ABSTRACTS FROM SYNTHESE
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ARE STATISTICAL HYPOTHESES COVERING LAWS?
Isaac Levi

EXPLANATION, PREDICTION, DESCRIPTION, AND INFORMATION THEORY
Joseph F. Hanna

The distinction between explanation and prediction has received much attention in recent literature, but the equally important distinction between explanation and description (or between prediction and description) remains blurred. This latter distinction is particularly important in the social sciences, where probabilistic models (or theories) often play dual roles as explanatory and descriptive devices. The distinction between explanation (or prediction) and description is explicated in the present paper in terms of information theory. The explanatory (or predictive power) of a probabilistic model is identified with information taken from (or transmitted by) the environment (e.g. the independent, experimentally manipulated variables), while the descriptive power of a model reflects additional information taken from (or transmitted by) the data. Although information is usually transmitted by the data in the process of estimating parameters, it turns out that the number of free parameters is not a reliable index of transmitted information. Thus, the common practice of treating parameters as "degrees-of-freedom" in testing probabilisitic models is questionable. Finally, this information-theoretic analysis of explanation, prediction, and description suggests ways of resolving some recent controversies surrounding the pragmatic aspects of explanation and the so-called structural identity theses.

ON EXPLANATION
Roger D. Rosenkrantz

Two main themes unify this following discussion of explanation. First, explanations are essentially more or less efficient ways of recording data. Powerful models are characterized in part by the dramatic reduction in the number of information units required for data storage which they effect. In addition, such models are sensitive discriminators of possible experimental outcomes. But, secondly, explanations are not mere reductions of data. The two features are related by the fact that interpretability insures overdetermination of a model's parameters, and thereby insures efficient recoding of the data. As a consequence, the logic of explanation exhibits a dual dependence on the relative strength of the probabilistic connections between explanandum and explanans and on the entrenchment or theoretical assimilability of the explanatory hypotheses.

BAYESIAN STATISTICS AND BIASED PROCEDURES
Ronald N. Giere

A comparison of Neyman's theory of interval estimation with the corresponding subjective Bayesian theory of "credible intervals" shows that the Bayesian approach to the estimation of the statistical parameters allows experimental procedures which, from the orthodox objective viewpoint, are clearly biased and clearly inadmissible. This demonstrated methodological difference focuses attention on the key difference in the two general theories, namely, that the orthodox theory is supposed to provide a known average frequency of successful estimates, whereas the Bayesian account provides only a coherent ordering of degrees of belief and a subsequent maximization of subjective expected utilities. To rebut the charge of allowing biased procedures, the Bayesian must attack the foundations of orthodox, objectivist methods. Two apparently popular avenues of attack are briefly considered and found wanting. The first is that orthodox methods fail to apply to the single case. The second is that orthodox methods are subject to a typical Humean regress. The conclusion is that orthodox objectivist methods remain viable in the face of the subjective Bayesian alternative—at least with respect to the problem of statistical estimation.

EXPLANATION AND ACTION: RECENT ISSUES AND CONTROVERSIES
RUTH MACKLIN

The paper surveys the recent philosophical literature on the topic of explanation of action. The issues are set forth in the form of a series of controversies between two opposing groups of philosophers, termed "the philosophical psychologists" and "the philosophers of science." The former group maintains that it is a mistake to look for causes of action and that hence, causal explanations of human action are not possible. Writers in the second group oppose this view, holding that the appropriate pattern of explanation for human action is similar to that found in the natural sciences and that an objective science of psychology is possible.

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MERGERS OF ECONOMICS AND PHILOSOPHY OF SCIENCE. A CRUISE IN DEEP SEAS AND SHALLOW WATERS
HERMAN O. WOLD

The developments of economics-econometrics since 1900 have brought an array of fundamental innovations in the methods of nonexperimental model building. These innovations call for a partial reorientation of philosophy of science with its traditional affinity to natural science and experimental method. The situation is reviewed with special regard to the notions of model and cause-effect relationship, two key concepts in econometric research. The author emphasizes the unity of scientific method as well as the need for specialized approaches to take into account the deepgoing differences in ends and means of model building that are marked by the twofold distinction between descriptive vs. causal-explanatory aims and experimental vs. nonexperimental observation.

ON ECONOMETRIC TOOLS
JACOB MARSCHAK

It is common to all inductive studies that certain hypotheses are tested by facts while some "prior" assumptions (variously called "specification," "model," "maintained hypotheses") are not subjected to the test. But it distinguishes today's empirical economics (in degree, not in essence) that (1) the economist's "prior" assumptions are mostly based on "common-sense," sometimes on supporting field surveys, and almost never on controlled experiment; and (2) his results are generally expected to be useful for practical policy. The joint occurrence of these two characteristics creates the problem of estimating "structural functions" which describe in probability terms how each economic action variable (actions of consumers, producers, lenders, etc.) is determined by other such variables as well as by changes in environment; the latter includes changes in policies.

CAUSATION AND SPECIFICATION IN ECONOMIC THEORY AND ECONOMETRICS
FRANKLIN M. FISHER

At the level of the individual decision-maker, causation in economics is generally considered a matter of stimuli and responses with prices taken as given and quantities adjusted. The lack of a good disequilibrium theory of price adjustment, however, has led to a blurring of the causal mechanism at the market level. Such blurring occurs in simultaneous equation econometric models in which some variables apparently simultaneously cause each other. If one considers such models as limiting cases of nonsimultaneous ones with very short time lags between stimulus and response, fairly strong consequences as to the admissibility of models can be adduced.

VOTING AND GROUP DECISION FUNCTIONS

BENGT HANSSON

This paper generalizes Kenneth J. Arrow's well-known theorem about the impossibility of finding a rule which aggregates several person's preference orderings to an ordering representative of the group. It is here only required that the rule yields a group choice, which may be a single alternative or a set of alternatives (to reflect the case of a tie). Arrow's axioms are translated accordingly and it is proved that the impossibility result still holds in this more general framework. It is also proved that the theorem in 'Group Preferences' (*Econometrica 37* (1969), pp. 50–54) about difficulties in finding rules which are neutral between both persons and alternatives admits a similar generalization.