

to some extent, selective biases of the environment on the new gene pool.

But historical factors are not always considered to be of secondary importance by Hiernaux. He suggests contacts with peoples of Arabia (instead of correlations with altitude) to explain the distribution of R_0 and L^M frequencies and certain biometrical features in the peoples of the Ethiopian highlands.

A particularly interesting approach used by Hiernaux is to compare independently the constituents of classical anthropometric indices with climatic variables. His results indicate that previous authors have been too simplistic in interpreting the meaning of these indices. For example, the two fundamental dimensions of the nose appear to be responsive to quite different climatic factors. Nasal breadth is highly correlated with mean annual rainfall and mean temperature in the hottest month, whereas nasal height is relatively unaffected by these factors. By contrast, nasal height is correlated notably with mean humidity in the coldest month and is relatively independent of the climatic factors that are highly correlated with nasal breadth.

In the final section, Hiernaux discusses the need to base classifications of human variability solely on biological information (as opposed to cultural and linguistic criteria). He offers a model of a modern biomathematical approach and gives examples of how results of his sophisticated statistical studies contrast with the opinions of several authors who have dealt previously (often in a typological manner) with sub-Saharan peoples. Hiernaux judiciously avoids erecting a "new" classification on the basis of his extensive, though admittedly still incomplete, data.

A work of such scope carries with it from the outset many difficulties that decrease the reliability of its results and conclusions. Hiernaux relies in great part on the published mensurations of many other scientists from different schools. Moreover, many characteristics, such as skin, eye, and hair coloration, pilosity, subcutaneous fat distribution, ear form, and other features commonly used in studies on "race" are omitted owing to the paucity of quantitative data in the literature. But Hiernaux generally discusses freely the inadequacies of conclusions based on available data.

The major value of Hiernaux's approach lies in its objectivity and emphasis on the quantitative expression of variability. It is to be hoped that mem-

bers of the International Biological Programme and other research teams will soon develop and adopt uniform techniques that will not only reduce biases of human biologists in collecting data but also express quantitatively those features that could not be included in Hiernaux's pilot study.

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Scoring the University

The Closed Corporation. American Universities in Crisis. JAMES RIDGEWAY. Random House, New York, 1968. xii + 276 pp., \$5.95.

Time and again during the series of crises at Berkeley, as I've listened to various accounts of what the "real" trouble is, I've been moved to ask myself the question of the old spiritual, "Were you there?" Like the blind men in the old tale who went to see the elephant, each one of us seems to have concentrated on one feature of the situation and to have attempted to amplify his picture into an image of the whole system. And this is not too difficult a task to perform, especially if you are angry. Nothing can shake the conviction of a Reagan or a Rafferty that the whole business of student violence is the work of a few highly trained revolutionaries of the red race. Nor can the facts in the least disturb the professional mind that has fixed the blame on a plot against academic freedom.

Now James Ridgeway gives us another image, in which the university of America is depicted as a very shoddy institution. Its professors meddle in politics and business in ways that range from the naive to the immoral. Its administrators are not merely indifferent to the problems of the community surrounding the university; some, as at Columbia and Chicago, are actively engaged in trying to rid their places of "undesirable" blacks, and could not care less where the good riddance goes. Perhaps shoddiest of all are the trustees, giants in the business world but hopelessly inept and dangerous in the world of education. The poor undergraduate is kept in a "holding pen" until fat enough for the market.

As I read this indictment, I couldn't help feeling again that the simple story was largely irrelevant. I agree whole-

heartedly that the make-up of the Regents of the University of California is very unhealthy for the university, and the method of appointment and tenure is extremely bad. But even supposing, as Ridgeway suggests, that the Regents were elected, with the help of the students, for reasonable terms, and even supposing the professors kept out of foolish entanglements with other institutions, and even supposing the administrators refused to serve on industrial boards of directors, what then? It seems to me nonsense to assume that making universities less shoddy in these respects will make them better institutions of learning.

My own biased viewpoint on the "crisis" is that universities have lost their philosophical basis. I don't merely mean that philosophy is no longer being taught by philosophy departments, though this is no doubt true. I mean that none of the leaders, faculty, student, or administration, seems able to say anything very significant about the meaning and purpose of higher education. Consider, for example, the "no nonsense, hard-line" policy of some politicians and some educators (Haya-kawa is a recent example). These men tell us that there is a vast "silent majority" who merely wish to be educated. Educated for what? The point is well illustrated by Ridgeway's book. "The principle that should govern higher education," he says, "is surely simple enough: Since educational institutions are generally regarded as serving a public function, and financed to a large extent by the general citizenry, they ought to be responsible to the public." Which is true and trite if "responsible to the public" means "serving the true needs of those who deserve to be educated," or else false and insidious if the phrase means "performing in a manner which pleases the majority of the electorate."

Of course it would be unfair to criticize Ridgeway's book for its lack of philosophy, because he is frankly writing as a journalist. Indeed, the great success of journalistic indictments of the auto industry, the drug industry, the air travel industry, and now the educational industry is partly to be explained by the shallowness of the philosophical base of our culture. But in the case of universities there must surely be some hope that a community of scholars and students can turn its attention to acquiring a deeper understanding of why such a community should exist.

One popular philosophy says that universities ought to be the agents which transmit higher learning from one generation to the next. This "model" does reasonably well in some of the so-called pure sciences, does less well in engineering, does rather poorly in the social sciences, and is hopelessly bad in the "humane" areas of learning. If universities are engaged in expanding and deepening the student's intellectual powers, they must do so with serious regard for the way in which the intellectual powers are related to other aspects of personal and social life. This wordy description is captured by the dissident students in the word "relevance." If a person's whole life is a monastic devotion to a science, then the relevant growth of his intellect may be quite clear. But otherwise it is by no means evident or simple to decide what intellectual changes ought to occur. At one time, we believed it was Latin that should above all be transmitted; now many think it is mathematics and computer sciences. What many of the dissident students are saying is that the intellectual life and the political life are aspects of the same being. From this point of view, the increase in campus rules governing political activity is a disaster, because as all of us know one does not learn by rigid regulations.

Ridgeway's conclusion is a hope that "the country will pursue the idea that a university is a place where great teachers and students are brought together." My hope is that the country won't do anything of the kind. It is a blessing that there are so few great teachers on our campuses who spellbind the student with fascinating irrelevance and who have stopped learning long ago. Perhaps a far richer philosophy of higher education might emerge if we depicted the ideal university as one in which every person is both teacher and student, one in which the student and the faculty learn how to learn.

Since Ridgeway urges us to be hopeful, we might also hope to include the administrators and trustees in such a community. If I were scoring a university for its performance, I'd count as negatives the number of required courses, the number of lecture courses, the number of regulations governing student and faculty behavior. I'd count as positives the number of students actively engaged in imaginative research with faculty, the hours of open debate, the courses of open dis-

cussion. And on the agenda of debate and discussion could surely be the question of Ridgeway's book: How should faculty and administrators spend their time? But a far more serious item for the agenda should be: What is a university?

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Analysis by Reaction Rates

Kinetics in Analytical Chemistry. HARRY B. MARK, JR., and GARRY A. RECHNITZ, with the assistance of Ronald A. Greinke. Interscience (Wiley), New York, 1968. xii + 339 pp., illus. \$16.95. Chemical Analysis, vol. 24.

The development of kinetic methods in analysis is, as the authors of this book state, opening up an important new area of research in analytical chemistry. Advances in instrumental technology, new methods of studying fast reactions, increased use of differential rate methods and catalytic reactions are all contributing to the development of chemical analysis by kinetics. The authors are active in this research area and are in an excellent position to bring its possibilities to the attention of chemists not acquainted with the field. The book contains some quite elementary material, such as the definition of a catalyst, explanations of the sensitivity of catalyzed reactions, and discussions of the effect of concentration and temperature on reaction rates. On the other hand, parts of the book deal with specialized topics, including the derivation of response functions for various input functions in relaxation methods and some highly detailed treatments of error analysis in differential-rate methods. The uneven level of treatment constitutes one weakness of the book. Unfortunately, it is not the only weakness.

The authors discuss both practical kinetic methods used in analysis and theoretical aspects of kinetics that are important in analysis. It is their intention to illustrate the advantages that kinetic techniques have over equilibrium techniques. After a chapter on the measurement of reaction rates they devote two chapters to kinetic methods for catalyzed and for uncatalyzed reactions. Simultaneous determinations of closely related mixtures in theory and in practice are treated. The determination of organic mixtures and correlations of

reaction rate with structure are considered. A chapter written with the assistance of Louis J. Papa gives a general error analysis and a detailed evaluation of three methods of handling differential rates for the simultaneous determination of compounds. The book closes with a chapter on analytical reactions from the kinetic viewpoint.

The conceptual plan for the book—from its opening remarks concerning advances in instrumental technology to its closing attempt to display the usefulness of kinetic information in analytical chemistry—is a good one, but in execution it is disappointing despite the fact that many topics of interest are included. The authors do not give any information about instrumental advances with the exception of one or two pages in chapter 2 which are incorrect; their statements that the most widely used fast-mixing method is *continuous-flow* and that *stopped-flow* has a minimum half-life of 1 second are serious errors. Figure 1 in this chapter also is highly misleading in its implication that the appearance of products formed in a reaction mixture could be followed over a range of 10^{-12} to 10^4 seconds.

Chapters 5 and 7, on differential kinetic analysis, are thorough and contain important information on the limitations of concentration ratios and of rate-constant ratios. However, the presentation is primarily concerned with single-point or double-point methods. In this regard the authors have honestly reflected what this reviewer thinks has been an extreme overemphasis on these methods in the literature for the past ten years. With advances in automatic rate systems and in data-acquisition systems and with the availability of computers a far more important question is how to minimize errors in calculations where there are many more points than unknowns. In practice it is hard to understand why any analyst would settle for one or two data points in a kinetic analysis unless it was an absolute necessity.

Finally, the long section on analytical reactions from the kinetic viewpoint has too much material on reactions that have little promise for analytical applications. The difficulty with this section and with much of the book is reflected in the authors' statement, "Aside from the immediate inferences of analytical significance to be derived from specific kinetic investigations, it may be possible to realize certain generalizations as a consequence of the