cause: (i) it represents (still) the largest, successfully operating microbial reactor systems in existence, (ii) it provides, in the aerated (activated) sludge process, a clearly studied, mixed population system (iii) it illustrates beautifully, with an anaerobic reactor simulation, the enormous sensitivity of actual mixed culture systems to process upsets of flow rate and feed composition.

15. **Homework problems** for every topic have been extensively revised, especially to add a number of brief calculational essays and to edit or remove some unduly long problems.

In spite of the apparent burden of covering an increasing number of topics in increasing depth, the biochemical engineering course has actually been strengthened and streamlined by two pedagogical approaches: (a) the topics build on the preceding topics, thus the early material contains primarily those key items needed in latter chapters, and (b) the nomenclature has been shifted and recodified into a vocabulary most familiar to chemical engineers. For example, metabolism leads to stoichiometry and energy balances, biological products are recovered in separation unit operations, and bioprocess economics is based on standard chemical plant cost estimating terminology.

Throughout, original presentations of biological background have been pruned and revised to present major concepts as clearly and concisely as possible. Introductory summaries are provided for all of the less familiar topics (*e.g.*, microbiology and cell biology, biochemistry, enzyme kinetics and structure, metabolism, genetics and DNA, biochemical control systems). As before, no chemical engineering material not already available to the chemical engineer by the end of the junior year (stoichiometry, energy balances, transport phenomena, thermodynamics, chemical kinetics) is assumed. Our experience indicates that eager students, willing to undertake new vocabularies in short order and to absorb the considerable amount of qualitative material prior to "comfortable quantitation" in equation form, will find the subject and its organization fascinating and exciting.

REFERENCES

1. J. E. Bailey and D. F. Ollis, "Biochemical Engineering Fundamentals," *Chem. Eng. Education*, Fall, 1976.
2. "Commercial Biotechnology; An International Analysis" (OTA-BA-214) Office of Technology Assessment, Washington, D.C. 20510 (January, 1984). A larger glossary appears on pages 586-597. (For sale by Superintendent of Documents, U.S. Gov't. Printing Office, Washington, D.C. 20402.)

ChE letters

"NONADIABATIC" A MISNOMER?

Dear Editor:

I noted in a recent issue of the AIChE Journal (April '85) an article with the word "Nonadiabatic" in the title.

I have always (for the past 25 years) called such a term simply "diabatic." The term nonadiabatic is redundant since the *a* prefix in adiabatic means nonadiabatic, i.e. without heat transfer.

The prefixes *a, ab,* or *an* in English all infer a negative connotation as in:

aneroid	= **without fluid (in a barometer)**
ascorbic acid	= **anti-scorbutic (Vitamin C)**
anhydrous	= **without water**
anesthesia	= **without feeling**
asymmetrical	= **not symmetrical**
anisotropic	= **not isotropic**
agnostic	= **without knowledge (of God)**
atheist	= **does not believe in God**
abnormal	= **not normal**
etc.	

Thus to use the term non-adiabatic, literally means non-non-diabatic and the two negatives cancel each other to yield the simpler term diabatic. No one would think of using non-abnormal to replace the word normal, or non-anisotropic for isotropic, so why not diabatic for non-adiabatic?

I would appreciate your publishing this letter and maybe someone will know the answer to these questions:

1. Have you ever heard of a reactor or a process with heat transferred to or from it being called "diabatic"?
2. Any references in books or journals to a diabatic reaction or other process?

In any case, I propose that Chemical Engineers use the simple term "diabatic" to replace this awkward, redundant and more complex expression non-adiabatic, at least for chemical reactors.

I have not coined a new word since Merriam-Webster's Unabridged Dictionary lists *diabatic* and defines it as involving the transfer of heat (opposed to adiabatic).

Allen J. Barduhn
Syracuse University