system.

The fields of nanotechnology and bioengineering are much newer, and are brought together in "Understand Discrete Nanoscale Transport," by Anh-Tuan Dinh, Chinmay Pangarkar and Simir Mitragotri (pp. 62–68). This article explains how the movements and interactions of the nanoscale entities within a cell are characterized by a transport phenomenon known as discrete nanoscale transport (DNT), unlike the macroscopic problems in mass, energy and momentum transfer, which are described by continuum equations.

Nanotechnology also figures prominently in the development of sensors, monitoring devices and analytical instruments for a wide range of industrial, environmental, medical and military applications. Contributing editor Suzanne Shelley points out in "Nanosensors: Evolution, not Revolution … Yet" (pp. 8–12), that many promising nanotechnology-based devices continue to advance toward commercialization, but that hurdles remain.

You might also be aware (even though we don't cover them in this issue) that nanoparticles are currently used as antibacterial agents in wound dressings (silver nanoparticles) and to treat rheumatoid arthritis (gold nanoparticles). May you enjoy good health and never need those nanotechnologies as friends.

Cynthia Mascone, Editor-in-Chief