out of thirty-odd nomograms collected in the Appendix and which in the words of the author "may prove useful in the fields of engineering, production, business, and statistics" there are only two taken from the field of statistics. These are a nomogram for the standard deviation (p. 170).

$$\sigma_y = \sqrt{\frac{\Sigma y^2}{n}}$$

and a nomogram for the correlation coefficient (p. 171)

$$r = \frac{\Sigma xy}{\sqrt{\Sigma x^2}\ \sqrt{\Sigma y^2}}$$

Both of these nomograms can be used only after Σx^2, Σy^2, Σxy have been calculated. Since the computation of Σx^2, Σy^2, Σxy is by far the most laborious part, it seems a little naive to expect that the above nomograms will introduce a significant saving of time.

Foundations of Economic Analysis. *Paul Anthony Samuelson* (Professor of Economics, Massachusetts Institute of Technology, Cambridge, Mass.). Harvard Economic Studies, Vol. 80. Cambridge 38, Mass.: Harvard University Press (38 Quincy Street), 1947. Pp. xii, 447. $7.50.

REVIEW BY GERHARD TINTNER
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THIS is a very important contribution in the field of pure economics which ought to be of interest to econometricians and those statisticians who concern themselves with economic matters.

The author endeavors throughout to derive "operationally meaningful" propositions in economics from the assumption of maximizing behavior. Operationally meaningful statements are hypotheses about empirical data which could conceivably be refuted, if only under ideal conditions. These ideas are related to those of some modern positivist philosophers, especially Bridgeman. It is perhaps unfortunate that the author has not included a methodological chapter in his book. An explicit statement of his philosophical ideas may have contributed to the understanding of his book. It may have helped some economists who are sceptical about the applicability of radical positivism and behaviorism in the social sciences.

The first part of the book is concerned with economic statics. It also includes a chapter on welfare economics, which seems a little out of place. The theory of maxima in all its ramifications is treated at great length. There is also a more systematic mathematical appendix on this subject.

On the basis of a very general approach the theory of cost and production and also the theory of consumer behavior is ably stated. An interesting feature in the treatment is the discussion of maxima if the functions in question are not continuous. This is a very important advance, though the discontinuities considered may not be the most important ones met with in economic life.

Monopoly and monopolistic competition get very little attention, to say nothing of more complicated situations like duopoly and bilateral monopoly. This narrowness of the point of view makes the book a little less useful than it might have been.

A short section on the economic theory of index numbers (pp. 146–156) should be of particular interest to the statistician. It is probably the best short statement available about the modern theory of cost of living index numbers.

A very interesting chapter on welfare economics concludes this first section of the book. In its brief compass it contains most of the important new results of the modern theory in this field.

The second part of the book deals with economic dynamics. But the discussion is almost entirely based upon purely formal consideration of equilibria and their relation to comparative statics. The "correspondence" principle of the author states that "the problem of stability of equilibrium is intimately tied up with the problem of deriving fruitful theorems in comparative statics" (p. 258). The author succeeds in reaching very interesting conclusions in this way. His work is inspired by the modern theory of dynamics (in physics), especially by the work of George D. Birkhoff (*Dynamical Systems*, 1927). A mathematical appendix deals with the theory of difference and other functional equations. The examples given in this section of the book include also a very interesting "dynamization" of the Keynesian system. But it appears here and elsewhere that not many definite conclusions can be drawn, even after making a number of somewhat arbitrary assumptions.

The second part of the book is hence somewhat disappointing to the economist. It is evident that not many valid and interesting conclusions can be drawn from such narrow assumptions as made by the author. The whole theory of anticipations and expectations is either neglected or appears only incidentally. Uncertainty hardly gets an adequate treatment in the small space allotted to it. Samuelson's book is in this respect inferior to the earlier work of J. R. Hicks (*Value and Capital*, 1939) and others who have endeavored to deal with problems of economic risk and uncertainty. I believe that especially the theory of formation of anticipations forms a true link between static economics and the more useful and interesting economic dynamics.

Chapter 11 deals with the classification of equilibria. This discussion is again based upon modern (physical) dynamics. The usefulness of the distinctions made in economics is not immediately apparent. The subsequent discussion of the business cycle is very short and not on the high level maintained in the earlier parts of the book.

The author devotes towards the end of the book a few pages to the theory of stochastic systems. The treatment is much too brief to yield important results. Some of the ideas presented may however prove stimulating to the statisticians working in this field, especially the indications about nonlinear stochastic systems.

In summary, the book ought to be recommended very highly to the mature reader who possesses an adequate knowledge of modern economic theory and higher mathematics. A conclusion which he may draw from its contents is the following: Assuming only maximizing behavior (something like the "economic principle" of the elementary text books) very few interesting conclusions about economic behavior can be drawn even by so brilliant a theoretician as Samuelson. There is a great deal of valid and important economic theory contained in his book. The reader might be inspired by the comparative failure of pure economics to devote his interest to a more promising approach. Econometric investigations combine modern economic theory, which is so ably presented in this book, with modern statistical methods in order to derive valid empirical conclusions.