Northern Lowlands in a single chronological column, has seriously understated the amount of chronological variability in the materials from Momil I and greatly underestimated the duration of the occupation of Momil I.

A more serious group of problems is raised by Reichel-Dolmatoff's tendency to derive almost all later innovation in Colombia's culture history from Mesoamerica. It is clear that maize came from that direction, but a case of comparable strength cannot be made for any of the other elements that Reichel-Dolmatoff suggests were introduced from Mexico. The theme is repeated in various parts of the book but receives its fullest expression on page 115: "It seems that Mesoamerican influences in Colombia date from as early as about 1200 B.C., when such elements as the jaguar cult, maize cultivation, burial mounds, monolithic sarcophagi, and obsidian mirrors were introduced by sporadic settlers. . . ." With the exception of maize cultivation, and possibly burial mounds, none of the above elements can be dated securely in Mesoamerica as early as 1200 B.C., but the cat motif is found in various examples of Peruvian art which are that old or older. Reichel-Dolmatoff goes on to say that "About 500 B.C., a second period of major Mesoamerican influence began, bringing in its wake such elements as deep-level shaft graves with lateral chambers, elaborate figurines, occipito-frontal head deformation, pottery with multiple supports, perhaps double-spouted vessels, flat and cylindrical stamps, elaborate spindle whorls, and biomorphic whistles." For many of these elements the distribution of dated occurrences favors a South American origin. Double-spout and bridge bottles occur in the Barrancas and La Cabrera complexes of Venezuela, 500 to 1000 B.C.; in Early Tutishcainyo, 1500 to 2000 B.C., in the jungles of eastern Peru; in Kotosh Waira-jirca, 1500 to 2000 B.C. in the Highland of Peru; and in Hacha, 1000 to 1500 B.C., on the South Coast of Peru. Tall solid vessel supports occur in Reichel-Dolmatoff's Momil Ia materials as well as in Early Tutishcainyo. Hollow, mammiform vessel supports occur in Early Tutishcainyo. Flat pottery stamps occur in Momil Ia, and cylindrical stamps are found on the Upper Pachitea in eastern Peru before 500 B.C. Elaborate spindle whorls are present in some of the preceramic cultures of Coastal Peru as well as in the very early ceramic tradition, La Florida, of the central coast of Peru.

Two other elements of ceramic decoration that are rather consistently present in the elaborate pottery styles of Reichel-Dolmatoff's Sub-Andean Cultures—resist painting and tall annular bases—are also dated far earlier in South America than in Mesoamerica. Resist painting occurs in Hacha on the South Coast of Peru and in Momil Ia, while tall annular bases are characteristic of Hacha, Barrancas, and Momil Ia. Reichel-Dolmatoff makes an excellent case for the theory that the close similarities between the figurine traditions on the South Coast of Colombia and North Coast of Ecuador, on the one hand, and those of the West Mexican Coast (Nayarit-Jalisco-Colima), on the other, indicate a close historical relationship. But the dates that he presents favor a South to North movement rather than the reverse.

It is clear that from 1200 or 1000 B.C. Colombia shared a progressively greater number of cultural elements with Mesoamerica. Some of these—for example, maize—clearly moved from North to South. On the other hand, the precocious and complex development of metallurgy in Colombia (see cover on this issue of *Science*), which precedes the introduction of that art into Mesoamerica by at least 1000 years, suggests that through most of this time Colombia was a center of rapid technological evolution rather than a passively receptive peripheral zone. All of the evidence cited suggests that cultural exchange between Colombia and Mesoamerica was by no means as one-sided as some passages in this book suggest.

It was the revival of the Spinden hypothesis (that all New World high culture was the result of the spread of a single uniform neolithic base from a single source) which focused the attention of archeologists during the 1950's on the areas between Peru and Mexico. In a sense, then, the very existence of this book is a result of that revival so we should be grateful that Spinden's formulations were disinterred. However, some of the presentation in this book appears to be forced so as to conform to the idea that most significant elements of New World high culture had their source in a localized area of Mesoamerica.

New World archeologists still have a long way to go before they fully understand the net of cultural interaction that connected Mexico, Peru, and all of the areas in between. None of the problems mentioned above have been solved definitely. What can be said without fear of contradiction is that during the last 20 years no other scientists have made a more solid contribution to our understanding of these problems than have Reichel-Dolmatoff and his wife. Through this book something of the scope of their contribution can now be appreciated by those students who confine their reading to the English language.

Mathematics and the Behavioral Sciences

Mathematical Explorations in Behavioral Science (Irwin and Dorsey Press, Homewood, Ill., 1965. 396 pp., $7.95), edited by Fred Massarik and Philburn Ratoosh, is a symposium volume. The occasion was a 4-day conference for researchers in psychology, sociology, business administration, political science, and economics, and the "desired emphasis was on conceptual innovations, supported by data, rather than on purely formal models or techniques of data analysis; contributors reported empirical findings when available, or indicated possible approaches to the empirical testing of a model or theory." As the editors are well aware, the 19 contributions vary as widely in meeting this desire as they do in their content. Some intend to serve only as a brief introduction to a given topic, but others assume that the reader is immersed in their field.

Statistical decision theory is discussed by two contributors. Hunt uses a Bayesian approach for formally deciding among alternative behavioral theories. Scheff gives an informal survey of how physicians in practice seem to weight type 1 errors against type 2 errors.

Strategic decisions are treated variously in an empirical study of two- and three-person games (Lieberman), a model for negotiations (Bartos), and simulation of international relations (Guetzkow).

The processing of information is given a purely formal model in "Semantic information and message evalua-

tion," by Harrah, while Meier presents a largely empirical analysis of a time-ordered sequence of 14 policies for the library system.

Social ecology is treated by physicalistic notions of gravity (Catton; Huff), long-tailed probability distributions (Mandelbrot), and latent structure analysis (Lazarsfeld and Henry), respectively.

Empirical studies are reported on the detection of repetition (Attneave) and on conformity in a picture arrangement test (Miner). Probabilistic models are suggested in two essays—"The effect of group size on group performance" (Solomon) and "Diffusion in incomplete social structures" (Coleman)—while integral calculus is used to develop equations in another essay—"The economic implications of learning by doing" (Arrow).

Pleas are entered for a "world information center for social sciences" (Churchman) and for "applications of stochastic and computer models to the process of free association" (Colby).

It is difficult to hypothesize what kind of reader such an uneven book should appeal to. Juxtaposition of such admittedly divergent "explorations" may serve largely to illustrate the vagueness and inappropriateness of "mathematics" as a unifying theme for studies in the behavioral sciences. In some papers, the impression is created that mathematics is being "applied to" behavioral problems, and does not *flow out* of them; other papers are not "mathematical." It may well be that when the problems of the latter are tackled more formally, this may lead to quite new branches of mathematics, and not merely to adaptations of old branches that flowed out of physics.

Four years elapsed between conference and publication; a third of the papers have already been published in other books or in journals. For many of the other papers, publishing in substantively differential contexts would also seem sufficient, and more appropriate than being reprinted together as in this volume.

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Studies in Anthropological Method

Many students, and not a few professors, will welcome the publication of Ernest L. Schusky's **Manual for Kinship Analysis** (Holt, Rinehart, and Winston, New York, 1965. 92 pp., $1.50), a volume in the Studies in Anthropological Method series, edited by George Spindler and Louise Spindler. The manual, which is intended mainly for general anthropology and intermediate level courses in social organization, is compact and to the point. A brief introduction, in which the author sets forth some of the anthropological concerns for kinship, precedes the presentation of the basic conceptual elements in kinship analysis and the diagrammatic procedures for presenting them. The method used in the next section constitutes one of the real strengths of the manual—the student is lead into the intricacies of kinship systems and their classification by having his attention drawn first to American kinship. Concepts are then developed to explain descent, cousin relations, lineage, and sibs, and these phase logically into the explication of other bilateral systems, and permit special attention to the Crow and Omaha unilineal systems.

The second half of the manual is concerned with the patterned behavior that derives from kinship systems and with some of the linkages between kinship and other institutions. Special attention is focused on marriage, residence groups, kin-based groups, the sib, phratry, and moiety. In this section, as in the first, practical suggestions on the mechanics of recording kinship data are interspersed throughout the text. Examples are given where needed most, without, however, unduly burdening the student.

Schusky is to be complimented for resisting the labyrinthine theory of kinship and retaining the "manual-for-student-format" throughout. He does, however, note significant points of theory, and credits sources for students who seek further information. In addition, the student is reminded a number of times of the caution that modern anthropologists exercise in drawing causal inference.

As a manual, and for the level that it is intended, the present work is recommended. The development of the concepts is logical, practical exercises are included at the right places, and the glossary, which is complete enough, conveys that not all theorists are agreed on definitions. As a systematized introduction to the basics of kinship analysis, student and professor alike should find the manual very helpful.

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Malthus Rerevisited

The study of population, which a generation or two ago was one important subdiscipline of economics, has been moved over to sociology departments almost entirely in the United States and in large part elsewhere. In the undoubtedly prejudiced view of one sociologist, this shift was on balance of great benefit. Economic Man, the repository of the psychological postulates underlying economic analysis, is too simplistic a being to help us understand such nonmarket activities as getting (or not getting) married and having (or not having) children. A price was paid for the transfer, however: with their notoriously ahistorical view of social reality, sociologists have usually managed to take the flow of life from generation to generation, as well as the succession of statistics from one census to the next, out of a meaningful historical context. And those relatively few sociologists who do use historical data generally take them from secondary sources and judge them with no special expertise.

An economic historian, in contrast, is typically trained in both of the disciplines relevant to his research. When he writes, as he often does, on a theme in demographic history, he works as a full professional. Thus, the demographic studies published by economic historians during the past two decades have become, in sum, the basis for a new interpretation not merely of Europe's population growth but to some degree of modern Western history. It was inevitable, given the state of academic publishing, that someone would compile some of these articles into a "reader," and it seemed to be our good fortune that two such eminent scholars as David Glass and David Eversley should have undertaken the task in **Population in History: Essays in Historical Demography** (Aldine, Chicago, 1965. 703 pp., $17.50). Although their effort is good in many of its parts, it is, unfortunately, disappointing as a whole.

The two editors contribute separate