Book Reviews

New Waves in Geography

Quantitative Geography. Techniques and Theories in Geography. JOHN P. COLE and CUCHLAINE A. M. KING. Wiley, New York, 1969. xii + 692 pp., illus. Cloth, $12.75; paper, $7.50.

Statistical Analysis in Geography. LESLIE J. KING. Prentice-Hall, Englewood Cliffs, N.J., 1969. xiv + 290 pp., illus. $6.95.

Quantification, broadly defined, has been the source of a postwar transformation of the social sciences, with effects probably felt more profoundly in graduate-level academic geography than in any other field. Innovative leadership was provided by American econometricians and psychometricians. The wave then moved to inquisitive followers in sociology and geography, to skeptics feeling bandwagon pressures in political science, and finally to laggards in anthropology and history. *Quantitative Geography* and *Statistical Methods in Geography* are products of this change.

Within geography, quantification also diffused in a spatial sequence from North America and Sweden into the rest of the North Atlantic community, followed later but very rapidly by the Soviet Union, with the rest of the world lagging far behind. This sequence parallels the spread of medium- and large-scale scientific computers.

Rather than one wave within geography, there have been several as the initial effects of quantification bred conceptual and methodological transformation. The first changes involved substitution of descriptive statistics and elementary inferential procedures (significance testing, correlation, regression) for the cartographic procedures that previously had constituted the basic working tools of geographers. The effect of this substitution was to bring home to professional geographers the ruinous effects of three atheoretical decades in which the exceptionalist philosophy of regionalism had dominated, decades in which geography drifted away from the position it had previously occupied on the frontiers of scientific discovery, and to generate a theoretical revolution. The theory, in turn, generated new rounds of technical development by a "new breed" of geographers, development that focused upon the peculiarly geographic problems of inference with spatial series (contiguity and spatial autocorrelation, point processes in the plane, individual vs. ecological correlations) while at the same time identifying conceptual lacunae that have been attacked vigorously by the multivariate data analysis procedures made possible by the very largest scientific computers. (Quite independently, for example, geographers developed procedures of numerical regionalization that paralleled similar advances in numerical taxonomy.)

And now the textbooks have started to appear. J. P. Cole and C. A. M. King have written a book for the first wave. They spell out with care the links between traditional ideas and methods in geography and both modern mathematics and beginning statistics. The book "starts each topic assuming that the reader knows nothing or very little about it . . . [so] that many people will be able to obtain a background that will enable them both to appreciate the so-called 'quantitative' papers now appearing in many geographical periodicals, and also to practise techniques and develop theories in their own work." Accordingly, it is long on how-to-do-it procedures and worked-out examples and short on proofs, the result being substantial oversimplification. Only 65 pages are devoted to mathematics, from set theory through topology, and another 54 to statistics, from elementary probability to multiple correlation. The balance of the book presents case study materials. And even though there is an 18-page chapter on "Theories, tendencies and laws," the book does not discuss modern geographical theory.

Leslie J. King's brief volume is of an entirely different level and caliber. From a good base in probability theory it moves directly to processes generating point patterns in the plane. Regression analysis is presented as the base for analyzing spatial series and is blended with treatment of trend-surface fitting. Factor analysis is presented as a basis-producing procedure to facilitate numerical regionalization. The as yet unsolved problems of spatial autocorrelation are discussed. The book makes no pretense of being comprehensive. Instead, significantly geographic problems of inference are identified and discussed thoroughly, without oversimplification.

It would be easy to conclude that L. J. King's volume is to be preferred to that of Cole and C. A. M. King, particularly because the latter authors deal only with classical descriptive and inferential statistics, whereas L. J. King correctly notes "the increasing evidence that many of the statistical techniques which have been used previously in geography are inappropriate for the particular problems posed in geographic research." But the majority of the profession throughout the world remains theoretically and technically unsophisticated, and may just need a painstaking volume like *Quantitative Geography* to be able to give good advice about course work to students and to be persuaded that they need new kinds of faculty colleagues. These students and faculty, in turn, will be the ones to realize the promise now latent in the revolutionized geography of America's leading graduate schools.

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Sound Generation

Sources of High-Intensity Ultrasound. Vol. 1. L. D. ROZENBERG, Ed. Translated from the Russian edition (Moscow, 1967) by James S. Wood. Plenum, New York, 1969. xx + 316 pp., illus. $25. Ultrasonic Technology.

This book is a collection of three independent articles whose joint purpose is to describe recent progress in the generation of intense sound. Each contribution offers a broad view of its particular subject, with emphasis on the optimal design and application of sound sources.

Part 1, Acoustic Gas-Jet Generators