really solve some problems or is it merely a utilitarian way around them? Neyman and Scott seem to take either view at various times. In some of their writings they admit that their stochastic approach may be at least partly utilitarian. In other places they state that the people who espouse determinism are trying to explain an indeterministic world with a deterministic model and so are doomed to failure. This can alienate some potential friends from the physical sciences. In yet another place Neyman calls such speculation idle. It may be idle technically but it can affect cooperation among scientists from different disciplines. A more accurate way of saying the same thing might be that the utilitarian aspects in the work of Neyman and Scott stand up no matter how we view the basic nature of the universe. The random portion of a stochastic model can be used to describe: (i) a truly random process; (ii) a process that appears random to us; (iii) a process that is too complex to be described completely.

If the world is basically indeterministic, the stochastic model can, of course, be realistic. If the world is basically deterministic, the stochastic model can still be thought of as a utilitarian generalization of a deterministic model. For example, when research reaches an impasse such as the contradiction between the cosmological principle and local irregularities, one can bypass it by the use of a stochastic model. The former impasse becomes an "island of indeterminism" within an otherwise deterministic model. Such a model can never explain in deterministic terms that part of the mechanism which has been assumed to be random. This statement is trivial but it does point up an important divergence in "parlance" between some theoretical statisticians and some physical scientists. To a statistician, any reduction of unexplained variation can be called an explanation. He can happily refer to an explanation of the behavior of aggregates in an "island of indeterminism" while the physical scientist bemoans the fact that the behavior of individuals is unexplainable with such a model.

Perhaps such divergence in views can be reconciled. To a statistician, any particular model is highly expendable. As knowledge increases, one can construct newer models with a decreasing area of indeterminism so that one approaches a deterministic model. The ultimate degree of approach will depend upon the nature of ultimate reality. A scientist can believe whatever he wishes about the ultimate state of affairs and still accept the stochastic model for its utilitarian aspects. This should be comforting to those in the physical sciences who like to feel that they are now working with reality even though the model they are using has replaced many former models and will itself inevitably be replaced some day.

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Detecting Antibodies to Penicillin

The report by Marguerite Epp [*Science* **130**, 1472 (1959)] that sera from penicillin-allergic subjects agglutinate erythrocytes coupled to penicillin by means of a bis-diazotized-benzidine linkage confirms results of my co-workers and me with the same method plus the use of human antiglobulin (Coomb's) reagent as a final step to "develop" the reaction. As a matter of fact we believe that our procedure, as reported to the first Latin American Congress of Microbiology (Mexico, 12–19 October 1958) and to the National Congress of Allergists (Toluca City, Mexico, May 1958), avoids the necessity of making the "checkerboard" titration that Epp uses.

References to our work appear only in Spanish [reports and abstracts of works presented to the first Latin American Congress of Microbiology (1958); F. Martínez and L. Martín *Prensa méd. Mex.* **24**, 245 (1959); M. Salazar Mallén and L. Ortiz, *Alergia Rev. iberoam. alergol.* **7**, 348 (1959); and the thesis of L. Ortiz, University of Mexico (1959)].

We believe that the description that Epp gives of the method she uses and the information given here will encourage other investigators to take advantage of this first specific in vitro procedure, so useful in our hands, for diagnosing or confirming diagnoses of penicillin allergy.

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There are several points of importance in M. Salazar Mallen's letter which, I think, should be made clear. I rather question his statement that the "checkerboard" titration to establish the optimal ratio of penicillin to bis-diazotized-benzidine is unnecessary. In practice, there are variations in biological and chemical products. For example, the optimal ratio may vary as follows: from 2.5 to 4.5 mgm of penicillin to from 0.25 to 0.5 ml of the diluted chemical compound. Moreover, the method of Salazar Mallen and his collaborators and that described by me differ in principle. The former detects incomplete antibodies, whereas the procedure described in my report measures complete antibodies.

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