14) I may be run over going to the hospital.
15) The hospital may burn down.

I understand: the anatomy of the body, the pathology of the development of hernia, the surgical technique that will be used to repair the hernia, the physiology of wound healing, the dietetic chemistry of the foods that I must eat to cause healing, the chemistry of body repair, and the course which my physician will take in treating any of the complications that can occur as a sequela of repairing an otherwise simple hernia.

Patient

Lawyer for Patient

Lawyer for Doctor

Lawyer for Hospital

Lawyer for Anesthesiologist

Mother-in-Law

Notary Public

Date

Place

Data Collection and Systems Analysis

W. C. H. Prentice writes (Letters, 4 March) about the problems raised by the increasing tendency to collect data for their own sake, particularly by means of questionnaire surveys. The remedies he proposes deserve close attention, for they can be generalized to apply beyond the limited domain of such surveys. The problem that Prentice addresses is far more pervasive and serious than may be realized. Because of the ease with which data may now be collected and processed, in some technical, economic, political, and social fields we are almost being studied to death. Many of the studies serve to obscure rather than to illuminate the central issues to be examined for effective decision-making. In addition—and this is potentially more serious—many such data collection studies are being represented as valid systems analyses of complex engineering, economic, political, and social problems.

In recent years some notable successes have been achieved through the application of the "systems approach" to a range of national security problems. The points of view and the techniques developed in such predominantly military systems have just begun to be extended wholesale to nonmilitary government, commercial, and industrial sectors. Examples include the fields of communication, transportation, urban development, education, health, and water-resources development. In the next 5 to 10 years this trend will increase sharply.

Systems analysis can be a powerful tool for decision-making in which are involved major allocations of resources in complex situations characterized by considerable uncertainty. Its essential components include goal setting (objectives, requirements, constraints), postulation and evaluation of alternatives (modeling, simulation, cost-effectiveness), and data collection (historical surveys, description of environment, structuring of relationships). These components are circularly related in the sense that the process of decision-making involves *sequential* and *iterative* application of goal-setting, alternative generation and evaluation, and data collection at successively deeper levels of analysis. The interactions among these phases—together with considerable human judgment—yield adjustments that ultimately converge to a "best" decision. Representing as it does the application of the scientific method to practical problem-solving, systems analysis is as applicable to problems involving personal choices as to problems involving the selection of an anti-missile missile system.

The basic point is that, in any of these applications, any data collection must be considered an integral part of the systems-analysis process. When this precept is ignored, considerable misplaced effort will result. These difficulties will increase as the complexity of the systems increase, for few limits can then be placed on the quantity of data that might be pertinent.

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Statistical Method

In reading the Reports in *Science* during the last quarter of 1965, I noted 16 in which statistical procedures were employed to the extent of making statements about "significance" or citing *P* values. (This count did not include reports giving means, standard deviations, or standard errors merely as summary values.) In eight of these reports I found errors in statistical method resulting from failure to understand the following:

1) The analysis of variance must be compatible with the experimental design described.

2) With regard to regression: (i) The correlation coefficient cannot "validate" a regression. (ii) The square of the correlation coefficient does not "demon-