good research seems to lead to less and less teaching and more and more time away from campus and the students.

The publication system seems to make it easier to recognize research by providing a convenient bean counting procedure. We seem to be strangely reluctant to try to really evaluate teaching. As a profession we're willing to categorize colleagues as being poor researchers or uninterested in research. It seems to be much harder to acknowledge poor teaching. A psychology department faculty evaluation system discussed at the ASEE Summer School in 1977 showed this very clearly. Department faculty rated their colleagues over a full five point scale from 1.1 to 4.8 on research but restricted their range to 3 to 4.5 on the teaching evaluation. The poor teacher label is clearly one which is neither given nor accepted easily. Isn't this an anomaly in light of my earlier discussion?

My opinion formed over years as a student, alum, and now teacher is that teaching effectiveness is the most important characteristic of a University. It determines the attitude and learning of students which in turn determines the long term reputation of the University. Good teaching is also the source of tremendous satisfaction to the faculty. Sadly, the University reward system does little to recognize and develop effective teaching and in fact seems to actively discourage it. My own strategy, evolved after very painful soul searching, is to give teaching the minimum possible amount of my time. My teaching ratings should show me to be competent and I do prepare for classes and try to be friendly to the students. I try nothing new or different and I have the minimum possible number of office hours. These things take too much time and effort. It goes without saying that committee assignments, advising and similar unrewarded time consumers are avoided like the plague. I hope to let my interest in teaching come to the surface in the future, after I'm over the tenure-promotion hurdle. In the meantime I would be glad to have you visit me in the lab to talk about my research and maybe steering a few graduate students my way. If I'm not in the lab look for me in the library working on a proposal. Don't look for me in my office during the day—students might find me also and right now I can't take the time to help them learn. □

ChE letters

Dear Editor,

In the Winter 1980 issue of*CEE*, Cassano [1] discusses at length various "definitions" of the rate of reaction and finally concludes that 'The rate of reaction expression is the "sink" or "source" term in the continuity equation for multicomponent systems which will take into account the creation or destruction of the said species by chemical reaction." The unnecessary inclusion of the word *expression* spoils this otherwise satisfactory statement.

If *process rates* are distinguished from *rates of change*, the confusion regarding the "definition" of a rate, which exists in much of the literature and which is not greatly clarified by the above article, is easily avoided.

Process rates, such as the rate of a chemical reaction, are conceptual and mechanistic. They depend on the local environment, as described by the thermodynamic potentials alone in the special case of a homogeneous reaction. Process rates are ordinarily not measurable. Rather they are inferred with some unavoidable uncertainty from measured rates of change in space or time through the equations of conservation.

This distinction is discussed and illustrated extensively in my book [2]. It has also been noted by Dixon [3], Peterson (reference [16] of [1]) and many others.

The primary positive contribution of reference [1] is the illustration of the reduction of the equation of conservation of species to several of the special cases which are commonly used to infer rates of reaction from measured rates of change.

1. Cassano, A. E., "The Rate of Reaction: A Definition or the Result of a Conservation Equation?," *Chem. Eng. Educ., 14*, 14 (1980).
2. Churchill, S. W., "The Interpretation and Use of Rate Data: The Rate Process Concept", revised printing, Hemisphere Publishing Corp., Washington, D.C. (1979).
3. Dixon, D.C., *Chem. Eng. Sci., 25*, 337 (1970).

Best regards,
Stuart W. Churchill
The Carl V.S. Patterson Professor
University of Pennsylvania

ChE books received

"What Every Engineer Should Know About Patents," W. G. Konald, Bruce Tittel, D. F. Frei, and D. S. Stallard. Marcel Dekker, Inc., New York, 1979, 136 pgs, $9.75

This book, written for engineers, outlines the law of intellectual property with emphasis on patent law. Its objective is to provide a perspective of patents, trademarks, trade secrets, and related matters, without undue use of specialized legal language and terminology.

"Principles and Applications of Electrochemistry," 2nd ed., D. R. Crow, John Wiley & Sons, New York, 1979, 232 pages (paperback), $13.95.

This book presents in a simple and concise way the basic principles of electrochemistry that students require and some of its applications.