SELECTION OF SURVEYING METHODS

by

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B.S., Kansas State University, 1969

A MASTER'S THESIS

submitted in partial fulfillment of the

requirements for the degree

MASTER OF SCIENCE

Department of Geology

KANSAS STATE UNIVERSITY
Manhattan, Kansas

1975

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Purpose

This investigation provides a means for judging the adequacy of the commonly available plane-surveying techniques and instruments in meeting pre-determined accuracy goals. These methods and instruments include: 1) plane table and alidade; 2) elevations by differential leveling, vertical angles, and altimetry; and 3) locations by traverse with distances by tacheometry, taping, and electronic devices, and directions by vernier transits, optical transits,and theodolites.

Because most systematic errors can be corrected or compensated for, the several sources of accidental error limit the attainable accuracy of each method or instrument. By determining, for each of the methods, the magnitude of these errors as a function of different conditions and instrument design, it should be possible to estimate the error in any future measurement. The Theory of Errors, which predicts the resultant of a series of independent accidental errors, could then be used to estimate the error for any measured point in a survey.

This is a study and tabulation of the errors in the methods; the determination of required precision rests with the user. Therefore, though the illustrations are drawn from geology, the principles and data have general application. The methods and their appropriate field procedures are well documented in existing texts and will not be described here. Simiarly, though photogrammetry is the optimal method for mapping any substantial area when the measured points can be identified on photographs, there already exists a substantial body of literature on the errors of these methods and selection has been treated by others (Aguilar 1967, 1969).