Mathematics and Politics. By Hayward R. Alker, Jr. (New York: The Macmillan Co., 1965. Pp. v, 152. $1.50.)

How much can one say about mathematics and politics in one hundred and fifty pages? As Hayward Alker shows in *Mathematics and Politics,* one can say a great deal. This is at the same time both the virtue and the problem of this pioneering book.

The virtue of *Mathematics and Politics* lies in Alker's skillful and highly imaginative demonstration of mathematics' relevance to various kinds of political inquiry. His first chapter sketches out the importance of mathematical thinking in classical Greek political theory. Chapter Two states the concerns of modern political inquiry in terms of the allocation of values and relates these concerns to qualitative and quantitative measurement of political phenomena. Philosophical concepts of equality and matching operational measures are the subjects of Chapter Three. Imaginary data inspired by Aristotle's collection of 150 city-state constitutions are used to investigate two-variable relationships in Chapter Four, employing Aristotle's proposition that unprovoked aggression will invite attack upon the aggressor. Chapter Five takes up relationships between more than two variables by examining the effect of economic development on the association between government spending and political participation. Chapter Six on correlation and causation makes its point by testing three competing theories on the causes and effects of Negro voting in the South. The concluding chapter on game theory advances the familiar but instructive paradox which occurs when voters are confronted with more than two alternatives for which preferences are not transitive. Alker's choice of examples and manner of presentation clearly indicate his concern for political analysis.

The title *Mathematics and Politics* may mislead some into thinking that the book deals with such things as functions of variables, matrix algebra, and stochastic models. Because Chapters Four, Five, and Six—which together make up more than half of the book—treat topics that are commonly included in statistics books, perhaps *Statistics and Politics* may have been a more accurate title. But by any name, the book applies quantitative analysis to a variety of patently political research questions.

The problem of the book lies in its very meaty nature. Little books are often taken for introductory books. By its size and survey-type chapter headings, *Mathematics and Politics* may be especially deceptive this way. The audience or market for which the book was written is not clear, but it does not seem suitable for students who lack prior training in statistics. To be sure, Alker at times handles the reader as if he were a rank beginner. Example: "For two dichotomous (two-part) attributes, such displays are called '2×2 contingency tables.' The 'dependent' attribute (which is to be explained) is presented vertically on the left side of the tables, while the 'independent' (explanatory) attribute is labeled horizontally." (P. 57.) Alker also points out that only basic algebra is needed to follow his formula derivations and proofs. Granted—but the lengthy derivations and proofs *per se* seem out of place in a book designed to introduce statistical applications to mathematically uninclined students.

But the most important obstacle to the beginner is the very concise nature of the book. Although Alker's writing is admirably clear, he just does not devote enough background information on his topics for the uninitiated reader. Many examples can be chosen to illustrate the point but two should suffice: Guttman scaling is covered from the beginning through the calculation of the Coefficient of Reproducibility in a scant two pages; game theory goes from zero-sum games through minimax strategy, saddle points, non-zero-sum games, Pareto optima, and Nash's Theorem in a breathless ten pages. The coverage is smooth enough, but it is far too fast for the student who has to be told what a contingency table is.

What then *is* the proper place for the book in

the curriculum? As Alker himself states, "The book is most emphatically not a 'how-to-do-it' cookbook of statistics for political scientists." (P. iii.) Although it is not a suitable introduction to statistics, the book may well be used as a supplementary text for statistics courses—especially those taught in other departments. But *Mathematics and Politics* seems to have its greatest value as a refresher, stimulant, and organizer of knowledge for political scientists who have already had statistics. Alker's book will forcefully remind them of mathematics' contribution to *precision* in political research. Features of the book that will prove especially instructive in this regard are his presentation of various measures of inequality, the interpretation of qualitative associations in terms of *form* as well as strength of relationships, the utilization of "dummy" variables in applying quantitative analysis to qualitative data, his discussion of the explanatory power of multivariate equations of relationships, and his concern with elaboration and identification of casual relationships.

To me, the most disappointing part of the book is the treatment of "Political Judgment and Statistical Significance" in the Appendix. I had hoped that Alker would grapple directly with the problem of determining the statistical significance of relationships found among data on *whole* populations, which often interest political scientists, instead of relationships found within *sample* data, which form the mainstay of psychologists and sociologists. But we cannot expect Alker to treat all aspects of quantitative political analysis in one book. We need more books and articles on mathematics and politics. In short, we need to develop a *literature* of mathematical analysis for political scientists. Alker has made a fine start on this task. Let us hope others follow, and soon.—KENNETH JANDA, *Northwestern University*.